UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

DEC 5 2012

Ms. Susan Bromm
US Environmental Protection Agency
Office of Federal Activities
EIS Filing Section
Ariel Rios Building (South Oval Lobby), Mail Code 2252-A
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Dear Ms. Bromm:

This letter is to inform you that the National Oceanic and Atmospheric Administration (NOAA) is adopting the U.S. Coast Guard's and the Maritime Administration's *Final Environmental Impact Statement (FEIS) on Port Dolphin LLC Deepwater Port License Application*. NOAA served as a cooperating agency on this document. The availability of the FEIS was published in the Federal Register on July 13, 2009, and is entered in EPA's database as EIS No. 20090228.

NOAA has determined that this FEIS adequately analyzes and discloses the environmental impacts associated with this project. Therefore, NOAA intends to adopt this FEIS for purposes of its compliance with the National Environmental Policy Act and agency decision-making purposes.

Should you have any questions, please contact the Responsible Official noted below or NOAA Program Planning and Integration at 301-713-1632.

Responsible Official:

Helen M. Golde
Acting Director
Office of Protected Resources
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
1315 East-West Highway
Silver Spring, MD 20910
(301) 427-8400
Helen.Golde@noaa.gov

Sincerely,

For Patricia A. Montanio
NOAA NEPA Coordinator

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COVER

FINAL EIS

USCG FINAL ENVIRONMENTAL IMPACT STATEMENT

ADDRESSING THE

PORT DOLPHIN LLC LIQUEFIED NATURAL GAS DEEPWATER PORT LICENSE APPLICATION

DOT DOCKET NUMBER: USCG-2007-28532

PREPARED BY: engineering-environmental Management, Inc. (e^2M)
for
USCG Deepwater Ports Standards Division (CG-5225)
U.S. Coast Guard Headquarters
2100 Second Street, SW Stop 7126
Washington, DC 20593-7126

CONTACT INFORMATION: M.A. Prescott, USCG, CG-5225, (202) 372-1440

Port Dolphin Energy LLC, proposes to own, construct, and operate a deepwater port, named Port Dolphin, in the Federal waters of the Outer Continental Shelf in lease blocks designated by the Minerals Management Service as St. Petersburg (PB) blocks: PB545, PB546, PB547, PB548, PB504, PB505, PB506, PB507, PB463, and PB589. These blocks are approximately 28 miles off the west coast of Florida to the southwest of Tampa Bay. Port Dolphin would consist of a permanently moored unloading buoy system with two submersible buoys separated by a distance of approximately 3 miles. The buoys would be designed to moor a specialized type of liquefied natural gas vessel called a Shuttle and Regasification Vessel (SRV) of either 145,000 or 217,000 cubic meter capacity. Natural gas would be delivered to shore from Port Dolphin via a proposed new 36-inch-diameter-pipeline, approximately 42 miles in length, that would connect onshore in Manatee County, Florida, with the Gulfstream Natural Gas System, LLC, and Tampa Electric Company (TECO) Bayside pipeline. Initially, Port Dolphin would be capable of a natural gas throughput of 400 million standard cubic feet per day (MMscfd) and would eventually be capable of an average of 800 MMscfd with a peak capacity of 1,200 MMscfd.

DATE OF PUBLICATION: July 10, 2009

DATE COMMENTS MUST BE RECEIVED: August 24, 2009

30 Jun 09	Melissa Perez	Deepwater Ports NEPA Specialist
Date	Preparer/Environmental Project Manager	Title/Position
30 Jun 2009	Mary G. Prescott	Chief, Deepwater Ports Standards
Date	Environmental Reviewer	Title/Position

This document has been prepared in support of the Administrator of the Maritime Administration for purposes of issuing a Record of Decision for this deepwater port application license.

30 Jun 2009	Mary G. Prescott	Chief, Office of Operating and Environmental Standards
Date	Responsible Official	Title/Position

FINAL ENVIRONMENTAL IMPACT STATEMENT ADDRESSING THE PORT DOLPHIN LLC DEEPWATER PORT LICENSE APPLICATION

Location: In the Gulf of Mexico, approximately 28 miles off the western coast of Florida, and approximately 42 miles from Port Manatee, Manatee County, Florida.

Docket Number: USCG-2007-28532.

Prepared By: The lead agencies, U.S. Coast Guard (USCG) and the Maritime Administration, and their contractor, engineering-environmental Management, Inc. (e^2M).

Cooperating Agencies: Federal Energy Regulatory Commission; U.S. Environmental Protection Agency; U.S. Department of the Interior, Minerals Management Service and U.S. Fish and Wildlife Service; U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries); U.S. Army Corps of Engineers.

Contact Information: M.A. Prescott (CG-5225), 2100 Second Street, SW, Washington, DC 20593-0001, 202-372-1440.

Abstract: Port Dolphin Energy LLC, proposes to own, construct, and operate a deepwater port, named Port Dolphin, in the Federal waters of the Outer Continental Shelf in lease blocks designated by the Minerals Management Service as St. Petersburg (PB) blocks: PB545, PB546, PB547, PB548, PB504, PB505, PB506, PB507, PB463, and PB589. These blocks are approximately 28 miles off the western coast of Florida to the southwest of Tampa Bay, in a water depth of approximately 100 feet. Port Dolphin would consist of a permanently moored unloading buoy system with two submersible buoys separated by a distance of approximately 3 miles. The buoys would be designed to moor a specialized type of liquefied natural gas (LNG) vessel called a Shuttle and Regasification Vessel (SRV). The Applicant would plan to use two classes of SRVs, either 145,000- or 217,000-cubic-meter capacity. When the SRVs are not present, the buoys would be submerged on a special landing pad on the seabed, 60 to 70 feet below the sea surface. SRVs are equipped to vaporize cryogenic LNG cargo to natural gas through an onboard closed-loop vaporization system, and to meter gas for send-out by means of the unloading buoy to a 36-inch flowline to a Y-intersection, and then to a 36-inch pipeline approximately 42 miles in length that would connect onshore in Manatee County, Florida, with the Gulfstream Natural Gas System, LLC, and Tampa Electric Company (TECO) Bayside pipeline. Only SRVs would call on Port Dolphin. Initially, Port Dolphin would be capable of a natural gas throughput of 400 million standard cubic feet per day (MMscfd) and would eventually be capable of an average of 800 MMscfd with a peak capacity of 1,200 MMscfd. Construction of Port Dolphin would be expected to take 11 months. Port Dolphin deepwater port would be designed, constructed, and operated in accordance with applicable codes and standards and would have an expected operating life of approximately 25 years.

Date of Publication: July 2009

FINAL

ENVIRONMENTAL IMPACT STATEMENT

ADDRESSING THE

PORT DOLPHIN LLC
DEEPWATER PORT LICENSE APPLICATION

Maritime Administrator
United States Maritime Administration
Southeast Federal Center
1200 New Jersey Ave, SE
Washington, DC 20590

and

Commandant
United States Coast Guard
Deepwater Ports Standards Division (CG-5225)
2100 Second Street, SW
Washington, DC 20593-0001

Docket No. USCG-2007-28532

The Federal Docket Management System
is available at <*http://www.Regulations.gov*>.

JULY 2009

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7 trees preserved for the future



21 lbs waterborne waste not created



3,131 gallons wastewater flow saved



346 lbs solid waste not generated



682 lbs net greenhouse gases prevented



5,220,360 BTUs energy not consumed

Executive Summary

Introduction

On March 29, 2007, Port Dolphin Energy LLC (also referred to as the Applicant, or as Port Dolphin) submitted to the U.S. Coast Guard (USCG) and Maritime Administration an application under the Deepwater Port Act of 1974 (DWPA)[1] for all Federal authorizations required for a license to own, construct, and operate a deepwater port off the coast of Florida. On June 15, 2007, USCG notified the Applicant that the application contained sufficient information to continue processing, and on June 25, 2007, the USCG and the Maritime Administration issued a Notice of Application in the *Federal Register* summarizing the application[2]. In December 2007, the Applicant filed an amended application that proposed a new pipeline route intended to avoid sensitive biological resource areas (Port Dolphin 2007b). In December 2008 the Applicant filed a second amendment to the application. The second amendment proposed a new pipeline route intended to avoid sand resource areas used for beach replenishment (Port Dolphin 2008d). The Port Dolphin project, referred herein to as the Project, was assigned Docket No. USCG-2007-28532.

The staffs of the USCG and Maritime Administration prepared this Environmental Impact Statement (EIS) to address the potential environmental and socioeconomic impacts associated with the Project. The Maritime Administration is the lead Federal agency responsible for licensing of the deepwater port, which is proposed to consist principally of two unloading buoys for mooring liquefied natural gas (LNG) vessels and a pipeline connecting to two existing onshore natural gas pipelines.

Concurrent with their application for the deepwater port, the Applicant submitted an application to the Federal Energy Regulatory Commission (FERC) for a Certificate of Public Convenience and Necessity (Certificate) under Section 7 of the Natural Gas Act (NGA), as amended, to construct and operate a new natural gas pipeline and ancillary facilities in Florida. FERC is the cooperating Federal agency responsible for the review of the onshore portion of the natural gas pipelines and associated aboveground components. The application was assigned FERC Docket Nos. CP07-191 and -192. FERC issued a Notice of Application in the *Federal Register* for the Proposed Onshore Pipeline on May 9, 2007[3]. After discussions with the Florida Department of Environmental Protection, the Applicant made changes to their onshore pipeline route. Subsequently, the Applicant filed an amended application with the FERC. On January 28, 2008, the FERC issued a new Notice of Amendment for the Proposed Onshore Pipeline which was published in the *Federal Register* on February 4, 2008[4]. The amended application was assigned Docket No. CP07-191-001. FERC also opened an additional scoping period to solicit comments on the proposed revisions to the onshore pipeline route. In January 2009, the Applicant filed a second amendment with FERC that modified details of the construction of the onshore pipeline. The Applicant also filed applications with the U.S. Army Corps of Engineers (USACE) for Department of the Army permits pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 United States Code [U.S.C.] 403) and Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344). The USACE has jurisdiction over the wetlands associated with the Proposed Onshore Pipeline. The Applicant also filed its applications for coverage under the Clean Air Act (CAA) and CWA with the U.S. Environmental Protection Agency (USEPA). This EIS is the supporting document for FERC's certification under the NGA, USACE's permit decisions related to Section 10 of the Rivers and Harbors Act and Section 404 of the CWA, and USEPA's permit decisions and related consultations under the CWA and CAA.

[1] Public Law (P.L.) 93-627, Sec. 3, January 3, 1975, 88 Stat. 2127, as amended, codified to 33 U.S.C. 1501–1524.
[2] 72 FR 121, pp. 34741–2.
[3] 72 FR 94, pp. 27552–3.
[4] 73 FR 23, pp.6497–8.

The DWPA establishes a licensing system for ownership, construction, and operation of deepwater ports in waters beyond the territorial limits of the United States. Originally, the DWPA promoted the construction and operation of deepwater ports as a safe and effective means of importing oil into the United States and transporting oil from the Outer Continental Shelf (OCS), while minimizing tanker traffic and associated risks close to shore. The Maritime Transportation Security Act of 2002 amended the definition of "deepwater port" to include facilities for the importation of natural gas[5].

LNG is natural gas that has been cooled to about minus 260 degrees Fahrenheit (°F) (-162.2 degrees Celsius [°C]) for efficient shipment and storage as a liquid. LNG is more compact than the gaseous equivalent, with a volumetric differential of about 610 to 1. LNG can be transported long distances across oceans using specially designed ships, thus allowing access to stranded reserves of natural gas that cannot be transported by conventional pipelines.

Under the DWPA, all deepwater ports must be licensed by the Secretary of Transportation (Secretary). On June 18, 2003, the Secretary delegated authority to the Maritime Administrator (Administrator) to issue, transfer, amend, or reinstate a license for the construction and operation of a deepwater port[6]. Hereafter, "the Administrator" refers to the Maritime Administrator's actions and responsibilities as the delegated representative of the Secretary. The USCG is preparing the EIS in coordination with the Maritime Administration although USCG is now part of the Department of Homeland Security (DHS)[7]. The DWPA requires a license applicant to submit detailed plans for its facility.

Purpose and Need

The purpose of licensing deepwater ports for importing LNG in the OCS is to provide a reliable and timely supply of natural gas that would increase energy diversity while considering impacts on the environment to serve the growing demand for natural gas for residential, industrial, and electric generation within west-central Florida. This requires construction of appropriate facilities for receiving the LNG, revaporizing the LNG to gaseous state, and interconnecting the facility to the transmission pipelines that can reach appropriate markets within the United States.

The DWPA of 1974, as amended, was passed to promote and regulate the construction and operation of deepwater ports as a safe and effective means of importing oil or natural gas into the United States. The DWPA requires the Administrator to approve, approve with conditions, or deny a deepwater port license application. The Congressional intent expressed in 33 U.S.C. 1501 is as follows:

- "authorize and regulate the location, ownership, construction and operation of deepwater ports in waters beyond the territorial limits of the U.S."
- "provide for the protection of the marine and coastal environment to prevent or minimize any adverse impact that might occur as a consequence of the development of such ports"
- "protect the interests of the U.S. and those of adjacent coastal States in the location, construction, and operation of deepwater ports"

[5] P.L. 107-295, Section 106, November 25, 2002, 116 Stat. 2064.
[6] 68 FR 36496–97.
[7] Title XV (Transition) of the Homeland Security Act provides that "pending matters," including license applications currently being processed, will continue regardless of the transfer of USCG from the U.S. Department of Transportation (USDOT). Even though the function of processing applications has been transferred with USCG to the U.S. Department of Homeland Security, the Secretary of Transportation retains ultimate authority to issue, transfer, amend, or reinstate licenses under the Deepwater Port Act.

- "protect the rights and responsibilities of the States and communities to regulate growth, determine land use, and otherwise protect the environment in accordance with law"
- "promote the construction and operation of deepwater ports as a safe and effective means of importing oil and natural gas into the U.S. and transporting oil and natural gas from the outer continental shelf while minimizing tanker traffic and the risks attendant thereto"
- "promote oil and natural gas production on the outer continental shelf by affording an economic and safe means of transportation of outer continental shelf oil and natural gas to the U.S. mainland."

Part of the intent for establishing the DWPA was to provide a mechanism to meet the nation's existing and estimated demand for energy supplies by increasing access to worldwide sources. The recent DWPA amendments to include LNG facilities indicate that Congress recognizes the potential for LNG imports to become a key energy supply source in the United States over the coming years.

Florida is heavily dependent on natural gas as a source of energy for electricity, home heating, and other uses. Based on future projections, there is a growing demand for additional natural gas in this area; however, this demand cannot be met by the existing domestic supply or by existing natural gas pipelines. The predominant energy concerns expressed in all the energy assessments and plans developed by the State of Florida in recent years relate to energy security, including the need for fuel diversity and fuel supply reliability. These plans identify the increasing dependency of Florida's electrical-generating utilities on natural gas (particularly given the volatility in its availability and price) and stress the need to return to the practice of balanced fuel supply. However, opposition to coal-fired generation and the long lead time needed to implement a balanced fuel supply will still result in increases in natural gas consumption by utilities. Moreover, the state is extremely dependent on natural gas supplies originating from the Gulf of Mexico (GOM), which is mainly transported via two natural gas pipelines. The potential for future disruptions of Florida's economy resulting from hurricane-inflicted damage to either gas field infrastructure or the pipelines is significant. By expanding Florida's natural gas infrastructure, an LNG deepwater port also would provide the state's natural gas markets with fuel supply diversity through global sourcing of LNG. The Port Dolphin project would provide a source of natural gas to western Florida that is independent of both GOM supply disruptions and of the pipeline constraints of the existing interstate pipelines.

Scope and Organization of the EIS

This EIS assesses potential environmental impacts associated with the installation, operation, and decommissioning of the Port. The affected environmental components encompassed by this EIS include water resources, biological resources, cultural resources, geological resources, marine areas and land use, recreation and aesthetics, air quality, noise, socioeconomic resources and environmental justice, and navigation and transportation. The EIS describes the Project and potential alternatives (**Section 2**), the affected environment as it currently exists (**Section 3**), the probable environmental consequences that might result from installation and operation of Port Dolphin (**Section 4**), public safety (**Section 5**), and cumulative and other impacts (**Section 6**). **Section 7** covers greenhouse gas emissions from the project. A list of preparers and references used in preparing the document are provided in **Sections 8** and **9**, respectively. Volume II and Volume III contain the appendices, including public comments, records of coordination with Federal and state agencies, applicable laws and executive orders (EOs), detailed maps, and specific biological information.

Public Review and Comment

Agency and public participation in the National Environmental Policy Act (NEPA) process promotes open communication between the public and the government and enhances decisionmaking. All persons and organizations having a potential interest in the Administrator's decision whether to grant the License are encouraged to participate in the decisionmaking process.

The USCG and the Maritime Administration initiated the public scoping process on July 12, 2007, with the publication of a Notice of Intent (NOI) to prepare an EIS in the *Federal Register*. The NOI included information on public meetings and informational open houses; requested public comments on the scope of the EIS; and provided information on how the public could submit comments by mail, hand delivery, facsimile, or electronic means[8]. Documents and comments for this project can be found at http://www.regulations.gov. Users can type in the complete docket number, USCG-2007-28532, and view all related documents, and submit a comment.

An Interested Party Letter, the NOI published in the *Federal Register*, and a fact sheet describing the Project were sent to approximately 190 Federal, state, and local agency representatives, and other potentially interested parties (see **Appendix A**). As a result of the Applicant's amended application (assigned FERC Docket No. CP07-191-001), the FERC issued a Notice of Limited Scoping for the proposed Port Dolphin project and Request for Comments on Environmental Issues, which was published in the *Federal Register* on February 11, 2008. The Notice indicated that FERC was soliciting input from the public and interested parties and such input would be limited to the proposed onshore pipeline and related facilities (i.e., those under FERC jurisdiction) in Manatee County, Florida. The comment period for scoping closed on March 5, 2008. Public comments submitted as part of the scoping process (see **Appendix A**) were considered during the development of this EIS.

A Notice of Availability for the Draft EIS was published in the *Federal Register* on April 18, 2008. The Draft EIS was uploaded to the Port Dolphin Docket, and more than 200 copies of the Draft EIS were sent to agencies, organizations, and individuals that had expressed interest in reviewing it. An Open House and Public Meeting was held at the Manatee County Convention Center on May 6, 2008, to provide a forum for the public and agencies to obtain information and to provide scoping. The meeting was advertised in the *Tampa Tribune* and the *Bradenton Herald*. The Public Meeting was attended by 41 individuals. Comments on the Draft EIS were accepted through June 2, 2008. Two written comments were provided during the Public Meeting. Seven individuals spoke at the Public Meeting and provided oral comments. A total of 32 comments were received on the USCG Port Dolphin Docket (see **Appendix B**). In total, 34 comments were received during the public review period. All comments on the Draft EIS were considered during the preparation of the Final EIS. **Appendix B** of the EIS includes all materials, including the NOA and other outreach tools used, and all comments on the Draft EIS that were received during the public review period.

Description of the Proposed Action

The Applicant proposes to construct, own, and operate a deepwater port for importation of LNG and send-out of natural gas. Port Dolphin (the Port) would be located approximately 45 kilometers (km) (28 miles [mi]) offshore from Tampa, Florida. The Port would be located in areas designated by the U.S. Department of the Interior (DOI) Minerals Management Service (MMS) as St. Petersburg (PB) blocks: PB545, PB546, PB547, PB548, PB504, PB505, PB506, PB507, PB463, and PB589. The Port would be capable of mooring two LNG carriers (LNGCs), referred to as shuttle and regasification vessels (SRVs), by means of a submerged unloading buoy system. Each of two unloading buoys, also known as

[8] 70 FR 61151–52.

submerged turret loading (STL) buoys, would have eight mooring lines connected to eight pile-driven anchor points in the seafloor. An SRV would typically moor at the deepwater Port for 4 to 8 days. When not connected to an SRV, the STL buoy would be submerged approximately 18.3 to 21.3 meters (m) (60 to 70 feet) below the sea surface and be supported by mooring lines and rest on the STL buoy landing pad. A marker buoy and retrieval line would be used to locate and recover the buoy as an SRV arrives at the deepwater Port. The unloading buoy would be retrieved from its submerged position and hoisted in through a moon-pool in the forward part of the SRV where it would be positioned in a receiving cone within the hull trunk. After the buoy is locked in position, unloading of LNG would begin.

The SRVs proposed for use by the Port would be equipped to transport, store, vaporize, and meter natural gas. A closed-loop, glycol/water-brine heat transfer system would be used to vaporize the LNG. The deepwater port would have an average throughput capacity of 800 million standard cubic feet per day (MMscfd) and a peak capacity of approximately 1,200 MMscfd. Natural gas flowlines from the Port would connect to a 36-inch gas transmission line. The transmission line would interconnect with the existing Gulfstream Pipeline interstate natural gas transmission line and the Tampa Electric Company (TECO) system approximately 73.9 km (46 mi) east of the deepwater port through onshore interconnections. Construction of the deepwater Port components would be expected to take 11 months, with operations planned to commence in the second quarter of 2011. A detailed description of the Applicant's proposal is included in **Section 2.3** of the Final EIS.

Alternatives

The DWPA requires the Secretary to approve, approve with conditions, or deny a deepwater port license application. Consistent with NEPA, in determining the provisions of the license, the Secretary must also consider alternative means to construct and operate a deepwater port. Alternatives for a natural gas deepwater port can extend to matters such as its specific location, methods of construction, and technologies for regasifying LNG. Considering alternatives helps to ensure that decisions concerning the license are well-founded as required by the DWPA and are in the national interest and consistent with national security and other national policy goals and objectives.

Screening was conducted in several steps. First, the conceptual design of the deepwater Port was considered and two designs were selected for evaluation. They are an STL buoy system with special purpose SRV and a Floating, Storage and Regasification Unit (FSRU). Because of environmental and feasibility issues, gravity-based structures, artificial islands, and fixed and floating platform designs were eliminated from further review. A three-phase assessment was then conducted to narrow the potential alternative sites. After site alternatives were identified, alternate routes for the pipelines necessary to interconnect with the existing natural gas transmission structure were evaluated. Finally, specific technology choices, such as vaporization technology, anchoring methods, and construction methods, were evaluated.

Upon application of the screening criteria, alternatives that were eliminated from detailed consideration included Port design concepts, some regasification technologies, design features, and construction methods. Alternatives evaluated in detail in this EIS are the STL and FSRU port concept, two vaporization technologies, two alternatives for siting of the Port in MMS Lease Blocks PB564 and PB190, three natural gas pipeline route alternatives (i.e., a Proposed Site and Route, a Southern Site and Route, and the Offshore Interconnection with Gulfstream Pipeline), and the No Action Alternative.

Proposed Action and Alternative Environmental Impacts

Potential environmental impacts are summarized in the following text by resource area. The impacts described would be essentially the same for both location alternatives, but the Southern Site and Route

alternative would result in more impacts due to the larger footprint, and the Offshore Interconnection with the Gulfstream Pipeline would result in less impacts due to the smaller footprint and avoidance of nearshore areas. **Table ES-1** compares the differences between the two location alternatives and three route alternatives.

Water Quality. A combination of long- and short-term, minor, adverse impacts on water quality would be expected. These would occur with respect to both marine and coastal waters.

Short-term, direct, minor, adverse impacts would include resuspension of sediments that would occur during installation of the Port structures and pipelines, particularly for the pipeline sections closer to Lower Tampa Bay where sediments are finer and would remain suspended for a longer period of time. Onshore pipeline installation, including both trenching and burial and horizontal directional drilling (HDD) methods, would likely encounter groundwater, resulting in a short-term modification of the groundwater flow regime. Construction activities would also be expected to cross some surface waterbodies and wetlands during pipeline installation, but HDD technology would minimize adverse impacts on water quality in these areas. During operations, cooling and bilge water discharges would have several impacts on water quality near the Port, including increased water temperature, increased turbidity, and decreased dissolved oxygen content. Spills of hazardous substances, such as hydrocarbons (e.g., petroleum, oils, and lubricants), might result in short-term, minor, adverse impacts on water quality.

Biological Resources. Minor to moderate, short-term, adverse impacts and minor, long-term, adverse impacts on biological resources could occur as a result of the Project. Onshore activities would have short-term, minor impacts on vegetation and wildlife. Short-term, minor impacts on freshwater wetlands could occur from onshore activities. Permanent minor impacts on forested wetlands would occur, but only a small portion of the impacted wetlands are forested. Brazilian pepper, a nonnative, exotic species, is the dominate species found in forested wetlands along the pipeline route. Permanent minor impacts would also occur to the extractive pond open-water habitats. A permanent levee would be constructed to isolate the area where the proposed pipeline would be placed and the water in the proposed right-of-way (ROW) would be pumped out. Therefore, the pipeline would be placed under hard ground, and the water in the ponds would not be restored in these areas. The ponds currently have little to no vegetation and were formed during mining and other extractive activities. Therefore, impacts on these ponds would be minor.

Short-term, moderate to major, adverse impacts on marine mammals and sea turtles would be due to construction noise. The highest noise intensities would be produced during the installation of the buoy anchors and from HDD operations. The highest operational noise would be from operation of the SRV thrusters during docking at the buoys.

Minor to moderate, short-term and long-term, adverse impacts on benthic communities would occur during the installation of the Port and offshore pipelines. Port and pipeline installation would result in the short-term impacts on approximately 234 acres of benthic habitat and long-term operational impacts on 22.09 acres from seabed sweep from the anchor lines. Approximately 3,000 acres of hard-bottom habitat could be disturbed by pipeline construction. The disturbance could result from anchor cable sweep from the vessels used to plow and lay the pipeline and place armoring mattresses over the pipeline in areas where the pipeline cannot be buried. Proper use of best management practices (BMPs) such as use of midline buoys on anchor cables and design of an anchor placement plan to minimize hard-bottom impacts would reduce the extent of hard-bottom impacts. Recovery of the benthic communities from construction impacts is difficult to predict. Soft-bottom communities would recover before hard-bottom communities. Concrete mattresses would likely be colonized by different communities than what was initially present. Communities impacted during operations by anchor sweep at the 22 acres (16 acres of soft-bottom and 6 acres of hard-bottom) of the Port site would not recover.

Table ES-1. Comparison of Location and Pipeline Alternatives for Port Dolphin

Project Component	Proposed Site and Pipeline Alternative	Southern Site and Pipeline Alternative	Offshore Interconnection with Gulfstream Pipeline
Port Components			
Port C/O footprint	22 acres	30 acres (+36%)	22 acres
Pipeline Components			
Total pipeline length	74.0 km (46 mi)	80.4 km (50 mi) (+9%)	28.8 km (18 mi) (-38%)
Offshore length (from the piggable Y to the bulkhead)	67.6 km (42 mi)	74 km (46 mi) (+9.5%)	N/A
Offshore pipeline construction footprint (3,000-foot construction survey corridor)	16,728 acres	18,180 acres (+ 8%)	6,545 acres (-39%)
Offshore Gulfstream Pipeline crossing	Crosses two times. HDD 1=1,335 feet, HDD 2=2,947 feet	none	N/A
Permitted Sand Borrow Area	0 cubic yards	2,237,225 cubic yards	0 cubic yards
Potential Sand Borrow Areas	48,370,164 cubic yards	63,621,485 cubic yards	0 cubic yards
Offshore shipping channel crossings	none	none	none
Nearshore Terra Ceia crossing	none	Crosses two times. 4.8 km (3.0 mi), and 1.1 km (0.7 mi)	none
Onshore pipeline length	6.4 km (4 mi)	6.4 km (4 mi)	6.4 km (4 mi)
Onshore pipeline C footprint (100-foot ROW)	48.5 acres	48.5 acres	48.5 acres
Onshore O footprint (30-foot ROW)	14.5 acres	14.5 acres	14.5 acres
Onshore wetland crossings C impacts	10.71 acres	10.71 acres	10.71 acres
Onshore wetland crossings O impacts	1.19 acres	1.19 acres	1.19 acres
Onshore Facility and Workspace Components			
Onshore landfall location	Just east of Gulfstream station at Port Manatee	Just east of Gulfstream station at Port Manatee	Just east of Gulfstream station at Port Manatee

Project Component	Proposed Site and Pipeline Alternative	Southern Site and Pipeline Alternative	Offshore Interconnection with Gulfstream Pipeline
Onshore Facility and Workspace Components (continued)			
Aboveground facilities	Interconnection with GS and TECO – 120 x 1,319 feet (3.4 acres) Valve station located on Port Manatee property – 50 x 60 feet (0.07 acres)	Interconnection with GS and TECO – 120 x 1,319 feet (3.4 acres) Valve station located on Port Manatee property – 50 x 60 feet (0.07 acres)	Interconnection with GS and TECO – 120 x 1,319 feet (3.4 acres) Valve station located on Port Manatee property – 50 x 60 feet (0.07 acres)
Onshore extra work spaces (located at the entrance and exit areas for HDD and boring activities)	6 acres	6 acres	6 acres
Staging areas, pipeyard, and contractor facilities would be located on Port Manatee (6 months)	34 acres; includes a concrete batch plant, mattress facility and pipe lay-down areas	34 acres; includes a concrete batch plant, mattress facility, and pipe lay-down areas	34 acres; includes a concrete batch plant, mattress facility, and pipe lay-down areas
Onshore access roads	None (use existing roadways)	None (use existing roadways)	None (use existing roadways)

Notes:
C – Construction; O – Operation
Length and acreage have been rounded to nearest whole number for NEPA planning purposes.

The closed-loop SRVs would adversely impact plankton. The SRVs would require cooling water for the generators that provide power for the vaporization system pumps and blowers, and for hotel loads for normal ship's functions. Prior to submission of the application for this Project, the USCG cooperatively developed an assessment methodology with National Oceanic and Atmospheric Administration's National Marine Fisheries Services (NMFS) to estimate the potential impacts on fisheries resources from entrainment within an open-loop vaporization system. During the development of this EIS and other similar projects in the GOM, USCG and NMFS agreed that evaluation of four species of finfish would represent all of the species that are likely to be present in the Project area. In comments on the assessments for the projects that had proposed open-loop vaporization systems, NMFS stated their preference for closed-loop vaporization systems, such as the one proposed by the Applicant. The primary mitigation identified by NMFS for open-loop systems was substitution of a closed-loop system. However, in evaluations for subsequent deepwater port projects that proposed closed-loop vaporization systems, an analysis of the potential impacts using the quantitative methodology was still conducted.

Based on discussions with NMFS and the Florida Fish and Wildlife Conservation Commission (FWC), two additional species were identified for analysis based on the Port location off the coast of Western Florida. Gag grouper (*Mycteroperca microlepis*) was selected as a commercially and recreationally important species in the Project area that is managed under a Federal Fishery Management Plan (FMP). Sheepshead (*Archosargus probatocephalus*) was selected as a species of concern to Florida that is not managed under a Federal FMP. Potential impacts on Spanish sardine (*Sardinella aurita*) were also assessed because of high densities in the Project area. Spanish sardines are an important forage species for many commercially and recreationally important fish in the eastern Gulf of Mexico. Other species

might have EFH in the Project area or occur in the Project area, but these representative species were selected (in cooperation with NMFS) based on economic and ecological importance, availability of life history data, and the similarity to other population types. It is assumed that impacts on other species in the Project area would be similar to impacts on these representative species. An assessment was also done for the FSRU alternatives using an ambient air vaporization (AAV) system. Since both the FSRU and the LNGCs servicing the Port would require engine cooling water, seawater intake for this alternative would be approximately 4.8 times the intake for STL/SRV alternative.

The assessment to fisheries resources indicates that closed-loop vaporization systems would have direct, adverse, minor impacts on biological resources from the impingement or entrainment of marine organisms. When the equivalent yield was compared to the average landings in Florida, the maximum impact on any species (gag grouper) was found to be 0.03 percent. Impacts for the FSRU/AAV alternative would be equivalent to 0.14 percent of the annual average landings in Florida.

Other minor adverse impacts on biological resources that could occur as a result of the operation of the Port include those associated with increases in vessel traffic, noise, marine debris, and port lighting. Increases in vessel traffic could increase the potential for collisions with marine mammals, thereby increasing the occurrence of serious injuries or mortality. Any marine mammal strike would be considered a "take" under the Marine Mammal Protection Act (MMPA). If a threatened or endangered marine mammal were to be struck, it would also be considered a "take" under the Endangered Species Act (ESA). The U.S. Fish and Wildlife Service (USFWS) has consistently upheld that the take of a single Florida manatee would jeopardize the continued existence of the species, and vessel collisions have been identified as a major source of mortality for this species. While it is known that an increase in vessel traffic increases the risk of collision, the probability of that risk cannot be quantified. The proposed pipeline route does not impact any manatee protected areas or designated habitat. Implementation of proposed BMPs, would reduce the possibility of impacts.

Cultural Resources. Offshore construction (e.g., buoy emplacement, flowline and pipeline burial, and barge anchoring) has the potential for direct and indirect adverse impacts on currently unknown properties potentially eligible for listing in the National Register of Historic Places (NRHP). The proposed Port site and pipeline route avoids known cultural resources. The Applicant has developed an unanticipated discoveries plan to protect any cultural resources discovered during construction of the Port and pipeline.

Geological Resources. Minor, direct, adverse impacts from Port and offshore pipeline installation would be expected. Impacts would be localized and short-term. Subsea sediments are the primary geological resource that would be affected by the Project. The Applicant revised the Proposed Pipeline Route to avoid a permitted sand borrow area and minimize the impacts on other mapped potential sand resource areas. Pipeline construction through permitted or potential sand resource areas would impact less than 1 percent of the potential available sand in each of the identified areas. Approximately 50 acres onshore would be temporarily impacted by construction activities in the pipeline ROW. HDD techniques would disturb natural geologic resources where they are employed, but impacts would be limited to the HDD entry and exit locations. No prime farmland would be impacted.

Marine Areas and Land Use. Minor to moderate, direct, adverse, short-term impacts on marine areas are expected from construction of the Port and offshore pipelines. Minor, long-term impacts on commercial fishing, recreational fishing, and boating could occur within the Safety Zone that would be established around the Port. This zone would limit usage of a very small percentage of the GOM for the life of the Port. The proposed Port and pipeline routes would avoid shipping fairways and navigation channels. The onshore pipeline would restrict future construction along the ROW. No direct or indirect, long-term, adverse impacts would be expected from pipeline operations offshore or onshore.

Recreation and Aesthetics. Short- and long-term, minor, adverse impacts on recreational fishing, boating, and other water-dependent uses would result from construction and operation of the Port. Offshore construction of the Port would be visible to recreational boaters, residents, and visitors. The SRVs in transit and when moored to the buoys would be consistent with other marine traffic in the area. Long-term minor impacts on recreational fisheries could result from the limits placed on boaters in the vicinity of the Port. Operation of the Port and associated onshore facilities could have minor, short-term, adverse impacts on local recreational infrastructure. It is anticipated that the affected resources would adapt to prevent any long-term adverse impacts.

Air Quality. Short-term, direct, minor, adverse impacts on air quality would be expected. Construction equipment onshore and offshore would be the primary source of emissions during construction of the Port (e.g., Port installation, pipeline installation, mobile sources, and pipeline testing). Impacts that exceed Federal and state air quality standards would exist for onshore construction activities but the exceedances would be of very short duration and limited to the area immediately surrounding the construction site. Emissions from Port operations, including SRV emissions, would have a long-term, direct, minor, adverse impact on air quality during the life of the Project. The Port would be within 300 km (186 mi) of two Class I areas, the Chassahowitzka National Wildlife Refuge (NWR), at a distance of 150 km (93 mi) and Everglades National Park (NP) at 244 km (152 mi). Impacts on Class I areas would be below Federal Land Management (FLM) guidelines for Class I areas. Predicted criteria pollutant impacts from operations do not exceed USEPA-established significant impact levels. Pipeline maintenance activities would have a minor, direct, adverse impact on air quality.

Noise. Short- and long-term, minor, adverse impacts on the airborne noise environment would occur from Port operations, vessel traffic, and construction activities. Activities that would produce the greatest amount of noise are short-term actions such as mooring buoy anchor installation, pipe-laying, and construction vessel traffic. Noise generated by the Port operations would not affect noise-sensitive receptors onshore due to the distance from the shore. Support vessels would have the potential to affect noise-sensitive receptors onshore. Noise associated with decommissioning of the facility could have short-term, minor, adverse impacts on local ambient airborne noise. Underwater noise impacts would be short-term, minor to major, and adverse. Construction activities that would produce the greatest amount of noise are short-term actions such as mooring buoy anchor installation. The noise produced by driving the anchor piles could result in major impacts on marine resources, but proper use of BMPs and mitigation measures would be designed to limit impacts. Port operations might produce a slight increase in underwater noise from vessel traffic. The use of thrusters by the SRVs during maneuvers to dock at the Port would result in short-term, minor to moderate, adverse impacts on marine resources. Noise impacts on marine mammals are discussed in the Biological Resources discussion.

Socioeconomics. Construction and operation of the Port would have minor, beneficial impacts on socioeconomic resources through increased employment and purchase of goods and services. The onshore fabrication and support-based operations would be conducted at available existing facilities on Port Manatee and would require no new land or displacement of existing land use. Construction of the offshore flowline and pipeline might have a minor, adverse impact on low-income populations if pipeline construction impacted local commercial or recreational fishing. Project impacts related to population, employment, housing, public services, vessel traffic, and shipping would be minor and easily absorbed within the existing Tampa Bay regional resources and socioeconomic infrastructure. Commercial fishing would be temporarily excluded from the vicinity of construction activities for approximately 11 months during construction. The Port would cause permanent loss of approximately 66 acres of benthic substrata. The benthic substrata impacted by the Port are typical for the area and are not protected or unique. Impacts on shellfish would be minor because the proposed facilities do not traverse any known commercial shellfish beds. Impacts on sand resources for beach sand replenishment programs from establishing a buffer zone around the pipeline are expected to be long-term, minor, and adverse.

Additional mapped sand resources exist in the immediate area and the proposed pipeline route would not impact the permitted sand borrow area.

The potential exists for impacts on biological resources from closed-loop vaporization to indirectly affect commercial and recreational fisheries. These potential adverse impacts would occur as long as the Port was operating. In an attempt to quantify the potential impacts, loss of fish was compared to commercial and recreational fishing activities. No major reduction in populations of the commercially and recreationally important species available to the fishing industries is anticipated. Therefore, measurable secondary economic impacts, such as reduced employment in fishing or fishing-related industries, also are not anticipated. Impacts on other fish species are expected to be of a similar magnitude.

Navigation and Transportation. Minor to moderate, short-term, adverse impacts on transportation resources would be expected from construction of the proposed Port and pipeline which would result in impacts from both construction and operational activities. Approximately 1,800 trips to and from shore are anticipated during the 11-month construction period. Port operations would have a minor, adverse, long-term impact on transportation resulting from two supply trips and one daily crew trip per SRV moored at Port Dolphin. Operational activities are anticipated to be approximately 928 trips annually.

Safety. While safety concerns might have minor, long-term, adverse or beneficial impacts on the decisionmaking processes of potential future proposals within the hazard area, there is no direct, short-term or long-term, adverse impact on activities outside the Safety Zone or Area to be Avoided (ATBA). Mitigation measures would be developed to effectively mitigate anticipated hazards to the general public, non-Port structures, and vessels associated with the Port. An Independent Risk Assessment for the Project estimated the maximum thermal radiation distance to be 4,680 m (2.9 mi). Since the Port locations are at least 28 miles from the nearest shoreline, the potential for direct impacts is minor.

Greenhouse Gas Emissions. An increase of greenhouse gas (GHG) emissions from anthropogenic (man-made) sources since the beginning of industrialization has been shown to correlate with an increase in global average temperature. This has led to concerns that the global climate is changing. The concern is that higher levels of GHGs in the atmosphere and the resultant increase in trapped heat results in the phenomenon of global warming. Since natural gas is a fossil fuel, combustion of natural gas contributes to the generation of greenhouse gasses. The Project would import a daily average of 800 MMscfd of natural gas or less than .0004 percent of U.S. consumption in 2005 and 18.6 percent of current Florida natural gas consumption. Estimated national emissions of GHG for the United States in 2004 were 7,133.5 million metric tons carbon dioxide (CO_2) equivalent. Approximately 83.5 percent of these emissions represent CO_2 emissions from combustion of fossil fuels. Estimated emissions of CO_2 from the State of Florida for 2004 were 258 million metric tons, while national emissions for the United States were 5,957 million metric tons. Therefore, the expected GHG emissions from operation of the Port, 0.9 million metric tons of CO_2 equivalent , represent less than 1 percent of the existing GHG for Florida and less than .000126 percent of the existing GHG for the United States.

No Action Alternative

The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the Applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Mitigation and Best Management Practices

The DWPA requires that an Applicant demonstrate that a proposed deepwater port would be constructed and operated using the best available technology, thereby preventing or minimizing adverse impacts on the marine and terrestrial environment. In addition, the Applicant would be required to follow any BMPs, mitigation measures, and recommendations put forth by Federal and state agencies to reduce adverse impacts on the marine and terrestrial environment. No mitigation measures have been identified for recreational resources and transportation.

Additional mitigations are expected to be developed during the approval process of the Port Operations Manual. The license would require the Applicant to comply with all environmental mitigations, standards, and limitations set forth in the environmental permits issued by the regulatory agencies.

Water Resources. The Applicant submitted a National Pollutant Discharge Elimination System (NPDES) permit application for all of the regulated discharges anticipated in association with operations of the Port. This permit is required under conditions of the CWA. If granted, the permit would describe the conditions and mitigation measures required for compliance.

Biological Resources. To minimize potential impacts on protected species such as marine mammals and sea turtles, the following are expected to be conditions of the License, if issued: MMS/NMFS's *Vessel Strike Avoidance and Injured/Dead Species Reporting* would be included in the Port Operations Manual, a waste management plan would be included in the Port Operations Manual, training on the elimination of marine debris for all offshore personnel, monitoring of impacts of the seawater intake on sea turtle prey, and a plan to use ramp-up procedures and mufflers to minimize the impacts of the noise associated with pile driving and vessel thrusters. If the License is approved, specific mitigation measures to minimize impacts on EFH and commercial and recreational fish and lobster stocks would be incorporated into the design and operation of the Port. A condition of any license granted would include an environmental monitoring program developed in consultation with NMFS to include preconstruction/baseline monitoring and operational monitoring aimed at identifying potential impacts and developing procedures to minimize impacts.

Cultural Resources. Avoidance of the identified sites and unidentified anomalies, and adherence to unanticipated discovery procedures and avoidance measures would ensure no adverse impacts on archeological or historical resources.

Geological Resources. Any significant geological hazard encountered during construction of the Port would be avoided. Additional pre-construction hazard surveys would be conducted prior to construction activities.

Air Quality. The SRVs would use only vaporized LNG as fuel for the diesel engines that provide power to the SRVs while they are moored to the buoys. The SRVs would have selective catalytic reduction (SCR) installed on the exhaust stack of the auxiliary boiler that would be used to provide thermal energy for vaporizing the LNG and on the dual-fuel diesel engines used for power generation while the SRVs are moored to the buoys. This significantly reduces the emissions of nitrogen oxide (NO_x). Oxidation catalysts would also be used to reduce the emissions of carbon monoxide (CO) and volatile organic compounds (VOCs). The Applicant would also be required to obtain all applicable and appropriate air quality permits. The License would require all monitoring and compliance requirements associated with the Port's air permits to be met during the operating life of the facility.

Noise. To minimize noise impacts on marine mammals associated with pile driving and other construction activities, machinery would be operated only when necessary and with the use of noise enclosures or mufflers. Port construction and operation would have minor impacts on shore-based receptors. If full pipeline burial depth cannot be achieved, concrete mattresses will be used. No blasting is anticipated.

Socioeconomics. The need for mitigation of socioeconomic impacts for potential losses of commercial and recreational fisheries is not anticipated. The areas that would be affected by the offshore construction, including all areas for the offshore Port and the pipeline route, including all the Safety Zone and pipeline construction buffer areas, would involve only 26.1 of the approximately 400 square miles of Tampa Bay, for a total of 2.6 percent of the area used by commercial fishermen.

FERC Staff Recommendations

If the FERC Commission authorizes the onshore pipeline portion of the Port Dolphin project, the FERC staff recommends that the following measures be included as specific conditions in the Commission's Order (Order). The FERC staff believes that these measures would further mitigate the environmental impacts associated with the construction and operation of the proposed Project. Mitigation measures 1 through 9 that follow are standard conditions typically recommended by the FERC staff for pipeline projects. FERC staff recommendations 10 through 13 are project-specific.

1. Port Dolphin shall follow the construction procedures and mitigation measures described in its application and supplements (including responses to data requests) and as identified in the EIS, unless modified by the Order. Port Dolphin must do the following:
    a. Request any modification to these procedures, measures, or conditions in a filing with the Secretary of the Commission (Secretary).
    b. Justify each modification relative to site-specific conditions.
    c. Explain how that modification provides an equal or greater level of environmental protection than the original measure.
    d. Receive approval in writing from the FERC Director of the Office of Energy Projects (OEP) before using that modification.
2. The Director of OEP has delegated authority to take whatever steps are necessary to ensure the protection of all environmental resources during construction and operation of the project. This authority shall allow the following:

a. The modification of conditions of the Order.

b. The design and implementation of any additional measures deemed necessary (including stop work authority) to ensure continued compliance with the intent of the environmental conditions, as well as the avoidance or mitigation of adverse environmental impacts resulting from project construction and operation.

3. Prior to any construction, Port Dolphin shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, environmental inspectors (EIs), and contractor personnel will be informed of the EI's authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs before becoming involved with construction and restoration activities.

4. The authorized facility locations shall be as shown in the EIS and as supplemented by filed alignment sheets. **As soon as they are available, and before the start of construction**, Port Dolphin shall file with the Secretary any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

   Port Dolphin's exercise of eminent domain authority granted under NGA Section 7(h) in any condemnation proceedings related to the Order must be consistent with these authorized facilities and locations. Port Dolphin's right of eminent domain granted under NGA section 7(h) does not authorize it to increase the size of its natural gas pipeline to accommodate future needs or to acquire a ROW for a pipeline to transport a commodity other than natural gas.

5. Port Dolphin shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, pipe storage yards, and other areas that would be used or disturbed and have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, and documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps, sheets, and aerial photographs. Each area must be approved in writing by the Director of OEP **before construction in or near that area**.

   This requirement does not apply to extra workspace allowed by the *Upland Erosion Control, Revegetation, and Maintenance Plan,* minor field realignments per landowner needs, and requirements which do not affect other landowners or sensitive environmental areas such as wetlands. Examples of alterations requiring approval include all route realignments and facility location changes resulting from the following:

   a. Implementation of cultural resources mitigation measures

   b. Implementation of endangered, threatened, or special concern species mitigation measures

   c. Recommendations by state regulatory authorities

   d. Agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

6. **Within 60 days of the acceptance of this certificate and before the start of construction**, Port Dolphin shall file an initial Implementation Plan with the Secretary for review and written approval by the Director of OEP. Port Dolphin must file revisions to the plan as schedules change. The plan shall identify the following:

a. How Port Dolphin will implement the construction procedures and mitigation measures described in its application and supplements (including responses to data requests), those identified in the EIS, and those required by the Order.

b. How Port Dolphin will incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to onsite construction and inspection personnel.

c. The number of EIs assigned per spread, and how the company will ensure that sufficient personnel are available to implement the environmental mitigation.

d. Company personnel, including EIs and contractors, who will receive copies of the appropriate material.

e. The training and instructions Port Dolphin will give to all personnel involved with construction and restoration (initial and refresher training as the project progresses and personnel change), with the opportunity for OEP staff to participate in the training session(s).

f. The company personnel (if known) and specific portion of Port Dolphin's organization having responsibility for compliance.

g. The procedures (including use of contract penalties) Port Dolphin will follow if noncompliance occurs.

h. For each discrete facility, a Gantt or PERT chart (or similar project-scheduling diagram), and dates for the following:

i. The completion of all required surveys and reports

ii. The mitigation training of onsite personnel

iii. The start of construction

iv. The start and completion of restoration.

7. Port Dolphin shall employ at least one EI per construction spread. The EI shall be:

a. Responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or other authorizing documents

b. Responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 5 above) and any other authorizing document

c. Empowered to order correction of acts that violate the environmental conditions of the Order, and any other authorizing document

d. A full-time position, separate from all other activity inspectors

e. Responsible for documenting compliance with the environmental conditions of the Order, as well as any environmental conditions/permit requirements imposed by other Federal, state, or local agencies

f. Responsible for maintaining status reports.

8. Port Dolphin shall file updated status reports with the Secretary, prepared by the EI on a biweekly basis until all construction and restoration activities are complete. On request, these status reports will also be provided to other Federal and state agencies with permitting responsibilities. Status reports shall include the following:

a. The current construction status of the project, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally sensitive areas

b. A listing of all problems encountered and each instance of noncompliance observed by the EIs during the reporting period (both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other Federal, state, or local agencies)

c. Corrective actions implemented in response to all instances of noncompliance, and their cost

d. The effectiveness of all corrective actions implemented

e. A description of any landowner/resident complaints which might relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns

f. Copies of any correspondence received by Port Dolphin from other Federal, state, or local permitting agencies concerning instances of noncompliance.

9. Port Dolphin must receive written authorization from the Director of OEP **before commencing service of the project**. Such authorization will only be granted following a determination that rehabilitation and restoration of the ROW and other areas affected by the Project are proceeding satisfactorily.

10. Port Dolphin shall not begin construction of the onshore portion of the Project until it has filed documentation that all Section 7 consultations with the USFWS regarding the onshore portion of the Project have been completed and Port Dolphin has received written notification from the Director of OEP that construction or use of mitigation may begin.

11. Prior to the start of construction, Port Dolphin shall file for each HDD location the following: (a) the estimated number of days of drilling required for each location, and whether drilling would be done 24 hours per day; and (b) a description of any noise mitigation which would be implemented during drilling activity to reduce noise impacts at the noise-sensitive areas below 55 A-weighted decibels (dBA) L_{dn}, or 10 dBA over background if ambient levels are above 55 dBA L_{dn}.

12. Port Dolphin shall not begin construction and use of the onshore facilities and staging, storage, and temporary work areas until Port Dolphin consults the Florida State Historic Preservation Officer (SHPO) regarding the need for survey of any newly identified pullouts, staging areas, and extra work spaces; and files the SHPO's comments, any required survey report(s), and the SHPO's comments on the reports. All material filed with the Commission containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering as follows: **"CONTAINS PRIVILEGED INFORMATION--DO NOT RELEASE."**

Cumulative Impacts

Several cumulative impacts would occur upon implementation of the Project. Most would arise in connection with other OCS activities. Several reasonably foreseeable future actions were identified in Tampa Bay and the GOM. Long-term impacts from Port operations on water quality, socioeconomics, recreation, transportation, and risk management (safety) would be localized. Some long-term, minor, adverse, cumulative impacts on biological resources, including marine mammals, sea turtles, fisheries resources, and EFH, could be associated with operation of the Port.

Water Quality. Marine water quality would be minimally affected by Port construction activities, and no incremental impacts on water quality would occur. Port fabrication activities and the discharges resulting from those activities would occur at existing fabrication facilities and would not be expected to result in any exceedances of permit effluent limitations. Since fabrication activities are not expected to occur at the same time or in the same locations as component fabrication for other Ports, no cumulative impacts would be expected. Therefore, only minor cumulative impacts on coastal water quality, within the limitations of the existing water quality permit, would be expected. Processed bilge water and treated sanitary water discharges from vessels would occur on an intermittent basis, while engine cooling water discharges would occur continuously. Port discharges would only produce minor incremental cumulative impacts on marine and coastal water quality and, if discharged in compliance with an approved NPDES permit, would produce only minor, localized changes to ambient marine water quality. No sodium hypochlorite treatment for cooling water is planned. Dredging and trenching operations required for pipeline installation would not interact with the construction activities for other LNG projects because they would not occur at the same time. Suspended sediments would remain in the water column for a period of time (i.e., hours to days) depending on the size of the sediments. Coarser sediments would fall out and resettle quickly (i.e., hours), while finer sediments could remain suspended for longer periods of time (i.e., days).

Biological Resources. The Port could interact with other OCS activities to produce long-term, adverse, cumulative impacts on biological resources. Marine mammals are and have been severely impacted by an increase in vessel traffic, turbidity, marine debris, and water quality degradation from waste discharges. Sea turtles and manatees are and have been impacted by vessel traffic, turbidity, an increase in marine debris, and a general increase in water quality degradation from waste discharges. Coastal and marine birds are and have been impacted by an increase in marine debris and a disturbance of nesting and foraging areas resulting from onshore construction. Benthic communities currently are and have been impacted by construction and installation of OCS pipelines, fishing, and vessel anchoring. The adverse impacts on these resources from construction and operation of the proposed Port are expected to be minor. Cumulative impacts from vessel traffic are indeterminant since there is currently no method of correlating vessel traffic with potential for ship strikes on marine mammals, sea turtles, or manatees. Further evaluation is being conducted to determine if correlations can be made and impacts more directly assessed.

For all future deepwater port licenses issued, the Maritime Administration could require the Applicant to develop and implement a *Prevention, Monitoring, and Mitigation Plan* to mitigate impacts on marine fisheries species, including meroplankton (organisms that spend part of their life cycle, usually the larval or egg stages, as plankton). Mitigation efforts would also extend to other marine fisheries species when, in the judgment of the Maritime Administrator and after consultation with NMFS, the monitoring program has identified adverse impacts. At this time, mitigation has not been fully developed and therefore, the effectiveness of that mitigation is uncertain.

Cultural Resources. The Port would be constructed to avoid impacts on cultural resources that are listed or eligible for listing in the NRHP. An unanticipated discoveries plan and an avoidance plan have been developed to protect cultural resources during construction. Implementation of the plans is necessary to avoid adverse direct, indirect, or cumulative impacts on cultural resources listed or eligible for listing in the NRHP. If these avoidance efforts were successful, there would be no adverse direct, indirect, or cumulative impacts on cultural resources listed or eligible for listing in the NRHP.

Geological Resources. Communities in the Tampa Bay area use sand resources found in Tampa Bay to renourish local beach fronts. The Proposed Action traverses potential sand resources that could be used for renourishment projects. The Gulfstream Pipeline was installed in an area that might have contained potential sand resources that were not identified at the time of construction. Because the area impacted by

the pipeline buffer is a small percentage of the mapped sand resources, only minor, adverse, cumulative impacts are expected.

Marine Areas and Land Use. Minor, adverse, localized, cumulative impacts on marine or land areas are anticipated. A Safety Zone would extend 850 m from the buoy when a ship is at the Port. This Safety Zone would limit recreational and commercial fishing traffic through the area. The USCG, in consultation with Captain of the Port, Tampa, would likely restrict anchoring near the Port at any time by establishing a No Anchor Area (NAA).

Recreation and Aesthetics. A minor, short-term, adverse impact on recreational fishing would result from temporary displacement associated with offshore Port and pipeline construction activities. Visual resources might be adversely affected by the temporary presence of pipe-laying vessels. Except for recreational vessels that are in the area of the Port, no cumulative visual impacts are expected. Avoiding Safety Zones would be inconvenient to recreational boaters. These impacts are expected to be minor.

Air Quality. Cumulative impacts on air quality from past and present actions would be expected from offshore emissions from cargo and other vessels and onshore emissions sources from power plants and vehicles. Foreseeable future actions that are anticipated to contribute to cumulative impacts include population growth and coastal development, such as factories, which will eventually lead to more demand on electric power. Construction and operation of the MPEH and BOET LNG Deepwater Ports and associated pipelines would be expected to contribute to minor, adverse, cumulative impacts on air quality. Expansion projects for the Big Bend and Bartow Electric Generating stations included installation of emissions-control equipment and replacement of oil-fired units with natural gas units This contributed to reductions in emissions of NO_x and sulphur dioxide (SO_2), and increases in emissions of CO and VOCs. Modeling results showed minor increases in impacts from these pollutants. Therefore, cumulative air quality impacts are expected to be minor.

Noise. Port operations would be distant from any onshore (human) noise sensitive areas and would have no adverse short-term or long-term impacts on those areas. Increased service vessels would have minor long-term, adverse impacts on onshore noise. The support vessels would operate in areas with existing support services. The long-term, adverse, cumulative impacts from the Port would be negligible relative to the noise from existing shipping traffic in the area.

Socioeconomics and Environmental Justice. Construction and operation of deepwater port projects have the potential to beneficially affect socioeconomic resources in the GOM region through job creation and expenditures on goods and services. Impacts associated with onshore fabrication yards are not expected to be cumulative. Components and SRVs are expected to be fabricated at overseas facilities. As a result, the potential to interact with construction of the other LNG ports or major construction activities to produce a cumulative impact is negligible. Relative to the existing economic activities in the region, the cumulative employment associated with the Project would have a negligible, short-term, beneficial impact on area economies. Because of the minor nature of potential losses to fishery stocks, only minor, indirect, adverse impacts on commercial fishing are expected.

Navigation and Transportation. Transportation increases from the construction and operation of the Port are expected to have moderate impacts on the cumulative traffic that currently uses the Egmont shipping fairway and the Tampa/Hillsborough Bay channel. Approximately 1,800 trips are expected during construction of the Port. Crew and supply vessels that travel in and out of Tampa Bay during the operation of the Port are expected to add minor traffic to the existing traffic patterns.

Public Safety. There are small but potentially significant risks associated with the storage and handling of LNG. However, there is no direct cumulative impact on activities outside of the Safety Zone or ATBA. An Independent Risk Assessment for the Project estimated the maximum thermal radiation distance to be 7,330 m (4.6 mi). Since the Port locations are at least 28 miles from the nearest shoreline, the potential for direct impacts is minor.

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FINAL ENVIRONMENTAL IMPACT STATEMENT ADDRESSING THE PORT DOLPHIN LLC LIQUEFIED NATURAL GAS DEEPWATER PORT LICENSE APPLICATION

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
µPa	Micro Pascals
AAV	Ambient Air Vaporization
ABR	auditory brainstem response
ACHP	Advisory Council on Historic Preservation
AHTS	anchor-handling tug supply
AO	Archeological Occurrence
AP	Aquatic Preserve
APE	area of potential effect
APRS	acoustic position reporting system
AQRV	Air-Quality Related Values
ATBA	Area to be Avoided
ATON	Aids to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BA	Biological Assessment
BACT	Best Available Control Technology
BMP	best management practices
BO	Biological Opinion
BOET	Bienville Offshore Energy Terminal
BP	before present
bscf	billion standard cubic feet
BTA	Best Technology Available
Btu	British thermal units
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAM	Compliance Assurance Monitoring
CBC	Christmas Bird Count
CEMS	continuous emissions monitoring system
CEQ	Council on Environmental Quality
CFD	Cubic feet per day
CFR	Code of Federal Regulations
CH	critical habitat
CH_4	methane
cm	centimeter
cm/s	centimeters per second
CO	carbon monoxide
CO_2	carbon dioxide
COLREGS	International Regulations for Prevention of Collisions at Sea
COMDTINST	Commandant's Instruction
COMPS	Coastal Ocean Monitoring and Prediction System
CORMIX	Cornell Mixing Zone Expert System
COTP	Captain of the Port
CPD	Coastal Programs Division
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
DAT	deposition assessment threshold
dB	decibel
dBA	A-weighted decibel
DCS	defense communications system
DF	dual fuel

DGPS	differential global positioning system
DHS	Department of Homeland Security
DMF	Division of Marine Fisheries
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of the Interior
DSM	demand-side management
DSV	direct support vehicle
DWPA	Deepwater Port Act of 1974
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EI	environmental inspector
EIA	Energy Information Administration
EIS	Environmental Impact Statement
EO	executive order
EPCHC	Environmental Protection Commission of Hillsborough County
ERG	Electroretinography
ESA	Endangered Species Act
ESD	Emergency Shutdown
ESU	Evolutionary Significant Unit
F&G	fire and gas
F.A.C.	Florida Administrative Code
FAAQS	Florida Ambient Air Quality Standards
FAS	Floridan Aquifer System
FCMP	Florida Coastal Management Program
FDEP	Florida Department of Environmental Protection
FDHR	Florida Division of Historic Resources
FDMS	Federal Docket Management System
FDOT	Florida Department of Transportation
FERC	Federal Energy Regulatory Commission
FERP	Florida Environmental Resource Permit
FFMZ	Federal Fishery Management Zone
FGT	Florida Gas Transmission
FLM	Federal Land Manager
FLUCCS	Florida Land Use, Cover, and Forms Classification System
FM	feet marker
FMC	Fishery Management Council
FMP	Fishery Management Plan
FMRI	Florida Marine Research Institute
FMSF	Florida Master Site File
FMV	Fair Market Value
FNAI	Florida Natural Areas Inventory
FOSC	Federal On Scene Coordinator
FP	floating platform
FPL	Florida Power and Light Company
FPSC	Florida Public Service Commission
FPSO	floating production, storage, and offloading
FRCC	Florida Reliability Coordinating Council
FSA	Facility/Vessel Security Assessment
FSO	Facility/Vessel Security Officer
FSP	Facility/Vessel Security Plan
FSRU	floating storage and regasification unit

ft/s	feet per second
FWC	Florida Fish and Wildlife Conservation Commission
FY	Fiscal Year
g/ha-yr	grams per hectare per year
gal	Gallon
GAO	Government Accountability Office
GBS	gravity-based structure
GHG	greenhouse gas
GIS	Geographical information system
GMFMC	GOM Fishery Management Council
GOM	Gulf of Mexico
GOMESA	Gulf of Mexico Energy Security Act
GPD	gallons per day
gpm	gallons per minute
GPS	Global Positioning System
HAP	Hazardous Air Pollutant
HAZID	hazards identification
HCA	high consequence area
HDD	horizontal directional drill
hp	horsepower
Hz	Hertz
IAS	Intermediate Aquifer System
ICI	industrial-commercial-institutional
ID	inside diameter
IGC	International Code for Construction and Equipment of Ships Carrying Liquefied Gasses in Bulk
IHA	incidental harassment authority
IMO	International Maritime Organization
IPCC	Intergovernmental Panel on Climate Change
IRA	independent risk assessment
ISPS	International Ship and Port Facility Security
IWAQM	Interagency Workgroup on Air Quality Modeling
JTTF	Joint Terrorism Task Force
kg	kilogram
kHz	Kilohertz
km	kilometer
km/hr	kilometers per hour
km^2	square kilometer
kW/m^2	kilowatts per square meter
kWh	kilowatt hours
LAER/BACT	lowest achievable emissions rate/best available control technology
lb	pound
LFL	lower flammability limit
LNB	low-NO_x burner
LNG	liquefied natural gas
LNGC	liquefied natural gas carrier
LOOP	Louisiana Offshore Oil Port
m	meter
m/s	meters per second
m^2	square meter
m^3	cubic meter
MAFLA	Mississippi, Alabama, and Florida
MAOP	maximum allowable operating pressure
MARPOL	International Convention for the Prevention of Pollution from Ships
mcf	million cubic feet
MD	Management Directive

mg/L	milligram per liter
mg/m^3	milligrams per cubic meter
MGD	million gallons per day
mi	mile
mi^2	square miles
MLLW	mean lower low water
mm	millimeter
MMBtu	million British thermal units
MMBtu/hr	million British thermal units per hour
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MMscfd	million standard cubic feet per day
MOU	Memorandum of Understanding
MPA	marine protected areas
MPEH	Main Pass Energy Hub™
mph	miles per hour
MPRSA	Marine Protection, Research, and Sanctuaries Act
MRFSS	Marine Recreational Fishery Statistics Survey
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act of 1976
MT/hr	metric tons per hour
MTS	U.S. Marine Transportation System
MTSA	Maritime Transportation Security Act
MW	megawatt
NAA	No Anchoring Area
NAAQS	National Ambient Air Quality Standards
NAIC	North American Industrial Classification
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NGA	Natural Gas Act
NHPA	National Historic Preservation Act
NM	Nautical mile
NMFS	National Marine Fisheries Service
NMS	National Marine Sanctuary
NMSA	National Marine Sanctuaries Act
NNSR	Non-attainment New Source Review
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NODC	National Oceanographic Data Center
NOI	Notice of Intent
NO_x	nitrogen oxide
NP	National Park
NPC	National Petroleum Council
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NPV	Net Present Value
NRHP	National Register of Historic Places
NSA	noise sensitive area
NSPS	New Source Performance Standards
NSR	New Source Review
NTL	Notice to Lessees and Operators
NTU	Nephelometric turbidity unit

NWI	National Wetland Inventory
NWR	National Wildlife Refuge
O_3	ozone
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
ODMDS	Ocean Dredged Material Disposal Site
OEP	Office of Energy Projects
OFW	Outstanding Florida Waters
OPS	Office of Pipeline Safety
ORV	open rack vaporizer
OSHA	Occupational Safety and Health Administration
PA&A	public address and alarm
Pb	lead
PB	St. Petersburg (lease block)
PCB	polychlorinated biphenyl
PHMSA	Pipeline and Hazardous Materials Safety Administration
PLC	Programmable Logic Controllers
PLEM	pipeline end manifold
PM_{10}	particulates equal to or less than 10 microns in diameter
$PM_{2.5}$	particulates equal to or less than 2.5 microns in diameter
ppm	parts per million
ppmvd	parts per million by volume, on a dry basis
ppt	parts per thousand
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
psig	pounds per square inch gauge
PTS	Permanent threshold shift
RACON	radar beacon
RACT	reasonable available control technology
RLNGC	Regasification Liquid Natural Gas Carriers
ROD	Record of Decision
ROI	Region of Influence
ROW	right-of-way
RPT	rapid phase transition
RTD	resistance thermal device
SAFMC	South Atlantic Fishery Management Council
SAS	Surficial Aquifer System
SCR	selective catalytic reduction
SCV	submerged combustion vaporizer
SEAMAP	South East Area Monitoring and Assessment Program
SEARCH	Southeastern Archeological Research, Inc.
SED	Statistics and Economics Division
SHPO	State Historic Preservation Officer
SIGTTO	Society of International Gas Tanker and Terminal Operators
SIL	Significant Impact Level
SIP	State Implementation Plan
SO_2	sulfur dioxide
SOLAS	Safety of Life at Sea
SPCC	Spill Prevention, Control, and Countermeasures
SPL	sound pressure level
SPV	Special Purpose Vessel
SRS	Special Regasification Ship
SRV	shuttle and regasification vessel
STL	submerged turret loading
STSSN	Sea Turtle Stranding and Salvage Network

STV	shell-and-tube vaporizers
SWFWMD	Southwest Florida Water Management District
TBEP	Tampa Bay Estuary Program
tcf	trillion cubic feet
TECO	Tampa Electric Company
TMDL	Total Maximum Daily Load
TMR	triple modular redundancy
tpy	tons per year
TRV	Transfer and Regasification Vessel
TSS	total suspended solids
TTS	temporary threshold shift
U.S.C.	United States Code
UFL	upper flammability limit
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USNOC	U.S. Naval Oceanographic Office
UV/IR	ultraviolet/infrared
VOC	volatile organic compound
VTR	vehicle trip report
yd^3	cubic yards

COMMON CONVERSIONS

Temperature

°F =	°C x 1.8 + 32
°C =	(°F – 32) ÷ 1.8

Length/Distance

1 in =	2.540 cm
1 in =	25.40 mm
1 ft =	0.3048 m
1 m =	3.2808 ft
1 mi =	1.6093 km
1 km =	0.6214 mi
1 NM =	1.15 mi

Volume

1 ft^3 =	0.02832 m^3
1 gal =	0.003785 m^3
1 m^3 =	264.172 gal
1 gal =	0.0238 bbl
1 m^3 =	6.29 bbl
1 MG =	23,800 bbl

Mass

1 g =	0.0022 lb
1 lb =	0.453592 kg
1 kg =	2.205 lb
1 ton =	0.9072 MT

Flow Rate (unit volume per time)

1 bbl/hr =	0.1192 m^3/hr
1 ft^3/s =	0.028316 m^3/s
1 ft^3/s =	448.8 GPM
1 GPD =	0.003785 m^3/day
1 GPM =	0.00379 m^3/min
1 MGD =	0.0438 m^3/s

Velocity

1 ft/s =	0.3048 m/s
1 ft/s =	30.48 cm/s
1 m/s =	1.467 ft/s

Concentration

1 mg/L =	1 ppm (in water)
1 mg/L =	1 x 10^6 µg/m^3

Energy

1 Btu =	2.9308 x 10^{-4} kW-hr

Power

1 kW =	1.340 hp
1 hp =	0.746 kW

Pressure

1 psi =	psig + atmospheric pressure
1 psi =	0.0689476 bar
1µPa =	145 psi

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1. Introduction

1.1 Deepwater Port License Application

On March 29, 2007, Port Dolphin Energy LLC (also referred to as the Applicant or as Port Dolphin) submitted to the U.S. Coast Guard (USCG) and Maritime Administration an application under the Deepwater Port Act of 1974 (DWPA)[1] for all Federal authorizations required for a license to own, construct, and operate a deepwater port off the coast of Florida. On June 15, 2007, USCG notified the Applicant that the application contained sufficient information to continue processing, and on June 25, 2007, the USCG and the Maritime Administration issued a Notice of Application in the *Federal Register* summarizing the application[2]. In December 2007, the Applicant filed an amended application that proposed a new pipeline route intended to avoid sensitive biological resource areas (Port Dolphin 2007b). In December 2008 the Applicant filed a second amendment to the application. The second amendment proposed a new pipeline route intended to avoid sand resource areas used for beach renourishment (Port Dolphin 2008d). The Port Dolphin project, referred herein to as the Project, was assigned Docket No. USCG-2007-28532.

The USCG prepared this Environmental Impact Statement (EIS) to address the potential environmental and socioeconomic impacts associated with the Project. The Maritime Administration is the lead Federal agency responsible for licensing of the deepwater port, which is proposed to consist principally of two unloading buoys for mooring liquefied natural gas (LNG) vessels and a pipeline connecting to two existing onshore natural gas pipelines. In accordance with Section 1504(f) of the DWPA, this EIS has been prepared in cooperation with additional Federal agencies and departments to comply with the requirements of the National Environmental Policy Act of 1969 (NEPA), and such compliance shall fulfill the NEPA responsibilities of such agencies and departments related to the licensing and review of the Port Dolphin project and the requirements of NEPA, the DWPA, USCG Commandant Instruction (COMDTINST) M16475.1D and Department of Homeland Security (DHS) Management Directive (MD) 5100.1, Environmental Planning Program.

Concurrent with their application for the deepwater port, the Applicant submitted an application to the Federal Energy Regulatory Commission (FERC) for a Certificate of Public Convenience and Necessity (Certificate) under Section 7 of the Natural Gas Act (NGA), as amended, to construct and operate a new natural gas pipeline and ancillary facilities in Florida. FERC is the cooperating Federal agency responsible for the review of the onshore portion of the natural gas pipelines and associated aboveground components. The application was assigned FERC Docket Nos. CP07-191 and -192. FERC issued a Notice of Application in the *Federal Register* for the Proposed Onshore Pipeline on May 9, 2007[3]. After discussions with the Florida Department of Environmental Protection (FDEP), the Applicant made changes to their onshore pipeline route. Subsequently, the Applicant filed an amended application with the FERC. On January 28, 2008, the FERC issued a new Notice of Amendment for the Proposed Onshore Pipeline, which was published in the *Federal Register* on February 4, 2008[4]. The amended application was assigned Docket No. CP07-191-001. FERC also opened an additional scoping period to solicit comments on the proposed revisions to the onshore pipeline route (see **Section 1.5**). In January 2009, the Applicant filed supplemental information with the FERC that modified details of the construction of the onshore pipeline. Port Dolphin Energy LLC also filed applications with the U.S. Army Corps of Engineers (USACE) for Department of the Army permits pursuant to Section 10 of the

[1] Public Law (P.L.) 93-627, Sec. 3, January 3, 1975, 88 Stat. 2127, as amended, codified to 33 U.S.C. 1501–1524.

[2] 72 FR 121, pp. 34741–2.

[3] 72 FR 94, pp. 27552–3.

[4] 73 FR 23, pp. 6497–8.

Rivers and Harbors Act of 1899 (33 United States Code [U.S.C.] 403) and Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344). USACE evaluates permit applications for essentially all construction activities, including pipeline and anchor construction, that occur in the Nation's waters, including wetlands associated with the Proposed Onshore Pipeline. USACE permits are also necessary for any work, including construction and dredging in navigable waters. The USACE will issue a joint public notice on the proposed permits. Port Dolphin Energy LLC also filed its applications for coverage under the Clean Air Act (CAA) and CWA with the U.S. Environmental Protection Agency (USEPA). This EIS is the supporting document for FERC's certification under the NGA, USACE's permit decisions related to Section 10 of the Rivers and Harbors Act and Section 404 of the CWA, and USEPA's permits and consultations under the CWA and CAA.

The DWPA establishes a licensing system for ownership, construction, and operation of deepwater ports in waters beyond the territorial limits of the United States. Originally, the DWPA promoted the construction and operation of deepwater ports as a safe and effective means of importing oil into the United States and transporting oil from the Outer Continental Shelf (OCS), while minimizing tanker traffic and associated risks close to shore. The Maritime Transportation Security Act of 2002 amended the definition of "deepwater port" to include facilities for the importation of natural gas[5].

LNG is natural gas that has been cooled to about minus 260 degrees Fahrenheit (°F) (-162.2 degrees Celsius [°C]) for efficient shipment and storage as a liquid. LNG is more compact than the gaseous equivalent, with a volumetric differential of about 610 to 1. LNG can be transported long distances across oceans using specially designed ships, thus allowing access to stranded reserves of natural gas that cannot be transported by conventional pipelines. For several years there were only four onshore LNG import terminals in the United States with these terminals located at Everett, Massachusetts; Cove Point, Maryland; Elba Island, Georgia; and, Lake Charles, Louisiana. All were built between 1971 and 1982. More recently the Gulf Gateway offshore LNG deepwater port in the Gulf of Mexico (GOM) received its first LNG cargo in 2005. In 2008, three new LNG import terminals became operational; two onshore terminals in Texas, (Freeport LNG and Sabine Pass LNG) and an offshore terminal in Massachusetts Bay (Northeast Gateway). All of the new terminals have received limited shipments of LNG to date. In 2001, LNG imports into the United States totaled about 238 billion standard cubic feet (bscf) (7 billion cubic meters [m^3]). In 2005 LNG imports into the United States had grown to about 631 bscf (17.9 billion m^3), but in 2006 import volume had fallen to about 520 bscf (14.72 billion m^3), and fell further in 2008 to 310 bscf (8.77 billion m^3) due to competition for LNG supplies throughout the world (EIA 2009a).

Under the DWPA, all deepwater ports must be licensed by the Secretary of Transportation (Secretary). On June 18, 2003, the Secretary delegated authority to the Maritime Administrator to issue, transfer, amend, or reinstate a license for the construction and operation of a deepwater port[6]. Hereafter, "the Administrator" refers to the Maritime Administrator's actions and responsibilities as the delegated representative of the Secretary. The USCG is preparing the EIS in coordination with the Maritime Administration although USCG is now part of the DHS[7]. The DWPA requires a license applicant to submit detailed plans for its facility.

Port Dolphin (the Port) would be located approximately 45 kilometers (km) (28 miles [mi]) offshore from Tampa, Florida. The Port would be capable of mooring two LNG carriers (LNGCs), referred to as shuttle

[5] P.L. 107-295, Section 106, November 25, 2002, 116 Stat. 2064.

[6] 68 FR 36496–97.

[7] Title XV (Transition) of the Homeland Security Act provides that "pending matters," including license applications currently being processed, will continue regardless of the transfer of USCG from the U.S. Department of Transportation (USDOT). Even though the function of processing applications has been transferred with USCG to the U.S. Department of Homeland Security, the Secretary of Transportation retains ultimate authority to issue, transfer, amend, or reinstate licenses under the Deepwater Port Act.

and regasification vessels (SRVs), by means of a submerged unloading buoy system. Each of two unloading buoys, also known as submerged turret loading (STL) buoys, would have eight mooring lines connected to eight pile-driven anchor points in the seafloor. An SRV would typically moor at the deepwater port for 4 to 8 days. When not connected to an SRV, the STL buoy would be submerged approximately 18.3 to 21.3 meters (m) (60 to 70 feet) below the sea surface and be supported by mooring lines and rest on the STL buoy landing pad. A marker buoy and retrieval line would be used to locate and recover the STL buoy as an SRV arrives at the deepwater port. The unloading buoy would be retrieved from its submerged position and hoisted in through a moon-pool in the forward part of the SRV where it would be positioned in a receiving cone within the hull trunk. After the buoy is locked in position, unloading of LNG would begin.

The SRVs proposed for use by the Applicant would be equipped to transport, store, vaporize, and meter natural gas. A closed-loop, glycol/water-brine heat transfer system would be used to vaporize the LNG. The deepwater port would have an average throughput capacity of 800 million standard cubic feet per day (MMscfd) and a peak capacity of approximately 1,200 MMscfd. Natural gas flowlines from the Port would connect to a 36-inch gas transmission line. The onshore pipeline would traverse east from the Port Manatee industrial area, turn south to travel along the Highway 41 utility corridor, and then turn east again to end in an industrial area. The transmission line would interconnect with the existing Gulfstream Pipeline interstate natural gas transmission line and the Tampa Electric Company (TECO) system approximately 73.9 km (46 mi) east of the deepwater port through onshore interconnections. Construction of the deepwater port components would be expected to take 11 months, with operations planned to commence in the second quarter of 2011.

1.2 Project Purpose and Need

The purpose of licensing deepwater ports for importing LNG in the OCS is to provide a reliable and timely supply of natural gas that would increase energy diversity while considering impacts on the environment to serve the growing demand for natural gas for residential, industrial, and electric generation within west-central Florida. This requires construction of appropriate facilities for receiving the LNG, revaporizing the LNG to a gaseous state, and interconnecting the facility to the transmission pipelines that can reach appropriate markets within the United States.

The DWPA of 1974, as amended, was passed to promote and regulate the construction and operation of deepwater ports as a safe and effective means of importing oil or natural gas into the United States. The DWPA requires the Administrator to approve, approve with conditions, or deny a deepwater port license application. The Congressional intent expressed in 33 U.S.C. 1501 is as follows:

- "authorize and regulate the location, ownership, construction and operation of deepwater ports in waters beyond the territorial limits of the U.S.
- "provide for the protection of the marine and coastal environment to prevent or minimize any adverse impact that might occur as a consequence of the development of such ports.
- "protect the interests of the U.S. and those of adjacent coastal States in the location, construction, and operation of deepwater ports.
- "protect the rights and responsibilities of the States and communities to regulate growth, determine land use, and otherwise protect the environment in accordance with law.
- "promote the construction and operation of deepwater ports as a safe and effective means of importing oil and natural gas into the U.S. and transporting oil and natural gas from the outer continental shelf while minimizing tanker traffic and the risks attendant thereto.

- "promote oil and natural gas production on the outer continental shelf by affording an economic and safe means of transportation of outer continental shelf oil and natural gas to the U.S. mainland."

The DWPA requires the Administrator to approve, approve with conditions, or deny a deepwater port license application. In reaching this decision, the Administrator must consider the nine requirements set forth in 33 U.S.C. §1503(c), as follows:

- The Applicant is financially responsible and will meet the requirements of the DWPA.
- The Applicant can and will comply with applicable laws, regulations, and license conditions.
- Construction and operation of the deepwater port will be in the national interest and consistent with national security and other national policy goals and objectives, including energy sufficiency and environmental quality.
- The deepwater port will not unreasonably interfere with international navigation or other reasonable uses of the high seas, as defined by treaty, convention, or customary international law.
- The Applicant has demonstrated that the deepwater port will be constructed and operated using best available technology, so as to prevent or minimize adverse impact on the marine environment.
- The Administrator has not been informed, within 45 days of the last public hearing on a proposed license for a designated application area, by the Administrator of the USEPA that the deepwater port will not conform with all applicable provisions of the CAA, as amended (42 U.S.C. 7401 et seq.); the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq.); or the Marine Protection, Research and Sanctuaries Act, as amended (16 U.S.C. 1431 et seq., 1447 et seq.; 33 U.S.C. 1401 et seq., 2801 et seq.).
- The Administrator has consulted with the Secretaries of the Army, State, and Defense to determine their views on the adequacy of the application, and its effect on programs within their respective jurisdictions.
- The Governor of the adjacent coastal state approves, or is presumed to approve, issuance of the License.
- The adjacent coastal state, the State of Florida, to which the deepwater port is to be directly connected by pipeline, has an approved coastal zone management program pursuant to the Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. 1451 et seq.).

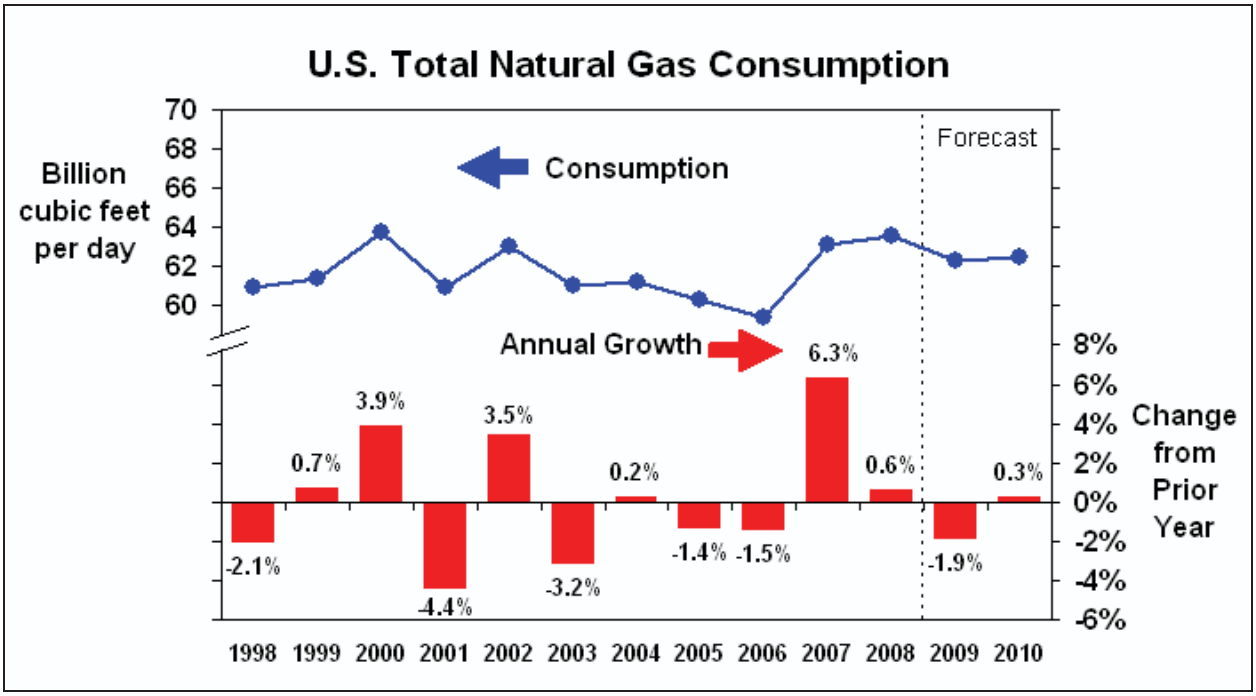
The DWPA application currently under consideration is one proposed by Port Dolphin Energy LLC. In its application, Port Dolphin Energy LLC proposes to construct, own, and operate Port Dolphin to receive and vaporize LNG and transport natural gas at a geographical location that allows it to connect into the west-central Florida natural gas market via the existing natural gas transmission infrastructure.

1.2.1 Increasing Demand for Natural Gas

Energy demand in the United States as a whole has been growing and continues to increase steadily. Part of the intent for the DWPA amendments was to provide mechanisms to ensure that the country's energy market could access worldwide natural gas supplies that the Federal government recognized would become a key supply source for the country's existing and projected natural gas demands over the coming years. However, estimates of the demand for LNG have been changing. In 2007, the U.S. Department of Energy (DOE), Energy Information Administration (EIA) estimated that total energy consumption in the United States will increase 1.1 percent annually, more than 31 quadrillion British thermal units (Btus), or

quads, over the next 20 years, from 100.2 quads per year in 2005 to 131.2 quads per year in 2030 (EIA 2007a). The EIA projected that annual demand for natural gas in the United States could reach 26.1 trillion cubic feet (tcf) by 2030, compared to an annual consumption of 22.0 tcf in 2005, due largely to projected increases in commercial demand and natural gas-fueled electrical power generation (EIA 2007a).

Recent trends in natural gas demand and supply in the contiguous 48 continental states illustrate that demand exceeds supply in 6 of the 13 years, raising concern over the ability to continue to meet projected demand growth regionally and nationally (see **Table 1.2-1**) (EIA 2008a). Although, natural gas demand is expected to fall by 1.9 percent in 2009 due to an expected 2.7 percent decline in the U.S. real gross domestic product (GDP), natural gas demand is expected to increase by 0.3 percent in 2010 due to a projected economic recovery, as shown in **Figure 1.2-1** (EIA 2009c). The EIA Annual Energy Outlook currently provides predictions to 2030. In the 2009 EIA Annual Energy Outlook, natural gas demand is projected to decrease from 23.6 tcf in 2008 to 21.0 tcf in 2015 and increase again to 23.5 tcf by 2030. This prediction is different from the 2007 EIA Annual Energy Outlook's predictions of 25.3 tcf of natural gas demand in 2015 and 26.1 tcf in 2030. Earlier Annual Energy Outlook's predicted even greater levels of natural gas use[8] (see **Figure 1.2-2**). As mentioned above much of the decline in the near future is expected to result from the current worldwide economic decline.



Source: EIA 2009c

Figure 1.2-1. Natural Gas Consumption through 2010

Onshore natural gas production growth is anticipated to come from new sources over the next 20 years. Domestic onshore production in the contiguous 48 states is grouped into six supply regions, which in 2007 ranked from highest to lowest in volume as follows: Gulf Coast, Rocky Mountain, Midcontinent, Southwest, Northeast, and West Coast (EIA 2008a). Projections for 2030 production in the Rocky Mountain region are expected to increase from 24 percent of the contiguous 48 states onshore production

[8] Earlier Additions of the Annual Energy Outlook (pre-2006) provide estimates to 2025.

Table 1.2-1. Annual United States Natural Gas Supply and Demand in the Contiguous 48 Continental States (trillion cubic feet)

Demand	Year													Projected	
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2015	2030
Residential	5.24	4.98	4.52	4.73	5.00	4.77	4.89	5.08	4.88	4.84	4.37	4.72	4.92	4.87	4.93
Commercial [a]	3.16	3.21	3.00	3.04	3.18	3.02	3.14	3.18	3.14	3.06	2.83	3.01	3.12	3.16	3.44
Industrial [b]	9.68	9.71	9.49	9.16	9.40	8.46	8.62	8.27	8.35	7.66	7.62	7.80	7.93	7.96	8.24
Transportation	0.72	0.76	0.64	0.66	0.66	0.64	0.68	0.61	0.59	0.58	0.60	0.64	0.66	0.68	0.79
Electric Power	3.81	4.06	4.59	4.82	5.21	5.34	5.67	5.14	5.46	5.80	6.22	6.87	6.81	6.03	7.01
Total Demand	22.70	22.73	22.25	22.41	23.45	22.24	23.01	22.28	22.43	21.93	21.64	23.04	23.44	22.70	24.41
Total Supply [c]	21.66	21.74	21.54	22.54	23.61	22.12	23.02	22.24	22.10	22.97	22.00	23.15	23.46	22.67	24.37
Net Reserves (Total Supply-Total Demand)	-1.04	-0.99	-0.71	0.13	0.16	-0.12	0.01	-0.04	-0.33	1.04	0.36	0.11	0.02	-0.03	-0.04

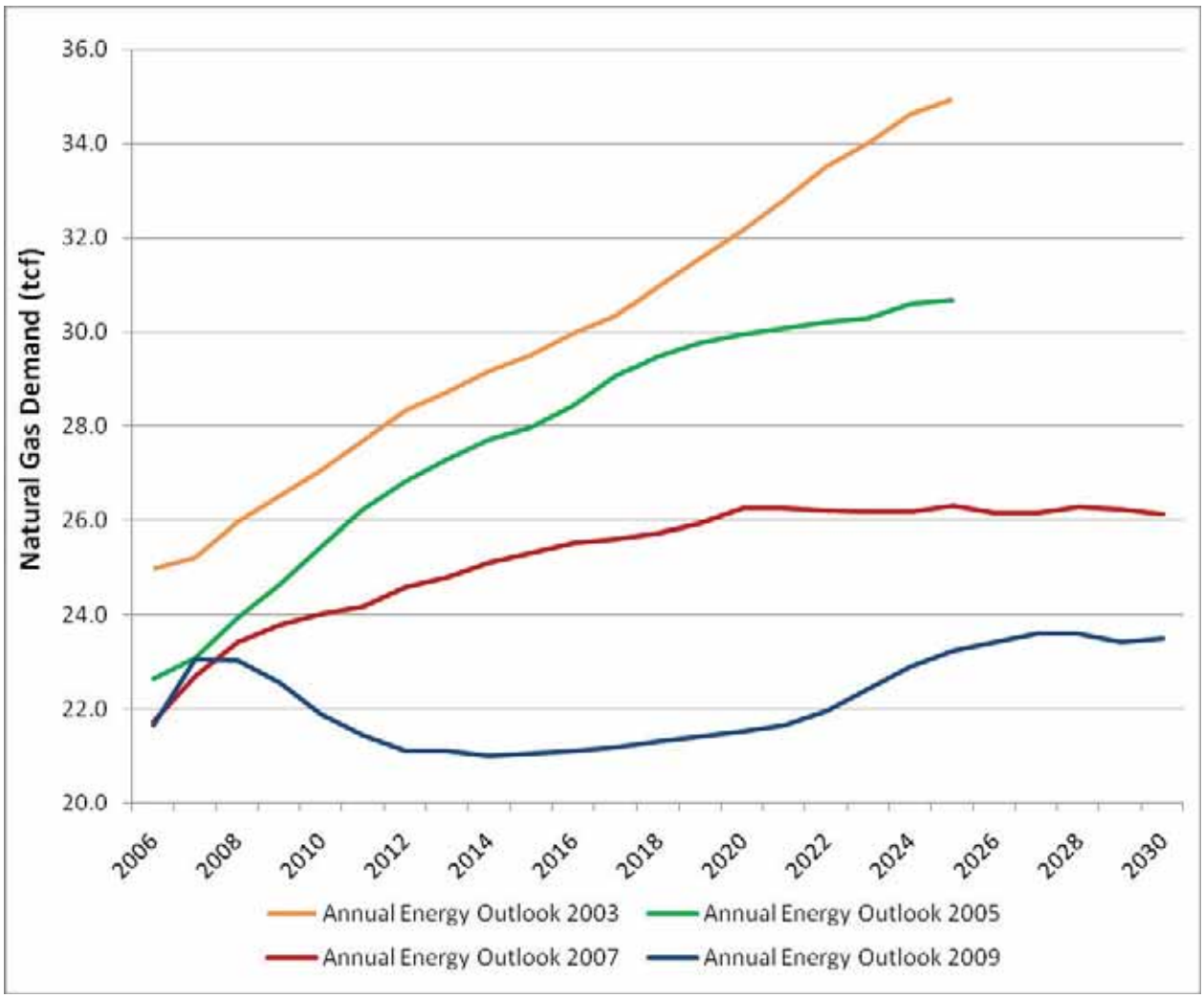
Source: EIA 2008a

Notes:

a. Commercial consumption is gas used by nonmanufacturing establishments or agencies primarily engaged in the sale of goods or services such as hotels, restaurants, wholesale and retail stores, and other service enterprises; and gas used by local, state and Federal agencies engaged in nonmanufacturing activities.

b. Industrial consumption includes natural gas used for heat, power, or chemical feedstock by manufacturing establishments; lease and plant fuel; those engaged in mining or other mineral extraction; and consumers in agriculture, forestry, fisheries, and construction.

c. Total Supply includes total U.S. dry gas production, imports, exports, supplemental gaseous fuels, and working gas in storage.



Source: EIA2003, EIA 2005a, EIA 2007a, EIA 2009a

Figure 1.2-2. Projected Annual Natural Gas Demand

to 29 percent. The Northeast is also expected to increase production from 6 percent of the contiguous 48 states onshore production in 2007 to 11 percent in 2030. These increases are primarily from unconventional sources such as tight sands, shale, and coalbed methane. The Gulf Coast and Midcontinent regions are projected to decrease in production during this time period, and the West Coast and Southwest will increase supply slightly or remain steady.

By 2030, the ranking of regions relative to production is projected to be as follows: Rocky Mountain, Gulf Coast, Southwest, Northeast, Midcontinent, and West Coast. Contiguous 48 states offshore natural gas production is projected to increase. Alaska production is projected to remain steady at current 2007 production levels of 0.4 tcf until 2020, when the North Slope Alaska natural gas pipeline is scheduled to begin operation. Once the planned pipeline begins operation, production of Alaska natural gas will increase fivefold to 2.0 tcf by 2021 with production remaining at this level through 2030 (EIA 2008a).

The GOM accounts for 12 percent of U.S. domestic production. Supply disruptions in the GOM resulting from major hurricanes have demonstrated the short-run vulnerability of the U.S. natural gas market to supply reductions. The severity of the storms and preparedness for the storms directly relates to the supply disruptions and subsequently, price volatility, described in the following paragraph.

According to EIA, Hurricanes Katrina and Rita in 2005 damaged a number of natural gas processing facilities on the Gulf Coast, resulting in reduced operating levels (EIA 2005b). This loss can affect recovery of natural gas production in the area. Even if platforms and pipelines are unaffected or readily restored to service, the gas might not be able to flow to market without treatment. A number of processing plants in Louisiana and Texas, with capacities equal to or greater than 100 MMscfd, experienced long-term production impacts (EIA 2005b). EIA estimates that 21 percent of natural gas production was shut in into 2006 (EIA undated). Loss of natural gas production and supply inevitably equates to increased prices. Estimated average natural gas wellhead prices went from $5.86 per million British thermal units (MMBtu) in May 2005 to $10.68 per MMBtu in October 2005 (EIA 2005b). On November 9, 2005, natural gas prices increased at virtually all market locations in the lower 48 states, with increases exceeding $2 per MMBtu at most markets. In November 2005, prices at most market locations were about $3 to $5 per MMBtu, (about 45 percent to 75 percent) above November 2004 levels (EIA 2005c). Prices at the Henry Hub on November 16, 2005, exceeded November 2004 levels by $4.47 per MMBtu, or about 68 percent (EIA 2005b).

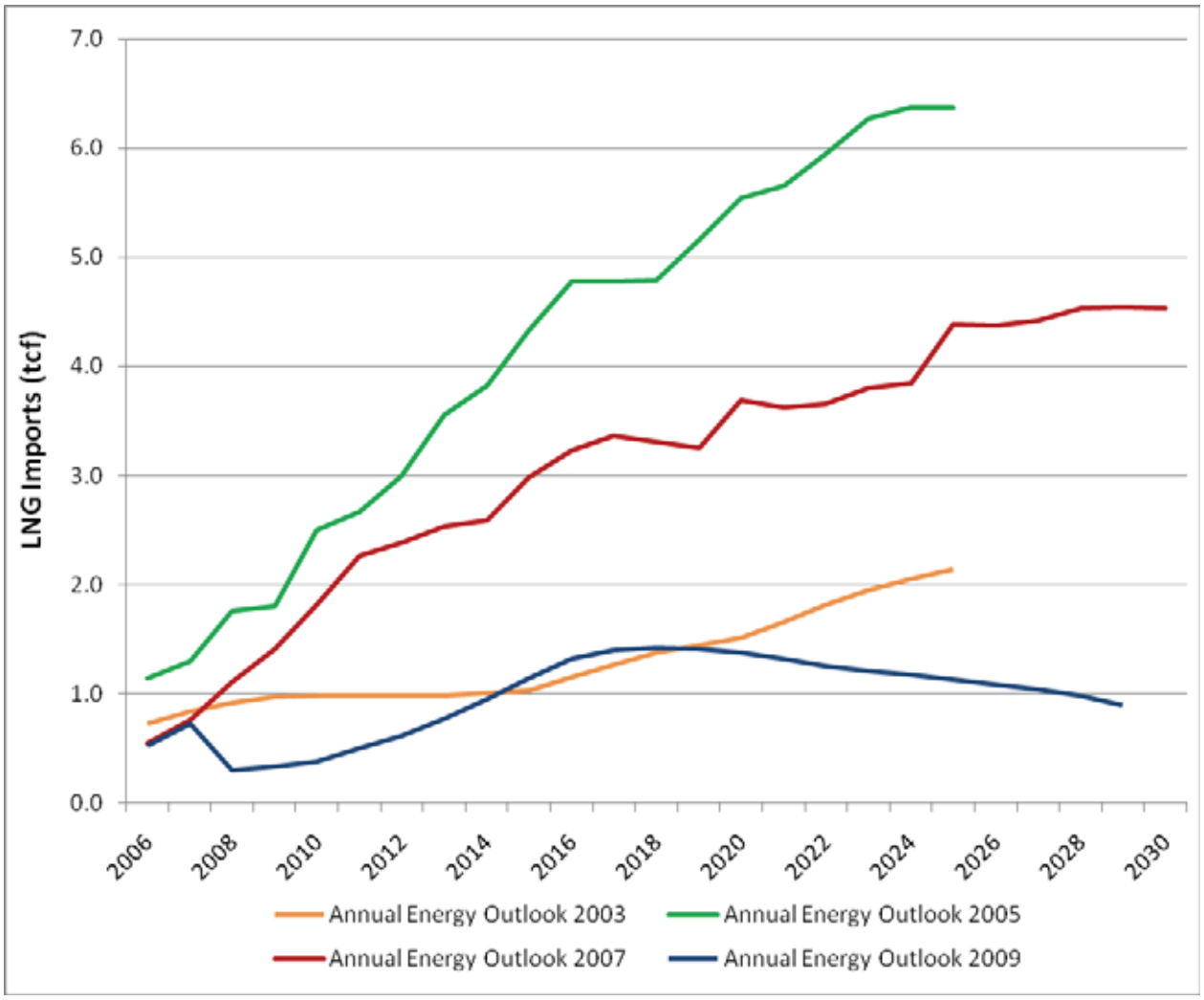
The two major hurricanes during 2008, Hurricanes Gustav and Ike, caused 95 and 98 percent, respectively, of GOM natural gas production to be shut-in. Much of the shut-in was due to evacuation of offshore platforms in anticipation of the storms, although much of the production initially shut-in returned to operation much quicker than in 2005. Unlike the 2005 hurricane season, the 2008 hurricane season did not cause major damage to the GOM infrastructure. For instance, in 2005, 113 platforms were destroyed and 52 damaged with 2 billion cubic feet (bcf) of production permanently offline; whereas, in 2008, 60 platforms were destroyed with no production permanently offline (EIA 2009b).

Henry Hub spot prices, the pricing point at which gas from the GOM is traded on the New York Mercantile Exchange, saw a short-run price increase prior to Hurricane Gustav with prices increasing $0.53 MMBtu to $8.55 on August 20, 2008, or an increase of 6.2 percent over the previous week (EIA 2008a). These increases were not as drastic compared to the 2005 hurricane season where prices increased 18 percent in the week following the hurricanes. There are numerous contributing factors for the marked difference between 2005 and 2008, one of these being the 2008 storms were not as volatile. The other major factor is that in 2005 demand for energy was high and subsequently prices for all energy sources were increasing. In contrast, during 2008, energy markets experienced a decrease in demand and falling prices as a response to worldwide economic decline.

By 2008, the Henry Hub price of natural gas had risen to $9.03 per MMBtu, as a result of higher exploration and development costs and a requirement for increased natural gas production to meet increased consumption while imports are decreasing (EIA 2009a). However, in April 2009, the average price had fallen again to $3.62, and the projected price for May 2009 was $4.02 (EIA 2009c). [This rapid rise and fall of natural gas prices underscores the need for diversity in import locations to prevent natural phenomena, such as hurricanes, from disrupting U.S. LNG input capabilities and to buffer reductions in domestic production.] It also highlights the challenges facing LNG import terminal developers in anticipating future market conditions.

1.2.2 U.S. Demand for LNG

A number of factors have contributed to interest in increasing the level of U.S. imports of LNG, including higher domestic natural gas costs (Gaul and Young 2003). As mentioned, many of the EIA's estimates for natural gas demand have declined recently. A similar trend is exhibited in their predictions for the national demand for LNG imports. In the 2009, Annual Energy Outlook LNG imports were predicted to total 0.8 tcf compared to the predicted 4.53 tcf in the 2007 Annual Energy Outlook. **Figure 1.2-3** shows the increase and decrease of LNG predictions in different editions of EIA's Annual Energy Outlook.



Source: EIA 2003, EIA 2005a, EIA 2007a, EIA 2009a

Figure 1.2-3. Projected Annual LNG Imports

In his June 15, 2006, speech on Energy and the Economy, Federal Reserve Board Chairman Bernanke noted that U.S. production of natural gas was 7 percent below its 2001 level in 2005, "with less than half of that decline reflecting the impact of hurricanes Katrina and Rita." "Between 1988 and 2001, net imports from Canada tripled, but have since flattened out" (Bernanke 2006). At present, about 16 percent of all natural gas consumed in the United States is imported from Canada, but this is expected to drop to 3 percent by 2020 (EIA, 2009a). Both U.S. and Canadian conventional gas fields have matured and are yielding smaller increases in output. Overall, Canadian natural gas production increased only 3 percent between 1999 and 2007, but the number of active wells has increased 102 percent during the same time period (NRC 2009).

Given the diminishing supply of natural gas from the traditional North American sources, LNG provides another alternative to meet the growing demand. As natural gas prices have risen and production and transportation of LNG has become more efficient, imports of LNG have become more economically attractive and can contribute to the overall supply of natural gas. However, offsetting the reduced output from conventional domestic natural gas sources is increasing production of gas from unconventional domestic natural gas sources, especially tight sand and shale deposits. Technological improvements in

drilling these resources are expected to increase production from 1.2 tcf in 2007 to 4.2 tcf in 2030; compensating for the decline in Canadian imports (EIA 2008a).

Recent declines in U.S. economic activity and the potential development of unconventional natural gas deposits, as noted above, could reduce the attractiveness of LNG imports as domestic supply can be met with lower cost domestic alternatives. "Stranded" reserves of natural gas in producing areas of the world can be used to increase the supply of gas in the United States. For these supplies to reach the United States, they must be liquefied prior to transport. Specialized transport ships must then carry the LNG to a regasification facility near the final market for the gas. To ensure that the intended purpose of natural gas deepwater ports is encouraged, the DWPA allows the Port to operate under a strategy of "exclusive use," dedicating the entire capacity of the facility for its own purposes without being subject to the requirements of open access or common carriage.

1.3 Florida Natural Gas Market

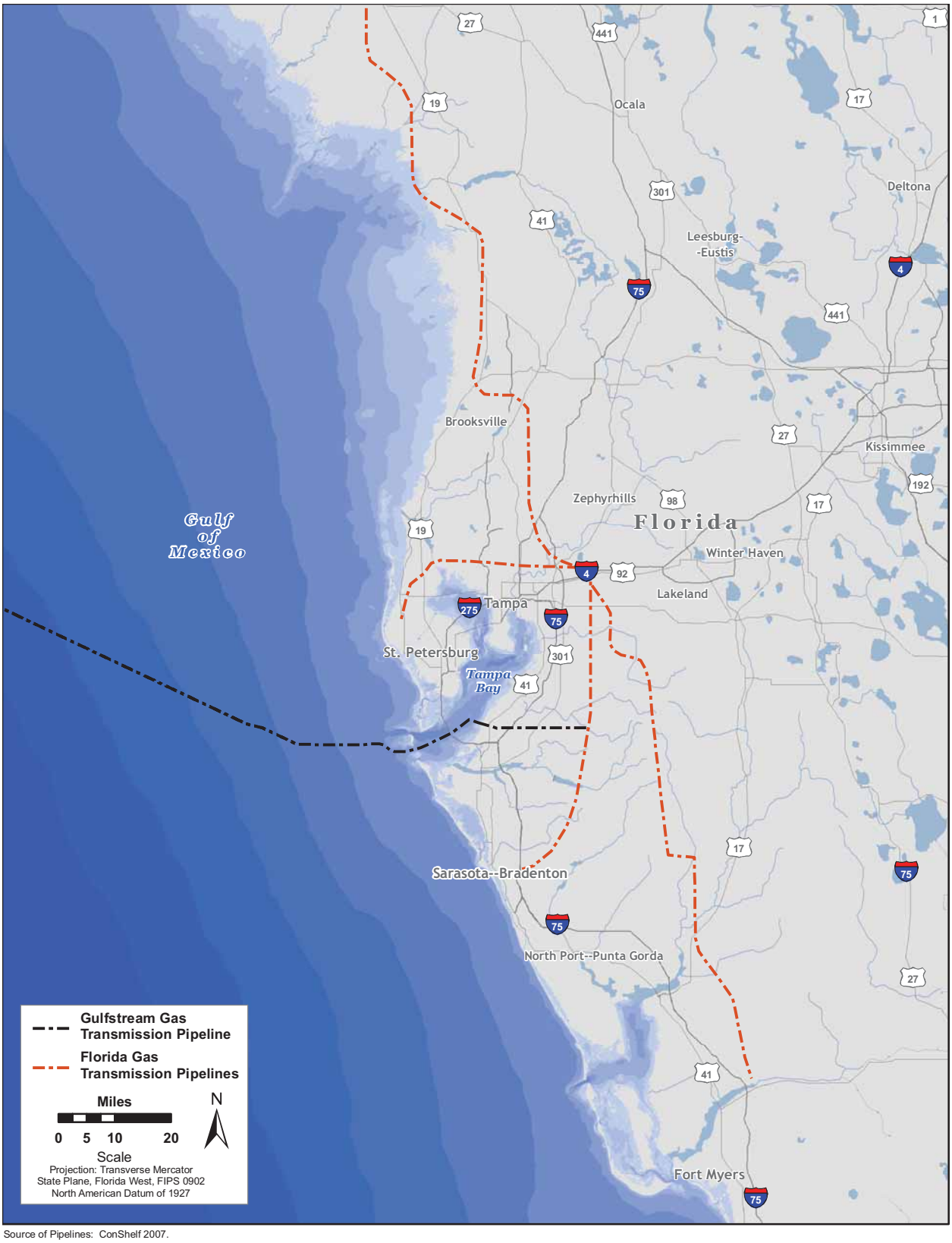
Florida is heavily dependent on natural gas as a source of energy for electricity, home heating, and other uses. Based on future projections, there is a growing demand for additional natural gas in this area; however, this demand cannot be met by the existing domestic supply or by existing natural gas pipelines (see **Figure 1.3-1**).

Based on estimates compiled by DOE, in 2001 the EIA ranked the State of Florida as third nationally in terms of total energy consumption (EIA 2005a). The state ranked 12th nationally in natural gas use in 2001, consuming approximately 543,143 million cubic feet (mcf). By 2007, this consumption rose to 917,245 mcf, raising the state's rank in consumption of natural gas to sixth. This represented a 69 percent increase in natural gas consumption in a 7-year period. The electric generation industry accounted for about 84 percent of the natural gas consumed (EIA 2009d).

The electric generation industry in Florida has an 18-year history in ramping up its use of natural gas. Between 1990 and 2007, the vast majority of new electricity-generating capacity constructed in Florida was natural gas-fired (EIA 2009d). Specifically, in 1990, only about 11 percent of electricity generated in Florida was from the firing of natural gas (FPSC 2005). By 2007, the industry's reliance on natural gas as a fuel source had increased to nearly 39 percent. Moreover, natural gas is projected to compose 54 percent of total energy generated in Florida by 2017 (FPSC 2008).

The need for electricity in Florida is driven largely because the state (1) is a popular tourist destination attracting nearly 80 million tourists annually, and (2) has one of the fastest rates of population growth in the United States. Between 1990 and 2000, the state's population increased by nearly 24 percent (FLOEDR 2008). Since the 2000 Census, the state has grown by 2.8 million persons (an increase of 19 percent). Net migration is the principal reason for the phenomenal growth rate that has occurred in Florida since the 1970s. By 2030, total resident population in the state is projected to exceed 26.4 million or a 47 percent increase over the 2000 Census population. This dramatic projected increase in resident population, coupled with the needs of tourism and industry, will impose a substantial demand on Florida's existing and future energy supply, particularly natural gas supplies and the natural gas transmission system.

Florida's natural gas supply is predominantly obtained from wellheads in the GOM off Texas and Louisiana and transported to Florida's consumers primarily via two pipelines: the Florida Gas Transmission (FGT) System and the Gulfstream Natural Gas System. In recent years, the wellheads in the GOM and onshore processing facilities suffered significant damage as a result of Hurricanes Ivan, Katrina, and Rita. In the wake of Hurricane Katrina, the Florida Reliability Coordinating Council's



Source of Pipelines: ConShelf 2007.

Figure 1.3-1. Existing Natural Gas Transmission Pipelines Serving West-Central Florida

(FRCC) State Capacity Emergency Coordinator issued a Generating Capacity Alert warning of the uncertainty of restoration of natural supplies from the GOM. On January 10, 2006, the EIA reported that nearly 20 percent of natural gas production remained shut-in during the aftermath of Hurricanes Katrina and Rita (EIA 2006a). In addition, approximately 100 oil and gas platforms in Federal waters remained out of service for extended periods and full recovery of oil and natural gas production along the Gulf Coast was not expected until summer 2006 (FDEP 2006a). This further underscores the need for diversified sources of natural gas supplies for Florida consumers.

In recognition of Florida's substantial energy needs and in light of the potential impact that fluctuations in the energy supply could have on the state's economy, former Governor Jeb Bush signed Executive Order (EO) Number 00-127 in May 2000. This EO established the Florida Energy 2020 Study Commission. The commission was charged with determining the extent of Florida's electric energy needs by 2020 and developing a strategy for supplying those needs in an "efficient, affordable, and reliable manner that will ensure adequate electric reserves" (Florida Executive Order 00-127, 2000). The Florida Energy 2020 Study Commission published its strategy in December 2001. The report, entitled *Florida…Energy Wise! A Strategy for Florida's Energy Future*, acknowledged that Florida possesses limited native fuel resources and expressed concern regarding the state's increasing dependence on natural gas for electricity generation.

In November 2005, Governor Bush signed EO Number 05-241 directing the FDEP to issue an updated energy strategy for the state. The Florida Energy Plan was released to the public on January 17, 2006. Two recommendations of the plan (#3 and #4) call for ensuring fuel diversity and fuel supply reliability, and facilitating additional fuel delivery mechanisms in Florida for power generation. In response to these calls for energy supply diversification a number of projects were announced, including two large coal-fired electric-generating plants. However, in response to increased local opposition (TEC 2007) and disapproval by state regulators (FPSC 2007), both projects have been cancelled.

As evident from the discussion above, the predominant energy concerns expressed in all the energy assessments and plans developed by the State of Florida in recent years relate to energy security, including the need for fuel diversity and fuel supply reliability. These plans identify the increasing dependency of Florida's electrical-generating utilities on natural gas (particularly given the volatility in its availability and price) and stress the need to return to the practice of balanced fuel supply. However, opposition to coal-fired generation and the long lead time needed to implement a balanced fuel supply will still result in increases in natural gas consumption by utilities between 2005 and 2014. Moreover, the state is extremely dependent on natural gas supplies originating from the GOM, which are mainly transported via two natural gas pipelines. The potential for future disruptions of Florida's economy resulting from hurricane-inflicted damage to either gas field infrastructure or the pipelines is significant. By expanding Florida's natural gas infrastructure, an LNG deepwater port also would provide the state's natural gas markets with fuel supply diversity through global sourcing of LNG. The Port Dolphin project would provide a source of natural gas to western Florida that is independent of both GOM supply disruptions and of the pipeline constraints of the existing interstate pipelines.

1.4 Scope and Organization of the EIS

The Administrator is responsible for complying with a variety of Federal regulations, including NEPA. As such, the purpose of this EIS is to provide an environmental analysis sufficient to support the Administrator's licensing decision; to facilitate a determination of whether the Applicant has demonstrated that the Project would be located, constructed, operated, and decommissioned using the best available technology to prevent or minimize adverse impacts on the environment; and to encourage and facilitate involvement by the public and interested agencies in the environmental review process.

This EIS assesses potential environmental impacts associated with the installation, operation, and decommissioning of the Project. The affected environmental components encompassed by this EIS include water resources, biological resources, cultural resources, geological resources, marine areas and land use, recreation and aesthetics, air quality, noise, socioeconomic resources and environmental justice, and navigation and transportation. The EIS describes the Project and potential alternatives (**Section 2**), the affected environment as it currently exists (**Section 3**), the probable environmental consequences that might result from installation and operation of Port Dolphin (**Section 4**), public safety (**Section 5**), and cumulative and other impacts (**Section 6**). Greenhouse gas emissions are discussed in **Section 7**. A list of preparers and references used in preparing the document are provided in **Sections 8** and **9**, respectively. Volume II contains the appendices, including public comments, records of coordination with Federal and state agencies, applicable laws and EOs, and specific biological information.

The SRVs would be constructed at existing shipyards outside of the United States and would not be restricted to supplying only one port. Therefore, the impacts associated with construction of the SRVs are not included in the scope of this EIS. Where applicable, this EIS also considers safety but does not function as the final safety screening. All aspects of deepwater port safety would be addressed in the Port Operations Manual, which requires USCG approval prior to initiation of port operations. Financial responsibility is being evaluated within the Maritime Administration as a separate analysis and will be considered along with this EIS as part of the final licensing decision.

In developing this EIS, the preparers adhered to the procedural requirements of NEPA; the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 Code of Federal Regulations [CFR] 1500–1508); USCG procedures for implementing NEPA COMDTINST M16475.1D, *National Environmental Policy Act Implementing Procedures and Policy for Considering Environmental Impacts*); the DHS MD 5100.1, Environmental Planning Program; and the USCG's rule for deepwater ports for LNG (33 CFR Parts 148, 149, and 150). The following elaborates on the nature of the characteristics of various impacts:

- Short-term or long-term. These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term impacts are those that would occur only with respect to a particular activity or for a finite period, or only during the time required for installation activities. Long-term impacts are those that are more likely to be persistent and chronic. For instance, air emissions associated with vessels at the deepwater port would occur for 20 years, the estimated useful life of the proposed facilities. Other types of long-term impacts might persist even beyond the Port's authorized operational period.
- Direct or indirect. A direct impact is caused by a proposed action and occurs contemporaneously at or near the location of the action. An indirect impact is caused by a proposed action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct impact of erosion on a stream might include sediment-laden waters in the vicinity of the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.
- Minor, moderate, or major. These relative terms are used to characterize the magnitude of an impact. Minor impacts are generally those that might be perceptible but, in their context, are not amenable to measurement because of their relatively minor character. Moderate impacts are those that are more perceptible and, typically, more amenable to quantification or measurement. Major impacts are those that, in their context and due to their intensity (severity), have the potential to meet the thresholds for significance set forth in CEQ regulations (40 CFR 1508.27) and, thus, warrant heightened attention and examination for potential means for mitigation to fulfill the requirements of NEPA.

- Adverse or beneficial. An adverse impact is one having adverse, unfavorable, or undesirable outcomes on the man-made or natural environment. A beneficial impact is one having positive outcomes on the man-made or natural environment. A single act might result in adverse impacts on one environmental resource and beneficial impacts on another resource.

1.5 Public Review and Comment

Agency and public participation in the NEPA process promotes open communication between the public and the government and enhances decisionmaking. All persons and organizations having a potential interest in the Administrator's decision whether to grant the License are encouraged to participate in the decisionmaking process.

The USCG and the Maritime Administration initiated the public scoping process on July 12, 2007, with the publication of a Notice of Intent (NOI) to prepare an EIS in the *Federal Register*. The NOI included information on public meetings and informational open houses; requested public comments on the scope of the EIS; and provided information on how the public could submit comments by mail, hand delivery, facsimile, or electronic means[9]. Documents and comments for this project can be found at http://www.regulations.gov. Users can type in the complete docket number, USCG-2007-28532, view all related documents, and submit a comment.

An Interested Party Letter, the NOI published in the *Federal Register*, and a fact sheet describing the Project were sent to approximately 190 Federal, state, and local agency representatives, and other potentially interested parties (see **Appendix A**). As a result of the Applicant's amended application (assigned FERC Docket No. CP07-191-001), the FERC issued a Notice of Limited Scoping for the proposed Port Dolphin project and Request for Comments on Environmental Issues, which was published in the *Federal Register* on February 11, 2008. The Notice indicated that FERC was soliciting input from the public and interested parties and such input would be limited to the proposed onshore pipeline and related facilities (i.e., those under FERC jurisdiction) in Manatee County, Florida. The comment period for scoping closed March 5, 2008. Public comments submitted as part of the scoping process (see **Appendix A**) were considered during the development of this EIS.

A Notice of Availability for the Draft EIS was published in the *Federal Register* on April 18, 2008. The Draft EIS was posted on the Port Dolphin Docket, and more than 200 copies of the Draft EIS were sent to agencies, organizations, and individuals that had expressed interest in reviewing it. An Open House and Public Meeting was held at the Manatee County Convention Center on May 6, 2008, to provide a forum for the public and agencies to obtain information. The meeting was advertised in the *Tampa Tribune* and the *Bradenton Herald*. The Public Meeting was attended by 41 individuals. Comments on the Draft EIS were accepted through June 2, 2008. Two written comments were provided during the Public Meeting. Seven individuals spoke at the public and provided oral comments. A total of 32 comments were received on the USCG Port Dolphin Docket (see **Appendix B**). In total, 34 comments were received during the public review period. All comments on the Draft EIS were considered during the preparation of the Final EIS. **Appendix B** of the EIS includes all materials, including the NOA and other outreach tools used, and all comments on the Draft EIS that are received during the public review period.

1.6 Permits, Approvals, and Regulatory Requirements

The Maritime Administration is responsible for license issuance. The USCG is responsible for processing the application along with the Maritime Administration. Together, they will ensure NEPA compliance,

[9] 70 FR 61151–52.

and compliance with the provisions of numerous Federal and state environmental laws that require consultation with other agencies concerning specific environmental resources. Examples of these include Section 7 of the Endangered Species Act (ESA), the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Marine Mammal Protection Act (MMPA), Section 106 of the National Historic Preservation Act (NHPA), and Section 307 of the CZMA. Descriptions of the requirements of these laws and their consultation obligations are presented below and, where applicable, in **Sections 3**, **4**, and **6**. In addition, any enforceable conditions imposed as part of an approved DWPA license must be consistent with (but are not limited to) all regulatory requirements under applicable statutes. Information on agency consultation is provided in **Appendix C**.

For its part, the Applicant would be required to obtain and comply with all applicable and appropriate permits, guidelines, and approvals as provided for in the CZMA, CWA, CAA, and any state or local permits such as the Florida Environmental Resource Permit (FERP), for any impacts on coastal resources, wastewater discharges, or regulated air emissions to the environment. It is the Applicant's responsibility to provide the permitting agency with the information necessary to determine the applicable requirements in a timely manner.

Table 1.6-1 lists major Federal and state permits, approvals, and consultations required to construct and operate an LNG deepwater port. **Appendix D** identifies the principal laws and EOs considered by the Administrator in formulating the license decision. Some of these authorities prescribe standards for compliance. Others require that specific planning and management actions are undertaken to protect environmental resources affected by issuance of a deepwater port license. The authorities shown in **Appendix D** are more fully addressed in various sections of the EIS when relevant to particular environmental resources and conditions. Full text of the laws can be accessed at *http://uscode.house.gov/lawrevisioncounsel.shtml.* EOs can be accessed at *http://www.archives.gov/federal-register/executive-orders/disposition.html*.

Provisions of the Endangered Species Act. Section 7 of the ESA states that any project authorized, funded, or conducted by any Federal agency should not "… jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined … to be critical." The Maritime Administration is required to "informally" consult with the U.S. Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration (NOAA), and the National Marine Fisheries Service (NMFS) to determine whether any federally listed or proposed endangered or threatened species or their designated critical habitats occur near the Port. Since it was determined that these species or habitats might be affected by the Project, the Maritime Administration began "informal" consultation with USFWS and NMFS and prepared a Biological Assessment (BA) (see **Appendix E**) to identify the nature and extent of impacts and recommend measures that would avoid or reduce potential impacts on the species. The BA determined that the Project is not likely to adversely affect one or more federally listed species. Therefore, the Maritime Administration has not requested to enter "formal" consultation under Section 7 of the ESA with the USFWS or NMFS. If formal consultation becomes necessary, USFWS or NMFS would issue a Biological Opinion (BO) on the potential for jeopardy. If their opinion is that the Project is not likely to jeopardize any listed species, they may also issue an incidental take statement as an exception to the takings prohibitions in Section 9 of the ESA. Correspondence with the USFWS and NMFS with respect to the ESA is presented in **Appendix C**.

Table 1.6-1. Major Permits, Approvals, and Consultations for Natural Gas Deepwater Ports

Agency	Permit/Approval/Consultation
U.S. Department of Homeland Security, USCG	– License application processing
USDOT, Maritime Administration	– License application processing and license issuance or denial
FERC	– Certificate of Public Convenience and Necessity to construct, install, own, operate, and maintain a pipeline under Section 7(c) of the NGA (15 U.S.C. § 717 (f)(c))
USDOT, Pipeline and Hazardous Material Safety Administration	– Establish and enforce deepwater port pipeline safety regulations for deepwater ports – Consultation on LNG facility design
U.S. Department of the Interior, Minerals Management Service (MMS)	– Advise USCG and the Maritime Administration concerning the potential impacts of DWPA Terminals on OCS lease blocks – Evaluation of Fair Market Value (FMV) and clearance of the Project footprint (including project pipeline rights-of-way [ROWs]); issuance of an MMS Segment Number, clearance letter, or other evidence that the Project does not conflict with planned or existing Outer Continental Shelf Lands Act (OCSLA) regulated facilities or activities – Hazard surveys guidance and coordination – Archeological coordination
U.S. Department of the Interior, USFWS	– Section 7 ESA coordination – Migratory Bird Treaty Act coordination – Coastal Barrier Resources Act coordination
USEPA	– CWA National Pollutant Discharge Elimination System permit (along with FDEP) – Title V CAA permit – CAA Preconstruction permit – CAA General Conformity Determination – CWA Section 403(c) Ocean Discharge Criteria – CWA Section 404 permit and mitigation consultation
U.S. Department of Commerce, NOAA NMFS	– Section 7 ESA coordination – Essential Fish Habitat (EFH) coordination under MSA – MMPA coordination – National Marine Sanctuaries Act (NMSA) Section 304(d) consultation
USACE	– Section 404 CWA permit – Rivers and Harbors Act Section 10 permit
U.S. Department of Defense	– Consultation (review of license application adequacy and views on effects on departmental programs)

Agency	Permit/Approval/Consultation
U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs	– Consultation (review of license application adequacy and views on effects on departmental programs)
Florida Department of State, Division of Historical Resources (State Historic Preservation Officer [SHPO])	– Section 106 NHPA coordination
Office of the Governor, Florida	– Approves, approves with conditions, or denies the license
FDEP, Coastal Management Program	– CZMA Consistency Determination
Florida Fish and Wildlife Conservation Commission (FWC)	– Consultation (protected species)
FDEP, Florida Department of State, Office of Cultural, Historical and Information Programs	– Consultation (NHPA coordination)
FDEP, Water Management District	– Environmental Resource Permit

Provisions of the Magnuson-Stevens Fishery Conservation and Management Act. The MSA, amended by the Sustainable Fisheries Act of 1996, establishes procedures designed to identify, conserve, and enhance essential fish habitat (EFH) for those species regulated under a Federal Fisheries Management Plan. The MSA requires Federal agencies to consult with NMFS on all actions or proposed actions authorized, funded, or undertaken by the agency that might adversely affect EFH. NMFS recommends consolidated EFH consultations with interagency coordination procedures required by other statutes such as NEPA or the ESA (50 CFR 600.920(e)(1)) to reduce duplication and improve efficiency. The mandatory content of an EFH Assessment is detailed in 50 CFR 600.920(e)(3). As part of the consultation process, sections of this EIS serve as the EFH Assessment for the Project. Correspondence with NMFS with respect to the EFH is presented in **Appendix C**.

Provisions of the Marine Mammal Protection Act. Under the authority of the MMPA of 1972 (16 U.S.C. §§ 1361 et seq.), the Secretary of Commerce is responsible for the protection of all marine mammals except walruses, polar bears, sea otters, manatees, and dugongs, which are the responsibility of the Secretary of the Interior. These responsibilities have been delegated to NMFS and the USFWS, respectively.

The MMPA prohibits the "take" of marine mammals, with certain exceptions, in waters under U.S. jurisdiction and by U.S. citizens on the high seas. Under Section 3 of the MMPA, "take" is defined as "harass, hunt, capture, kill, or attempt to harass, hunt, capture or kill any marine mammal." In the 1994 amendments to the MMPA, two levels of "harassment" were defined. "Harassment" is defined as any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild (Level A); or any act that has the potential to disturb a marine mammal or marine mammal stock in the wild by disrupting behavioral patterns, including, migration, breathing, nursing, breeding, feeding, or sheltering (Level B). In cases where U.S. citizens are engaged in activities, other than fishing, that result in "unavoidable" incidental take of marine mammals, the Secretary of Commerce can issue a "small take authorization." The authorization can be issued after notice and opportunity for public comment if the Secretary of Commerce finds negligible impacts. The MMPA requires consultations with NMFS if impacts on marine mammals are unavoidable.

Section 101(a)(5)(A) of the MMPA directs the Secretary of Commerce, upon request, to authorize the unintentional taking of small numbers of marine mammals incidental to activities (other than commercial fishing) when, after notice and opportunity for public comment, the Secretary (1) determines that total takes during a 5-year (or less) period have a negligible impact on the affected species or stock, and (2) prescribes necessary regulations that detail methods of taking and monitoring and requirements for reporting. The MMPA provides that the moratorium on takes may be waived when the affected species or population stock is at its optimum sustainable population and will not be disadvantaged by the authorized takes (i.e., be reduced below its maximum net productivity level). Section 101(a)(5)(A) also specifies that the Secretary has the right to deny permission to take marine mammals if, after notice and opportunity for public comment, the Secretary finds (1) that applicable regulations regarding taking, monitoring, and reporting are not being followed; or (2) that takes are, or might be, having more than a negligible impact on the affected species or stock.

Provisions of the National Historic Preservation Act. Section 106 of the NHPA requires the Maritime Administration to consider the impacts of its undertakings on properties listed on or eligible for listing on the National Register of Historic Places (NRHP), including prehistoric or historic sites, districts, buildings, structures, objects, or properties of traditional religious or cultural importance, and to allow the Advisory Council on Historic Preservation (ACHP) to comment on the undertaking. Consultation with the State Historic Preservation Officer (SHPO) will take place in the event of a potential adverse impact on historic properties as a result of the Project. The Maritime Administration has requested that the Applicant, as a non-Federal party, assist in meeting the Maritime Administration's obligations under Section 106 by preparing the necessary information and analysis as required by ACHP procedures (36 CFR Part 800). The cultural resources sections of this EIS discuss the Section 106 review.

Provisions of the Coastal Zone Management Act. The CZMA calls for the "effective management, beneficial use, protection, and development" of the nation's coastal zone and promotes active state involvement in achieving those goals. To reach those goals, the CZMA requires participating states to develop management programs that demonstrate how these states will meet their obligations and responsibilities in managing their coastal areas. The agency responsible for administering CZMA in the designated adjacent coastal state is the FDEP Coastal Management Program. The Applicant must prepare a consistency certification, finding that its proposed activities would be fully consistent with the enforceable policies of the state's coastal zone management program, and submit it to the state for review.

Provisions of the Marine Protection, Research, and Sanctuaries Act. Under Section 101 of the Marine Protection, Research, and Sanctuaries Act (MPRSA), 33 U.S.C. 1401, no person may transport material from the United States for the purpose of dumping it in ocean waters in the absence of a permit issued by USEPA pursuant to Section 102 of the Act. "Dumping" does not include "construction of any fixed structure or artificial island nor the intentional placement of any device in ocean waters, or on or in the submerged land beneath such waters, for a purpose other than disposal, when such construction or such placement is otherwise regulated by Federal or state law…" Installation of the Project falls within the ambit of this statutory exclusion.

2. Detailed Description of the Project and Alternatives

The Applicant proposes to construct, own, and operate a deepwater port for importation of LNG and send-out of natural gas. Port Dolphin (the Port) would be located approximately 45 km (28 mi) offshore from Tampa, Florida. The Port would be capable of mooring two LNGCs at one time, referred to as SRVs, by means of a submerged unloading buoy system. Each of two unloading buoys, also known as STL buoys, would have eight mooring lines connected to eight pile-driven anchor points in the seafloor. An SRV would typically moor at the deepwater Port for 4 to 8 days. When not connected to an SRV, the STL buoy would be submerged approximately 18.3 to 21.3 m (60 to 70 feet) below the sea surface and be supported by mooring lines and rest on the STL buoy landing pad. A marker buoy and retrieval line would be used to locate and recover the buoy as an SRV arrives at the deepwater Port. The unloading buoy would be retrieved from its submerged position and hoisted in through a moon-pool in the forward part of the SRV where it would be positioned in a receiving cone within the hull trunk. After the buoy is locked in position, unloading of LNG would begin. The SRV would unlock from the receiving cone and leave the Port after the LNG is unloaded.

The SRVs proposed for use by the Applicant would be equipped to transport, store, vaporize, and meter natural gas. A closed-loop, glycol/water-brine heat transfer system would be used to vaporize the LNG. The deepwater Port would have an average throughput capacity of 800 MMscfd and a peak capacity of approximately 1,200 MMscfd. Natural gas flowlines from the Port would connect to a 36-inch gas transmission line. The transmission line would interconnect with the existing Gulfstream Pipeline interstate natural gas transmission line and the TECO system approximately 73.9 km (46 mi) east of the deepwater Port through onshore interconnections. Delivered natural gas would meet interstate pipeline tariff conditions at the point of delivery and would be conditioned as necessary. Construction of the deepwater Port components would be expected to take 11 months, with operations planned to commence in the second quarter of 2011. A detailed description of the Applicant's proposal is included in **Section 2.3**.

This section of the EIS includes the alternatives that have been considered to determine whether they meet the purpose of and need for the Project; are feasible; and provide environmental advantage in comparison with the Proposed Action. Some of these alternatives were identified by the Applicant. Some have been used in similar projects in other locations. This section identifies the alternatives that will be evaluated in more detail in this EIS (including the No Action Alternative), and alternatives that have been eliminated from detailed analysis.

2.1 Alternatives Considered

NEPA requires that any Federal agency proposing a major action (as defined under NEPA) must consider reasonable alternatives to the Proposed Action, including the No Action Alternative. Evaluation of alternatives assists in reducing or avoiding unnecessary impacts by identifying a reasonable range of alternatives and broadens the scope of options to achieve the underlying purpose that the Applicant might or might not have considered. This analysis of alternatives also broadens the scope of options that might be available to reduce or avoid impacts associated with the action as proposed by the Applicant. The Administrator may approve, approve with conditions, or deny an application for a license under the DWPA. Consistent with NEPA, in determining the provisions of the license, the Administrator may also consider alternative means to construct and operate a deepwater port. Alternatives for an LNG deepwater port can extend to matters such as its specific location, port design concepts, methods of construction, technologies for storing and regasifying LNG, and specific routes for transmission of product.

2.1.1 No Action Alternative

The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the License, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the Applicant could withdraw the license application. Any of these actions or the disapproval by any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Screening criteria, described in detail within each alternatives category, are used to determine whether the broad list of alternatives presented in **Section 2.1.3** will be carried forward for detailed analysis in **Section 4** or eliminated from further consideration. For alternatives eliminated from further consideration, the basis of elimination is given. The Administrator has identified potential alternatives to the Project. The following discussion identifies alternatives found to be reasonable, alternatives found not to be reasonable, and, for the latter, the basis for such finding. The alternatives considered are summarized in **Table 2.1-1**.

2.1.2 Offshore vs. Onshore LNG Alternatives

Congress has passed statutes that distribute responsibility for the development of LNG facilities in the United States across different agencies within the Federal government. For offshore LNG facilities, the USCG and Maritime Administration jointly share responsibility for evaluating and processing applications submitted under the DWPA. For onshore facilities, the responsibility lies within the FERC under the NGA. LNG import terminals that are proposed as onshore facilities are projects independent of LNG deepwater ports that are proposed offshore (i.e., they are not mutually exclusive); therefore they are not considered to be alternatives to each other. In addition no onshore LNG facilities exist or are being proposed that target the west-central Florida market. Several onshore facilities have been approved or proposed for other Gulf Coast states. Onshore facilities are discussed under the No Action Alternative, since they could be developed regardless of the outcome of the proposed DWPA application. Other deepwater port projects in the GOM, including Bienville, and Main Pass Energy Hub™ (MPEH) are discussed in **Section 6**, Cumulative and Other Impacts, as foreseeable actions. The number of LNG facilities needed to meet the growing demand in Florida will ultimately be based on market conditions.

Table 2.1-1. Summary of Alternatives Considered

Alternative Concept	Options/Locations (Subsection in Section 2 Discussed)	Evaluated in Detail in Section 4
No Action Alternative		Yes
Energy Sources	Proposed LNG	Yes
	Coal	No
	Oil	No
	Natural Gas	No
	Nuclear	No
	Alternative Energy	No
Deepwater Port Concepts	Gravity-Based Structure	No
	Fixed Platform	No
	Floating Storage and Regasification Unit	Yes
	Proposed Submerged Turret Loading Buoy System	Yes
	Floating Platform	No
	Artificial Island	No
Port Location	North of Tampa Bay	No
	St. Petersburg Area	No
	Tampa Bay Area	Yes
	Sarasota Area	No
	Fort Myers Area	No
Alternative Vaporization Technologies	Closed Loop - Submerged Combustion Vaporizer	No
	Closed Loop – Shell and Tube Vaporizer	Yes
	Open Loop – Open Rack Vaporizer	No
	Open Loop – Shell and Tube Vaporizer	No
	Ambient Air Vaporizer	Yes
Alternative Pipeline Routes	Offshore Northern Route	No
	Offshore Southern Route	Yes
	Offshore Gulfstream Interconnect	Yes
Alternative Anchoring Methods	Embedment Anchors	No
	Drilled and Grouted Anchors	No
	Suction Piles	Yes
	Gravity Anchors	No
Propulsion Alternatives	Turbine Drive	No
	Slow Speed Diesel	No

Alternative Concept	Options/Locations (Subsection in Section 2 Discussed)	Evaluated in Detail in Section 4
Marine Life Exclusion Systems	Aquatic Filter Barrier	No
	Wedgewire Screens	No
Pipeline Construction Methods	Jetting	No
	Plowing	Yes
	Dredging	Yes
	Horizontal Directional Drill	Yes

2.1.3 Offshore Port Design Alternatives

There are six basic deepwater port design concepts that have been developed by industry and are currently considered commercially available for use as an offshore LNG import port: gravity-based structure (GBS); fixed platform-based unit; floating storage and regasification unit (FSRU); STL buoy systems with Special Purpose Vessels (SPV) that transport and vaporize LNG onboard, such as the SRV proposed for this Project; special purpose floating platforms; and man-made islands constructed to house LNG storage and vaporization equipment. All six port concepts include use of subsea natural gas pipelines to transport regasified LNG from the Port to the existing onshore pipeline system.

Although there is some adaptability of design in each of the six concepts, there are inherent features of each that are most compatible with certain environmental conditions. Each design concept was evaluated based on potential environmental impacts, water depth, required seafloor characteristics, and reliability. Environmental impact areas included areas of seafloor disturbance, water use, air emissions, impacts on shore and nearshore areas, and visual impacts. Reliability was evaluated based on weather and wave conditions in the area that could limit the capability of LNGCs to dock with the port, transfer LNG to storage, or vaporize LNG to natural gas using on board systems. The availability of storage at the Port could increase the reliability of the Port in severe weather since LNGCs would not have to dock for vaporization to continue while the stored LNG was processed. Although there are many system design characteristics that affect overall reliability, system design can compensate for reliability issues through over-design and redundancy. Therefore, for the purposes of this alternatives analysis, each port design alternative is considered to be roughly equal in terms of design-based reliability. Screening was limited to weather- and wave-related conditions. A site was not eliminated solely because a single preselected type of port design was found to be unsuitable for conditions present at that site. Likewise, a design was not eliminated prior to considering whether that design would be suitable for the Applicant's proposed location. In addition, a port design or location was not eliminated solely because it would not support the proposed vaporization alternative. **Table 2.1-2** compares the offshore port design alternatives under analysis.

Table 2.1-2. Comparison of Port Type Alternatives

Alternative Deepwater Port Designs – Comparison of Siting and Operational Requirements						
	GBS	**Fixed Platform**	**FSRU**	**Submerged Turret Loading Buoy System**	**Artificial Island**	**Special Purpose Floating Platform**
Proposed or Existing Deepwater Ports	Port Pelican, Gulf Landing, Compass Port, Pearl Crossing, Beacon Port.	Main Pass Energy Hub, Clearwater.	Cabrillo Port	Gulf Gateway, Northeast Gateway, Neptune, Calypso[1], OceanWay Secure Energy, Port Dolphin.	Safe Harbor Energy	Bienville Offshore Energy Terminal.
Fixed or Floating?	Fixed	Fixed	Floating	Floating – Can be single-point or multiple-point	Fixed	Floating
Ancillary Structures or Vessels	Might have separate platforms for regas or personnel.	Might have separate floating or fixed platform for mooring.	No	For regasification, might have permanently moored vessel to receive traditional LNGCs, or special purpose vessels instead of traditional LNGCs.	No	Might have platform or permanently moored floating facility for regas and port operations.
LNG Storage	LNG storage available	Potential storage on platform or in salt dome	LNG storage available	No LNG storage	LNG storage available	No LNG storage
Water Depth Required	60 –100 feet	> 60 feet	>100 feet	>100 feet	60 –100 feet	100 – 500 feet
Topography	Level or gently sloping	Flexible	Flexible	Flexible	Flexible	Flexible
Substrate Characteristics	Substrate capable of supporting fully loaded structure and seismic stability.	Substrate capable of supporting fully loaded platform.	Flexible; only needed for anchorage.	Flexible; only needed for anchorage.	Substrate capable of supporting fully loaded structure and seismic stability.	Flexible; only needed for anchorage.

Alternative Deepwater Port Designs – Comparison of Siting and Operational Requirements						
	GBS	**Fixed Platform**	**FSRU**	**Submerged Turret Loading Buoy System**	**Artificial Island**	**Special Purpose Floating Platform**
Reliability	• Fixed mooring structures provide limited flexibility during extreme weather. • Storage capability allows regas and send-out in extreme weather.	• Fixed mooring structures provide limited flexibility during extreme weather. • If available, storage capability allows regas and send-out in extreme weather.	• Floating structure limited by wave height. • Storage capability available, but regasification would halt if FSRU were moved in extreme weather.	• Floating structure limited by wave height. • Lack of fixed storage means send-out could potentially halt in extreme weather.	• Fixed mooring structures provide limited flexibility during extreme weather. • Storage capability allows regas and send-out in extreme weather.	• Floating structure limited by wave height. • Lack of fixed storage means send-out could potentially halt in extreme weather.
LNG Vaporization Technology Supported	No restrictions	No restrictions	Open-loop technologies are restricted to shell-and-tube vaporizers (STVs) due to constant movement. Ambient air vaporization (AAV) is possible.	Restrictions would be dependent upon the ancillary structure or vessel.	No restrictions	Weight and size restrictions of floating platform preclude closed-loop or AAV technologies. Open-loop technologies are restricted to STV due to constant movement. If regasification equipment is on ancillary structure/vessel, restrictions would be dependent upon the ancillary structure/ vessel.

2.1.3.1 Gravity-Based Structure Design

A GBS consists of a large concrete structure that contains integrated storage tanks and sits on the seafloor. The GBS would be built at an onshore graving dock using well-proven construction methods and then floated, towed to the site, and installed on the seafloor. This port concept has been commonly and successfully used in the offshore oil and gas industry since the 1980s (CEE 2006). The first use as a platform for an LNG import terminal is the Adriatic LNG project in Italy, which was installed in September 2008 and is scheduled to be fully operational in 2009 (Oil & Gas Journal 2008).



Figure 2.1-1. Gravity-Based Structure

Source: USCG and MARAD 2004

LNG could be offloaded from conventional LNGCs, placed in storage tanks, and then vaporized for delivery as natural gas to the onshore market via an undersea pipeline. An example can be seen in **Figure 2.1-1**. Given the expense associated with constructing and operating a GBS, it appears that these facilities are only economically feasible for projects with relatively large LNG storage (e.g., 250,000 to 330,000 m^3) and natural gas send-out volumes (e.g., 800 to 2,000 MMscfd). The Port Pelican and Gulf Landing Projects have been approved to use facilities of this design in the GOM, but Port Pelican was cancelled by the applicant and Gulf Landing has been indefinitely postponed by the applicant. The Compass Port and Beacon Port Projects were proposed to use GBS designs, but the applications have been withdrawn.

Environmental Impacts. Installation of a GBS would result in a large footprint on the seafloor. This loss of seafloor area would generally result in the loss of more benthic and fish habitat than other concept designs, except for an artificial island. A GBS design also can involve substantial coastal impacts (e.g., wetland loss, dredging) because it typically requires construction of a very large graving dock and sufficient nearshore water depths for floating the GBS to deeper water (USCG and MARAD 2005). In addition, because of its maximum depth limitations, use of a GBS in the GOM would tend to impact nearshore areas where sensitive shallow water habitats and fisheries exist, where the majority of recreational boating and fishing activity takes place, and where it creates potential safety and aesthetic concerns. For comparison, the main deck of the SRVs proposed is 14 m (48 feet) above sea level, whereas a GBS structure previously proposed in the GOM would rise 35 m (114 feet) above the ocean surface (USCG and MARAD 2005.) On the other hand, GBS can serve as artificial reefs, providing hard substrate for the development of new encrusting and fouling communities. As has been demonstrated by other permanent offshore oil and gas structures, such facilities have the potential to support significant and diverse fish and shellfish communities.

Reliability. GBSs that are designed for continuous supply of natural gas must have sufficient storage capacity to allow continuous vaporization while LNGCs transit to and from the port. This storage capability allows for the transfer of natural gas to the market even when LNGCs cannot traverse waters in times of severe weather. Therefore, GBS might be more reliable than floating systems in severe weather conditions. However, LNGCs are limited by wave height when docking with the GBS or platform-based port. Generally, LNGCs are limited to 2.0- to 2.5-m (6.6- to 8.2-foot) wave heights when docking.

Conclusion. The GBS option is more sensitive to weather conditions than the proposed STL option. The sensitivity is based on weather effects on mooring and unloading of SRVs. However, based on the

historic weather patterns at the proposed location, the total downtime for any system is limited to a few days at most. Provided that the wave conditions are not so extreme that the vaporization process would have to be shut down, the designs such as GBS that provide onsite LNG storage would be able to continue send-out even if the LNGCs could not dock at the port. If extreme weather required shutdown of vaporization, then it would likely also limit operation of the STL design as well. Therefore, weather-related reliability of the systems is likely to be similar.

The GBS system has higher vulnerability to damage during extreme weather events. As demonstrated during Hurricanes Katrina and Rita, damage to GOM surface facilities can result in system shutdowns that extend longer than the weather event itself. Therefore, the STL design offers reliability advantages. During a weather event the SRV can depart the buoy, the buoy can be safely moored below the surface, and the SRV can return and resume transfer as soon as the storm has passed.

Although a GBS port would have high reliability for continuous delivery of supply, it has several disadvantages from an environmental standpoint because it must be sited in shallow waters, where it presents a source of impact on areas of high marine productivity, potential conflict with nearshore fisheries, proximity to nearshore recreational boating and fishing areas, and a permanent visual obstruction on the horizon. These shortcomings, coupled with high capital and construction costs, make the GBS design less preferable. Therefore, the GBS design is not carried forward for detailed review, and sites suitable for GBS port designs were not considered in the analysis of alternative locations.

2.1.3.2 Fixed Platform-Based Unit

The fixed platform-based unit design would consist of a newly constructed platform or conversion of an existing offshore platform or platforms with docking facilities and LNG unloading arms, storage, and vaporization equipment. Because these platforms are or would be anchored using fixed-tower structures, they could be located in a broader range of water depths than a GBS. Similar to the GBS design, LNG could be unloaded from conventional LNGCs, vaporized at the platform, and sent as natural gas to the onshore market via an undersea pipeline. An example can be seen in **Figure 2.1-2**. Depending on the specific design, the use of an offshore platform might not include offshore storage of LNG. The Clearwater Port project proposal includes using an existing platform as a terminal to import LNG into California from the Clearwater Project, and Freeport-McMoran Energy LLC has recieved a DWPA license for MPEH™ to modify a series of existing connected platforms about 26 km (16 mi) off the coast of southeastern Louisiana to use as a deepwater LNG terminal.



Figure 2.1-2. Fixed Platform-Based Unit

Source: USCG and MARAD 2006

Environmental Impacts. Fixed platform-based units would have adverse impacts on benthic resources from the installation of the platform legs. The number of legs for each platform, the number of platforms required, and the methods used to install the legs would alter the environmental impacts. Platforms would also stand taller and result in greater visual impacts than floating designs.

The platform port designs would be served by conventional LNGCs. Therefore, in addition to the cooling water required for port electric-generating equipment cooling, the LNGCs would also require cooling water for onboard generating equipment and propulsion auxiliaries. An average of three LNGCs per

week would be required to maintain the design send-out rate for the Project. Based on reported cooling water intakes for LNGCs, and assuming that the LNGC would be moored at a port for 24 hours, a total of 57 MGD would be used by the LNGCs for cooling. The Port would require 135 LNGC visits for a total of 7,695 million gallons of cooling water intake per year. In addition, the Port would use 5.5 MGD. Therefore, a total annual cooling water use of 9,702.5 million gallons would be required for GBS system cooling and LNGC water intake, which exceeds the 2,007 million gallons used by the SRV design. For any design, the volume of ballast water intake would be dependent on the volume of LNG vaporized, so all port designs would use approximately the same volume of ballast water (FERC 2008b).

Reliability. GBS, fixed platform-based units, and FSRUs that are designed for continuous supply of natural gas must have sufficient storage capacity to allow continuous vaporization while LNGCs transit to and from the platforms. This storage capability allows for the transfer of natural gas to the market even when LNGCs cannot traverse waters in times of severe weather. Therefore, GBS and other fixed platform-based units might be more reliable than floating systems in severe weather conditions. However, LNGCs are limited by wave height when docking with the GBS or fixed platform-based port. Generally, LNGCs are limited to 2.0- to 2.5-m (6.6- to 8.2-foot) wave heights when docking.

Conclusion. Platform option is more sensitive to weather conditions than the SRV and floating platform (FP) options. The sensitivity is based on weather effects on mooring and unloading of SRVs, as well as the FSRUs processing operations due to LNG sloshing in tanks and other motion-related effects on fluid mechanics. However, based on the historic weather patterns at the proposed location, the total downtime for any system is limited to a few days at most. Provided that the wave conditions are not so extreme that the vaporization process would have to be shut down, the designs that provide onsite LNG storage would be able to continue send-out even if the LNGCs could not dock at the port. If extreme weather required shutdown of vaporization, then it would likely also limit operation of the SRV and FP projects as well. Therefore, weather-related reliability of the systems is likely to be similar for all port designs.

Each of the fixed systems has higher vulnerability to damage during extreme weather events. As demonstrated during Hurricanes Katrina and Rita, damage to GOM surface facilities can result in system shutdowns that extend longer than the weather event itself. Therefore, the SRV and STL design offers reliability advantages. During a weather event the SRV can depart the buoy, the buoy can be safely moored below the surface, and the SRV can return and resume transfer as soon as the storm has passed.

A fixed platform-based unit would require additional platforms to be installed to contain sufficient LNG storage to unload the entire cargo from an LNGC. Therefore, either several platforms would be required, with attendant environmental impacts, or regasification would have to be performed directly as LNG is unloaded from the moored LNGC. If a vessel is unable to moor alongside the fixed structure due to high winds and wave conditions, the throughput could be interrupted. Essentially, a fixed platform-based system has more limited operational ability to moor, connect, and unload LNG compared to an SRV during bad weather conditions. Thus, the level of reliability and continuous throughput required for the commercial viability of the Project might not be achieved using the fixed platform-based system. The environmental impacts of a fixed platform-based unit would be higher than for the SRV, FP, and FSRU designs because of the platform legs that would be set to support the platforms. Therefore, the fixed platform-based design was not carried forward for additional review.

2.1.3.3 Floating Storage and Regasification Unit



Figure 2.1-3. Floating Storage and Regasification Unit

Source: USCG and MARAD 2007e

An FSRU is a purpose-built floating ship-like vessel without a propulsion system, based on LNGC technology and components of floating production, storage, and offloading (FPSO) systems, which are widely used in the offshore oil and gas production industry. The first unit was installed in Spain in 1977, and more than 50 are operating in locations in Europe, Africa, North America, and Asia (Skipsrevyen 2007). The first FSRU for use as an LNG port was converted from an LNGC by Golar in 2007 and contracted to Petrobras, and an additional four LNGCs are being converted by Golar for service as FSRUs (GlobeNewswire 2006). LNG storage tanks would be integrated within the hull, and regasification and unloading equipment would be on deck. These units would be permanently anchored offshore where conventional LNGCs could dock next to and unload LNG to the FSRU. The FSRU would be connected to an external turret, which would allow high-pressure gas to be sent out through a riser to the subsea pipeline. While the FSRU could be spread-moored (i.e., on a constant heading), a weathervaning turret-mooring would most likely be used, unless a very sheltered location was available. An example can be seen in **Figure 2.1-3**. This design was proposed to import natural gas to markets in California at the Cabrillo Port Project, which was rejected by the Governor of California, and has been proposed in New York at the Broadwater Energy Project.

Environmental Impacts. The environmental impacts of the FSRU would depend on the number of anchors installed and the method of installing the anchors. A discussion of impacts due to anchor type is included in **Section 2.1.5**. The number of anchors would be influenced by the size of the vessels, with large vessels requiring larger sizes or numbers of anchors.

Reliability. FSRUs that are designed for continuous supply of natural gas must have sufficient storage capacity to allow continuous vaporization while LNGCs transit to and from the platforms. This storage capability allows for the transfer of natural gas to the market even when LNGCs cannot traverse waters in times of severe weather. FSRUs could be limited by LNG sloshing in the storage tanks in severe wave events. Additionally, LNGCs are limited by wave height when docking with the FSRU. Generally, LNGCs are limited to 2.0- to 2.5-m (6.6- to 8.2-foot) wave heights when docking (FERC 2008b).

Conclusion. The FSRU is more sensitive to weather conditions than the SRV and FP options. The sensitivity is based on weather effects on mooring and unloading of SRVs, as well as the FSRUs processing operations due to LNG sloshing in tanks and other motion-related effects on fluid mechanics. However, based on the historic weather patterns at the proposed location, the total downtime for any system is limited to a few days at most. Provided that the wave conditions are not so extreme that the vaporization process would have to be shut down, the designs that provide onsite LNG storage would be able to continue send-out even if the LNGCs could not dock at the port. If extreme weather required shutdown of vaporization, then it would likely also limit operation of the SRV and FP projects as well. Therefore, weather-related reliability of the systems is likely to be similar for all port designs.

Each of the fixed systems has higher vulnerability to damage during extreme weather events. As demonstrated during Hurricanes Katrina and Rita, damage to GOM surface facilities can result in system

shutdowns that extend longer than the weather event itself. The FSRU is designed to weather storms at the site, but if extreme weather was predicted, it could be towed to a safe location until the storm passed and then returned to operation.

The FSRU design has a small environmental footprint and can be located in deeper water, farther from shore. The FSRU can operate in more extreme sea conditions, and therefore provide greater reliability of service. The FSRU design can support the Applicant's proposed gas send-out rates without additional storage or control platforms.

The FSRU has nearly the same level of environmental impacts as the SRV. Impacts resulting from anchors for the FSRU are likely to be lower because a single set of anchors would be required for the FSRU to support continuous vaporization and send-out of natural gas, while an SRV system would require two sets of anchors to allow simultaneous operation of two SRVs while one is shutting down and the other is starting up. The principal advantage offered by the FSRU design would be the ability to use the ambient air vaporization system discussed in **Section 2.1.7.3**.

Although an SRV and unloading buoy system could be more costly than a conventional LNGC due to the required vaporization and buoy mating systems, the total capital cost of an FSRU system that would meet this Project's supply conditions would likely be larger, mainly due to the increased costs to accommodate floating storage needs. Because the environmental impacts of the anchoring system would be similar to the SRV, the operating parameters would provide similar reliability as the SRV, and the potential for reduced marine impacts through the use of the AAV system, the FSRU design is carried forward for detailed review.

2.1.3.4 Special Purpose Floating Platform

This concept is essentially a hybrid of the submerged buoy concept and the fixed platform-based unit. An FP is held in place by an anchoring system similar to the anchors used for submerged unloading buoys. The FP is designed to dock with conventional LNGCs. Vaporization equipment is housed on the platform, and a small support platform constructed nearby houses personnel facilities and support structures for the floating platform. No LNG storage would be provided by this design. An example can be seen in **Figure 2.1-4**. The Bienville Offshore Energy Terminal (BOET) Project using this concept has been proposed by TORP Technologies for construction in the GOM. In October 2008, the Application for BOET was withdrawn by the Applicant. In public statements, the Applicant for BOET has said that a new application will be filed and a closed-loop vaporization system will be proposed (Energy Current 2008). To date, no additional information has been made available. The Esperanza Project off the coast of Southern California has been announced by Tidelands Oil and Gas, but no application has been filed.

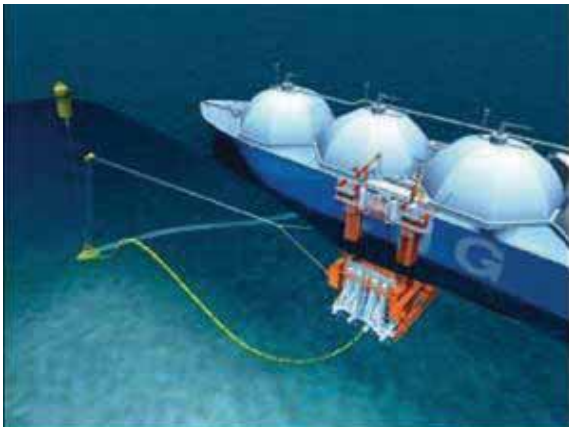


Figure 2.1-4. Special Purpose Floating Platform

Source: USCG and MARAD 2007d

Environmental Impacts. The environmental impacts of floating designs would depend on the number of anchors installed and the method of installing the anchors. A discussion of impacts due to anchor type is included in **Section 2.1.5**. The number of anchors would be influenced by the size of the vessels, with

large vessels requiring larger sizes or numbers of anchors. FPs also require an additional support platform. The FP design includes impacts from both the anchor system and the support platform legs.

Reliability. The FP design provides for docking with a wide range of existing and planned conventional LNGCs. FPs have weather-related characteristics similar to SRVs. Model tests have demonstrated capabilities to dock with LNGCs and to continue offloading operations in seas up to 4.5 m (14 feet) (TORP LNG 2006a, 2006b).

Conclusion. The FP and STL designs have similar sensitivity to weather conditions. The sensitivity is based on weather effects on mooring and unloading of LNGCs and SRVs. If extreme weather required shutdown of vaporization, then it would likely limit operation of both the STL and FP projects. Therefore, weather-related reliability of the systems is likely to be similar.

The FP design has higher vulnerability to damage during extreme weather events because of the associated fixed platform. As demonstrated during Hurricanes Katrina and Rita, damage to GOM surface facilities can result in system shutdowns that extend longer than the weather event itself. Therefore, the STL design offers reliability advantages. During a weather event the SRV can depart the buoy, the buoy can be safely moored below the surface, and the SRV can return and resume transfer as soon as the storm has passed.

The FP design would provide capabilities similar to the SRVs. The existing FP design can only support an open-loop shell-and-tube vaporizer system design. The seawater intake design for the Bienville Project has been redesigned to minimize impacts from the open-loop design. The Esperanza Project proposes to use the cooling water effluent from an onshore power plant as its warming water supply. The closest power plant to the proposed location of Port Dolphin is more than 40 miles away, compared to the 15-mile distance for the Esperanza project. The nearest power plant is also about 15 miles inland compared to the shoreside location of the power plant in California. Therefore, the impacts associated with bringing power plant effluent to the Port Dolphin site would be considerably higher than those associated with Esperanza. Since a support platform would also be required, the FP design would have higher environmental impacts than the SRV design. In addition, because of objections raised by the Governor of Alabama, the adjacent coastal state associated with BOET, the application was withdrawn. Therefore the FP design is not carried forward for detailed review.

2.1.3.5 Artificial Island

An artificial island such as the proposed Safe Harbor Energy Island Terminal near Long Island, New York, would create approximately 60.5 acres in surface area and would require a seafloor footprint of 116 acres. The site would be built using mostly four main components: sand, rock, concrete caissons, and concrete armor units. The interior would be built with sand and the exterior would be built up using a combination of rock and concrete armor units to protect the artificial island from wave attack. An example can be seen in **Figure 2.1-5**.



Figure 2.1-5. Artificial Island

Source: USCG and MARAD 2007d

The artificial island port design would include (1) a rock breakwater structure surrounding the main body of the island to provide a protected harbor for the berthing of LNG tankers and support vessels;

(2) granular fill material (sand and gravel) for the main body of the island would be contained and protected on all sides by a rock breakwater structure; (3) a steel pile-supported pier structure with the unloading facilities and associated mooring dolphins and breasting dolphins that would be capable of securing two LNG tankers for the unloading of LNG cargo; (4) LNG storage tanks constructed on pile supports to contain the LNG; (5) LNG vaporization equipment; (6) facilities required for the docking of the LNG vessels and support of the LNG processing operation including power generation and accommodations for workers; and (7) miscellaneous supporting facilities, such as a sewage treatment system, a storm water collection system, and administration, maintenance, and storage buildings.

Environmental Impacts. Installation of an artificial island would generally result in a much greater loss of benthic and fish habitat, and thus a greater adverse effect on fish and marine communities than other port design alternatives due to its large footprint.

An artificial island port design would require procurement of sand, rock, and concrete, likely from areas outside of the GOM. In addition because its maximum depth limitations would require a location fairly close to shore, use of an artificial island could adversely impact sensitive shallow water habitats and fisheries, as well as recreational boating and fishing activity. Nearshore locations could also create potential safer concerns. Furthermore, as artificial islands are permanent fixed structures that would likely be closer to shore than most other port designs, they would likely result in greater adverse aesthetic impacts if located close enough to shore to be visible. Finally, the environmental impacts of decommissioning an artificial island (unless abandoned in place) are unknown, but could reasonably be expected to be higher than decommissioning the other port design alternatives.

It is anticipated that four tugs would be required to assist with the maneuvering the LNGCs to dock with this port structure. This would increase vessel traffic and potential interactions with sensitive species in addition to increasing daily withdrawal volumes of support vessels as compared to the Proposed Action.

Potential environmental benefits of an artificial island port design alternative include the additions of hard surfaces which could serve as an artificial reef for potential colonization of hard-bottom communities. As demonstrated by other permanent offshore oil and gas structures, such facilities have a potential to support significant and diverse fish and shellfish communities. In addition, the creation of an artificial island could provide an alternative use for dredge spoil or other materials that would otherwise require disposal and use of landfill or offshore disposal capacities.

Reliability. Artificial islands are generally used in port designs that require LNG storage to facilitate continuous throughput. The artificial island port design could receive conventional LNGCs, which would maximize reliability.

Conclusion. The artificial island port design alternative could accommodate open- or closed-loop vaporization system or AAV technology and conventional LNGCs, and would provide enough space for storage or sufficient berthing area to accommodate a continuous throughput. However, creating an artificial island would be cost-prohibitive due to the water depth at the site 30.5 m (100 feet); thus, an artificial island would not be viable unless sited closer to the coast, which would likely increase both safety and environmental concerns in comparison with the proposed location. For these reasons, the artificial island port design alternative was eliminated from further analysis and consideration.

2.1.3.6 Submerged Turret Loading Buoy System (STL)

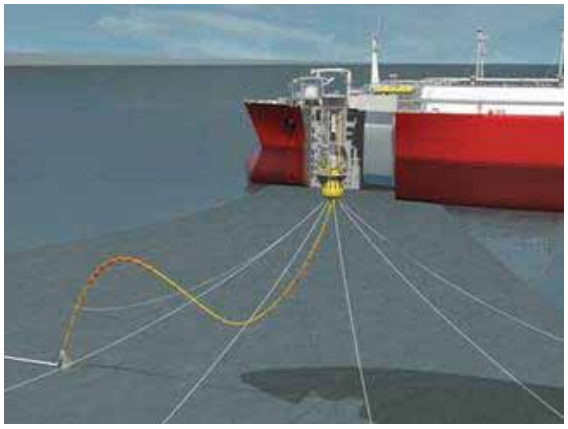


Figure 2.1-6. Submerged Turret Loading Buoy System (STL)

Source: USCG and MARAD 2007d

This concept differs from the other four technologies insofar as it does not involve any permanent storage or regasification facility. The proposed offshore port site would consist of a permanently installed single-point point submerged turret unloading buoy, and would receive SRVs that would be capable of containing onboard LNG vaporization equipment. After mooring, LNG would be vaporized onboard the vessel and discharged via the unloading buoy and a flexible riser into the subsea pipeline. Because the LNG would be vaporized with the SRV's onboard equipment, no permanent fixed or floating storage or vaporization facilities would be required. Unlike standard LNGCs, which offload LNG in 18 hours or less, SRVs offload natural gas (i.e., regasified LNG) and inject it into a subsea natural gas pipeline at standard pipeline pressures. As a result, this process can take 5 to 8 days to discharge a full cargo of LNG, and continuous off-loading operations are essential to minimize fluctuations in the throughput of natural gas. An example can be seen in **Figure 2.1-6**. There have been three variations of this design. Excelerate Energy's Gulf Gateway Project has begun operation in the GOM using a single buoy for intermittent send-out of natural gas. Excelerate's Northeast Gateway Project has begun operation in Massachusetts Bay using two buoys to allow continuous send-out with two vessels moored to the buoys during a transition period as the first vessel completes vaporizing its cargo and shuts down vaporization while the second vessel begins its vaporization cycle. Suez's Neptune Project in Massachusetts Bay is similar in design to Northeast Gateway and has begun construction. The Calypso Project proposed off the eastern Florida coast would have employed a two-buoy design that combined an FSRU and an SRV vessel design. The FSRU would have been permanently moored to one buoy. SRVs would dock at the second buoy. The Calypso application has been withdrawn by the applicant.

Environmental Impacts. The environmental impacts of floating designs would depend on the number of anchors installed and the method of installing the anchors. A discussion of impacts due to anchor type is included in **Section 2.1.5**. The number of anchors would be influenced by the size of the vessels with large vessels requiring larger sizes or numbers of anchors. If an STL design used two submerged turrets, its impacts would be greater than a project proposing a single turret.

Reliability. STLs that are designed for continuous supply of natural gas must have at least two buoy systems to allow continuous vaporization while SRVs transit to and from the Port site. One SRV would be moored at the Port and vaporizing LNG while a second SRV transited to the Port and moored at a second buoy. When the first SRV completed vaporizing its cargo, the second SRV would phase in. The first SRV would then depart and transit to pick up another LNG cargo. During severe weather events, the SRVs would not be able to moor and send out natural gas. Therefore, GBS and other fixed platform-based units might be more reliable than floating systems in severe weather conditions. However, LNGCs are limited by wave height when docking with the GBS or fixed platform-based port. Generally, LNGCs are limited to 2.0- to 2.5-m (6.6- to 8.2-foot) wave heights when docking. The FSRU could be designed to remain on location like a fixed platform-based unit or move to another location during hurricanes or other severe weather. The FSRU is also limited in wave height for the side-by-side unloading which cannot operate at waves greater than 2.0 m (6.6 feet).

An SRV can be moored to the specially designed unloading buoys in significant wave heights (3.5 m [11.5 feet]). **Table 2.1-3** compares the approximate percentages of time that wave heights greater than 2.0 m (6.6 feet) and 3.5 m (11.5 feet) occur in the Project area.

Table 2.1-3. Equivalent Days of Downtime

Operations	Significant Wave Heights (m)	Percentage of Year*	Number of Days
SRV	> 3.5	0.15%	0.5
GBS/platform	> 2.5	0.9%	3.3
FSRU	> 2.0	2.6%	9.5

Note: * Port Dolphin 2007j

Conclusion. The FSRU and GBS/Platform options are more sensitive to weather conditions than the STL buoy and FP options. The sensitivity is based on weather effects on mooring and unloading of SRVs, as well as the FSRUs processing operations due to LNG sloshing in tanks and other motion-related effects on fluid mechanics. However, based on the historic weather patterns at the proposed location, the total downtime for any system is limited to a few days at most. Provided that the wave conditions are not so extreme that the vaporization process would have to be shut down, the designs that provide onsite LNG storage would be able to continue send-out even if the LNGCs could not dock at the port. If extreme weather required shutdown of vaporization, then it would likely also limit operation of the STL buoy and FP projects as well. Therefore, weather-related reliability is likely to be similar for all port designs.

Each of the fixed systems, GBS, FSRU, and fixed platform-based units, have higher vulnerability to damage during extreme weather events. As demonstrated during Hurricanes Katrina and Rita, damage to GOM surface facilities can result in system shutdowns that extend longer than the weather event itself. Therefore, the STL buoy design offers reliability advantages. During a weather event the SRV can depart the STL buoy, the STL buoy can be safely moored below the surface, and the SRV can return and resume transfer as soon as the storm has passed.

The STL buoy design has a small environmental footprint and can be located in deeper water, farther from shore. SRVs can operate in more extreme sea conditions, and therefore provide greater reliability of service. The STL buoy design can support the Applicant's proposed gas send-out rates without additional storage or control platforms.

Based on environmental impacts, water depth, the local substrate, and general reliability in severe weather known to the area, the STL buoy system is a viable option. **Figure 2.1-7** shows the Port Dolphin conceptual site plan to be carried forward.

2.1.4 Port Location and Pipeline Route Alternatives

There are a number of possible locations off the U.S. coast that would be suitable for siting an LNG port. A company proposing to construct and operate an offshore port would have identified a market that it believes would provide the economic incentives that support licensing and construction costs, and, in this case, matches their technical expertise. Therefore, alternative offshore port locations must be evaluated in light of the target market for the natural gas. As stated in **Section 1.2**, the Project is intended to supply natural gas to the west-central Florida market and surrounding areas, and therefore only locations that meet these fundamental criteria would be considered.

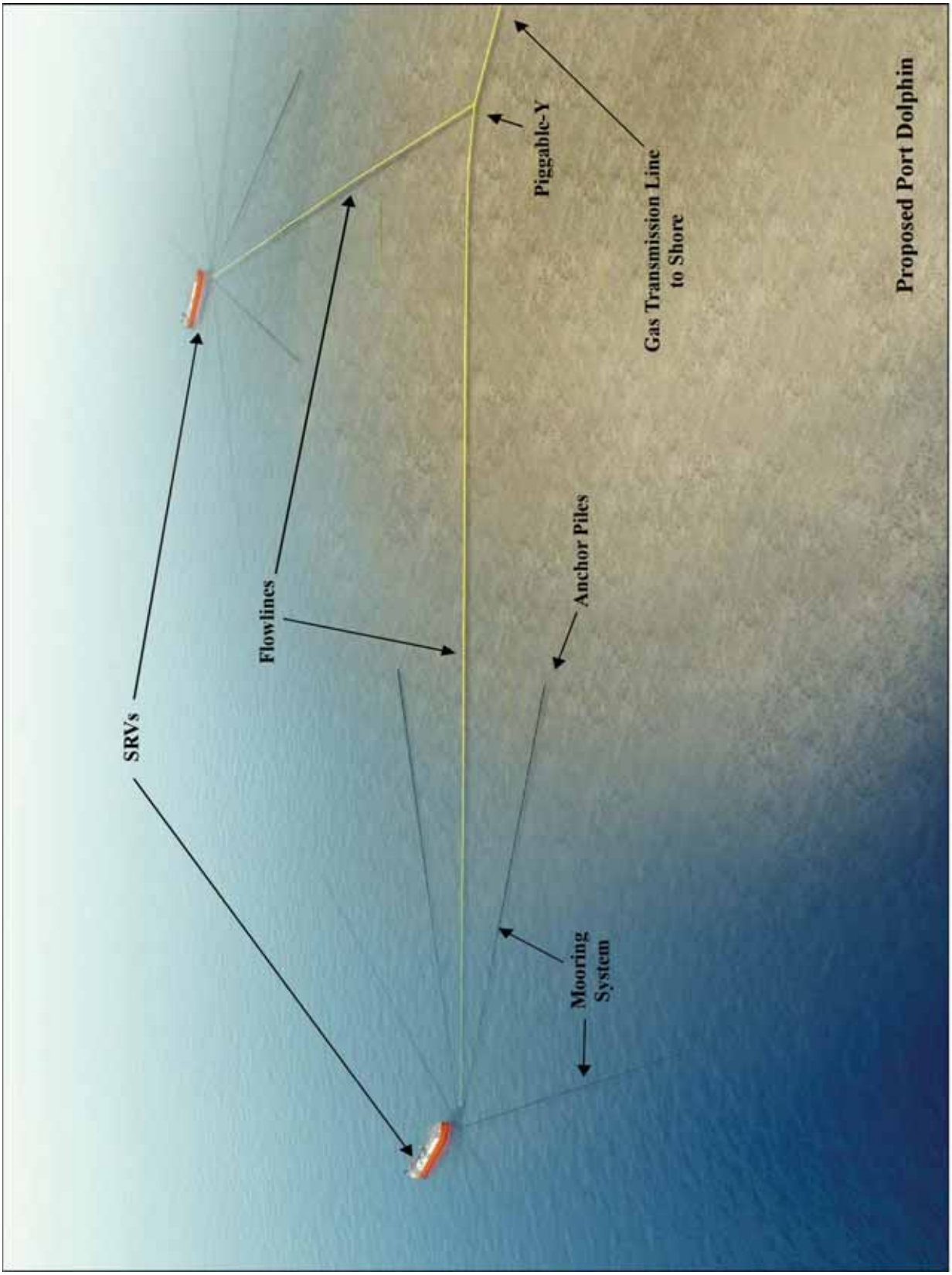


Figure 2.1-7. Port Dolphin Project Conceptual Site Plan

In light of the demand for energy in west-central Florida discussed in **Section 1.3**, it is reasonable to use a phased process to identify and evaluate potential locations for an offshore LNG import port considering the opportunities and constraints posed by each of the deepwater port concept designs available. The alternatives analysis used a screening and site-selection process that began with the entire west-central Florida coastal region and progressively narrowed the geographic range of locations where it would be reasonable and feasible to site an offshore LNG facility. The three steps of this siting process are Regional Site Screening, Suitable Area Analysis, and Site-Specific Analysis.

2.1.4.1 Phase 1 Regional Site Screening

This analysis considered various scenarios for siting an LNG deepwater import port at a location that would allow access to the Applicant's target market. The first phase (regional site screening) was to determine the general region along the west-central Florida coast with the greatest potential to meet regulatory, technical, operability, and interconnection requirements. The selected region would also need to meet the DWPA requirements as specified in Title 33 CFR Section 148.720 (listed above).

The Florida natural gas market is unique because conventional sources of natural gas to Florida are from areas to the north and west, and come into the state through interstate pipelines from the northern and central parts of the state and then down the peninsula. As shown in **Figure 1.3-1**, the existing natural gas pipelines serve specific geographical regions of the state with limited interconnection between the east and west coasts. Therefore, the ability to serve the west-central Florida area is limited by the capacities of the pipelines to move gas into the area. As a result, a location close to the intended area of service is necessary.

In identifying a potential site for a project, USCG guidelines (Title 33 CFR Section 148.720) for siting LNG deepwater port terminals must be considered. The guidelines indicate that an appropriate site for a deepwater port meets the following criteria:

- Optimizes location to prevent or minimize detrimental environmental impacts
- Minimizes the space needed for safe and efficient operation
- Locates offshore components in areas with stable seafloor characteristics
- Locates onshore components where stable foundations can be developed
- Minimizes the potential for interference with its safe operation from existing offshore structures and activities
- Minimizes the danger posed to safe navigation by surrounding water depths and currents
- Avoids extensive dredging or removal of natural obstacles such as reefs
- Minimizes the danger to the port, its components, and tankers calling at the port from storms, earthquakes, or other natural hazards
- Maximizes the permitted use of existing work areas, facilities, and access routes
- Minimizes the environmental impact of temporary work areas, facilities, and access routes
- Maximizes the distance between the port and its components and critical habitats including commercial and sport fisheries, threatened or endangered species habitats, wetlands, floodplains, coastal resources, marine management areas, and EFH
- Minimizes the displacement of existing or potential mining, oil or gas production, or transportation uses

- Takes advantage of areas already allocated for similar use, without overusing such areas
- Avoids permanent interference with natural processes or features that are important to natural currents and wave patterns
- Avoids dredging in areas where sediments contain high levels of heavy metals, biocides, oil, or other pollutants or hazardous materials, and in areas designated as wetlands or other protected coastal resources.

A principal screening criterion is to interconnect with one or more existing transmission pipeline systems. This is necessary to allow delivery of the gas to the intended market without the environmental impacts associated with developing an extensive pipeline system to serve the intended market. This is a primary environmental screening criterion since construction of long onshore or offshore pipeline systems would involve extensive environmental impacts. As shown in **Figure 1.3-1**, the only currently existing interstate natural gas pipelines in the region are the Gulfstream Pipeline that runs offshore near the proposed Project location and then onshore in the southern part of Tampa Bay, and the Florida Gas Transmission Pipeline that runs from the northern part of the state down and through the Tampa Bay area and terminates between Tampa Bay and Fort Myers.

Criterion 1, Proximity to an Existing Commercial Port. The deepwater Port would require a variety of services from onshore facilities. Therefore, an existing commercial port capable of providing these services should be within 160 km (100 mi) of the proposed Port location to ensure reasonable access to the Port would be available.

Criterion 2, Required Operational Water Depths. The STL port design identified in **Section 2.1.3.6** requires sufficient depth for the buoy to remain submerged when not in use and not present a navigational hazard. When the buoy is mated to the SRV, there must be sufficient water depth to ensure the buoy would not strike the seafloor as the SRV rises and falls with wave action. The FSRU design requires sufficient depth to accommodate the mooring lines and flexible risers connecting to the subsea pipeline. Therefore, a minimum operational depth of 30.4 m (100 feet) was selected.

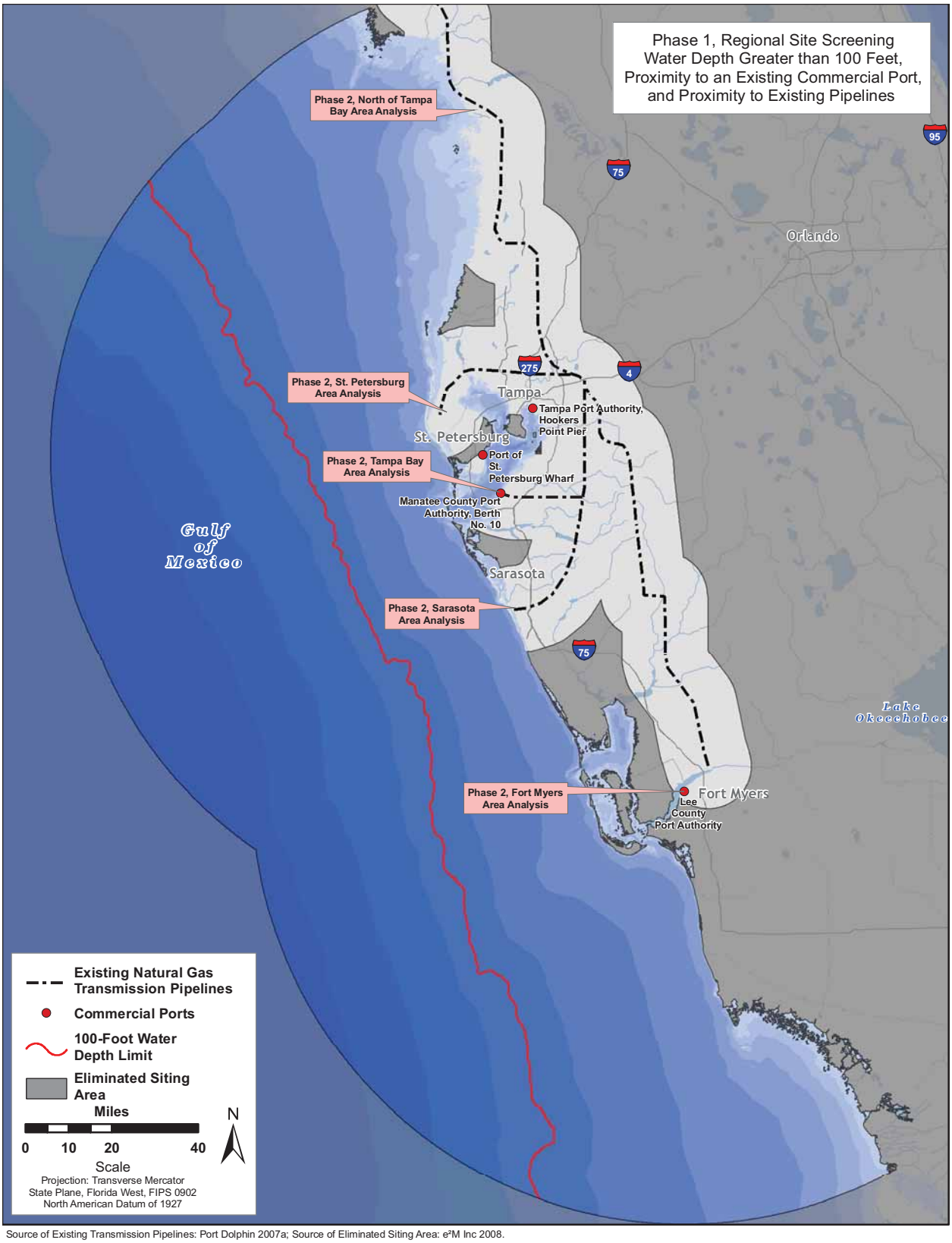
Criterion 3, Proximity to Existing Onshore Pipelines. To provide a reasonable proximity of interconnection, existing onshore pipelines would need to be within about 10 miles of the coast. Florida has a number of sensitive habitats so extensive disturbance from construction of a long interconnecting pipeline would be unacceptable.

2.1.4.2 Phase 1 Analysis

Based upon the regional site-screening evaluation, the areas within the region where it would be reasonable and feasible to locate an SRV facility would be five areas offshore: north of Tampa Bay where the FGT Pipeline is within 10 miles of the coast; the St. Petersburg area where the FGT pipeline is within 10 miles of the coast; off of Tampa Bay where both the FGT and Gulfstream Pipelines are within 10 miles of the coast; off of Sarasota where the FGT pipeline again comes within 10 miles of the coast; and near the Caloosahatchee River area near Fort Myers, Florida, as shown on **Figure 2.1-8**. Advantages of these areas include the following:

- Proximity to the west-central Florida market
- Proximity to an existing pipeline network
- Pipeline corridors within reasonable distances
- Proximity to existing commercial ports.

Each of these five areas were carried forward for additional screening.



Source of Existing Transmission Pipelines: Port Dolphin 2007a; Source of Eliminated Siting Area: e²M Inc 2008.

Figure 2.1-8. Phase 1, Regional Analysis

2.1.4.3 Phase 2 Suitable Area Analysis

The secondary screening process compared the advantages and disadvantages of the alternative locations within the feasible areas identified in Phase 1 to eliminate those locations where it is not reasonable or feasible to locate an LNG deepwater port facility. The selection criteria included avoidance of, to the extent possible, sensitive coastal environmental resources, environmentally sensitive land cover, and National Wetland Inventory (NWI) mapped areas; and appropriate land use and zoning for onshore pipeline segments, especially the landing area for a horizontal directional drill (HDD) from offshore to onshore portions to minimize coastal impacts. Desktop screening using publicly available data was used to compare the areas. The five areas identified as suitable in the Phase I screening (see **Figure 2.1-8**) from north of Tampa Bay to Fort Myers are north of Tampa Bay, St. Petersburg area, Tampa Bay area, Sarasota area, and Fort Myers area (see **Figures 2.1-9** through **2.1-13**). These areas were evaluated using the following criteria.

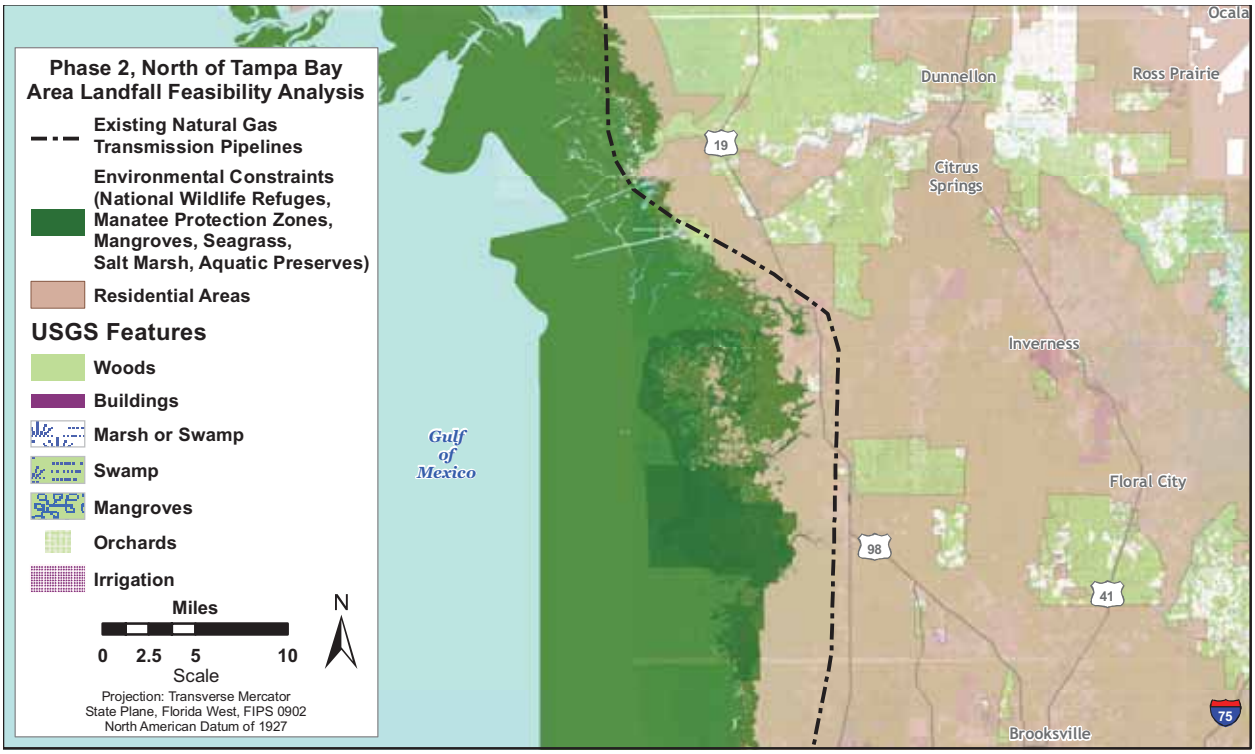
Criterion 1, Avoidance of, to the Extent Possible, Sensitive Coastal Environmental Resources. Maps of resources, including seagrass beds, protected waters, sea turtle habitat, mangrove resources, and other environmentally sensitive resources, were obtained from Applicant-provided and publicly available sources. The information was organized using geographical information system (GIS) data layers to create maps of the identified area. Each area was evaluated and the potential extent of impacts was estimated.

Criterion 2, Avoidance of, to the Extent Possible, Inappropriate Land Use Designations. For a pipeline to be brought onshore to an interconnection point with an interstate or intrastate pipeline, suitably zoned property must be available for HDD and pipeline construction activities. Although pipeline construction and operation is allowed as a conditional use in residential areas, sufficient area must be available for the HDD site, construction laydown and staging areas, and rights-of-way (ROWs) for pipeline construction. Selection of densely populated residential areas complicates the construction process and increases adverse socioeconomic impacts. Land use designations were obtained and potential pipeline routes from the areas off the coast identified in the Phase I screening. **Figures 2.1-9** through **2.1-13** show the areas that were evaluated and detailed maps and photographs of the areas located as potential landfall sites are included in **Appendix F**. Each area is discussed in **Appendix F**.

2.1.4.4 Phase 2 Analysis

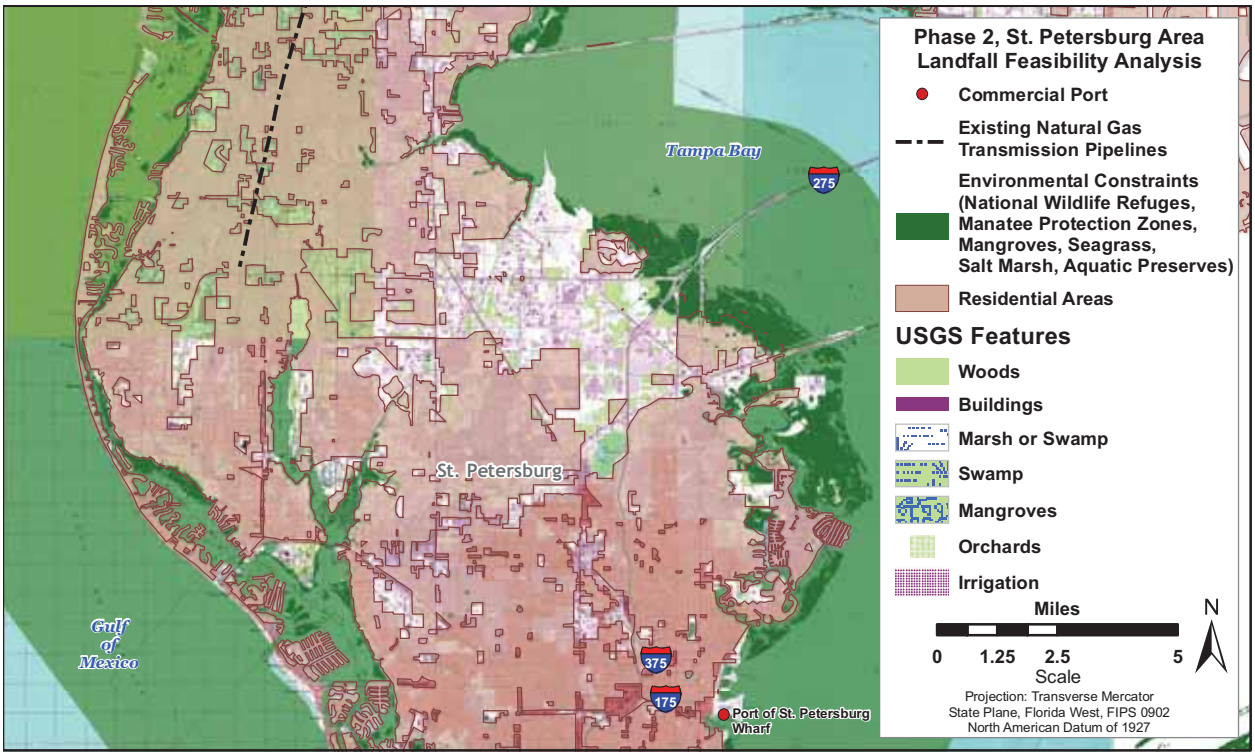
The area north of Tampa Bay as shown in **Figure 2.1-9**, is characterized by coastal environmental resources and environmentally sensitive areas, including seagrass beds, turtle habitat, mangrove resources, and protected waters. The land between the coast and the FGT Pipeline is densely developed with predominantly residential areas. The Applicant also reported that, in discussions with state agencies, the area was not recommended for interconnection with the interstate pipeline (Port Dolphin 2007n). Therefore, the area north of Tampa Bay was not carried forward for detailed analysis.

The St. Petersburg area in the vicinity of the FGT pipeline, shown in **Figure 2.1-10**, is also characterized by coastal environmental resources and environmentally sensitive areas, including seagrass beds, turtle habitat, mangrove resources, and protected waters. The land between the coast and the FGT Pipeline is densely developed with predominantly residential areas. Therefore, the St. Petersburg area was not carried forward for additional analysis.



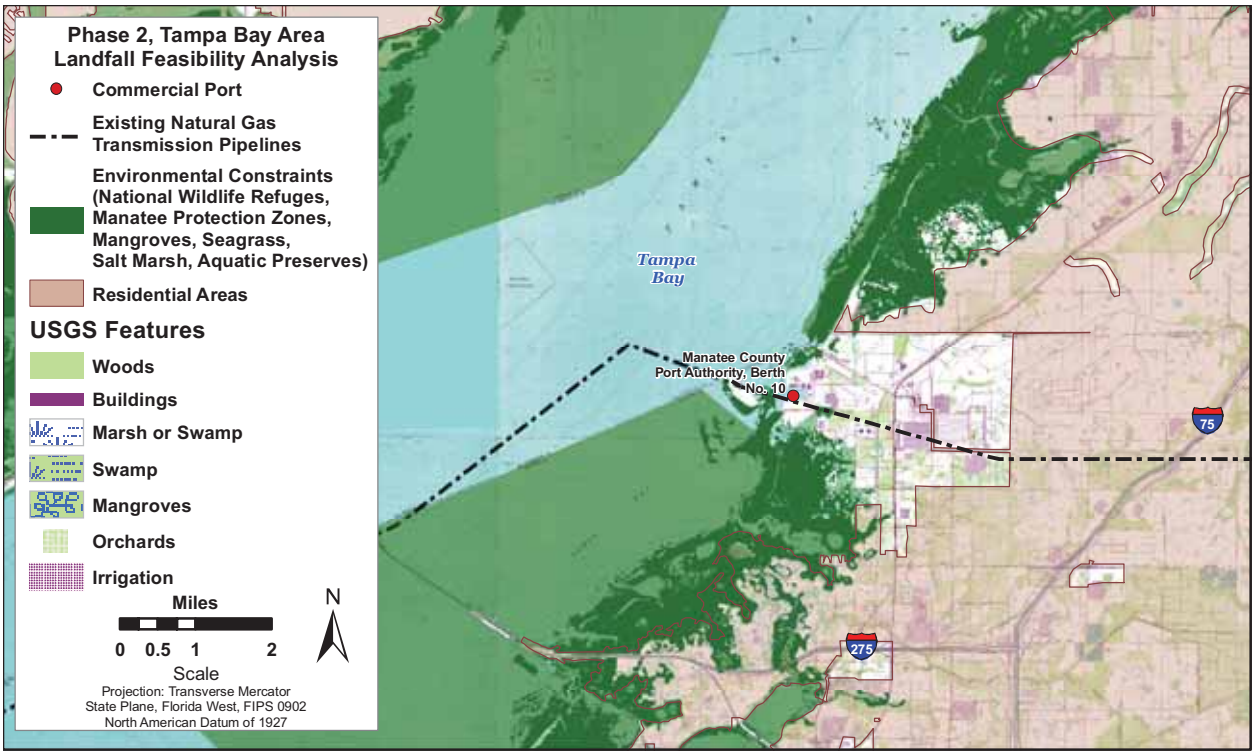
Source of Existing Transmission Pipelines: Port Dolphin 2007a; Source of Environmental Constraints: ConShelf 2007.

Figure 2.1-9. Phase 2, Area North of Tampa Bay Area Analysis



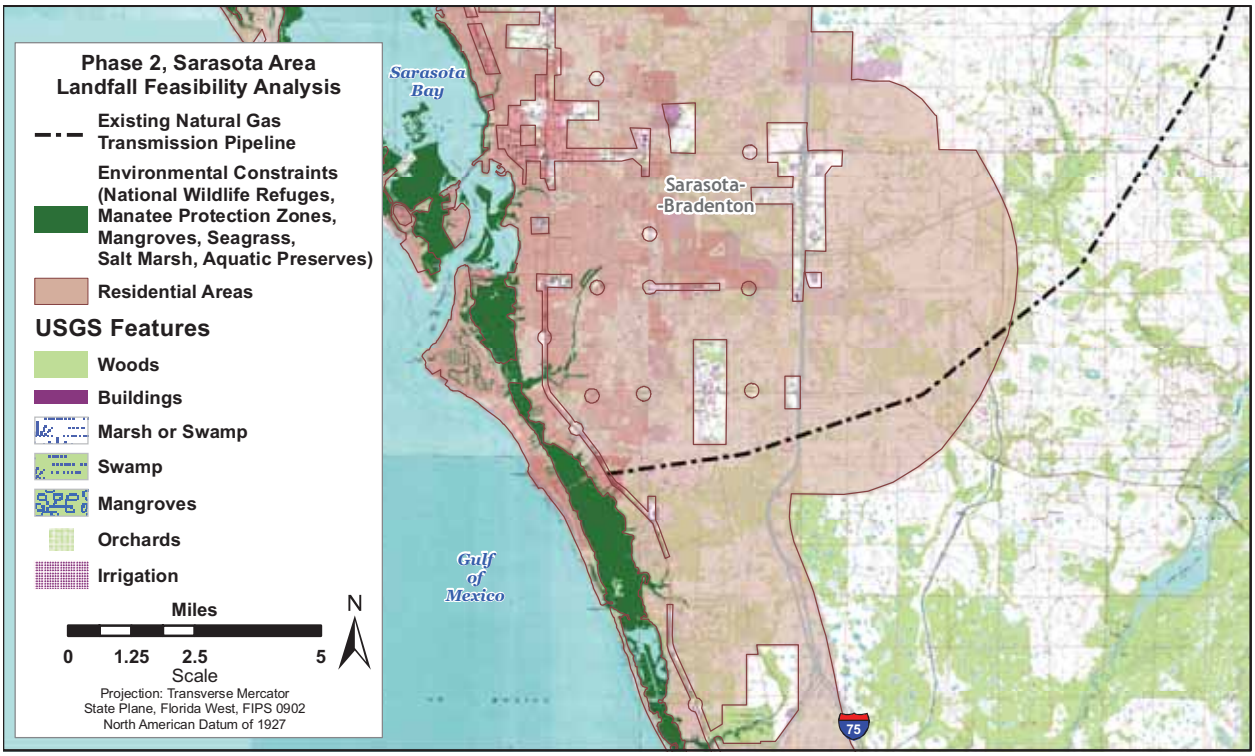
Source of Existing Transmission Pipelines: Port Dolphin 2007a; Source of Environmental Constraints: Conshelf 2007.

Figure 2.1-10. Phase 2, St. Petersburg Area Analysis



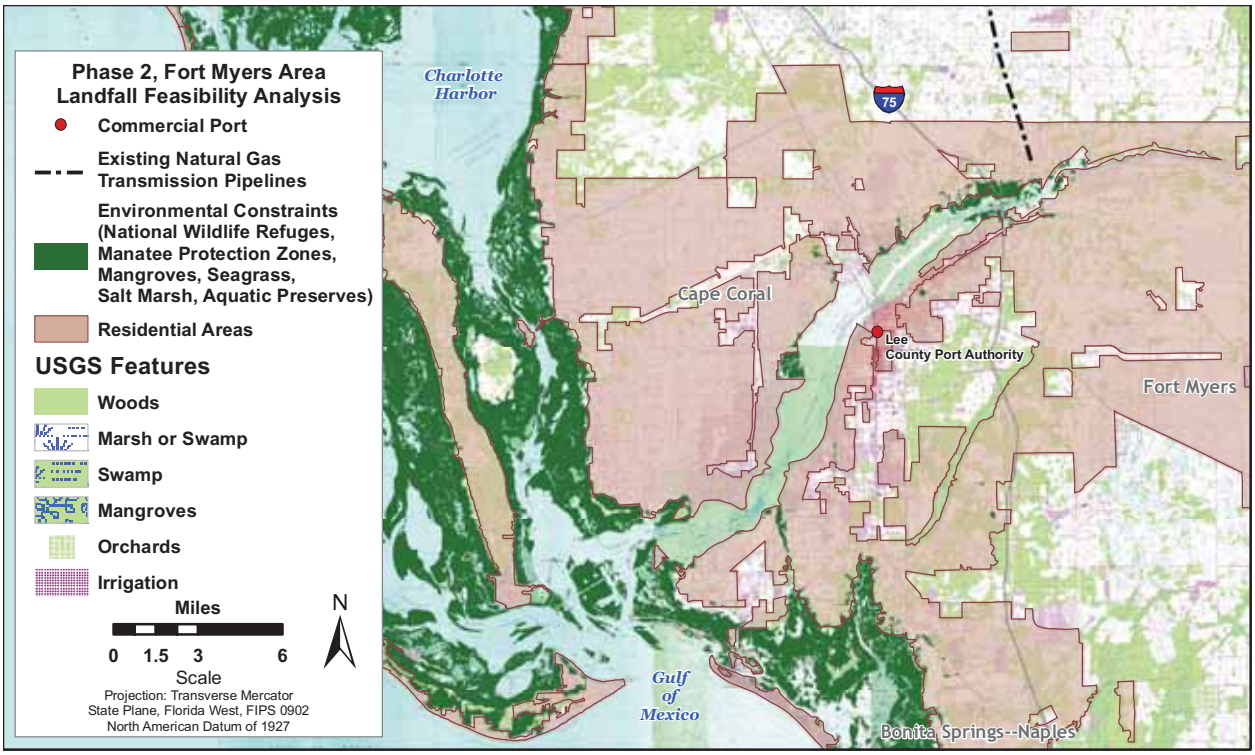
Source of Existing Transmission Pipelines: Port Dolphin 2007a; Source of Environmental Constraints: ConShelf 2007.

Figure 2.1-11. Phase 2, Tampa Bay Area Analysis



Source of Existing Transmission Pipelines: Port Dolphin 2007a; Source of Environmental Constraints: ConShelf 2007.

Figure 2.1-12. Phase 2, Sarasota Area Analysis



Source of Existing Transmission Pipelines: Port Dolphin 2007a; Source of Environmental Constraints: ConShelf 2007.

Figure 2.1-13. Phase 2, Fort Myers Area Analysis

Several properties were identified around Tampa Bay that could support pipeline construction. However, as shown in **Appendix F**, they require crossing the navigation channel in areas where dredging is routinely used for channel maintenance or they require longer offshore pipelines through sensitive coastal areas. The Port Manatee property offers a relatively large, industrial area with offshore access through minimal environmental resources. The potential pipeline interconnection would predominantly be through industrial, agricultural, and undeveloped land. Therefore, the area off of Tampa Bay was carried forward for additional analysis.

South of Tampa Bay in the Sarasota area, the coastal area is densely developed with residential properties for at least 8 km (5 mi) from the coast, making it unsuitable for pipeline construction. Coastal resources also include seagrass beds, turtle habitat, mangrove resources, and protected waters. One area south of the FGT pipeline has nonresidential property closer to shore, but that property is a State Recreational Area and therefore not suitable for pipeline construction (see **Figure 2.1-12** and **Appendix F).** Therefore, the area south of Tampa Bay was not carried forward for additional analysis.

The area near Fort Myers and the Caloosahatchee River is characterized by a similar high concentration of seagrass beds, turtle habitat, mangrove resources, and protected waters. In addition, the interstate pipeline can only be accessed from within the Caloosahatchee River Delta. Because of the barrier islands and shipping channels, a pipeline would have to be constructed through miles of sensitive inland waters or a very long (more than 20 miles) onshore pipeline would have to be constructed to an interconnection point with the FGT pipeline (see **Figure 2.1-13** and **Appendix F**). Therefore, the Fort Myers area was not carried forward for additional analysis.

2.1.4.5 Phase 3 Port Site Specific Analysis

The primary and secondary screening processes resulted in the selection of an area off Tampa Bay as the only area meeting the screening criteria for the siting of an LNG deepwater port facility and pipeline routes to shore. Because the seafloor off Tampa Bay is relatively uniform, the entire area off the coast with water depths over 30.5 m (100 feet) could be considered for the Port site. However, the farther the potential port location is from the entrance to the bay, the longer the offshore pipeline would be, and therefore, the greater the potential impacts during construction. Therefore, the potential sites identified by the Applicant were evaluated and determined to represent a reasonable subset of the area. These areas were screened based on the following criteria: avoidance of archeological resources, avoidance of shipping lanes, avoidance of mapped sand resources, avoidance of ocean dredged material disposal sites (ODMDSs), and avoidance of fish havens. When information was available, the differences in impacts on hard-bottom areas between the alternatives were evaluated. Where information was not available, it was assumed that a longer route would result in greater impacts on hard-bottom areas.

For any pipeline route, the criterion from the Phase 2 analysis related to avoidance of sensitive coastal environmental resources would still be applicable as specific locations in the Tampa Bay area are screened. In addition, for onshore pipeline routes, the criterion in the Phase 2 analysis related to avoidance of inappropriate land use designations would be applicable as onshore alternatives are screened.

Criterion 1, Avoidance of Archeological Resources. Known prehistoric or historic sites should be avoided.

Criterion 2, Avoidance of Shipping Lanes. Operation of the port should not interfere with existing or planned commercial shipping fairways. Only sites located outside the boundaries of designated shipping fairways should be considered. The site must also be accessible to SRVs from the commercial shipping lanes, so sites located near but not in the designated lanes would be preferred. Minimizing pipeline crossings of shipping lanes is also a priority since the pipeline would have to be protected from potential anchor strikes from transiting vessels.

Criterion 3, Avoidance of Mapped Sand Resources. Siting a project in a sand resource area permitted by the Minerals Management Service (MMS) or FDEP would be difficult. To the extent possible, permitted sand resource areas should be avoided for the port site and minimized for the pipeline route consistent with minimizing impacts on other environmental resources.

Criterion 4, Avoidance of Ocean Dredged Material Disposal Sites. Siting a project in an identified dredged material disposal site would be difficult, and likely would not be approved by USACE in coordination with USEPA.

Criterion 5, Avoidance of Fish Havens. Fish havens have been established by state agencies, sport fishing organizations, and individuals. These frequently involve promotion of artificial or natural reef development to attract fish. There are several mapped areas off of Tampa Bay that should be avoided.

Criterion 6, Minimize Impacts on Wetlands and Protected Habitat for Onshore Pipeline Alternatives. Areas that have been delineated as wetlands and areas with habitat for known threatened or endangered species should be avoided to the extent practicable.

2.1.4.6 Phase 3 Analysis – Site-Specific Analysis

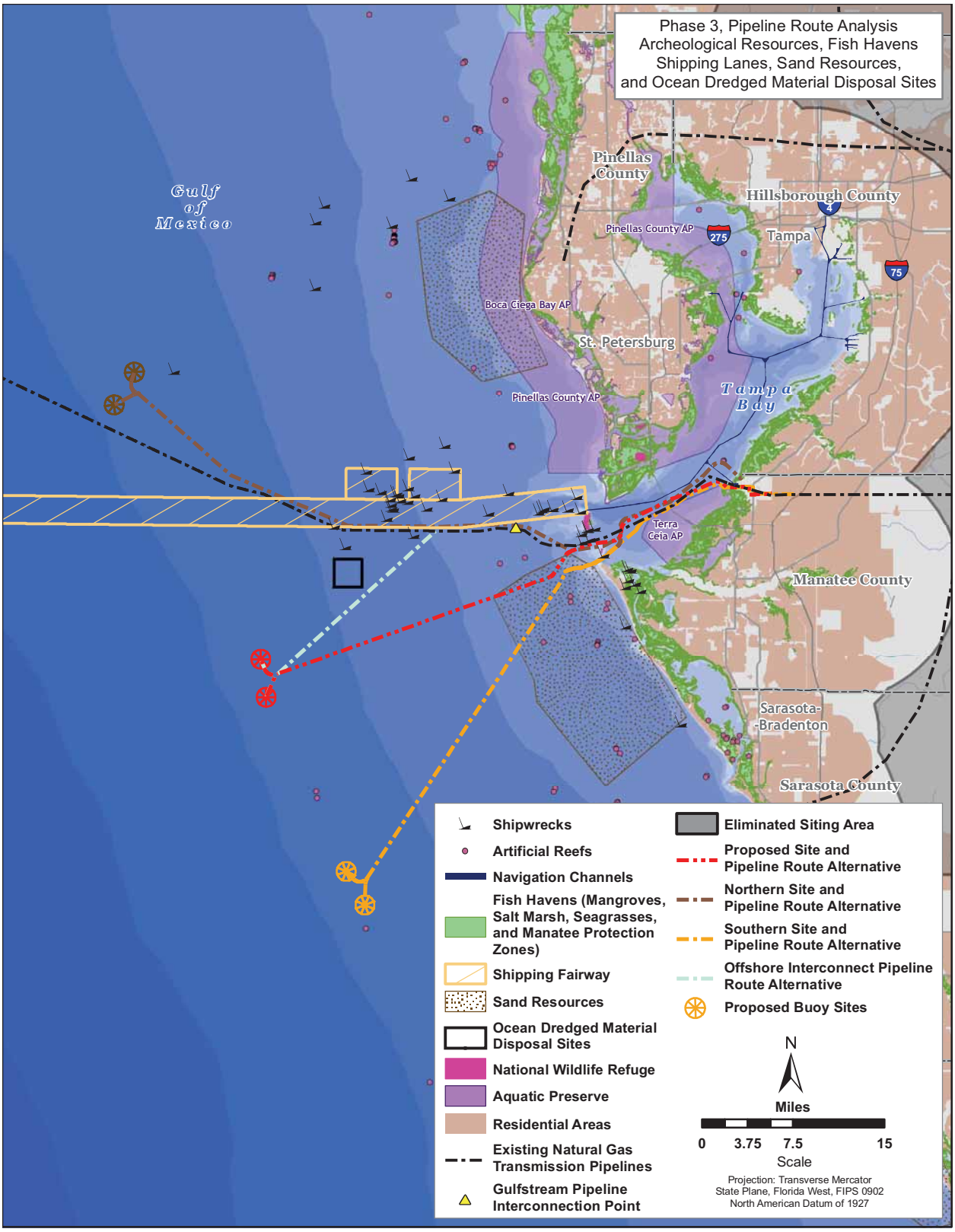
The Applicant surveyed areas of 7,620 m (25,000 feet) by 3,810 m (12,500 feet) off the coast of Tampa Bay for potential port sites. They also surveyed a corridor from the site areas to the shore that was 914 m (3,000 feet) wide.

The Applicant identified three alternative site locations and associated pipeline route corridors for the transmission of natural gas from the port to the pipeline interconnection points. These port and pipeline alternatives are referred to as the Proposed Site and Pipeline Alternative, the Northern Site and Pipeline Alternative, the Southern Site and Pipeline Alternative, and the offshore interconnection Pipeline Alternative. Based on comments on the initial site and route evaluation discussed in the Draft EIS, additional alternatives have been considered. These included adding an offshore interconnection to the Gulfstream Pipeline and modifications to the proposed pipeline route to minimize impacts on sand resources while maintaining acceptable impacts on other benthic resources. Offshore pipeline alternatives are shown in **Figures 2.1-14** though **2.1-17**. The following discusses the criteria used in evaluating the potential sites and routes. **Table 2.1-4** outlines the offshore pipeline route alternatives.

Table 2.1-4. Offshore Pipeline Route Alternatives

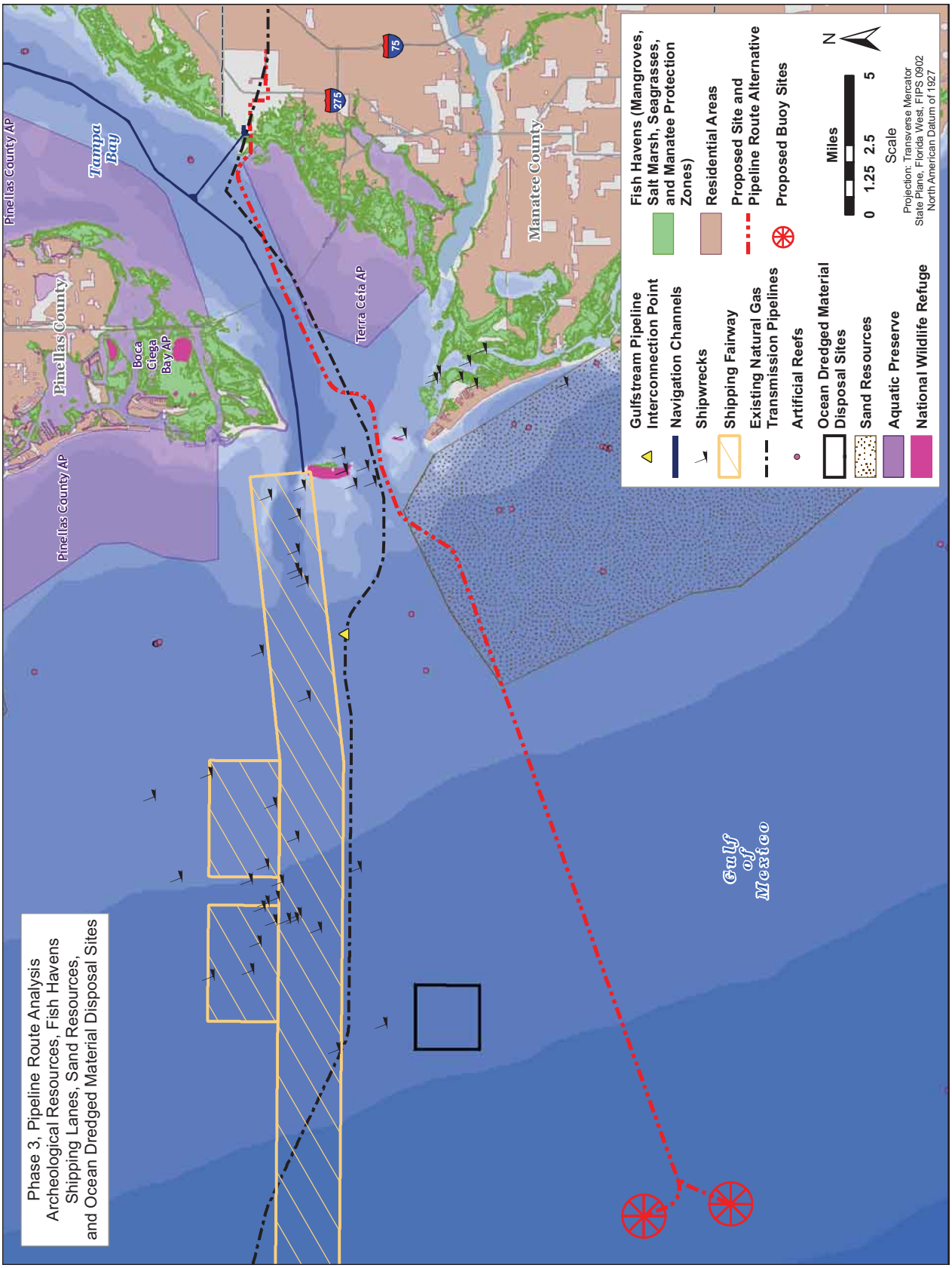
Port Site Associated with Pipeline Route	Offshore Pipeline Length	Construction Footprint (3,000-foot-wide corridor)	Construction Method	Estimated Volume of Resuspended Sediment (m^3) *
Proposed Site and Route Alternative	67.6 km (42 mi)	16,728 acres	Conventional trenching using anchor barges and concrete mattresses where necessary offshore. HDD or boring under sensitive areas. Conventional trenching with special protection in wetland areas onshore.	338,000
Northern Site and Route Alternative	89.6 km (56 mi)	20,364 acres	Conventional trenching using anchor barges and concrete mattresses where necessary offshore. HDD or boring under sensitive areas. Conventional trenching with special protection in wetland areas onshore.	448,000
Southern Site and Route Alternative	74 km (46 mi)	18,180 acres	Conventional trenching using anchor barges and concrete mattresses where necessary offshore. HDD or boring under sensitive areas. Conventional trenching with special protection in wetland areas onshore.	370,000
Proposed Site and Offshore Interconnection with Gulfstream Pipeline Alternative	28.8 km (18 mi)	6,545 acres	Conventional trenching using anchor barges and concrete mattresses where necessary offshore. HDD or boring under sensitive areas. No onshore construction.	144,000

Note: * Volume of sediment resuspended calculated based on estimates in MMS 2001 and assuming the full length of the pipeline route is plowed.



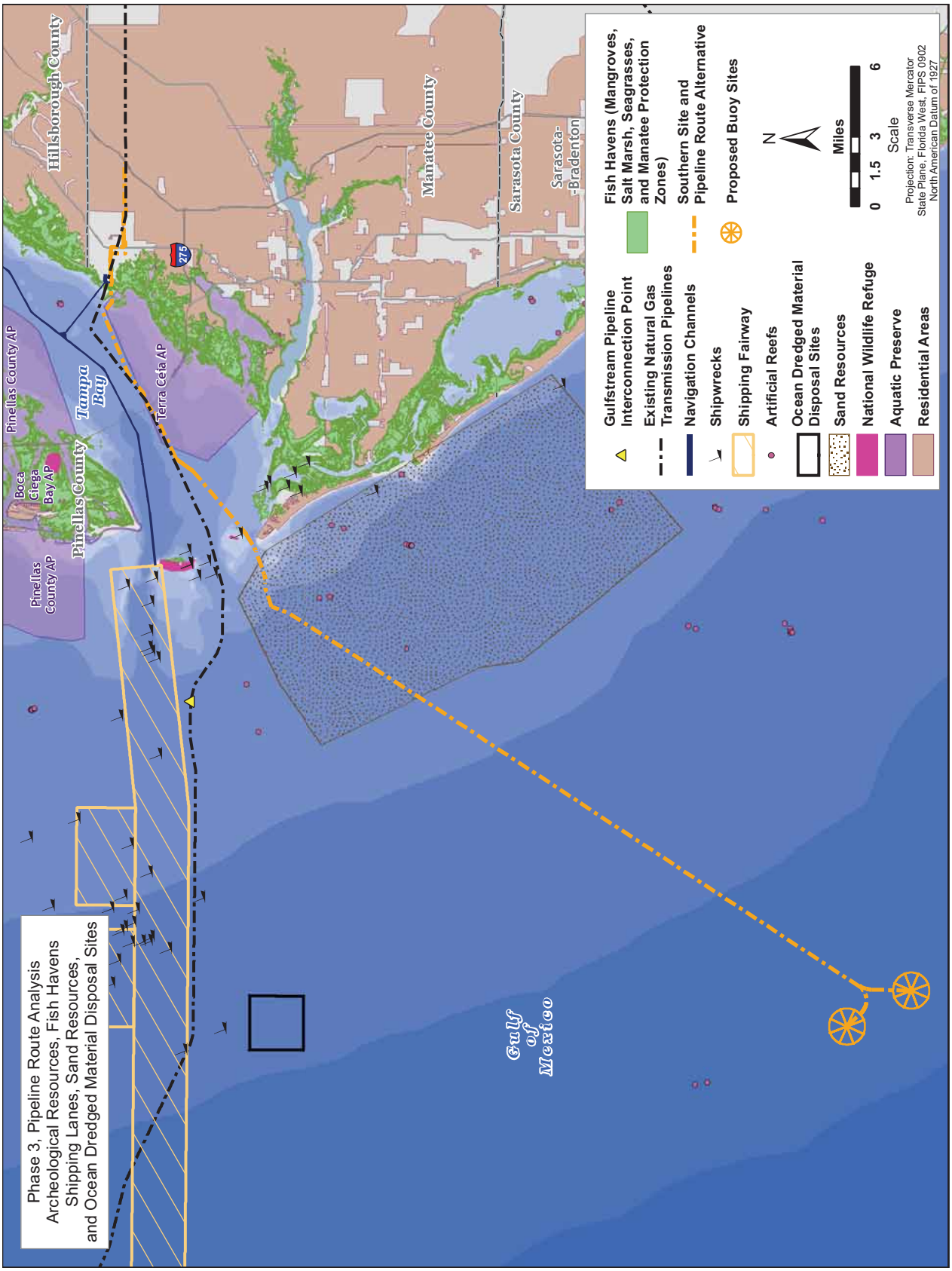
Source of Proposed Piplines: ConShelf 2007. Source of Florida Gas Transmission Pipeline: ConShelf 2007. Source of Eliminated Siting Area: e²M Inc 2008.

Figure 2.1-14. Phase 3, Pipeline Route Analysis



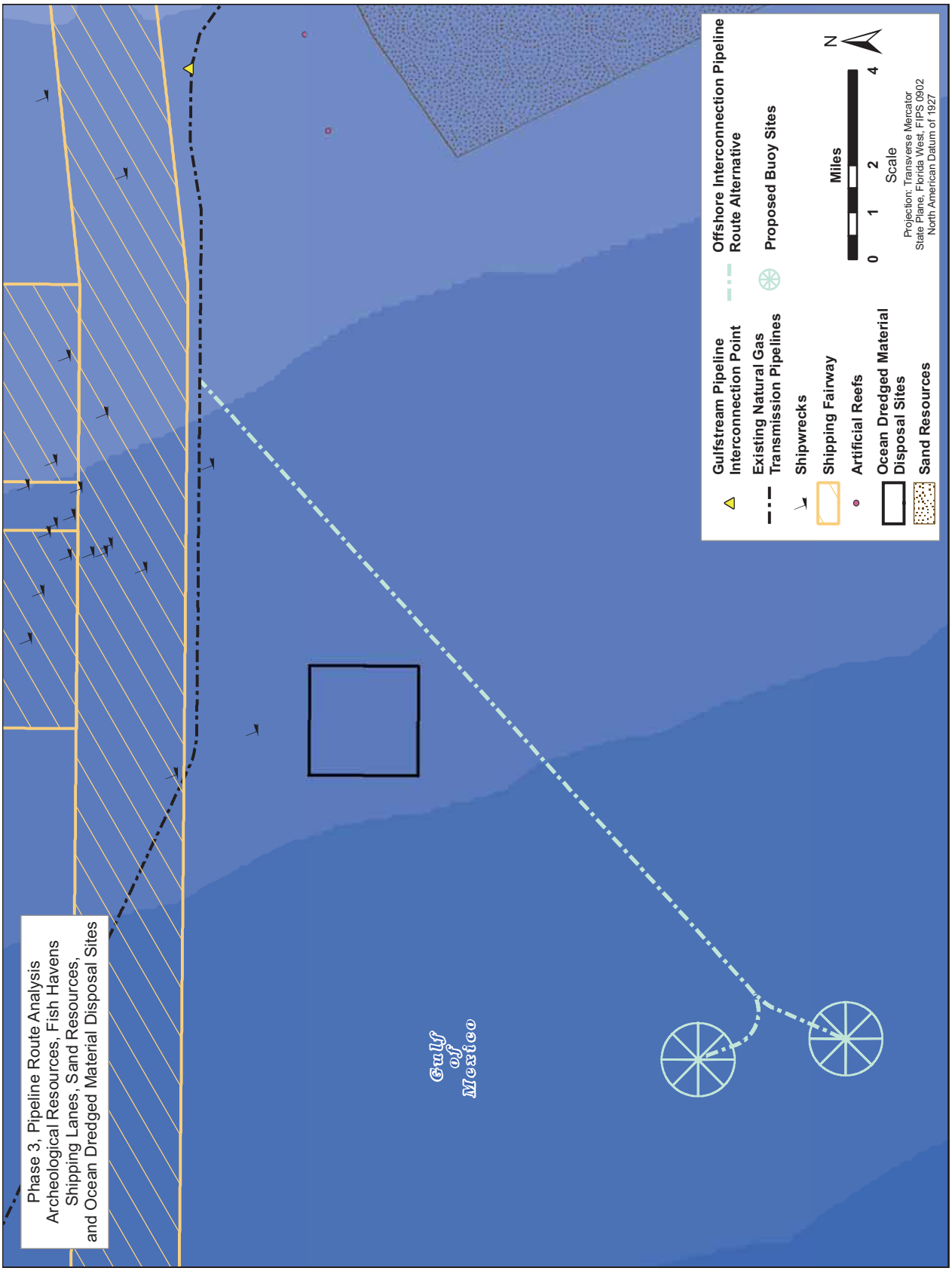
Source of Proposed Piplines: ConShelf 2009. Source of Florida Gas Transmission Pipeline: ConShelf 2007. Source of Constraints: ConShelf 2007.

Figure 2.1-15. Phase 3, Proposed Pipeline Route



Source of Southern Pipline: ConShelf 2007. Source of Florida Gas Transmission Pipeline: ConShelf 2007. Source of Constraints: ConShelf 2007.

Figure 2.1-16. Phase 3, Southern Route Alternative



Source of Offshore Interconnect Alternative: e²M, Inc. 2008. Source of Florida Gas Transmission Pipeline: ConShelf 2007. Source of Constraints ConShelf 2007.

Figure 2.1-17. Phase 3, Offshore Interconnection Alternative

Offshore Pipeline Alternatives. The Proposed Port Site would be centered at 83°11'36.23"W/ 27°23'51.26"N. From there, the interconnection pipeline would proceed east-northeast through MMS St. Petersburg (PB) blocks: PB463, PB507, PB506, PB505, PB504, PB548, PB547, PB546, PB545, and PB589. The pipeline would pass between Egmont Key and Mullet Key (Fort De Soto County Park), north of the Terra Ceia Protected Area before taking a northerly path close to Manbirtee Key. The Proposed Route would avoid known archeological resources, shipping lanes, and fish havens. It would potentially impact sand resources.

The Southern Port Site would be centered at 83°4'5.12"W/27°8'44.04"N. From there the interconnection pipeline would proceed northeast through MMS PB blocks: PB812, PB768, PB769, PB725, PB726, PB682, PB638, PB639, PB595, PB596, and PB552. It would follow a route between Egmont and Passage Keys and would pass the Terra Ceia Protected Area and make landfall on property owned by Port Manatee. The Southern Route would avoid known archeological resources, and shipping lanes. It would potentially impact the Terra Ceia Aquatic Preserve and mapped sand resources. This alternative is carried forward for detailed review to determine the extent of these impacts.

The Northern Port Site would be centered at 83°23'2.64"W/27°44'33.28"N. From there the interconnection pipeline would proceed southeast through MMS PB blocks: PB190, PB233, PB234, PB235, PB279, PB280, PB324, PB325, PB326, PB370, PB371, PB372, PB373, PB374, and PB375. It would continue between Egmont and Passage Keys and would pass through the northern edge of the Terra Ceia Protected Area before taking a northerly path close to Manbirtee Key. The Northern Route Alternative would then proceed to a landfall point at the northern end of Port Manatee (see **Figure 2.1-14**). As shown in **Figure 2.1-14**, the Northern Pipeline Route must cross the shipping fairway into Tampa Bay, pass north of Passage Key, and then conform to the Proposed Route through Tampa Bay. The location of the Fairway crossing and route toward the entrance to Tampa Bay is restricted by the offshore disposal area and a number of mapped historical wrecks. The potential for disturbance of historical wrecks would be higher if this alternative were constructed. The pipeline cannot enter Tampa Bay farther north of the Proposed Route because of the concentration of identified wrecks near Egmont and Mullet Keys. The pipeline would also pass through hard and live bottom areas identified during the review of the Gulfstream Pipeline by FERC. FDEP requested Gulfstream to avoid these areas, and the Gulfstream pipeline route was revised to pass further to the south than originally proposed. Therefore, the Northern Route Alternative is not carried forward for detailed evaluation.

In addition to the offshore routes that connect to existing pipelines onshore, an alternative offshore pipeline route would be to interconnect with the Gulfstream Pipeline offshore, near the proposed site. This pipeline alternative would pass through MMS PB blocks: PB374, PB418, PB417, PB461, PB460, PB504, PB503, PB502, PB546, PB545, and PB589. One potential offshore interconnection location proposed by Gulfstream is shown on **Figure 2.1-17**. This alternative would be approximately 28.8 km (18 mi) in length. This would eliminate approximately 40 to 60 km (24 to 38 mi) of the offshore pipeline impacts and all the nearshore and onshore impacts. There are technical issues that would have to be resolved to allow an offshore interconnection, including operating pressure, pipeline capacity, and loss of an independent, competing source of natural gas into the western Florida region. These issues have been brought before the FERC in filings by Port Dolphin and Gulfstream. The Offshore Interconnection Route would avoid known archeological resources, shipping lanes, mapped sand resources, fish havens, and all nearshore and onshore environmental resources. It would also be shorter than the proposed pipeline route. Therefore, the Offshore Interconnection Route has been carried forward for detailed analysis of impacts.

In comments submitted during the Draft EIS public comment period, the City of Longboat Key and the counties of Manatee and Sarasota objected to the proposed pipeline route because it impacted a permitted offshore sand borrow area used to replenish beach sand. The Applicant proposed a revised pipeline route

to avoid the permitted area. In response Longboat Key proposed alternative routes. One of these routes would deviate from the Applicant's revised proposed route as shown in **Figure 2.1-18**. The alternative route suggested by Longboat Key was evaluated based on information included in documents filed with FERC and FDEP during the processing of the initial certificate application for the Gulfstream Natural Gas Interstate pipeline, which is adjacent to a portion of Longboat Key's suggested alternative. Information on potential sand resources submitted by Longboat Key was also evaluated. During the Gulfstream evaluation, FDEP requested that Gulfstream reroute the pipeline from its proposed route to an area just south of the Tampa Bay shipping channel (north of where it had originally been proposed) to avoid concentrations of live- and hard-bottom areas. If the route proposed by Longboat Key were followed, the Port Dolphin pipeline route would traverse the same areas identified by FDEP as areas to avoid. Based on the sand resource information provided by Longboat Key and shown on **Figure 2.1-15**, the Applicant's revised proposed route would pass through approximately 2,259 m (7,413 feet) of identified sand resource areas (marked as areas A and B on **Figure 2.1-18**). The route proposed by Longboat Key would pass through 5,052 m (16,575 feet) of sand resource areas (marked as areas B and C on **Figure 2.1 18**). Even if the buffer zone for the route proposed by Longboat Key is assumed to overlap a Gulfstream Pipeline buffer zone, the resulting impact area would be reduced by half. The impacted ROW would be approximately 61 m (200 feet) in this case, which would still impact an area similar to the revised proposed route, assuming that both areas have the same depth of sand.

Although detailed geotechnical surveys have not been made of the area proposed by Longboat Key, their submittal notes that the area was proposed because it is characterized by a lack of sand resources. Therefore, one can reasonably assume that the route proposed by Longboat Key would likely impact more hard-bottom area, which FDEP specifically objected to in the Gulfstream proceedings. In addition, an offshore interconnection with the Gulfstream Pipeline is already being evaluated in detail in this EIS (Offshore Gulfstream Interconnect). The Offshore Gulfstream Interconnect route alternative is essentially parallel to the alternative route proposed by Longboat Key, west of the hard-bottom area identified by Longboat Key, and in less-sensitive biological areas.

In selecting alternatives to evaluate, a reasonable range that covers the full spectrum of alternatives should be considered. However, if a proposed alternative is not substantially different from either the proposed or another alternative, or would result in unacceptable additional impacts, then detailed analysis is not required[1]. For the route alternative proposed by Longboat Key, the impacts on sand resources would potentially be greater, although the sand resources affected would be geographically farther from Longboat Key. In addition, the potential impacts on hard-bottom areas would be greater, and the pipeline would traverse areas specifically identified by FDEP for avoidance in an earlier proceeding. Finally, portions of Longboat Key's suggested route alternative are redundant with an alternative route already being evaluated in detail. An evaluation of the impacts on sand resources of the Applicant's revised proposed route and an evaluation of the offshore interconnection to the Gulfstream Pipeline are included in **Section 4**. The alternative pipeline route proposed by Longboat Key is not carried forward for detailed evaluation.

Several alternative locations were identified with appropriate land use designations and size to support the construction area associated with the HDD necessary to bring the pipeline ashore. After detailed review, only the proposed location on Port Manatee was carried forward because the other sites involved longer onshore and offshore pipelines with attendant impacts and longer HDD, and some alternatives required crossing the shipping channel. **Appendix F** includes a discussion of those locations, and figures that show detailed maps of each pipeline route alternative.

[1] See 40 CFR 1502.14 and CEQ's 40 Frequently Asked Questions, number 1b.

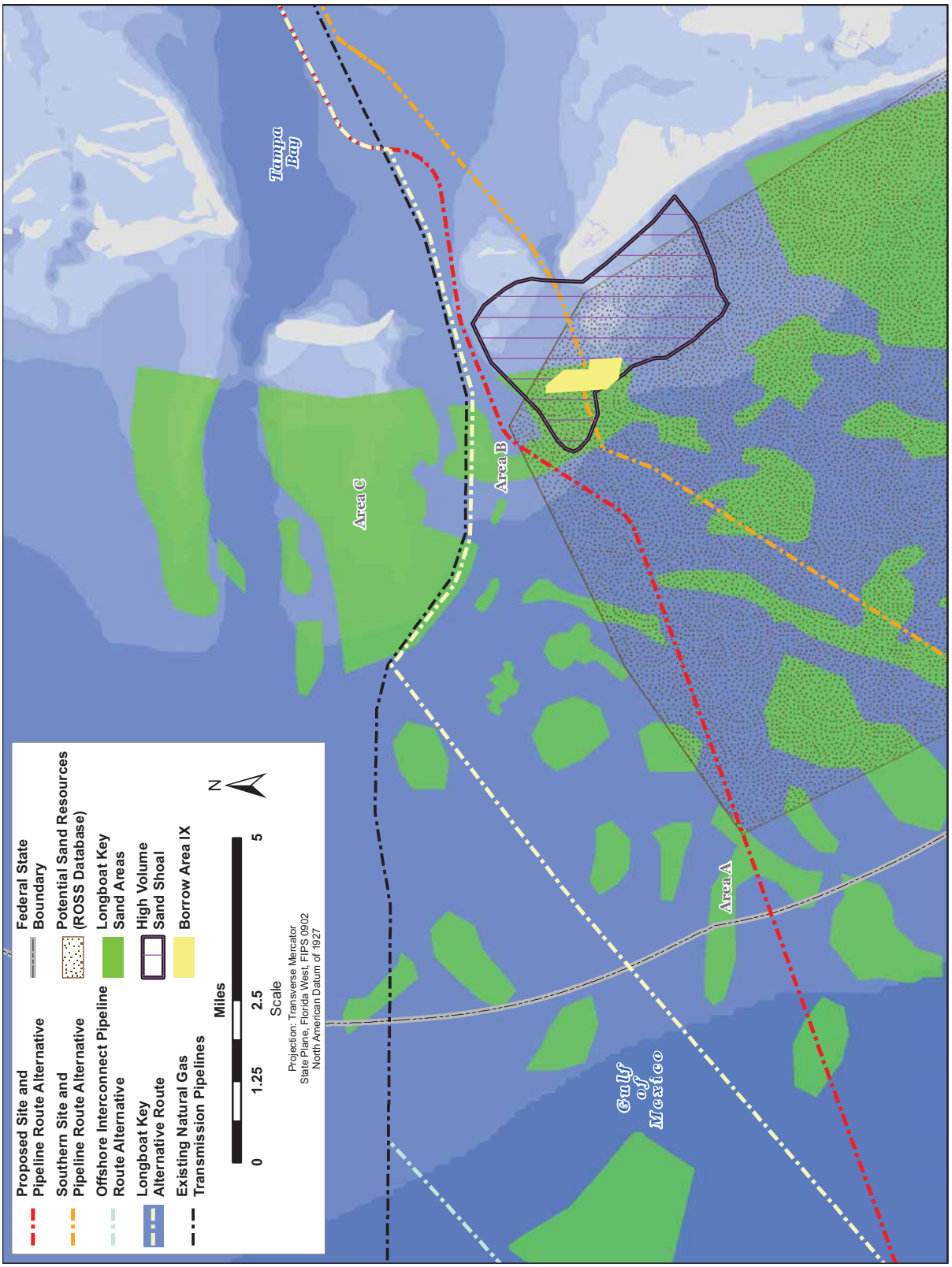


Figure 2.1-18. Longboat Key Proposed Alternative

A summary of the results of the screening is included in **Table 2.1-5**. The concentrations of sensitive biological resources do not appear to vary between the three alternatives.

Table 2.1-5. A Summary of Proposed and Alternative Port Dolphin Deepwater Port Sites and Offshore Pipeline Routes Evaluated With Respect to Selection Criteria

Selection Criteria	Proposed Site and Route Alternative	Northern Site and Route Alternative	Southern Site and Route Alternative	Proposed Site and Interconnect to Existing Gulfstream Pipeline
Operational depths	Present	Present	Present	Present
Avoidance of archeological resources	Avoids mapped resources	Avoids mapped resources but traverses areas with high concentration of mapped shipwrecks	Avoids mapped resources	Avoids mapped resources
Avoidance of shipping lanes	Avoids major shipping fairway and waterways	Crosses the major shipping fairway and Port Manatee waterway	Avoids major shipping fairway and waterways	Avoids major shipping fairway and waterways
Distance from landfall location	67.6 km (42 mi)	89.6 km (56 mi)	74 km (46 mi)	27.6 km (26 mi)
Avoidance of sand resources	Avoids most mapped resources and all permitted resources	Avoids permitted sand resources	Impacts some mapped and permitted resources	Avoids mapped resources that have not been impacted by Gulfstream pipeline
Avoidance of ODMDSs	Avoids ODMDS	Avoids ODMDS but borders disposal area	Avoids ODMDS	Avoids ODMDS
Avoidance of fish havens	Avoids fish havens	Avoids fish havens	Avoids fish havens	Avoids fish havens
Avoidance of crossing Gulfstream Pipeline	Crosses twice	Crosses three times	Avoids the Gulfstream pipeline	Connects with Gulfstream

Onshore Pipeline Alternatives. Details of the onshore portions of the Proposed Route are discussed in **Section 2.3.9**. Construction methods discussed in **Section 2.3.11** for the Proposed Route also apply to the Southern Route alternative. Both onshore pipeline route alternatives pass through equivalent land use areas and environmental resources. Construction methods would be similar for both routes. Detailed evaluation would be required to determine whether the routes resulted in different levels of environmental impacts.

Onshore, the Proposed Route would proceed east across Port Manatee property through a tidally influenced conveyance ditch through Reeder Road to just west of the CSX railroad for a total of

approximately 1,981 m (6,500 feet). At that point the pipeline would turn south on the west side of U.S. Highway 41 and proceed south for approximately 481 m (1,580 feet) through the Florida Power and Light Company (FPL) tank farm before turning east again. The pipeline would cross the CSX railroad and parallel the FPL Transmission Line right ROW across U.S. Highway 41, and end at the interconnection with the Gulfstream pipeline and the TECO pipeline within the Margaret Mock industrial property.

The Southern Route Alternative (see **Figure 2.1-16** and **Section 2.3.1**) would travel east from Port Manatee property and cross the CSX railroad and U.S. Highway 41 before heading south along the eastern side of U.S. Highway 41. The Southern Route alternative would follow the proposed route to the crossing of U.S. Highway 41 where it would turn south before crossing U.S. Highway 41 and continue to follow the Proposed Route to the interconnection station within the Margaret Mock industrial property.

Potential impacts from the two onshore alternatives appear similar. Therefore, both alternatives will be carried forward for detailed review.

In comments on the Draft EIS, Gulfstream pipeline objected to the location of the HDD entry point proposed by Port Dolphin. Gulfstream stated that the entry point was too close to its existing pipeline for safe execution of the HDD. Contrary to Gulfstream's allegations, we are not convinced that Port Dolphin's proposed HDD entry point poses an unacceptable safety risk. First, the HDD operators will have an extremely high level of control over the location and path of the drilling operation during the initial entry of the HDD where the proposed pipeline is in proximity to Gulfstream. As an HDD progresses further and further from the entry rig, there is the possibility for some amount of wayward movement; however, this should not pose a problem at the initiation of the HDD where the operators have greater control over the directional path of the drill and more precise information about the location of adjacent utilities. The further the HDD progresses along its alignment path adjacent to Gulfstream the vertical separation between these two pipelines will increase, as noted below. Second, the location of the Gulfstream pipeline is firmly established, so there is no chance that the HDD would encounter heretofore unknown Gulfstream facilities. Third, according to information submitted by Port Dolphin, the HDD entry point itself is 27 feet from the Gulfstream pipeline, and the HDD entry pit would be at least 20 feet from the Gulfstream facilities. This is within accepted industry practice.
Port Dolphin has proposed several measures in order to provide an added level of safety and to address some of Gulfstream's proximity concerns. Specifically, Port Dolphin would:

- invite Gulfstream personnel to be onsite both prior to construction (to help identify the exact location of the Gulfstream facilities), and during HDD operation;
- fence off Gulfstream's exclusive easement (5 feet on either side of Gulfstream's pipeline), thus preventing any Port Dolphin activity from encroaching within this area; and
- shore up the HDD entry pit with sheet piling or other materials to prevent soil collapse near the Gulfstream pipeline.

Gulfstream also expressed concerns over the angle and clearance of the HDD path as it crosses beneath the existing Gulfstream pipeline. However, according to information filed by Port Dolphin, the HDD path (which is a progressively deepening parabola for the onshore portion) would cross below the Gulfstream pipeline with about 75 feet of vertical separation.
Based on the FERC Staff review, the FERC Staff concluded that the HDD proposed by Port Dolphin, along with Port Dolphin's proposed additional safety measures, would be consistent with accepted industry practices. As such, the FERC Staff found Port Dolphin's proposed HDD acceptable. Therefore, no alternative HDD entry points were carried forward for detailed analysis of impacts.

2.1.5 Alternative Anchoring Methods

Installation of the mooring anchors for the two proposed offloading buoys would be one of the primary activities associated with construction of the Port having potential to cause environmental damage. There are a variety of available anchoring systems, each with its own suitability for varying environmental (e.g., seafloor, water depth, metocean) conditions, that also differ in the nature of their potential adverse impacts on marine resources associated with their installation. **Table 2.1-6** identifies the five types of systems and their primary characteristics.

Table 2.1-6. Alternative Types of Anchors

Alternative	Considerations	Characteristics
Embedment anchors	Substrate	Versatile and accommodate wide range of soils. Difficult to install in hard-bottom areas.
	Impact	Large short-term impacts due to installation. Small long-term impacts.
	Decommissioning	Recoverable on decommissioning.
Drilled and grouted anchors	Substrate	Difficult to install in sandy soils.
	Impact	Small short-term area of disturbance and noise impact during installation. Long-term loss of small benthic area.
	Decommissioning	Usually abandoned in place.
Suction piles	Substrate	Sensitive to variations in soil type.
	Impact	Small short-term area of disturbed seafloor from installation. Long-term loss of small benthic area.
	Decommissioning	Recoverable on decommissioning.
Driven piles	Substrate	Designed to suit existing soil conditions.
	Impact	Small short-term area of disturbance and short-term but large area noise impact during installation. Long-term loss of small benthic area. Hammer impacts produce high noise impulses.
	Decommissioning	Usually abandoned in place.
Gravity anchors	Substrate	Versatile, accommodates most bottom types.
	Impact	Moderate short-term impacts during installation. Moderate long-term loss of benthic area offset by potential artificial hard substrate of anchors.
	Decommissioning	Recoverable on decommissioning.

Criteria for evaluating the five anchoring alternatives were suitability of substrate, area of bottom disturbance, noise generated during installation, and recoverability on decommissioning. From an engineering design standpoint, the types of soils or substrate were generally deemed to be the major deciding factor in determining the most suitable anchor.

The five anchoring alternatives are described as follows:

- *Embedment anchors* are versatile and accommodate a wide range of soil types. As implied by the name, these anchor types are embedded in the soil by dragging them with heavy pull tugs. Thus, installation involves disturbance of the seafloor to a greater degree than any of the other

alternatives, with impacts on benthic communities and water quality as well as the noise generated by tugs during installation. They are difficult to install in areas with hard-bottom. Embedment anchors can be recovered upon decommissioning of the Port. Because of the greater seafloor disturbance, embedment anchors will not be carried forward for detailed evaluation.

- *Drilled and grouted piles* require drilling a hole in the seafloor and filling it with a pour or cast pile. Because a drilled hole must remain open for concrete to be poured into place to form the pile or for a precast pile to be lowered into the hole, it is difficult to install drilled piles in soft sand bottoms that refill quickly unless some casement remains in the hole after drilling. Drilled piles are about the same size as driven piles. Because the sediment in the proposed and alternative site areas would not support drilled and grouted piles, they are not carried forward for detailed evaluation.
- *Suction piles* require specific depths and types of soils, but disturb a limited bottom area. They are installed by placement on the seafloor and drawn into the soft sediments by lowering the pressure beneath them. They require a minimum of 7.6 m (25 feet) of surficial soils, but are highly reliable. Once installed, suction piles do not protrude above the seafloor. Suction piles are carried forward for detailed evaluation.
- *Driven piles* are the most versatile anchoring system, being effective in almost any type of soil condition, and they have the smallest area of bottom disturbance of the four alternatives. The repetitive hammer blows needed to drive the piles into the sediment create substantial sound pressure waves that have been demonstrated to cause behavioral changes and physiological damage to marine mammals' hearing ability, depending on the proximity to the Port and the magnitude of the noise. Driven piles are proposed, and thus carried forward for detailed evaluation.
- *Gravity anchors* are massive concrete objects that provide a stable anchor by their weight rather than by embedment in the seafloor. These are rapid and easy to install and recover at the time of facility decommissioning, but would create a large obstruction on the seafloor for the life of the Project. Because gravity anchors impact a larger area of the seafloor they are not carried forward for detailed evaluation.

2.1.6 SRV Propulsion Alternatives

There are two main SRV propulsion alternatives: turbine drive and diesel drive. Turbine drive uses either steam produced in boilers or the exhaust of a natural gas turbine to drive a turbine. Many conventional ship propulsion systems use steam turbines for propulsion. If a steam turbine were used for propulsion, the steam boiler would also be available for producing steam as a source of vaporization heat. Alternately, if the propulsion system boiler is separate from the vaporization system, then the propulsion system boiler can be shut down when the SRV is docked at the port. If a gas turbine propulsion system is used, then a separate boiler would be used to supply steam to the closed-loop vaporization system.

If diesel drives were used, then either slow-speed diesel engines could be used to directly drive the propulsion system, or high speed diesel engines could be used to generate electricity that would drive electric motors to propel the vessel.

The first alternative considered was gas-fired propulsion steam boilers which would provide steam to turbine generators to propel the vessel while underway, and then would be used to supply steam to heat the LNG in the vaporizer heat exchangers when the SRVs were at the port. The boiler steam would also be expanded through turbine generators to make electricity to run the LNG pumps and to meet ship hoteling requirements. The steam boiler propulsion system is proven technology and used on many classes of vessels throughout the world. However, the water use required to cool the steam turbines is

greater than the water required for the diesel engine alternatives and the air emissions are higher. Therefore, the steam boiler alternative was not carried forward for detailed analysis.

The second dual purpose alternative was gas-fired turbines to propel the vessel. At the Port during vaporization the turbines would be fired to generate electrical power and waste heat from electrical generation would be recovered to vaporize LNG. Gas turbine designs have been used in military applications, but currently there are no LNGCs operating with gas turbine propulsion, and there have been documented failures of gas turbine drive systems. The gas turbine propulsion system is considered a novel concept and is not proven for this SRV application (Chang et al. 2008; MPT Consultancy). The gas turbine option was not carried forward for detailed evaluation because of the reliability issue.

The slow-speed diesel propulsion system alternative would require separate propulsion and LNG vaporization systems. There would be no integration between systems. The slow-speed diesel would not be capable of burning boil-off gas from the LNG storage tanks, therefore marine diesel oil would have to be burned, resulting in higher air emissions. The heat required to vaporize LNG would be supplied by gas-fired auxiliary marine boilers. Electrical requirements would be supplied by the generation engines. Because the air emissions generated by the slow-speed engines are higher than the high-speed engines and other impacts of the two systems are similar, the slow-speed diesel generator alternative was not carried forward for detailed analysis.

The high-speed diesel propulsion system alternative would require separate propulsion and LNG vaporization systems. There would be no integration between systems. The high speed diesel would be capable of burning boil-off gas from the LNG storage tanks, therefore marine diesel oil would be burned only during ocean transit. Boil-off gas would be burned while the vessel is at the Port, resulting in lower air emissions. The heat required to vaporize LNG would be supplied by gas-fired auxiliary marine boilers. Electrical requirements would be supplied by the generation engines. The high-speed diesel alternative was carried forward for detailed evaluation.

A summary of the emissions and water use for the steam boiler and diesel engine alternatives is presented in **Table 2.1-7.**

Table 2.1-7. SRV Propulsion Alternative

System Type	Water Use (MGD)	NO_x (tpy)
Boiler [1]	27–90	100–185
Slow-Speed Diesel [2]	5–7	62
High-Speed Diesel [3]	5–7	45–52

Sources:

1. FERC 2008b; USCG and MARAD 2007b; USCG and MARAD 2007d
2. Port Dolphin 2007j; USCG and MARAD 2007b
3. USCG and MARAD 2003; USCG and MARAD 2007b; USCG and MARAD 2007c

2.1.7 LNG Vaporization Alternatives

There are three available heating methods used to vaporize the LNG: burning part of the vaporized LNG, using the surrounding seawater to warm the LNG, or using the surrounding air to warm the LNG. Any of these warming media can be used directly to warm LNG or can warm an intermediate fluid that then warms the LNG. Burning part of the LNG and no use of ambient seawater is generally referred to as a closed-loop system. Using the surrounding seawater in a once-through system to warm the LNG is generally referred to as an open-loop system. Using ambient air to warm LNG is referred to generally in

this EIS as ambient air vaporization (AAV). There are several commercially tested vaporization systems currently used as heat exchangers to vaporize LNG: submerged combustion vaporizers (SCVs), shell-and-tube vaporizers (STVs), open rack vaporizers (ORVs), and ambient air vaporization (AAV) equipment with or without backup heating systems (usually SCVs). Vaporization systems can be configured in numerous ways to use one or more of the available heat sources to vaporize LNG.

In response to public comments a vaporization system designed by Wheaton Process Systems was evaluated. The system would use the warm seawater surrounding a deepwater port as the warming source to vaporize the LNG, but it does not pump the water through a heat exchanger system. Instead, an intermediate fluid is circulated through a set of heat exchangers that would be submerged in the seawater. The large surface area of the heat exchangers exposed to the seawater would allow for heat transfer from the seawater into the LNG. The colder seawater would flow away from the heat exchanger array due to the reduced buoyancy of the colder water and the motion of the ocean currents at the site (Engdahl 2008). The Wheaton vaporizer system would require a large, fixed array of heat exchangers making it technically unfeasible for the SRV or FSRU vessel-based port system alternatives. Also, there have been no installations of the proposed technology in similar applications in either demonstration projects or commercial applications. Therefore, the technology is not considered commercially available. The Wheaton Process System vaporization system is not carried forward for detailed evaluation because it is not technically feasible for the port designs and has not been demonstrated to be commercially available.

2.1.7.1 Closed-loop Systems

SCV uses a burner that exhausts the hot combustion gases through a water bath to heat the water. The water then flows up through a tube bundle containing the LNG and vaporizes it. The water bath must be able to circulate over a weir and return through a downcomer to be heated again by the combustion gases. SCVs are suited for fixed port designs, such as a fixed platform, GBS, or artificial island because these port designs would provide the stability required to prevent the water bath from sloshing over the weir and disrupting circulation. However, SCVs have been proposed for use on an FSRU for the Cabrillo Port Project.

A STV can also use steam to heat an intermediate fluid, such as propane or a water-glycol mixture. The intermediate fluid is then circulated over a tube bundle containing the LNG. The heated intermediate fluid vaporizes the LNG and is returned to the steam heat exchanger to be reheated. The intermediate fluid system can be completely enclosed. STVs can be used on either fixed or floating port designs, as the use of an intermediate fluid lessens the system's vulnerability to sloshing. Closed-loop STVs are being used on the Northeast Gateway project.

2.1.7.2 Open-loop Systems

In an ORV, seawater is used as the heating mechanism; the seawater is pumped to the top of an open water box that distributes it along the vaporizer. The water spills over the top of the water box and down a system of finned tubes containing LNG. As heat from the seawater vaporizes the LNG, the seawater is cooled. This system can only be used on a fixed port design such as GBS, fixed platform, or artificial island because the system must be stable to prevent the water bath from sloshing over the weir and disrupting circulation. It cannot be used on a LNGC, such as the STL/SRV design proposed by Port Dolphin or an FSRU, because the rolling of the vessel does not provide a stable platform.

Alternatively, a STV can use seawater to heat the intermediate fluid. A STV using seawater as the heat source can be used on any port design. The seawater is pumped through a heat exchanger to an intermediate fluid system, such as propane or a water-glycol mixture. The intermediate fluid is then circulated over a tube bundle containing the LNG. The heated intermediate fluid vaporizes the LNG and

is returned to the seawater heat exchanger to be reheated. The intermediate fluid system can be completely enclosed. Open-loop STVs are being used on the Gulf Gateway project.

2.1.7.3 Ambient Air System

When ambient air is used to warm the LNG, air is blown down through finned tubes that contain LNG to vaporize the liquid. This process requires a relatively large surface area for the air movement to warm the LNG, and sometimes supplemental heating depending on the ambient air temperatures. This system can fit only on a facility with sufficient deck space and stability for large structures, including GBS, fixed platform, and artificial island. It cannot be used on a LNGC, such as the SRVs that would service the STL design proposed for Port Dolphin.

The FSRU design can accommodate AAV technology. Because the FSRU would not transit open ocean except under controlled conditions when being brought to the Project site, it would not be subject to the conditions that would prevent use of the AAV system. An FSRU could be designed that would be stable under the projected site conditions at the proposed Port Dolphin site.

The applicant for the Ocean Way Project in California has proposed to use purpose-built vessels called Regasification LNG Carriers (RLNGCs) that would use AAV as the principal heat source for vaporization. Each vessel would have AAV modules installed to supplement heat available from the propulsion and power generation waste heat systems. The AAV and waste heat recovery would be capable of providing 90 percent of the energy required to vaporize the LNG at rates comparable to those required for Port Dolphin. Supplemental heating from combustion of boil-off gas would also be necessary.

However, the Ocean Way RLNGCs would be designed for operation at or near the port site. LNG would be transported from its origination points to the port site in conventional LNGCs and transferred to the RLNGC. The RLNGC would then moor with an unloading buoy, vaporize, and send out the natural gas. The RLNGC would be limited to a top speed of 15 knots, and it is not clear from available information if it would be capable of open ocean crossings during heavy weather conditions because of the heavy topside structures required to house the AAV modules (OceanWay 2007).

Any port design will require electrical generators to provide electrical power to the systems at the port. Systems for generating electricity that are currently available on SRV or FSRU designs include steam turbine and diesel engine powered generator units. Both types of generators result in waste heat that must be removed from the turbines and generators. The applicant for the Calypso Deepwater Port project has proposed to use a specially designed vessel that would be moored semi-permanently at one of two proposed mooring buoys. This vessel, the Special Regasification Ship (SRS), would employ a specially designed engine cooling system that recirculates the cooling water through heat exchangers for the vaporization system. Therefore, the waste heat is used to supply heat for vaporizing the LNG. Because this is a specially designed system, it would not be available on the SRVs that would service the Port Dolphin STL buoys. However, if the FSRU design was selected, this system could be used. Therefore, the Closed Engine Cooling System has been carried forward for review as an alternative associated with the FSRU vaporization system.

2.1.7.4 Environmental Considerations

Water-Warmed STV. For systems that use water as the energy source for vaporizing the LNG, there are direct environmental impacts from the intake of seawater. Marine organisms are entrained with the water in the intake system, or become impinged on the screening devices used to keep marine life out of the system. Eggs and plankton are entrained in the warming water and are likely to be killed by the thermal

and mechanical forces as they pass through the system. As noted above, the use of fuel to power electrical generators also creates air emissions. In previously filed projects where seawater was used to vaporize the LNG (e.g., Gulf Landing, Compass Port, and Beacon Port), the vaporization equipment would be located on a deck high above the sea surface. Water would be pumped up to the equipment deck level, which would require substantial amounts of power. This would result in additional air pollution from the turbine generators, thus reducing the air quality advantages that seawater vaporization system appeared to have. Therefore, shell-and-tube vaporizers can result in higher air emissions than the ambient air vaporizer if the vaporization equipment is located far above the sea surface. In another application of open-loop STV proposed by the BOET project, the open-loop STV would be located beneath the water surface, and thus the power required to pump seawater to the vaporization equipment would be less, and the advantages of using seawater to warm LNG in terms of impacts on air quality would be more evident.

STV open-loop systems would create greater marine impacts than closed-loop systems. Based on the seawater throughputs for open-loop STV used by Gulf Gateway in the GOM (76 MGD to vaporize 690 MMscfd) (USCG and MARAD 2003), Port Dolphin would require an open-loop system of at least the same volume for LNG heating purposes. Therefore, since the maximum vaporization rate of 1,200 MMscfd is higher for the proposed Project than at the Gulf Gateway Project, the warming water flow would be approximately 132 MGD. Thus, either seawater intakes would have to be proportionally larger, threatening vessel safety, or the intake velocity would have to be higher. Warming water from the open-loop system would be discharged at a temperature of 11 to 17 °C (20 to 30 °F) cooler than ambient except during periods of low water temperatures when supplemental heating would be required. (USCG and MARAD 2003). Marine organisms (eggs and larvae) would be entrained in the once-through system, resulting in 100 percent mortality caused by passing through the system, the temperature change, and the anti-fouling agents applied to the open-loop warming water system to retard marine growth. Secondary biological impacts are fish impingement on intake screens and cold water discharge plume from the open-loop STV system. Therefore, although open-loop STV capabilities are available for the SRVs and FSRU, they would not be considered for use at Port Dolphin due to potentially greater impacts on marine ecosystems than closed-loop systems and AAV.

Fuel-Fired STV. When a fuel source such as natural gas or diesel is used to create the heat from within the vaporizer system, the result is high air emissions in the form of nitrogen oxide (NO_x) and volatile organic compounds (VOCs) that could contribute to degradation of the air quality. There would be no seawater for vaporization, but water would be required for cooling the electrical generating equipment. This cooling water intake would result in direct mortality to marine life due to entrainment of eggs and plankton in the intake, and due to the discharge of the cooling water at elevated temperatures.

The Calypso Project (Application withdrawn) proposed to use a closed-loop vaporization system on the SRS that would usually be moored at one of the two proposed buoys. The SRS is custom-designed to include a system capable of vaporizing the LNG in a closed-loop system and to cool the electricity-generating engines. The system would use generator waste heat as the warming energy to vaporize the LNG. The SRS technology would be owned by Calypso and therefore, Calypso can specify the design. The Transfer and Regasification Vessel (TRV) that would service the Calypso Project would not be owned by the Calypso applicant, and therefore Calypso has proposed to use a commercially available vessel design. The vaporization system design of the TRV is virtually identical to the SRV proposed by the Applicant, and Calypso has proposed to employ a closed-loop vaporization system the same as the one proposed for Port Dolphin (USCG and MARAD 2007a). The SRS vaporization technology design is not available for the Port Dolphin SRVs and, therefore, SRS vaporization technology is not a viable alternative for the SRV design. However, with the FSRU design, the closed-loop cooling water system could be used. Even though there would be no water intake for the FSRU, the LNGCs that service the FSRU would require cooling water. Since most current generation LNGCs are steam-powered, the

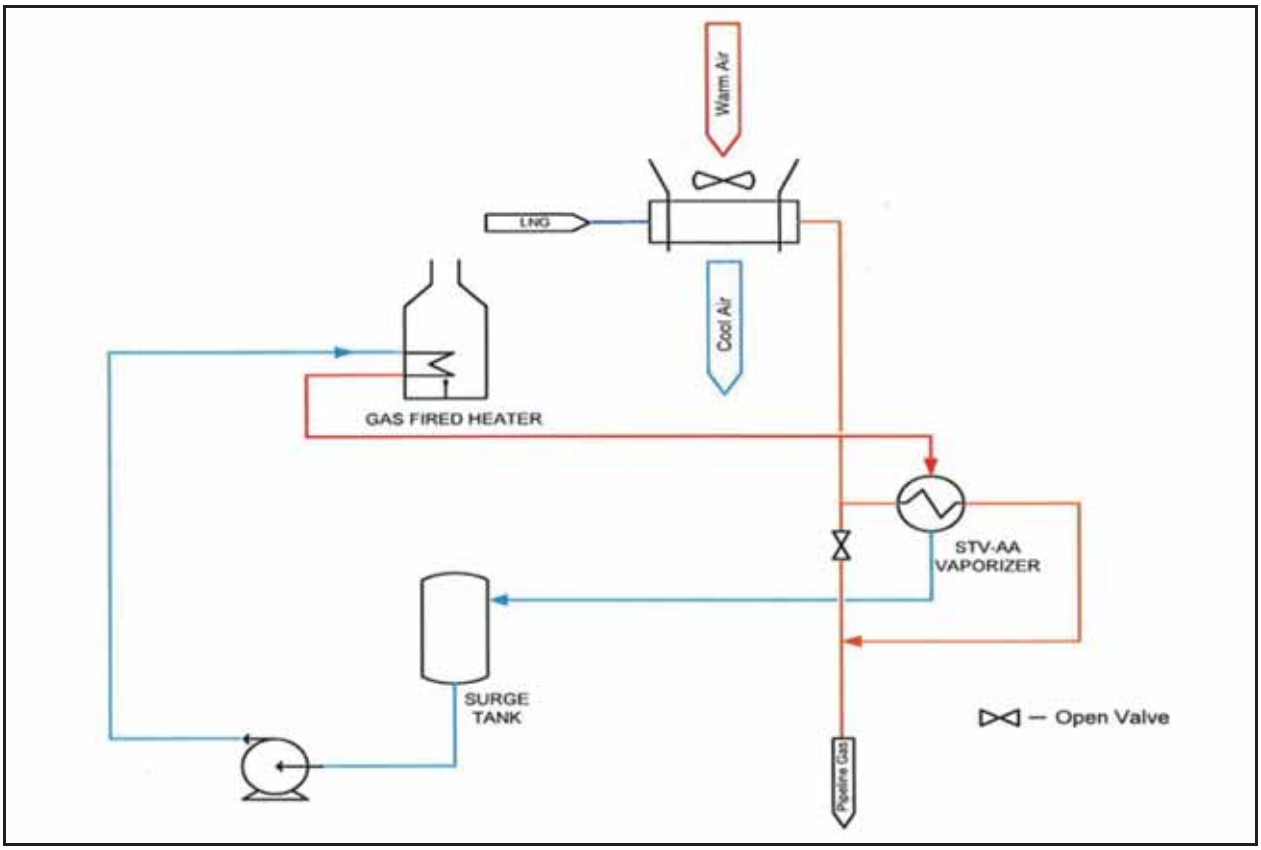
propulsion boilers and power generation systems would be required while the LNGC is berthed at the port. The LNGCs are estimated to have a seawater intake that averages 13.75 MGD, based on the time required to offload their cargo. This would limit the reduction in impacts on marine resources (USCG 2007a).

AAV with Supplemental Heating. AAV would not require seawater for vaporization, but would require water for cooling electric generating equipment. In addition, the LNGCs servicing the FSRU would be conventional LNGCs, and would also require cooling water. The FSRU port design would be served by conventional LNGCs. Therefore, in addition to the cooling water required for port electric-generating equipment cooling, the LNGCs would also require cooling water for onboard generating equipment and propulsion auxiliaries. An average of three LNGCs per week would be required to maintain the design send-out rate for the Project. Based on reported cooling water intakes for LNGCs, and assuming that the LNGC would be moored at a port for 24 hours, a total of 57 MGD would be used by the LNGCs for cooling. The Port would require 135 LNGC visits for a total of 7,695 million gallons of cooling water intake per year. In addition, the Port would use 5.5 MGD for cooling water. Therefore, a total annual cooling water use of 9,702.5 million gallons would be required for FSRU system cooling and LNGC water intake, which exceeds the 2,007 million gallons used by the SRV design. For any design, the volume of ballast water intake would be dependent on the volume of LNG vaporized, so all port designs would use approximately the same volume of ballast water (FERC 2008b).

AAV is not technically feasible without supplemental heating in addition to the ambient air. Supplemental heating would require a closed-loop STV, reducing some of the benefits of using AAV as the vaporization system. Also, as the ambient air cools, the moisture in the air is condensed, and volumes of fresh water are generated. Some of this water can be used for normal shipboard uses such as potable water or firewater system testing, but most of the fresh water would be discharged overboard at temperatures lower than the ambient seawater.

2.1.7.5 LNG Vaporization Alternatives Conclusion

Based on the initial screening process and the comparisons of impacts from other projects that did detailed evaluations of open- and closed-loop vaporization systems (USCG and MARAD 2006, 2007b, 2007c, 2007d), it is clear that the impacts from the proposed closed-loop STV system would have lower overall environmental impacts on water quality and marine resources than an open-loop STV system. Therefore, only the closed-loop STV alternative will be evaluated in detail for use with the SRV port design. A schematic of the STV design can be found in **Figure 2.3-6**. For the FSRU port design, AAV will be considered in detail. A schematic of the AAV system with supplemental heat is shown in **Figure 2.1-19.** The FSRU design can support AAV, and the potential reduction to impacts on marine resources supports its evaluation. **Table 2.1-8** Vaporization Alternatives summarizes the criteria and analysis presented above.



Source: ASIG 2007a

Figure 2.1-19. AAV with Supplemental Heat Vaporizer Process Flow Chart

Table 2.1-8. Vaporization Alternatives

	SCV with Supplemental Heat	STV	ORV	AAV with Supplemental Heat
Vaporization Sources	Water	LNG	Water, LNG	Air, LNG
Substrate required for Vaporization System	Platform for water source, LNGC for LNG source	LNGC	Platform	Platform
Air emissions (Comparison)	++++	++++	+++	+
Water intake (comparison)	+++	+++	++++	+
Water Discharge (comparison)	+	+	+	++++

Source: OceanWay 2007, USCG and MARAD 2003, USCG and MARAD 2007a, ASIG 2007a

Notes: + = lowest possible impact, ++++ = highest possible impact

2.1.8 Alternatives for Marine Life Exclusion Systems

The Applicant has proposed to obtain engine cooling water (for the engines powering the revaporization process) via two sea chests located below the waterline. Openings to the sea chests would each measure 1.5 m by 2.0 m (4.9 feet by 6.56 feet).

Selection of a marine life exclusion system must be consistent with the operational and safety considerations of an oceangoing marine vessel, since the SRVs are used to transport the LNG to the Port

and to vaporize it. The proposed design provides for a through slot intake of 0.25 inches with a velocity of less than or equal to the USEPA-recommended velocity of 0.15 meters per second (m/s) (0.5 feet per second [ft/s]). It provides for exclusion of most juvenile fish.

Past deepwater port applications have considered aquatic filter barriers and cylindrical wedgewire screen barriers of variously sized gap openings and heights, resulting in the selection of 0.25-inch gap screens. For shipboard applications, neither cylindrical wedgewire screens nor fabric filters are practical. If smaller slot sizes are used, either the intake velocity must be increased, which would threaten impingement of a greater number of marine organisms, or the hull openings would have to be enlarged, threatening vessel integrity.

Since the proposed intake structure design would result in an intake velocity of less than or equal to 0.15 m/s (0.5 ft/s) and alternative technologies did not offer increased protection for marine organisms without jeopardizing vessel integrity, the Applicant's proposed intake structure design is the only alternative carried forward for detailed evaluation.

2.1.9 Alternative Biocide Systems

The Port as proposed would use approximately 9.5 MGD of seawater to cool the engines producing power for the LNG revaporization process and hotel loads. The water would also be used for ballast control as the LNG cargo is vaporized. When the SRVs are at the Port, the Applicant has committed to ensuring that the installed biocide system that would be used when the SRVs are underway in international waters would not be operated while the SRVs are operating at the Port. This results in no use and no discharge of biocide at the Port. All alternatives would result in some discharge, either at the port site or at a land disposal site. This would result in greater environmental impacts than not using biocide. Therefore, no alternative biocide systems have been evaluated.

2.1.10 Alternative Pipeline Construction Methods

Conventional pipeline construction methods include alternatives for the placement of the pipeline in offshore and onshore areas, and alternatives in offshore vessels used to connect pipeline sections into a continuous pipe and lay the pipeline on the seafloor. For the proposed Project and alternative locations, the water depth never exceeds 61 m (200 feet), and therefore the pipeline must be buried to at least 1 m (3 feet) under the bottom grade to comply with MMS requirements. Alternative methods to bury the pipeline include dredging, plowing, jetting, and directional drilling. In areas where a hard-bottom would not allow for the burial of the pipeline, concrete mattresses would be placed on top of the pipe to protect it from hazards. Dredging involves removing material from the bottom to construct a trench for the pipeline, laying the pipeline in the trench, and then returning the dredged material to cover the pipeline or allowing natural currents to refill the trench. Plowing involves laying the pipeline on the bottom and then dragging a plow along the seafloor using the pipeline to guide the plow. The plow simultaneously casts the bottom sediment to the sides of the trench and lowers the pipeline into the trench. After the pipeline is placed in the trench, the plow is reversed and dragged along the trench, refilling the trench with the material cast out of the trench during plowing. Jetting involves using a hydraulic jet of ocean water to blast the sediments out of the trench, and then lowering the pipeline into the trench. Directional drilling requires creating a space to access the bottom with a drilling rig. A pilot hole is then drilled sideways from the point of entry to an exit point that also requires access to surface equipment. After the pilot hole is drilled, it is reamed to the necessary size and the pipeline is pulled through the hole.

The placement of concrete mattresses, dredging, plowing, and jetting would all result in resuspension of sediments and impacts on benthic communities from redeposition of sediments in benthic areas.

Resuspension of sediments would also impact water quality. Without additional analysis, it is not possible to determine which of these methods would result in lower impacts.

Directional drilling would minimize impacts due to resuspension of sediments, but the process is not suitable to all offshore areas. It would be impossible to complete a single directional drill from the Port site to the onshore interconnection point. Therefore, a series of drilled segments would be required. Financial and technical issues would preclude this option. However, as with the nearshore to onshore transition that the Applicant has proposed to directional drill, some pipeline segments could be installed using directional drilling if particularly sensitive habitat areas would be traversed.

Construction of the pipeline is likely to include a combination of three techniques for pipeline installation. Jetting has not been proposed by the Applicant. Therefore, the dredging, plowing, and directional drill alternatives will be considered in the detailed evaluation.

2.2 No Action Alternative

The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the License, or the Governor of an adjacent coastal state would disapprove the Project under the DWPA, or the Applicant could withdraw the License application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, identified during construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers could have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

No onshore LNG facilities exist or are being proposed that target the west-central Florida market, but several onshore and offshore projects have been licensed or proposed that would provide additional supplies of natural gas to the interstate pipelines that serve Florida. Proposed onshore and offshore facilities are projects independent of each other (i.e., they are not mutually exclusive); therefore they are not considered to be alternatives to each other. Onshore facilities are discussed under the No Action Alternative, since they could be developed regardless of the outcome of any proposed DWPA application.

As described in **Section 1.3**, projected natural gas demand in west-central Florida is expected to exceed the currently available supply.

If natural gas is not brought into the region by the proposed Project or other similar action, short-term natural gas shortages and increased reliance on other fuel sources could occur to make up the difference, especially for use in electricity generation. Many natural gas power plants have the option of substituting fuel oil, should natural gas become unavailable or prohibitively expensive. The projected national increase in petroleum product consumption between 2002 and 2025 is similar to that for natural gas. Consequently, there is unlikely to be a surplus of petroleum fuel that could readily provide a cost-effective alternative to natural gas without significant new discoveries of crude oil.

It is possible that existing natural gas infrastructure supplying the proposed market area could be developed in other ways unforeseen at this point, including the further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, wind, solar, hydro, or biomass to compensate for the reduced availability of natural gas. It is also possible that energy conservation could partially reduce the demand for natural gas, as discussed in **Section 2.2.2**.

2.2.1 Energy Source Alternatives

Use of the No Action Alternative could lead to increased use of other fossil fuels if energy demand is more than natural gas supply. Natural gas is the cleanest burning fossil fuel. Increased use of other fossil fuels with existing emissions-control technologies would lead to increased emissions of combustion by-products, including carbon dioxide (CO_2), sulfur dioxide (SO_2), and NO_x (see **Table 2.2-1**).

Natural gas combustion generates 34 to 52 percent less CO_2, than conventional fuels such as oil or coal. Other emissions from natural gas combustion are also significantly lower than those from oil or coal. Thus, the use of other fossil fuels in place of natural gas would increase atmospheric pollution and waste volumes, and would incur secondary impacts associated with production (e.g., coal mining and oil drilling), transportation (e.g., oil tankers, rail cars, and pipelines), and refining.

Table 2.2-1. Estimated Air Emissions by Fossil Fuel Type for Electric Power Generation

Fossil Fuel Type	CO_2 (lb/kWh)	SO_2 (lb/kWh)	NO_x (lb/kWh)
Coal	2.1	0.01	0.008
Oil	1.6	0.01	0.002
Natural Gas	1.0	0.000007	0.002

Source: EIA 2004

Notes: Estimated emissions are based on total emissions and total electrical power production for each fossil fuel type, as reported in USEPA's Annual Energy Review 2003.

lb/kWh = pounds per kilowatt hour

Currently, there are several programs at various stages of research, development, and deployment to convert coal to clean-burning gaseous products and to control pollutants, including CO_2, from the direct combustion of coal. Many of the technologies are promising but none have been demonstrated at commercial scales. The potential for these technologies to replace natural gas is unknown.

Other traditional long-term fuel source alternatives to natural gas for electric generation are nuclear power, hydropower production, and development of renewable energy sources. FPL has announced its intention to license and construct new nuclear units at its existing Turkey Point site. FPL also estimates that the development and review of the application would take 6 years (FPL 2008). The licensing phase would be followed by construction of the units, which would add additional years onto the process before

new generation could be brought on line. Because of permitting, cost considerations, nuclear waste disposal, and potential public concerns, this estimate might be optimistic (FPL 2008). Therefore, new sources of nuclear power are unlikely to appear in the near future. It is also unlikely that significant new hydropower sources could be permitted and brought online in a timeframe as a reliable alternative to the LNG provided by the Project since there are no viable hydropower resources in Florida.

Technology is improving and costs are declining for renewable energy (e.g., wind, solar, and biomass), the percentage of national electricity generated from nonhydropower renewable energy sources is projected to increase from 2.2 percent of domestic energy use in 2002 to 3.7 percent in 2025 (EIA 2004). However based on EIA studies, there is little potential for developing wind power on or off the coast of Florida (EIA 2006b). Several programs are underway to develop methods for generating commercial quantities of hydrogen as a transportation- and electricity-generating fuel. Consideration has been given to generating hydrogen at remotely sited renewable energy complexes and transporting the hydrogen to high use areas. While this is in the early stages of research, if hydrogen eventually becomes a widely used fuel, then the mechanisms for importing it into the Florida market would involve environmental impacts that cannot be estimated. Consequently, the quantity of energy generated from nonhydropower renewable energy sources is not likely to provide a reasonable alternative to an increased natural gas supply.

Another alternative energy source would be traditional non-LNG-derived natural gas. While natural gas production is important to the overall supply of energy nationally, production levels are not expected to rise in the short term, except from the Arctic region and unconventional sources (e.g., shale, tight sands, and coalbed methane) in the Rocky Mountain region. Given a projected increase in natural gas demand in the Rocky Mountain region itself, these unconventional sources would not provide a reasonable alternative to the Project. Likewise, natural gas from the Arctic region is not a reasonable alternative because those supplies alone would be insufficient to meet projected increases in demand.

The National Petroleum Council's (NPC) September 2003 publication, *Balancing Natural Gas Policy*, determined that traditional North American producing areas will provide 75 percent of long-term needs for natural gas in the United States, but will be unable to meet projected demand. The NPC study found that the overall level of indigenous production will be dependent on industry's ability to increase its production of nonconventional gas (i.e., gas from tight formations, shales, and coalbed methane).

The Gulfstream Pipeline has recently announced an "open season" to assess the demand for additional capacity on the pipeline. This would potentially make additional supplies from both shore-based and deepwater LNG ports available in addition to the domestic supplies already transported in the Gulfstream pipeline system. At this time there is little available information on the potential size of a proposed expansion or on the attendant environmental impacts. For the expansion to affect the supply proposed for the Project, the Gulfstream Pipeline capacity would have to effectively double. It is doubtful that this could be achieved without construction of additional pipeline and supporting infrastructure including compression. Expansion of the Gulfstream Pipeline would not contribute to diversity of natural gas supplies since the gas would be from the same GOM sources that currently supply the pipeline and would therefore be vulnerable to severe weather outages and other supply disruptions.

2.2.2 Energy Conservation Alternatives

Energy conservation and increased efficiency in energy production have been a component of the national energy agenda since the 1973 Oil Embargo. Energy conservation can play a critical role in the future of the United States energy sector, however, growth projections continue to indicate that the demand for energy, and specifically natural gas, will outstrip cost-effective programs designed to stimulate energy conservation. For example, the Oak Ridge National Laboratory analyzed data from the DOE's State

Energy Program. The State Energy Program is a federally funded, state-based program administered by the DOE (the only such program administered by the DOE) that provides financial and technical assistance for a variety of energy efficiency and renewable energy activities. The Oak Ridge National Laboratory determined that the program resulted in an estimated annual energy savings of approximately 41 trillion Btu (Schweitzer and Tonn 2005). To put this amount of energy in context, the United States consumed 98 quadrillion Btu of total energy in 2002, roughly 2,400 times the 41 trillion Btu of energy savings reported by the Oak Ridge National Laboratory.

In the Florida Energy Plan several energy conservation and energy efficiency initiatives are discussed. These include The *Green Lodge* guidelines and designation for hotels; the *Rebuild America* program in partnership with Federal and local commercial, governmental, and public-housing officials to foster energy efficiency in buildings; and the *Florida Energy Conservation Assistance Program* that provides energy surveys for state and municipal governments, small business, agricultural buildings, and the hospitality industry. Investor-owned, municipal and cooperative utilities can recover investments in energy conservation that are required to meet numeric goals established by the Public Services Commission. The goals set in 2004 were lower than goals set in 1999 for three reasons: the Florida building code contains increased minimum energy efficiency levels, limiting the amount of incremental savings from utility sponsored programs; many utility demand-side management (DSM) programs have reached a saturation in participation levels; and the relatively low cost of new generating units has reduced the cost-effectiveness of several DSM programs (FDEP 2006a).

In summary, existing energy conservation programs are unlikely to fully offset the projected growth in demand for energy, and a corresponding demand for natural gas, in west-central Florida or nationally. Continued economic growth, particularly growth of electricity demand, throughout the United States will lead to increased natural gas use, despite programs to encourage energy conservation. In its *Review of Ten Year Site Plans for Florida's Electric Utilities* (FPSC 2006), the Florida Public Service Commission (FPSC) noted its approved increase in DSM programs. However, the Commission notes that a balanced fuel supply is necessary. Thus, energy conservation alone would not preclude the need for this Project.

2.2.3 Potential LNG Import Facilities

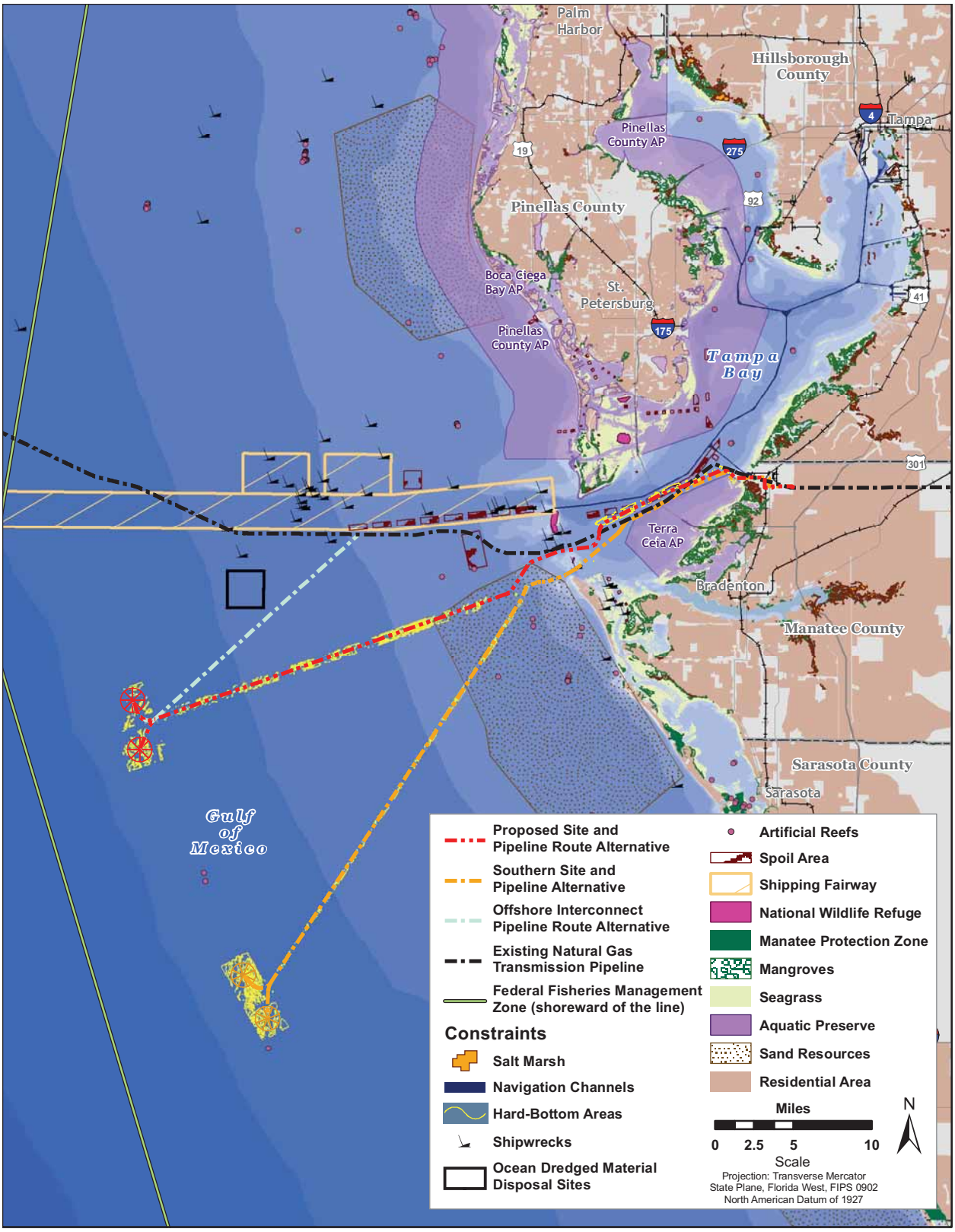
Numerous LNG import terminals are proposed for the GOM area of the United States. Currently there are no onshore LNG facilities proposed in Florida. There are several onshore LNG facilities proposed in the GOM, and the Elba Island, Georgia, LNG Terminal has two approved expansions. However, any revaporized natural gas from any of the onshore facilities approved or proposed would have to be transported to west-central Florida through new or existing natural gas transmission pipelines. The proposed expansion of the Gulfstream Pipeline is discussed above. There are currently no other pipeline expansions proposed. Therefore, construction of additional onshore LNG facilities is not considered as viable alternatives to the proposed Project.

The Bienville and MPEH™ Projects are discussed in **Section 6**, as foreseeable actions.

2.3 Detailed Description of the Project

2.3.1 Overview

The Applicant proposes to construct, own, and operate a deepwater port, named Port Dolphin, in the Federal waters of the OCS in PB blocks: PB545, PB546, PB547, PB548, PB504, PB505, PB506, PB507, PB463, and PB589, approximately 45 km (28 mi) southwest of Tampa, Florida, in a water depth of approximately 30.5 m (100 feet). See **Section 2.3.2** for a discussion of lease blocks and the overall site plan. The proposed location of the Port is shown in **Figure 2.3-1**, and a nearshore location diagram of the



Source of Proposed Pipeline: ConShelf 2009. Source of Southern Pipeline: ConShelf 2007.

Figure 2.3-1. Port Dolphin Offshore Project Location Diagram

Port is shown in **Figure 2.3-2**. The Port would be connected to existing onshore natural gas distribution pipeline systems in Manatee County, Florida, as shown in **Figure 2.3-3**.

The Port would be capable of mooring SRVs with capacities of either approximately 145,000 m^3 or 217,000 m^3. Up to two SRVs would temporarily moor at the Port by means of an STL buoy system. Two unloading buoys would be separated by a distance of approximately 5 km (3.1 mi). The unloading buoys would moor each SRV on location throughout the unloading cycle. Each unloading buoy would have eight mooring lines consisting of wire rope and chain. The mooring lines would connect each unloading buoy to eight anchor points consisting of driven piles or suction anchors on the seafloor. An SRV would typically moor at the deepwater port for between 4 and 8 days, depending on SRV size, vaporizer throughput, and send-out rate. The two separate buoys would allow natural gas to be delivered in a continuous flow, without interruption, by having a brief overlap between arriving and departing SRVs.

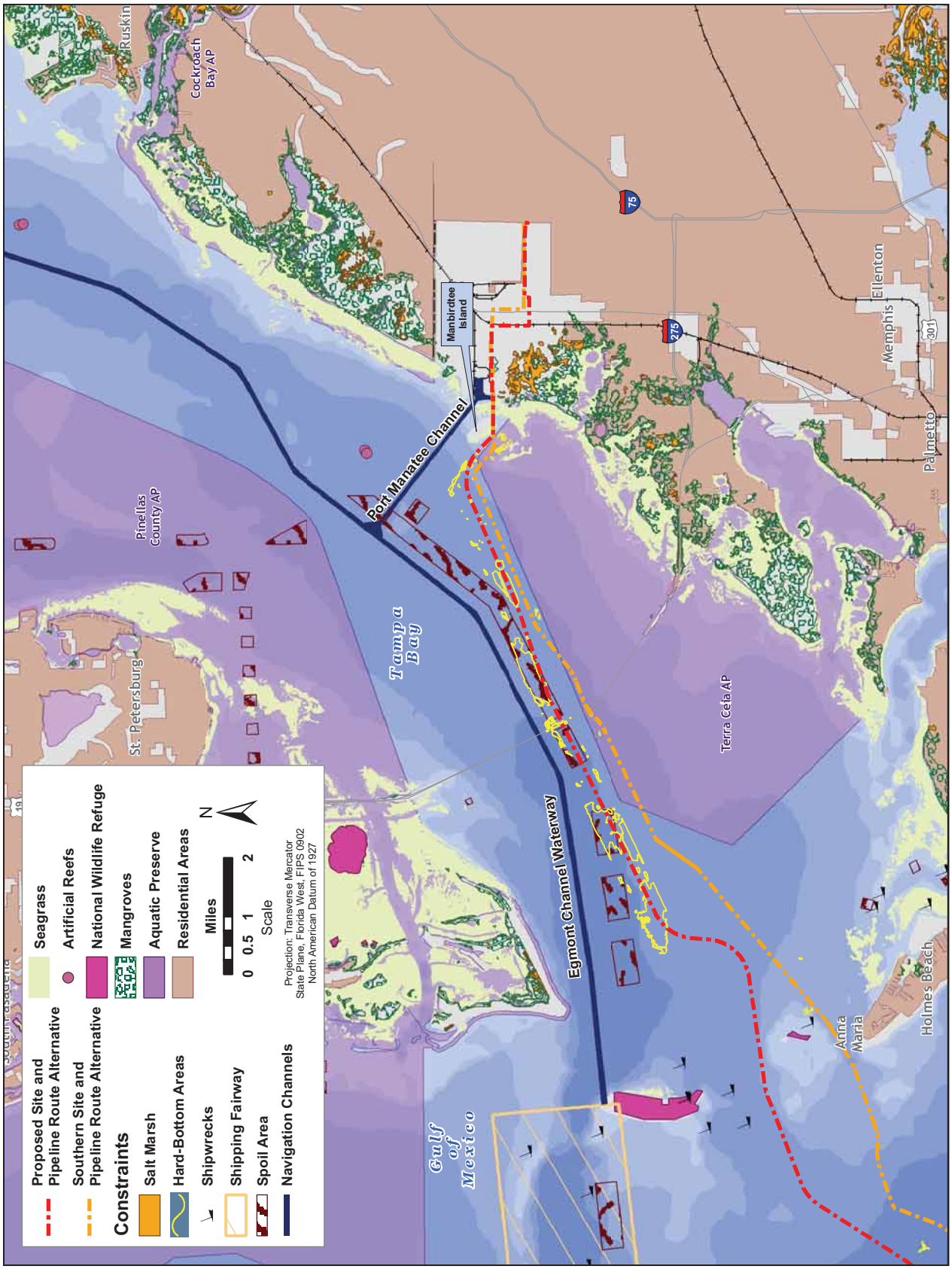
When not connected to an SRV, the unloading buoy would be submerged and held on the unloading buoy landing pad by the mooring lines with the top of the buoy approximately 18.3 to 21.3 m (60 to 70 feet) below the sea surface. A marker buoy and retrieval line would be used to locate and recover the buoy as an SRV arrives at the Port. The unloading buoy would be retrieved from its submerged position by means of a winch and recovery line. The unloading buoy would be hoisted into a trunk constructed in the forward part of the SRV where it would be located in a receiving cone. After the buoy is locked in position, unloading of natural gas would begin.

The SRVs would be equipped to store, transport, and vaporize LNG, and to meter natural gas that would then be sent out through conventional subsea pipelines. Each SRV would have insulated LNG storage tanks within its hull. Each tank would be equipped with an in-tank pump to circulate and transfer LNG, at a temperature of -160 °C (-256 °F), to the vaporization facilities on the deck of the SRV. The vaporization system would have a closed-loop, glycol/water-brine cycle with recirculating heat exchangers.

The Port would have an average throughput capacity of 800 MMscfd and a peak capacity of approximately 1,200 MMscfd. At the average throughput capacity, 50 SRV round trips per year would be required to supply the Port with LNG. However, the Port can handle up to 90 SRV round trips per year. Natural gas would be sent out by means of two flexible risers and two subsea flowlines leading to a 36-inch gas transmission line (see **Figure 2.3-2**). The gas transmission line would extend approximately 67.6 km (42 mi) to the east to landfall in Manatee County.

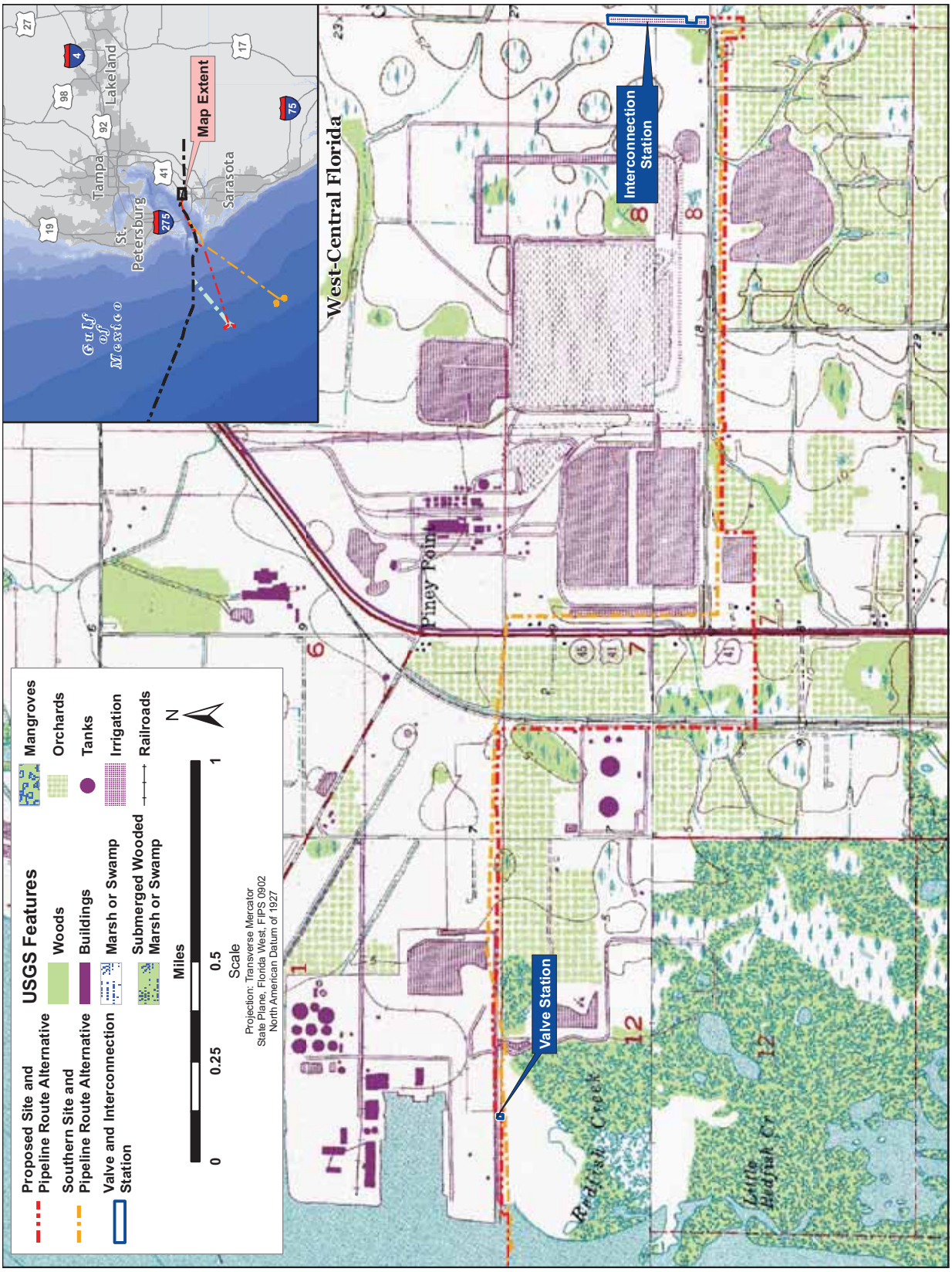
Onshore, the pipeline would proceed east across Port Manatee property through a tidally influenced conveyance ditch through Reeder Road to just west of the CSX railroad for approximately 1,981 m (6,500 feet). At that point the pipeline would turn south on the west side of U.S. Highway 41 and proceed south for approximately 481 m (1,580 feet) through the FPL tank farm before turning east again. It would cross the CSX railroad and parallel the FPL Transmission Line ROW across U.S. Highway 41. The pipeline would end at the collocated interconnection with the Gulfstream and TECO pipelines within industrial property owned by Port Dolphin (see **Figure 2.3-3**). From those two interconnection points, natural gas would be transported to serve residential, commercial, and industrial consumers, primarily in the west-central parts of Florida.

LNG delivered to the Port would be obtained from LNG supply at locations including the Caribbean, Africa, and the Middle East. The Applicant reported that it intends to procure LNG from supplies available through LNG supply markets. Construction of the Port components would be expected to take approximately 11 months beginning with offsite fabrication of Project components starting in August 2010, with startup of commercial operations in mid 2011. Construction of the onshore pipeline would



Source of Environmental Constraints: ConShelf 2007.

Figure 2.3-2. Port Dolphin Nearshore Project Location Diagram



Source of Topographic Map: USGS 2001.

Figure 2.3-3. Port Dolphin Onshore View of the Project Location Diagram

commence in summer of 2010 and be completed in approximately 3 months. The Port would be designed, constructed, and operated in accordance with applicable codes and standards and would have an expected operating life of approximately 25 years.

The functions of the Port would be to temporarily moor SRVs, vaporize LNG, meter natural gas, and send out natural gas by pipeline. The major fixed components of the Port would be two unloading buoy systems in a water depth of approximately 30.5 m (100 feet); eight mooring lines consisting of wire rope and chain connecting each unloading buoy to anchor points on the seafloor; eight driven pile anchor points; one flexible pipe riser to each buoy; riser manifolds; one flowline from the north buoy approximately 3.2 km (2 mi) in length; one flowline from the south buoy approximately 3.2 km (2 mi) in length; a single 36-inch offshore natural gas transmission line (approximately 67.6 km [42 mi]) to landfall in Manatee County; and a continuation of the 36-inch natural gas pipeline from its landfall point for 6.4 km (4 mi) to the collocated Gulfstream and TECO Interconnection Station where it would tie into metering facilities, transition manifolds, hot taps, and connecting pipes tying into the existing Gulfstream and TECO pipelines. These components are further described in subsequent subsections.

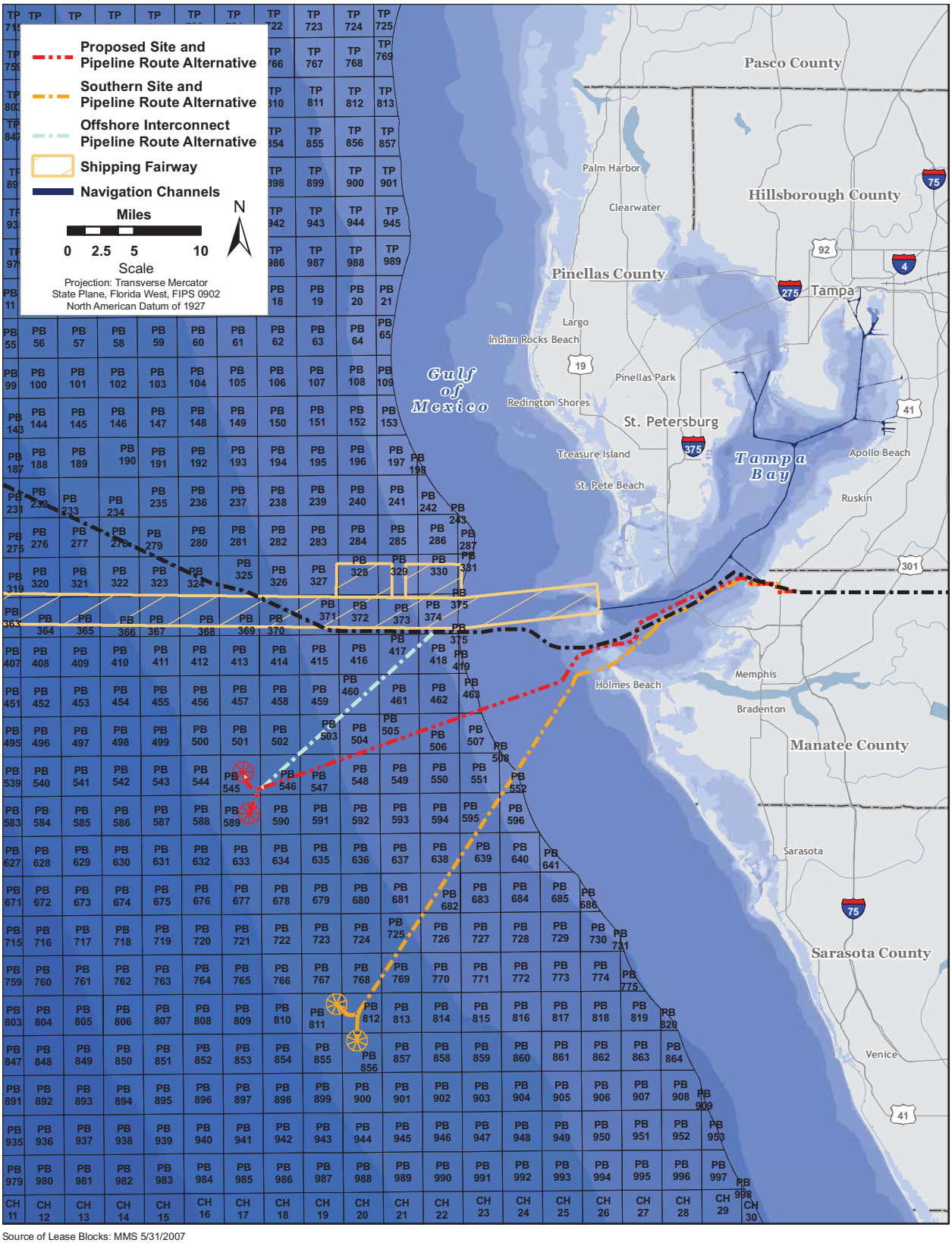
2.3.2 Lease Blocks and Overall Site Plan

The Port unloading buoys would be in MMS PB blocks: PB545 and PB589. The lease blocks where the Port would be are shown in **Figure 2.3-4**. The SRVs would approach the Port from the south and maneuver into position on the buoys depending on variations in weather and other local conditions. The approaches to or exits from the buoys would include MMS PB blocks: PB500, PB501, PB543, PB544, PB587, PB588, and PB631. Other lease blocks might be crossed as the SRVs enter the GOM and transit to the Project area. The natural gas transmission line would originate in block PB546 and pass through blocks PB547, PB548, PB504, PB505, PB506, PB507, and PB463 before it reaches the state/Federal undary. **Table 2.3-1** lists the lease blocks identified as being within the Project area and the SRV access and egress routes. There are no existing leases in any of the blocks identified in **Table 2.3-1**.

Table 2.3-1. Lease Block Information for the Proposed Action

Description	OCS Area	OCS Lease Blocks
North Unloading Buoy	St. Petersburg	545
South Unloading Buoy	St. Petersburg	589
Gas Transmission Line	St. Petersburg	547, 548, 504, 505, 506, 507, and 463
SRV Route	St. Petersburg	500, 501, 543, 544, 587, 588, and 631

Figure 2.3-4 shows the marine site plan for the Port. The site plan includes the proposed size and location of all fixed and floating structures and associated components seaward of the high-water mark. **Figure 2.3-4** also shows navigational fairways approaching Tampa Bay. The Port would have no associated anchorage areas for SRVs or support vessels.



Source of Lease Blocks: MMS 5/31/2007

Figure 2.3-4. Lease Blocks in the Vicinity of the Port Dolphin Project

2.3.3 Shuttle and Regasification Vessels

SRVs with approximate cargo capacities of either 145,000 m^3 or 217,000 m^3 based on standard designs for oceangoing LNGCs would be used to supply LNG to the Project. The vessels would also be equipped with a trunk and mating cone to receive the unloading buoy, lifting and connection devices, an LNG vaporization system, and gas metering systems. The SRVs would have accommodations for as many as 42 persons. Normal crew size would be approximately 30 persons. All critical functions would be manned 24 hours per day; other functions would be accomplished on a regular, scheduled basis. The following provides details on each SRV.

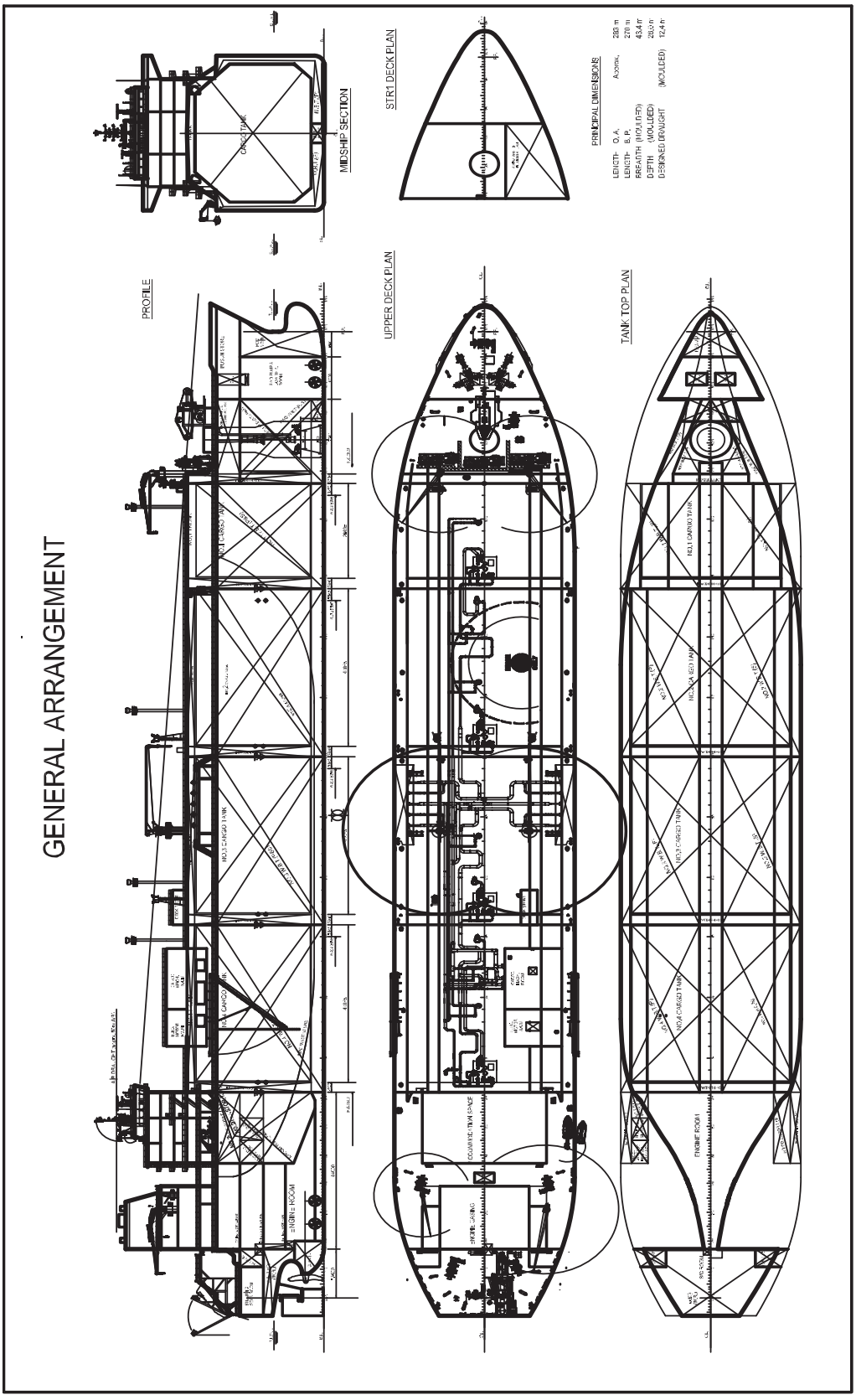
Dimensions. Approximate dimensions of each SRV would range from 280 m (918 feet) in length and 43 m (141 feet) in breadth, with a design draft of 11.4 m (37.4 feet) for the 145,000 m^3 vessels to 315.5 m (1,035 feet) in length and 50 m (164 feet) in breadth, with a design draft of 12 m (39.5 feet) for the 217,000 m^3 vessels. The maximum height above the waterline would be 41.1 m (135 feet). The 145,000 m^3 SRV would displace 80,000 metric tons and the 217,000 m^3 SRV would displace 108,000 metric tons. A drawing of a typical SRV is shown in **Figure 2.3-5**.

Hull. The SRVs would generally have a flush deck without forecastle, a bulbous bow, and a transom stern. The engine room, crew accommodation, and bridge would be located aft. Bow thrusters and stern thrusters would be provided to improve maneuvering of the SRV when approaching the loading or unloading locations but thruster designs would vary between vessels. A trunk and mating cone would be constructed in the forward part of the SRV to allow it to moor to the unloading buoy at the Port. The SRV would have a double hull arrangement. The inner hull would accommodate the membrane-type LNG storage tanks. Moss-type vessels would have spherical tanks to contain the LNG. The double bottoms and double sides would be used for seawater ballast. A conventional cargo manifold amidships would be provided for loading and unloading of the LNG at shoreside facilities.

Capacities. The two vessel types that serve the Port would have a capacity of approximately 145,000 m^3 or approximately 217,000 m^3. The ballast tank capacity would be sufficient to limit the draft variations when loading and discharging the cargo. The SRV and the cargo containment and handling systems would be suitable for cargoes of specific gravities up to 0.50. Various tanks aboard each SRV would have approximately the following ranges of capacities: diesel oil tanks, 6,000 m^3 (1,583,400 gallons [gal]) to 7,000 m^3 (1,848,000 gal); distilled water tanks, 280 m^3 (11,760 gal); freshwater tanks, 250.0 m^3 (66,000 gal) to 600 m^3 (159,600 gal); and potable water tanks, 200 m^3 (52,500 gal). The fuel capacity would be sufficient for a range of approximately 13,000 nautical miles (NM) with 5 days of reserve.

Propulsion and Electrical Power Generation. The 145,000-m^3 SRV's power plant would use four dual-fuel diesel engines, one producing 5.7 megawatts (MW) and three producing 11.4 MW. Two 11.4-MW engines would be equipped with selective catalytic reduction (SCR) and oxidation catalyst and used for electrical power generation when the SRV is moored. One 5.7-MW engine would be equipped with SCR and oxidation catalyst and would be needed for propulsion and electrical power generation when the SRV is underway, positioning, and hotelling at the Port. One 11.4-MW engine would not be equipped with emissions controls and would be used only outside of the safety zone and during ocean transit. Propulsion would be provided by a single-screw driven by twin electric motors.

The dual-fuel diesel engines would burn 99 percent natural gas (a combination of 67 percent boil-off gas from the cargo tanks, 32 percent vaporized LNG), and 1 percent marine diesel as pilot fuel. The dual-fuel electric machinery concept would offer a substantial improvement over traditional steam turbines in terms of operating economy, exhaust gas emissions, and redundancy. At the same time, standards of safety, reliability, and maintainability would be kept at appropriate levels. The increased economy over



Source: Port Dolphin 2007a

Figure 2.3-5. Typical Shuttle and Regasification Vessel with Sea Chest Arrangement

conventional steam plants is a result of the higher efficiency of dual-fuel engines. Instead of a conventional steam plant, the Project's SRVs would use up to four low-pressure marine auxiliary boilers, each rated at about 278 MMBtu per hour (MMBtu/hr). These would be designed to operate on cargo boil-off gas and vaporized LNG. The steam would be supplied to the cargo vaporization units and not to the power generation and propulsion system.

Dynamic Positioning. The SRVs would have two thrusters forward and could have one or two thrusters aft. These thrusters push water out the side of the vessel to allow precise control of position while mooring with the buoy. Each thruster would have a controllable pitch propeller, with joystick control at the bridge house and bridge wings. The dynamic positioning system would be used while retrieving the submerged unloading buoy handling line and moving onto the buoy. The system normally would not be used while the SRV is moored to the unloading buoy. The SRV would be equipped with a thruster control system with a specially developed software program for handling all unloading buoy mooring operations. The SRV would also have a differential global positioning system (DGPS) and an acoustic position reporting system (APRS). The APRS would be used for monitoring the unloading buoy draft and its position before and during connection/disconnection. The bottom of the unloading buoy would be fitted with six transponders, equally spaced around the circumference of the lower part of the buoy. The APRS would automatically search for the strongest return signal from the buoy. If the APRS should lose the return signal from the transponder, the search procedure would start again.

SRV Mooring System. The SRVs would be equipped with normal mooring equipment for conventional LNGCs including port and starboard anchors. Head, breasting, and spring lines would be provided for mooring to shoreside LNG pier facilities. In addition, the SRVs that would be used at the Port would be equipped to moor to the unloading buoys.

LNG Containment System. The proposed cargo system for the 145,000 m^3 vessels would have either membrane or spherical-type tanks. The LNG with a specific gravity of typically between 0.43 and 0.47 would be stored at -160 °C (-256 °F). The maximum daily boil-off rate would be 0.15 percent of the cargo capacity. Spherical or prismatic cargo systems could be proposed for other vessel classes. The final design chosen by the Applicant would comply with all International Maritime Organization (IMO) requirements applicable to vessels designed for a 40-year North Atlantic operational lifespan.

2.3.4 Vaporization and Process Facilities

Regasification System. Each SRV would be equipped with up to five vaporization units, each with the capacity to vaporize 250 MMscfd (about 210 metric tons per hour [MT/hr]). Under normal operation, two or more units would be in service, with one unit on standby. The average annual send-out capacity would be expected to be 800 MMscfd. SRVs would be designed for simultaneous operation of all units at a maximum send-out capacity of 1,200 MMscfd.

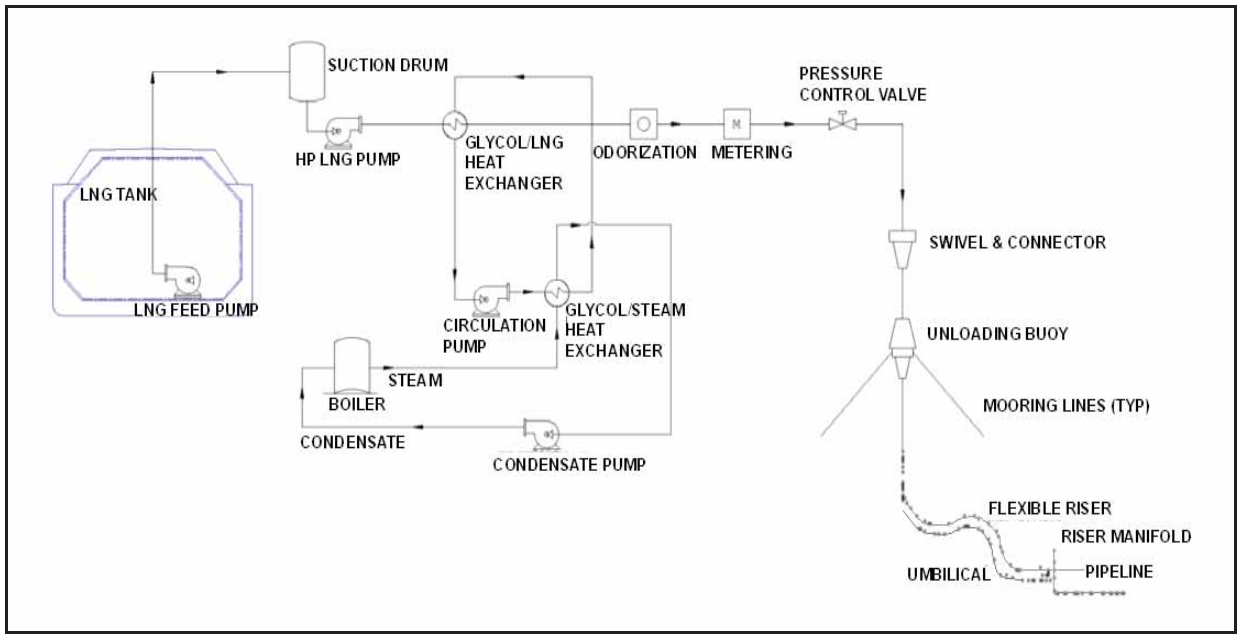
The vaporization system would be installed on the main deck in the front of the vessel. Each unit would be independent and could be disconnected from the main deck for transportation to shore for maintenance. Each unit would include the following components: two high-pressure cryogenic LNG pumps, two heating glycol/water-brine circulation pump, one steam/brine heat exchanger, one brine/LNG heat exchanger, and one control module. LNG at -160 °C (-256 °F) and approximately 72 pounds per square inch (psi) would be pressurized in multistage centrifugal pumps to a pressure up to 1,740 psi. The LNG would then be evaporated and heated as gas ranging in temperature between 0 to 10 °C (32 to 50 °F). Heating would be accomplished in a shell-and-tube heat exchanger, where LNG would be evaporated and heated in the tubes, and a glycol/water-brine solution would flow through the shell and around the tubes that contain the LNG, heating the LNG in tubes.

The intermediate fluid (glycol/water-brine) used to heat the LNG would be warmed by steam generated in the auxiliary boiler. This avoids the use of steam from the SRV's boiler room directly in a heat exchanger against LNG. This would prevent the danger of hydrocarbon gas entering the boiler room if internal leakage in the LNG/steam heat exchanger were to occur.

The glycol/water-brine would be circulated in a closed loop. Glycol/water-brine, being pumped with sufficient head to drive it through the closed loop, would enter the LNG heat exchanger at 90 °C (194 °F) and leave at 20 °C (68 °F). The glycol/water-brine would then be reheated in the steam, at which time it would again enter the LNG heat exchanger.

Steam would be piped from the engine room to the steam-to-glycol/water-brine heat exchanger. Condensed steam from the heat exchanger would be returned to the boiler feed water tanks at about 100 °C (212 °F). Steam supply would be adjusted by a control valve regulated by the temperature of the vaporized LNG.

In addition to the LNG vaporization units, a forcing vaporizer would be installed in the cargo compressor room to vaporize LNG, supplied by one of the spray pumps in the cargo tanks, for supplying fuel gas to the dual fuel engines. The capacity of the forcing vaporizer would be sufficient to produce the full quantity of fuel gas as forced boil-off to achieve 100 percent gas demand from the two dual fuel engines at maximum generated output. The STV closed-loop LNG vaporizer process flow diagram is presented in **Figure 2.3-6**.



Source: Port Dolphin 2007a

Figure 2.3-6. STV Closed-Loop LNG Vaporizer Process Flow Diagram

Cooling and Ballast Seawater. Seawater would be used to ballast the SRV, cool the dual-fuel diesel engines supplying power for the regasification process, and condense the steam produced by the boilers supplying heat to the vaporization process. Ballasting the SRV is required to maintain proper buoyancy as the LNG is vaporized and offloaded through the pipeline. Water intake for ballasting the SRV would require an average intake of 360 m^3 per hour (2.3 MGD) over the vaporization cycle. The seawater cooling system would take in seawater through one of two sea chests, each measuring 1.5 m by 2.0 m (4.9 feet by 6.56 feet). The seawater intakes for the cooling system are located in the aft near the engine

rooms at depths of 4.6 and 7.6 m (15 and 25 feet). The cooling water system would require an intake of approximately 1,520 m^3 per hour (9.5 MGD). Water velocity through the lattice screens at the hull side shell would not exceed 0.15 m/s (0.5 ft/s) at the maximum flow rate of 1,520 m^3 per hour (6,692 gallons per minute [gpm]).

Cooling water discharges would be made at points removed from the intake sea chests to avoid recirculating warmed water through the cooling system. All of the cooling water would be discharged at a temperature of approximately 10 °C (18 °F) above the ambient water temperature. Although the seawater system would be equipped with a chlorination system to prevent biofouling of heat transfer surfaces and system components, the chlorination system would not be used while the SRVs are approaching the Port or moored at the buoys. Discharges of ballast water would be made when the SRV takes on its next cargo of LNG, and international and the local country's requirements for discharging ballast water would apply.

Produced Discharges. The SRVs would have three production discharges while at the buoy: stack gases from the auxiliary boilers and the dual-fuel engines, warmed water discharges from cooling water system, and discharges of storm water from exposed deck areas.

Emissions would be produced by the gas-fired marine auxiliary boilers, each rated at about 278 MMBtu/hr, and from the dual-fuel engines. The proposed boilers would have SCR units to reduce NO_x emissions to 0.037 pounds (lb)/MMBtu and combustion controls would limit carbon monoxide (CO) to 0.015 lb/MMBtu.

Two of the 11.4-MW dual-fuel engines and one 5.7-MW dual-fuel engine would have SCR units to reduce NO_x emissions. The SCR system would use ammonia as the catalyst agent to reduce NO_x formation. An oxidation catalyst would also be installed on the dual-fuel engines to reduce CO and VOC emissions. Two 11.4-MW dual-fuel engines would not be provided with SCR as these engines would be used only for propulsion.

Boil-off gas would be fully consumed by the dual-fuel engines and boilers. In the event of insufficient boil-off gas to fuel the engines and boilers at peak load, additional LNG would be vaporized and used. If excess boil-off gas were present, a vapor combustor would be used to burn the excess gas; the vapor combustor would only be operated when LNG vaporization equipment is shut down.

2.3.5 Operations

The following describes major aspects of Port operations.

Operations Manual. Based on available preliminary information, the Applicant has prepared a draft Operations Manual for the Port. As design and construction of the Port proceeds, the manual would be updated and resubmitted to the USCG for final approval prior to commencement of any operations.

Loading and Transit. LNG would be transferred from a foreign shoreside LNG pier to the SRVs. The loading operations would typically require approximately 1 day for berthing the SRV, loading the LNG, and preparing for departure from the LNG pier at the supply location. Normal security and safety policies would be followed and would comply with all applicable international rules and regulations. While in the open ocean, the SRVs would typically transport the LNG at speeds up to 19.5 knots and comply with the International Convention for the Prevention of Pollution from Ships (MARPOL), the Society of International Gas Tanker and Terminal Operators (SIGTTO), and other applicable international rules.

Connecting, Vaporization, and Unloading. When an SRV is not moored to the unloading buoy, the buoy would be submerged approximately 18.3 to 21.3 m (60 to 70 feet) below the ocean surface, and held in place on the Landing Pad by the mooring lines. The riser would remain attached. The valves at the top of the buoy and at the pipeline end manifold (PLEM) would be closed. A buoy marker and retrieval line would go from the top of the unloading buoy to a marker buoy that would be equipped with the required navigation lights. When the SRV approaches, the SRV would retrieve the unloading buoy with specific shipboard equipment, connect the buoy to the mating cone in the hull of the SRV, and prepare for vaporization and unloading of the LNG. Two unloading buoys approximately 5 km (3.1 mi) apart would be used so that natural gas could be delivered in a continuous flow without interruption by having brief overlap between arriving and departing SRVs. One SRV would typically be at the Port at all times. The SRV would typically be connected to the buoy for 4 to 8 days while vaporizing the LNG, depending on the cargo capacity and send-out rate of the SRV. As the first SRV moored at the Port is emptied, a second SRV would arrive and moor at the Port. One vessel would be moored to each of the two buoys to allow for continuous send-out of natural gas. As the first vessel completes vaporization of its cargo and the second vessel has initiated vaporization, the first vessel would shut down its vaporization equipment, disconnect from the buoy, and depart the Port area. It is estimated that between 45 and 90 SRVs would use the Port annually (Port Dolphin 2008a).

Disconnection from Unloading Buoy. Prior to departure of the SRV, the unloading buoy would be disconnected and lowered to rest on the Landing Pad approximately 18.3 to 21.3 m (60 to 70 feet) below the ocean surface.

Manning and Crew Changes. The SRVs would have accommodations for as many as 42 crew members, but the typical crew size would be approximately 30. All critical functions would be manned 24 hours per day. Other functions would be accomplished on a regular, scheduled basis. Crew changes could take place at either the LNG loading site or at the Port. Crew changes at the Port would be made using the dedicated Crew Vessel.

Pipeline Operation. The SRVs would control the normal send-out of revaporized natural gas into the pipeline system with onboard control and monitoring systems, unloading buoy valves, and remotely operable valves in the PLEM. A control umbilical containing electrical and hydraulic control circuits would allow remote control of buoy manifold and PLEM valves. The isolation valve at the PLEM would also have an overpressure sensor that would automatically actuate the shutoff valve if pipeline overpressure was sensed. Intervention and maintenance work might require divers or a remotely operated vehicle to open or close pipeline system valves. The pipeline system would be designed to accommodate subsea pigging operations (a pig is a device that moves through the inside of a pipeline for the purpose of cleaning, dimensioning, or inspecting the interior of the pipe), including passage of instrumented internal inspection devices, for the flowlines and the gas transmission pipeline. In addition, flanged connections and tie-in spools could be leak-tested underwater without having to pressure-test the entire system. A block valve would be located on Port Manatee property to allow Project operations personnel in the onshore support facility to isolate the pipeline. Additional isolation valves; pig receivers; and filtration, liquid removal, and measurement devices would be at the collocated Gulfstream and TECO Interconnection Facility.

2.3.6 Mooring and Unloading Buoys

The design of the mooring and unloading buoys would be based on proven technology used for more than a decade in hostile ocean environments such as the North Sea, as well as for the Excelerate Gulf Gateway Project. The technology is also proposed for the Neptune Project and used in the Northeast Gateway Project. It was proposed for the Calypso Project, which has since been withdrawn by the Applicant. The

unloading buoy would have the same dimensions as other ports to provide the greatest flexibility for the quantity of vessels that could moor to the unloading buoy.

The size and length of the mooring lines, risers, and control umbilicals would be custom-designed for the site-specific conditions for the Port facility during the detailed design and construction phase of the Project. The mooring and unloading buoys would be designed for the SRV to remain moored on location during non-hurricane 100-year storm conditions, and to survive the 100-year storm conditions when the unloading buoy is submerged below the ocean surface.

Unloading Buoys. The Port would include two unloading buoy systems in a water depth of approximately 30.5 m (100 feet) and separated by a distance of approximately 5 km (3.1 mi). Each unloading buoy would have eight mooring lines consisting of wire rope and chain connecting each unloading buoy to anchor points on the seafloor, eight anchor points consisting of driven piles, one 16-inch inside diameter (ID) flexible pipe riser, and one electrohydraulic control umbilical from the unloading buoy to the riser manifold (see **Figure 2.3-7**).

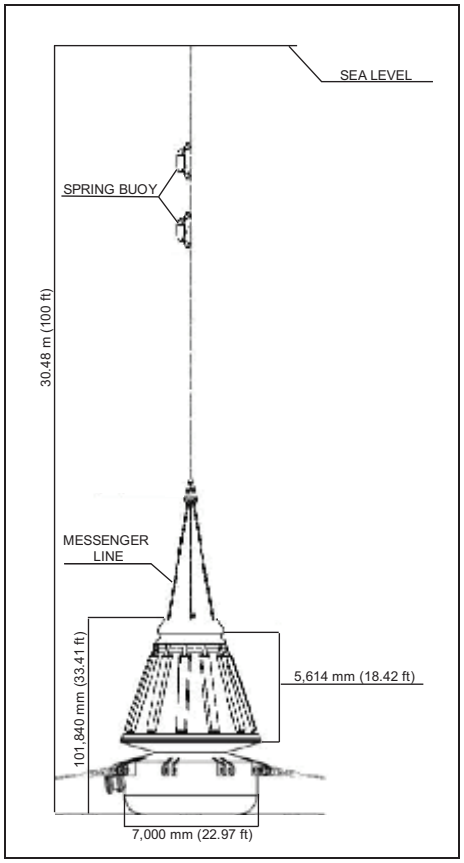


Figure 2.3-7. Schematic of a Submerged Turret Loading Buoy

Buoyancy Cone. The buoyancy cone would be a welded, conical steel structure that would provide required buoyancy and ensure smooth transfer of mooring, riser/umbilical, and reaction forces to the vessel hull. The buoyancy cone would be locked into the mating cone in the SRV when the unloading buoy is connected. The outer shell would be designed to withstand expected impact loads during hook-up and disconnection, in addition to hydrostatic pressure in the submerged position. Physical contact with the vessel would be limited to the upper and lower mating rings, which require strict, interface tolerances. A vertical support structure would be located on top of the buoyancy cone. The top would also serve as a protective structure for the buoy-mounted valves and the male part of the mechanical connector so they would not suffer damage during connection and disconnection. Lifting and pull-in pad-eyes also would be integrated in the top of the structure.

Turret. The integrated turret would be the fixed portion of the unloading buoy. It would consist of a shaft and a lower section with mooring connections (pad-eyes). Mooring line tensions would be transferred into the turret through the turret pad-eyes. These forces would be further transferred via the bearings and into the buoy and vessel structure. The turret would be buoyant. To contribute to the overall buoyancy requirements, as well as to reduce thrust forces on the axial bearing during operation, it would be divided into separate watertight compartments. The turret would be equipped with integrated guide-tubes allowing the riser and umbilical to be pulled all the way through the turret for final suspension at the turret top plate.

Mooring Connection. Each mooring line would be connected to the lower turret section at a double lug integrated with the turret internal structure. A connecting link element would be fitted between the lugs and the mooring wire socket to allow free pivoting about both axes.

Turret Bearings. The main purpose of the turret bearings would be to ensure load transfer from the turret structure to the buoyancy cone and allow free and unrestricted rotation. There would be three main bearings in the buoy: upper axial bearing, upper radial bearing, and lower radial bearing. The upper axial bearing would support all the vertical loads from the mooring, riser/umbilical, and valve/connector/swivel assembly. This bearing would be exposed to the highest continuous loading. The turret bearings would be designed to allow full weathervaning of the vessel with no restrictions regarding weather conditions or vessel operation. All turret bearings would be made in segments of self-lubricating, sliding, and bearing materials. The upper bearing segments (both axial and radial) would be fitted into a housing in the locking recess ring of the buoyancy cone. The lower bearing segments would be fitted into a housing in the lower ring of the buoyancy cone. The bearings could operate properly even when submerged in nearly stagnant seawater. The turret bearings would be designed to operate without additional lubrication.

Pick-up Line System. To pull in the unloading buoy for mating to the SRVs, a pick-up assembly would be connected to the top of the unloading buoy. The main components would be a three-leg lifting bridle, a messenger line with spring buoys for attachment to the messenger line to obtain extra buoyancy, and a marker buoy and a finger buoy to facilitate location and pick up by the arriving SRV.

Landing Pad. A concrete or steel landing pad would be fixed to the seafloor by means of a skirted mud mat to allow lowering the turret to the ocean floor when it is not in use. The landing pad would have fenders to reduce impact loads.

Anchors. Each unloading buoy would be connected to eight driven piles. Each pile would be 1.8 m (6 feet) in diameter and approximately 20 to 30 m (66 to 98 feet) long. The anchor coordinates for the northern and southern unloading buoys are shown in **Table 2.3-2**.

Table 2.3-2. Mooring Anchor Locations and Line Length

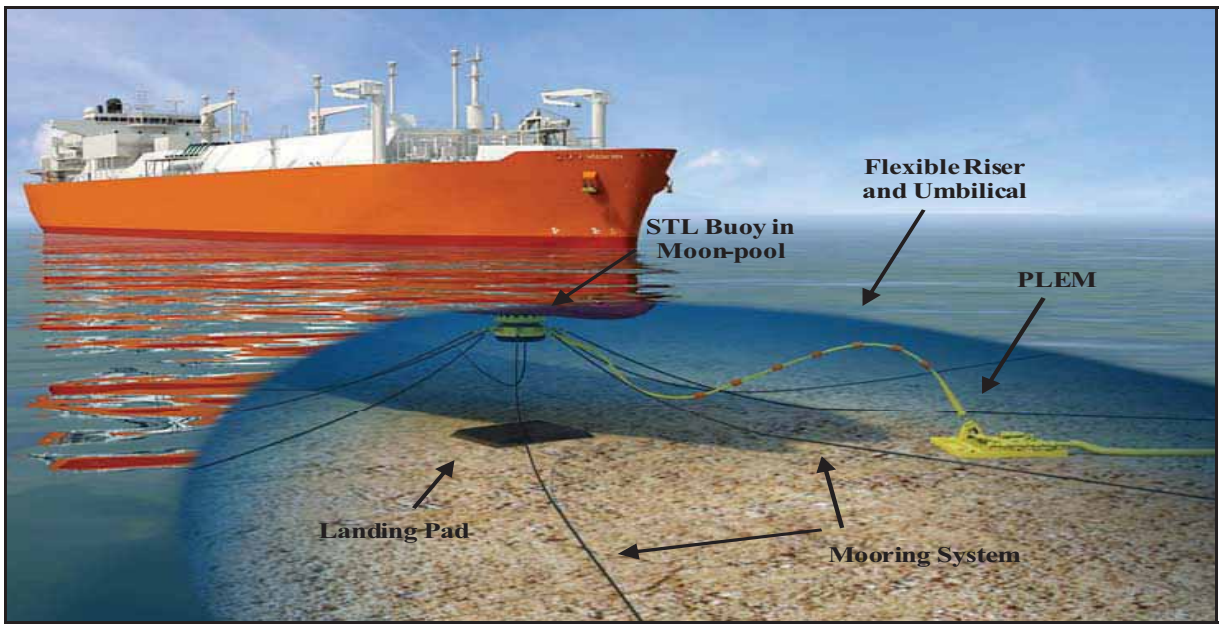
Anchor	Coordinates (NAD 27)		Distance from Turret Center to Mooring Anchor (m)
Northern 1	27°25’38.70	83°11’50.40	800
Northern 2	27°25’27.17	83°11’33.58	650
Northern 3	27°25’12.32	83°11’26.50	650
Northern 4	27°24’57.36	83°11’33.26	650
Northern 5	27°24’54.16	83°11’49.84	800
Northern 6	27°24’50.11	83°11’14.31	950
Northern 7	27°25’11.82	83°11’24.66	950
Northern 8	27°25’33.71	83°11’14.78	950
Southern 1	27°22’54.66	83°11’22.78	800
Southern 2	27°22’43.76	83°11’5.96	650
Southern 3	27°22’28.91	83°11’58.88	650
Southern 4	27°22’13.94	83°11’5.64	650
Southern 5	27°22’02.75	83°11’22.22	800
Southern 6	27°22’06.74	83°11’46.68	950
Southern 7	27°22’08.42	83°11’57.03	950
Southern 8	27°22’50.30	83°11’47.15	950

Source: Port Dolphin 2007g

Mooring Lines. Each unloading buoy would have eight mooring lines designed so that the SRV could remain moored in the non-hurricane 100-year storm conditions. Mooring lines would vary in length, from 548.6 to 1,219.2 m (1,800 to 4,000 feet) for the northern unloading buoy and from 762 to 1,097.3 m (2,500 to 3,600 feet) for the southern buoy. The mooring lines would consist of 132-millimeter (mm) (5.25-inch) Grade R4 chain and 120-mm (5-inch) spiral-strand wire rope. Information on the mooring lines is provided in **Table 2.3-2**.

Flexible Riser. The riser system for each unloading buoy would consist of one 40-centimeter (cm) (16-inch) interior diameter flexible riser in a steep-wave configuration (see **Figure 2.3-8**). The riser would be directed between two of the mooring lines. Total length of the riser is approximately 82 m (269 feet). The horizontal distance from the turret centerline to the PLEM is approximately 75 m (246 feet). The flexible riser system would lie on the seafloor when not in use. A typical flexible riser has various layers consisting of the following, starting with the innermost layer:

- Carcass. Essentially a corrugated metallic tube that forms the body of the flexible pipe. The primary function is to prevent the polymer inner liner from collapsing due to possible external pressure or rapid decompression.
- Pressure sheath. An inner liner that is highly resistant to hydrolysis and virtually any chemicals used in the offshore industry.
- Pressure armor. Consists of C- or Z-shaped profiles.
- Tensile armor. Consists of two cross-wound layers of rectangular carbon steel wires providing the strength of the flexible riser with respect to axial forces that are induced by the internal working pressure, weight of the flexible pipe, and external loads (e.g., tension loads during installation or dynamic loads).
- Insulation layer. Applied before the extrusion of the outer sheath.
- Outer sheath. Protects the steel armor layers against mechanical damage and exposure to seawater, thus providing corrosion protection of the steel strands in both the pressure and the tensile armor.



Source: Port Dolphin 2007a

Figure 2.3-8. Flexible Riser System Configuration

End terminations and termination flanges would be at each end; end terminations would provide a gas relief system. In addition, the upper end would be fitted with a bend stiffener that would be pulled into the lower part of the guide-tube in the unloading buoy.

Control Umbilicals. The control umbilical would connect the PLEM controls to the control system onboard the SRV. The umbilical would have sufficient hydraulic lines to open and close valves and sufficient signal lines to transmit required information. The upper end of the umbilical would be fitted with a bend stiffener that would be pulled into the lower part of the I-tube in the unloading buoy. The umbilical would be further fitted with an end termination and hang-off arrangement at the upper turret plate. The hydraulic and signal lines would be routed from the end termination to wet mateable connectors. At the manifold end, the umbilical would be fitted with an end termination that, most likely, would be bolted to the manifold. The hydraulic and signal lines would necessarily have wet mateable connectors. The umbilical would be fitted with distributed buoyancy and configured the same way as the flexible riser (either as stand-alone or strapped to the flexible riser). The control umbilicals would rest on the seafloor when not in use.

Design Criteria for the Mooring and Unloading Buoys. The maximum sea state for connection of the SRV to the unloading buoy would be a significant wave height of 3.5 m (11.5 feet), 1-hour mean wind speed of 15 m/s (29 knots), and current speed of 1.5 m/s (3.0 knots). The maximum sea state while connected to the unloading buoy would be the 100-year extra-tropical storm condition (non-hurricane) with a significant wave height of 6.2 m (20.3 feet), 1-hour mean wind speed of 20 m/s (38.9 knots), and current speed of 1.5 m/s (3 knots). The maximum sea state for disconnection of the SRV from the unloading buoy would be a significant wave height of 6.2 m (20.3 feet), 1-hour mean wind speed of 20 m/s (38.9 knots), and current speed of 1.5 m/s (3 knots), which is defined as a 100-year extra-tropical storm condition.

2.3.7 PLEM

Integral to the Project pipeline system would be two PLEMs near the unloading buoys that would connect the flexible risers to the flowlines and a Y-connection that would connect the two flowlines to the new gas transmission pipeline. There would be two PLEMs in the system, each approximately 75 m (246 feet) offset from the proposed unloading buoy locations. The purpose of the PLEM would be to provide an interface between the pipeline system and the flexible riser, isolate the riser between gas unloading operations, and attach a subsea pig launcher or receiver. Each PLEM would include a flange connection for attaching the flexible riser or the subsea pig launcher/receiver and a full-bore subsea hydraulic control valve and electrohydraulic umbilical termination assembly. Each PLEM would have a mud mat foundation to provide a stable base for bearing PLEM and riser weight and to resist sliding and overturning forces.

2.3.8 Offshore Pipelines

The Project pipelines would consist of two 36-inch flowlines approximately 3.2 km (2 mi) long from the southern PLEM and 3.2 km (2 mi) long from the northern PLEM to a Y-connection. From the Y-connection a 36-inch gas transmission line approximately 74.0 km (46 mi) long would carry the gas from the unloading buoys to interconnections with the Gulfstream and TECO pipeline systems. The pipelines would have a nominal outer diameter of 36 inches, nominal wall thickness of 1.9 cm (0.75 inches), an external coating of fusion-bonded epoxy coating with a thickness of 0.04 cm (0.016 inches), and a concrete weight coating thickness of 11.4 cm (4.5 inches). The location and routing of the pipelines is shown in **Figures 2.3-1** and **2.3-2** and the basic pipeline design criteria are shown in **Table 2.3-3**.

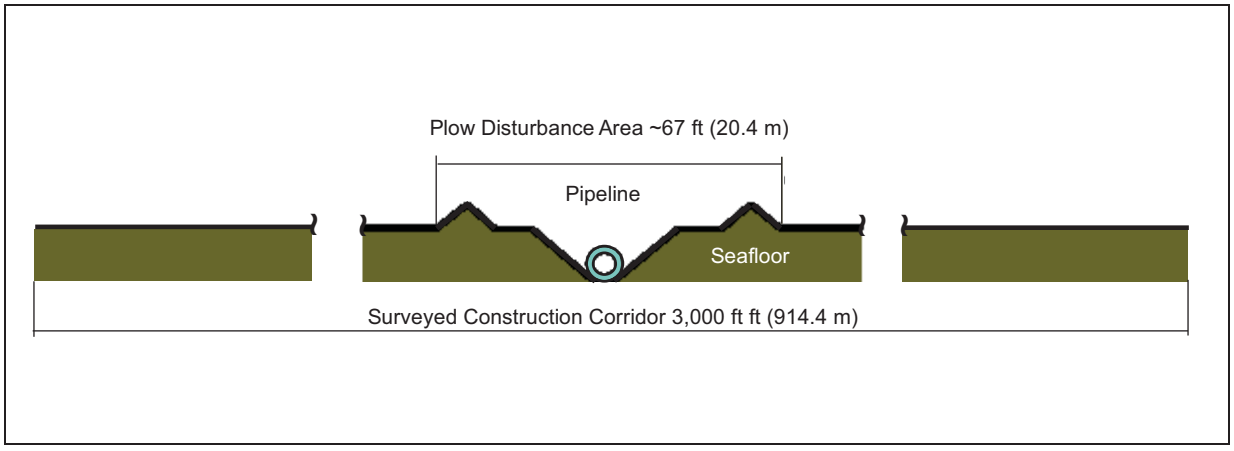
Table 2.3-3. Pipeline Basic Design Criteria

Criteria	Value
Water depth range	0 feet to 110 feet
Maximum allowable operating pressure	1,750 psig
Normal operating pressure	1,000 psig
Throughput range	4 MMscfd – 1.2 Bscfd
Pipe fabrication method	Submerged arc welded
Steel unit weight	490 lbs per cubic foot
Concrete weight coating density	190 lbs per cubic foot
Design life	25 years

Note: psig – pounds per square inch gauge

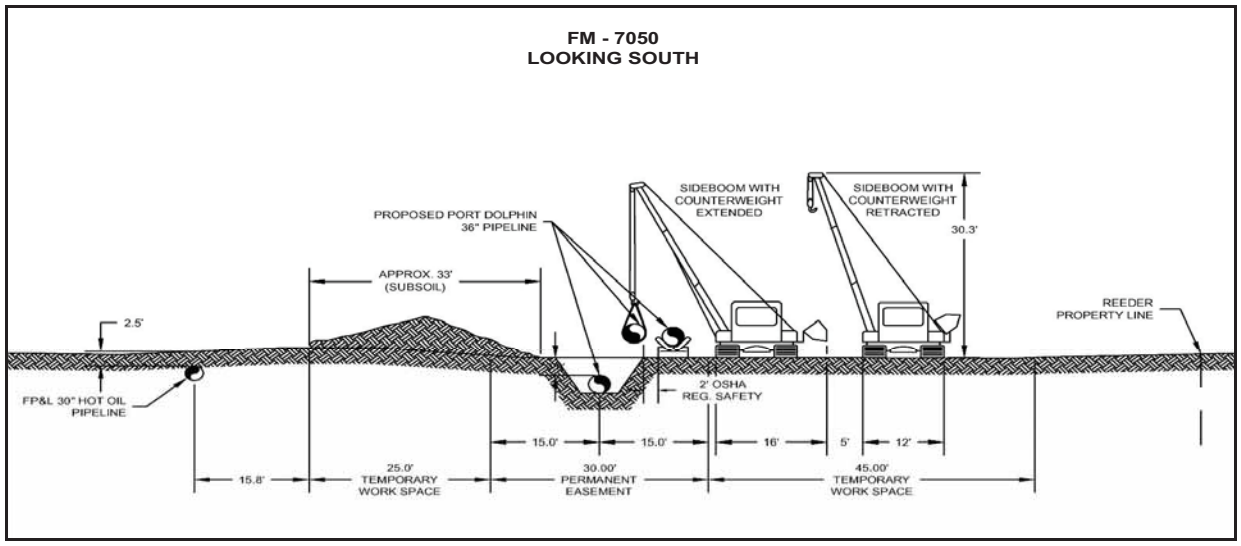
Pipeline trenching and burial requirements are governed by 30 CFR 250 Subpart J, which requires pipelines and all related appurtenances to be protected by 0.9 m (3 feet) of cover in all portions in water depths less than 61 m (200 feet). The flowlines and pipeline would be buried to a depth of 0.9 m (3 feet) in both Federal and state waters. Portions of the pipelines through hard-bottom areas might not be buried to the full 0.9 m (3 feet) depth. In these areas flexible concrete mattresses would be used to cover the pipeline. In places that the pipeline crosses shipping lanes, it would be buried 3.0 m (10 feet) if the seafloor permits plowing. Burying the pipeline and flowlines would protect them from potential damage from anchors and trawls and avoid potential fouling, loss, or damage of fishermen's trawls. The pipeline construction corridor would be 914.4 m (3,000 feet) wide in offshore areas and 30.5 m (100 feet) wide in onshore construction areas. The permanent ROW for the pipeline would be 61 m (200 feet) wide offshore and 9.1 m (30 feet) wide onshore**. Figures 2.3-9** and **2.3-10** show the typical construction corridors and permanent ROWs for offshore and onshore construction respectively.

Pipeline Crossings. The proposed pipeline would cross the existing Gulfstream Pipeline two times offshore using HDD drilling technology in order to avoid construction in the Terra Ceia Aquatic Preserve (see **Figure 2.1-14**). The easternmost HDD crossing would be 898 m (2,947 feet) in length, and the westernmost HDD crossing would be 407 m (1,335 feet) in length. Both crossings would be in a water depth of 21 feet. The Port Dolphin pipeline would be drilled to a depth of approximately 6 m (20 feet) below the existing Gulfstream Pipeline (Port Dolphin 2007b).



Source: Port Dolphin 2007a

Figure 2.3-9. Typical Offshore Construction Corridor



Source: Port Dolphin 2007a

Figure 2.3-10. Typical Onshore Construction Corridor

Tie-Ins. There are 11 locations where tie-in operations would be required to piece the pipeline sections together. This mechanical operation is accomplished with specially designed connectors and a manned diving rig. This common operation does not require welding. Tie-ins would be required at each end of all HDD crossings, the Y-connections, and the PLEMs.

2.3.9 Onshore Pipeline and Aboveground Facilities

FERC would have jurisdiction of all Project components from the pier bulkhead to the pipeline's interconnections with Gulfstream and TECO in the western portion of Manatee County, Florida. The onshore portion of the 36-inch gas transmission line would be approximately 6.4 km (4 mi) long. Onshore components would also include a valve station and one interconnection station.

The onshore pipeline would be engineered, designed, constructed, inspected, tested, operated, and maintained in accordance with applicable Federal regulations and guidelines including the U.S. Department of Transportation (USDOT) regulations 49 CFR Part 192, Transportation of Natural Gas and Other Gas by Pipeline: Minimum Federal Safety Standards; and FERC Regulations 18 CFR 380.15, Siting and Maintenance requirements. The Applicant states that it would adhere to the FERC *Upland Erosion Control, Revegetation, and Maintenance Plan* (FERC Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (FERC Procedures) while constructing its onshore pipeline[2]. The Applicant also states that prior to the start of construction it would develop a project-specific "Wetland and Waterbody Construction and Mitigation Procedures" document. The Applicant further states that it would develop a site-specific restoration plan in consultation with appropriate agencies. FERC staff will review these plans once they are filed by Port Dolphin. Port Dolphin would not be authorized to begin construction of the onshore pipeline until these plans (and any other forthcoming information) have been reviewed and approved by the Director of Office of Energy Projects (OEP).

[2] The FERC's Plan and Procedures are a set of construction and mitigation measures that were developed in collaboration with other Federal and state agencies and the natural gas pipeline industry to minimize the potential environmental impacts of the construction of pipeline projects in general.
The Plan can be viewed on the FERC Internet Web site at http://www.ferc.gov/industries/gas/enviro/uplndctl.pdf and the Procedures at http://www.ferc.gov/industries/gas/enviro/wetland.pdf.

Onshore Transportation, Communication, and Utility Crossings. There are six planned transportation, communication, or utility crossings for the onshore portion of the pipeline. An HDD would be used to cross the FPL tank farm at a depth of 12.5 m (40 feet). The proposed pipeline would cross under roadways and the CSX railroad using boring techniques. All bores are expected to be between 4.6 to 6.1 m (15 to 20 feet) below land surface. The HDD would require entry and exit pits resulting in 2.5 acres of extra workspace outside the planned 30.5-m (100-foot) construction ROW.

In comments on the Draft EIS, Gulfstream pipeline objected to the location of the HDD entry point proposed by Port Dolphin. Gulfstream stated that the entry point was too close to its existing pipeline for safe execution of the HDD. Contrary to Gulfstream's allegations, the FERC is not convinced that Port Dolphin's proposed HDD entry point poses an unacceptable safety risk. First, the HDD operators will have an extremely high level of control over the location and path of the drilling operation during the initial entry of the HDD where the proposed pipeline is in proximity to Gulfstream. As an HDD progresses further and further from the entry rig, there is the possibility for some amount of wayward movement; however, this should not pose a problem at the initiation of the HDD where the operators have greater control over the directional path of the drill and more precise information about the location of adjacent utilities. The further the HDD progresses along its alignment path adjacent to Gulfstream, the vertical separation between these two pipelines will increase, as noted below. Second, the location of the Gulfstream pipeline is firmly established, so there is no chance that the HDD would encounter heretofore unknown Gulfstream facilities. Third, according to information submitted by Port Dolphin, the HDD entry point itself is 27 feet from the Gulfstream pipeline, and the HDD entry pit would be at least 20 feet from the Gulfstream facilities. This is within accepted industry practice. Port Dolphin has proposed several measures in order to provide an added level of safety and to address some of Gulfstream's proximity concerns. Specifically, Port Dolphin would:

- Invite Gulfstream personnel to be onsite both prior to construction (to help identify the exact location of the Gulfstream facilities), and during HDD operation
- Fence off Gulfstream's exclusive easement (5 feet on either side of Gulfstream's pipeline), thus preventing any Port Dolphin activity from encroaching within this area
- Shore up the HDD entry pit with sheet piling or other materials to prevent soil collapse near the Gulfstream pipeline.

Gulfstream also expressed concerns over the angle and clearance of the HDD path as it crosses beneath the existing Gulfstream pipeline. However, according to information filed by Port Dolphin, the HDD path (which is a progressively deepening parabola for the onshore portion) would cross below the Gulfstream pipeline with about 75 feet of vertical separation.

Based on its review, the FERC concluded that the HDD proposed by Port Dolphin, along with Port Dolphin's proposed additional safety measures, would be consistent with accepted industry practices. As such, the FERC found Port Dolphin's proposed HDD acceptable. Therefore, no alternative HDD entry points were carried forward for detailed analysis of impacts.

Onshore Wetland and Waterbody Crossings. The pipeline would cross nine wetlands with a total crossing length of 2,596 meters (8,516 feet). The additional protection procedures for wetland crossings include the use of either low-ground-weight construction equipment or the use of timber riprap, prefabricated equipment mats, or terra mats for standard excavation equipment; installing erosion-control devices to minimize sediment flow into the wetland; reestablishing appropriate vegetation species through natural recruitment and planting as necessary; and monitoring the success of the revegetation and weed-control efforts.

Aboveground Facilities. The valve station that would be on Port Manatee property would be approximately 50 feet by 60 feet, and occupy approximately 0.07 acres.

The 36-inch pipeline segment would terminate at the Gulfstream/TECO interconnection station where the pressure and flow of the natural gas would be monitored and controlled. The Gulfstream/TECO interconnection station would occupy an approximate 3.4-acre site on agricultural land purchased by the Applicant. The parcel would be 120 feet by 1,319 feet. At the Gulfstream/TECO Interconnection Station, hot taps would connect the gas transmission pipeline to the existing Gulfstream and TECO natural gas pipeline systems. Equipment and associated piping at the station would control flow, filtration, liquid handling, custody management, and overpressure equipment. The station would be designed to deliver approximately 70 percent of the flow from Port Dolphin to the Gulfstream pipeline, and 30 percent to the TECO pipeline.

No new compressor stations would be constructed. No underground storage of natural gas is proposed as part of this pipeline.

2.3.10 Maritime, Safety, and Related Matters

The following identify several maritime, safety, and related matters pertaining to the Port.

Marine Pipeline Metering System. The SRV's onboard control and safety systems would control pipeline pressures and flow rates at the discharge of the high-pressure LNG pumps. The Port's natural gas product would be metered for commercial purposes onboard the SRV. The metering system would be proposed on the forward part of the main deck between the vaporization units and the unloading buoy trunk. An ultrasonic gas metering system would consist of two ultrasonic gas flow meters, two pressure transmitters, and two temperature transmitters. A gas analyzer system would consist of a sample probe, two gas chromatographs, a pressure reduction cabinet, and an analyzer cabinet. The metering control system would consist of a metering cabinet, two flow computers, terminal flow computers and gas chromatographs, a supervisory computer and operator station, and a local area network switch.

Cargo System. The cargo system would include the necessary pumps and control systems for monitoring and control of the LNG storage tanks. The onboard class-approved load and stability calculator would ensure that liquids are properly distributed to minimize the stresses in the vessel hull. The operator would be able to monitor the cargo fluid levels, temperatures, and processes within each tank and control the valves for filling, emptying, and stripping the tanks. The operator could also monitor and control the auxiliary equipment associated with the cargo system, including the following:

- Compressors. One low-duty gas compressor would be used to provide boil-off gas for the boilers. Also, high-duty gas compressors would be used to return LNG vapor ashore during loading operations, return gas/vapor ashore during gassing-up and initial cool-down operations, and circulate heated cargo vapor through the cargo tank system during warm-up operations.
- Cargo discharge pumps. Each LNG tank would be outfitted with two cargo discharge pumps. These pumps would be single-stage, centrifugal pumps with one inducer stage. The single stage would help to obtain a very low net positive suction head to minimize vapor formation. The pumps would be of the submerged motor type, with the motor windings cooled by the pumped LNG. The LNG also would lubricate and cool the pump and motor bearings. The rated capacity would be approximately 5,600 gallons per minute.

Other Shipboard Systems. The SRVs would be equipped with all normal shipboard systems, such as a bilge and ballast system, safety equipment, lifesaving equipment, firefighting equipment, deck lighting,

navigation aids, and all other equipment needed for compliance with the applicable codes, standards, and regulations. These would include the following:

- Cargo leak detection. Any small cargo leakage within the membrane interbarrier space would be detected at an early stage by the gas detection system. The gas detection system would continuously monitor the interbarrier space by circulation of nitrogen within the space. Should a leak occur, it would be detected. Cargo would be restrained from coming into contact with the inner hull of the SRV by the secondary barrier membrane. An assessment of the leak could then be made and any special recovery measures, such as emptying the tank concerned, could be implemented.
- Emergency Shutdown (ESD) System. The ESD system would be designed to ensure a controlled shutdown of LNG equipment to avoid any unsafe conditions. It would be essential that the machinery be stopped and valves closed in the correct sequence to avoid any pressure or temperature surges that might exceed the design limitations of process or pipeline systems.
- Accommodation and machinery spaces gas detection system. This gas detection system would monitor the accommodation and machinery space areas of the ship. The range of measurement would be from 0 to 100 percent Lower Explosion Limit. The system would normally continuously scan the locations sequentially 24 hours per day, 7 days per week. In addition, a separate gas detector would be installed for continuous monitoring of gas supply to the main boilers.
- Cargo areas gas detection system. A separate gas detection system would cover the LNG insulation spaces and cargo area compartments. The control unit would be similar to the accommodation and machinery spaces gas detection system.
- Fire detection and alarm system. The fire detection system would be computerized with a fully addressable analogue fire alarm system and analogue detectors. The central control unit with back-up battery, operating panel, and power supply would be contained in a central cabinet on the bridge. There would be a repeater panel in the fire control headquarters. The system would be interfaced to the Distributed Control System which would indicate loop status and could control the fire pumps. The operator also would access deck plans indicating the exact location of individual detectors. The system would use a wide range of detectors and sensors to suit different needs and conditions. It would include detectors with different alarm parameters (for example, ion and optical smoke detectors, heat and flame detectors, manual call points, short circuit isolators, and timers where required). The detectors would be wired in a loop configuration with four loops in total. A fault in the system or a false alarm would be detected immediately because the function of the detectors and other installed loop units would be tested automatically and continuously.

Surface Requirements. Under the DWPA implementing regulations, the USCG is authorized to establish a permanent mandatory Safety Zone around deepwater ports whether a vessel is present or not. The Safety Zone would extend approximately 850 m (2,789 feet) from the center of each buoy and encompass approximately 561 acres. This is a result of maintaining 500 m (1,641 feet) from the moored LNGC (maximum of approximately 350 m [1,148 feet] length) as it weathervanes (rotates) around the buoy. All unauthorized vessels would be prohibited from anchoring or transiting the proposed Safety Zone at any time. The USCG would have the primary jurisdiction for the Safety Zone.

If a License is issued, the USCG may designate a mandatory No Anchoring Area (NAA) and recommendatory area to be avoided (ATBA) to further facilitate Port operations, safety, and security. The NAA restrictions would extend beyond the buoy anchors with an approximately 1,000-m (3,280-foot) radius around each of the buoys. The ATBA would extend with an approximately 1,200-m (3,937-

foot) radius around each of the buoys, and would include the area between the buoys. The Safety Zone, ATBA, and NAA for the Port are shown in **Figure 2.3-11**.

The NAA is necessary to prevent vessels from anchoring (or bottom trawling) within the Port's mooring system and damaging the mooring system, the vessel itself, or its equipment. The ATBA would represent an advisory notice to mariners to seek alternate routes around the area if possible. The USCG would not prevent vessels from crossing the ATBA, but they would be expected to maintain a predictable course at a speed of 10 knots or less. Activities that would not threaten port operations or navigational safety, such as fishing and transiting through the ATBA by recreational boaters, would be allowed within the ATBA. The Applicant would be encouraged to develop communications protocols with parties who have an interest in transiting the Project area such as fishing or recreational boating.

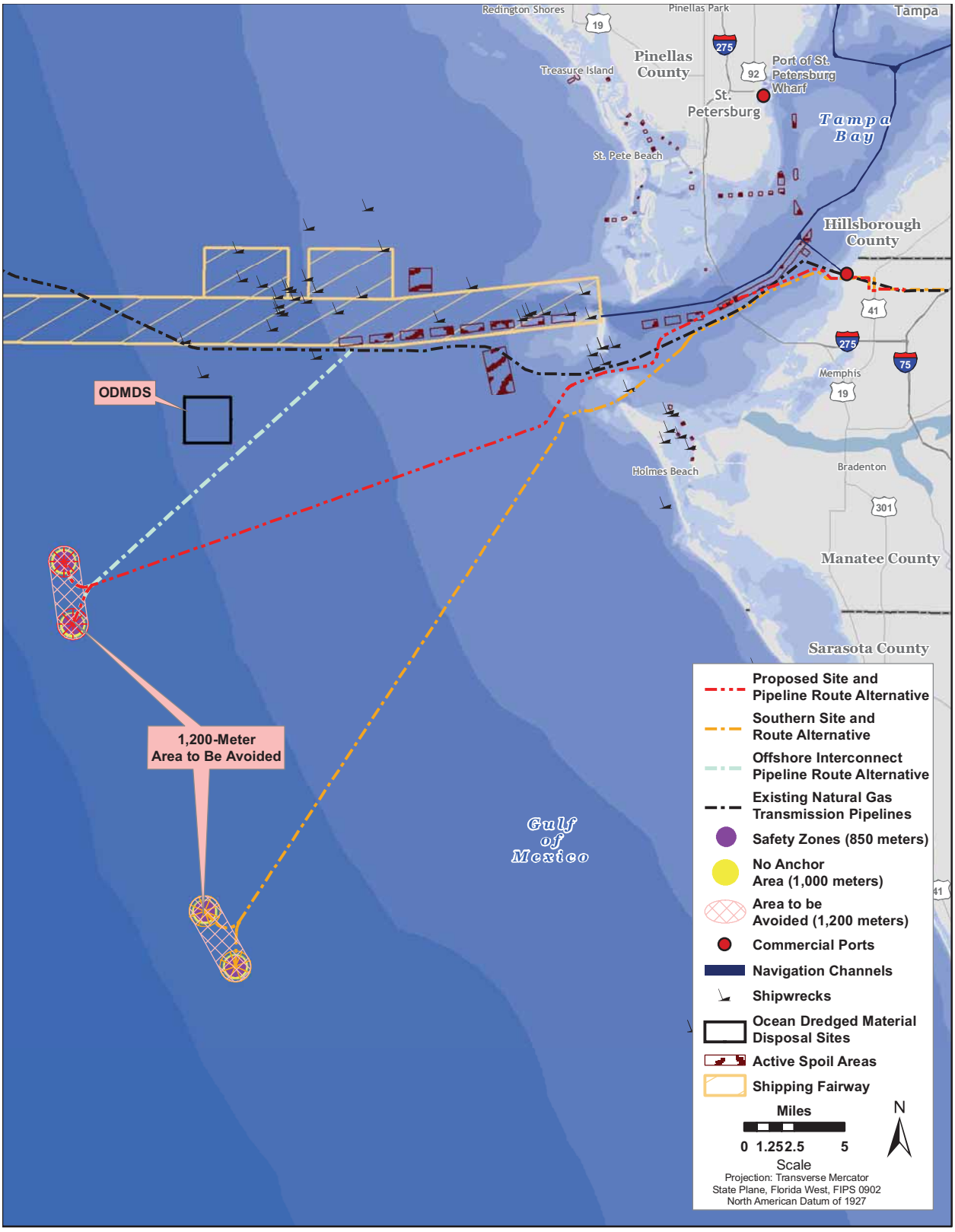
If the License is approved, the USCG, in working with the Applicant, could determine that additional operational restrictions such as a Precautionary Area are required. NAAs, ATBAs, and other restrictions need to be proposed to and approved by the IMO if they extend beyond the 19-km (12-mi) limit. The Applicant would be encouraged to develop communications protocols with parties who have an interest in transiting the Project area such as fishing or recreational boating. A notice of any operational restrictions or area designations would also be placed in the *Federal Register*.

Mooring Line Break Detection. Monitoring of possible mooring line failure would be based on the change in mean turret offset position. If the mean turret offset position from the latest 30 minutes deviates more than 1.98 m (6.5 feet) from the previous 30 minutes mean turret offset position, then there would be a potential line breakage in one of the windward lines. Both averages would be updated for each DGPS reading and displayed on a monitor. A line failure alarm could either be given automatically or based on visual monitoring of the two mean offsets. In case of visual monitoring, this should be performed approximately every 30 minutes. The system would be designed for single line failure, and therefore disconnection would not be necessary immediately upon detection of a potential line failure.

Navigational Lighting. While attached to the unloading buoy, the SRV would be considered "a vessel at anchor." Accordingly, it would exhibit the light and sound signals appropriate to a vessel at anchor in accordance with International Regulations for Prevention of Collisions at Sea (COLREGS). Thus, the SRVs at anchor would exhibit one all-round white light in the fore part and one all-round white light at or near the stern and at a lower level than the light in the fore part. The SRV would also use the available working or equivalent lights to illuminate her decks. To minimize impacts on marine animals, all lighting would be installed and used in accordance with the USFWS guidelines in **Section 4.2.**

The messenger retrieval line for the submerged buoy, which would float on the surface of the water when an SRV is not connected, would be provided with two lighted buoy markers. The lighted buoy markers would be used to assist during retrieval of the buoy by the SRV and to alert vessel traffic of the presence of the floating messenger line when an SRV is not on station. The lighted buoy markers would be fitted with flashing yellow lights.

Pollution Prevention Equipment. There would be no ship-to-ship fuel oil transfer operations at the Port, minimizing the possibility of fuel spill. Coamings (approximately 7.6 to 10.2 cm [3 to 4 inches] high) would be built around hydraulic deck machinery (winches and cranes) and associated piping on deck to contain potential leakage. While moored at the Port, the deck would be patrolled by the crew around the clock. In addition, all deck areas would be continuously monitored by closed-circuit television cameras from the cargo control room and the bridge. In this way, the vessel would be able to respond immediately if any leak should occur. Oil spill recovery equipment would be deployed adjacent to possible sources for hydraulic oil spills. Such equipment would include sawdust, shovels, and portable pumps (connected for



Sources of Proposed Pipeline: ConShelf 2009; Southern Pipeline: ConShelf 2007; Offshore Interconnect Alternative and Precautionary Area: e²M, Inc. 2008; Safety Zones and No Anchor Areas: e²M, Inc. 2009.

Figure 2.3-11. Potential Safety Zone, ATBA, and NAA

immediate use). Any spilled oil (contained in coamings) would be pumped into storage drums and retained on board for transportation to a shore disposal or recycling facility. In addition to these measures, the Port would operate under the provisions of an approved oil spill contingency plan.

Waste Treatment Equipment. Each SRV would be equipped with an approved sewage treatment unit sized to suit the SRV quarters' capacity. While at the Port, discharge from the sewage treatment unit and other accommodation drains would be collected in a tank for later disposal at sea, away from the Port and in accordance with international regulations. Bilge drains in engine and machinery spaces would be directed to an oily bilge holding tank. An emulsion-breaking oily water separator in compliance with the latest rules and regulations would be fitted. While at the Port, the bilge would be retained in bilge holding tanks. During sea voyage, the oily bilge separator would reduce the oil content to less than 15 parts per million (ppm). The separated oil would be stored in holding tanks for disposal onshore at the LNG loading location or sent to the shipboard incinerator. The incinerator would be used to dispose of contaminated fuel waste cleaning materials, oil, and any oil recovered from the machinery space bilge separating system. All trash from the accommodations, including plastic, would be compacted and returned to shore for proper disposal.

Fuel Bunkering of SRVs. No vessels would be used for bunkering of fuel or LNG into SRVs that use the Port.

Shore-Based Support. A dedicated support vessel and a dedicated crew boat would be used for monitoring and control purposes and occasional supply and personnel transfer. It would be expected that these vessels would be ocean-class towing vessels up to approximately 44.2 m (145 feet) long, 12.2-m (40-foot) beam, and 6.7-m (22-foot) draft, powered by up to two diesel engines with up to 7,000 horsepower. The vessels would be equipped with firefighting equipment. They would be able to rescue tow an SRV in up to Beaufort 5 conditions and perform security functions. The support vessels would operate from an existing dock facility in Tampa Bay. The deepwater port would receive commercial, logistics, legal, operations, and administrative support from offices in Tampa Bay, Florida, that would be contracted in existing commercial space.

2.3.11 Construction and Installation

Construction of the components for the Port would occur at seaside or upland areas, and installation would occur at the ocean site. This work would comply with relevant environmental, pipeline, maritime, and coastal regulations governing the construction process. The following provides details on these matters.

Fabrication, Storage, and Handling. The first step in construction would be ordering pipe and other material and preparing fabrication contracts based on final design and specifications for major components of the deepwater Port. Fabrication contractors for major components would be selected through an international solicitation process. Major components would include the following:

- SRVs. The SRVs would be built at an international shipyard that has extensive and recent experience in the design and construction of SRVs. The shipyard would have the capability to install the vaporization facilities and the mating cone for the unloading buoy.
- Mooring System and Unloading Buoys. The major components would be custom-fabricated, based on the final engineering design and specifications, at worldwide manufacturing facilities that have expertise and experience in manufacturing offshore mooring systems and buoys.
- Pipeline Components. PLEM pipe for the flowlines and transmission pipeline, as well as vessels, meters, and other components for the interconnection station, would be fabricated, based on the

final engineering design and specifications, at worldwide manufacturing facilities that have expertise and experience in manufacturing subsea pipeline components. The piggable–Y and other components would most likely be manufactured at an existing GOM facility.

The manufactured components would be shipped to the region, and stored temporarily at an existing onshore staging yard (typically at or near the dock of a nearby port, such as Port Manatee). Quality assurance and inspections would be conducted at the site of manufacture to ensure the components meet engineering design specifications. These components would include anchor piles, mooring lines, concrete-coated flowline and gas transmission pipeline, PLEMs, spool pieces, unloading buoys, flexible pipe risers, and other equipment.

Offshore Preconstruction Activities. The following activities would be accomplished prior to start of construction operations:

- Applicant submits construction plan to USCG
- Geotechnical and Hazard surveys completed
- Evaluation of fair market value (FMV) and clearance of the Project footprint (including project pipeline); issuance of an MMS Segment Number, clearance letter, or other evidence that the Project does not conflict with planned or existing OCSLA regulated facilities or activities
- Development and approval of detailed construction procedures
- Pre-lay survey of pipeline routes and anchor placement plans
- Placement of marker buoys and transponders on the seafloor (if required)
- Final coating of piping.

Offshore Construction Sequence. It is anticipated that the installation effort would be accomplished in the following sequence:

- Mobilize the Main Installation Vessel, an offshore crane, an anchored lay barge for the pipeline ROW route, and pipe-laying vessel with plow, pile-driving equipment, and workboats from either Louisiana or Texas. Mobilization would be staggered, as the travel times to Tampa Bay would be different for each piece of equipment.
- Install the Port Manatee HDD. This would be installed from onshore to the offshore location.
- Construction and installation of the HDD pipe sections for the drills under the Gulfstream pipeline.
- Install pipe segments between Port Manatee HDD and the Gulfstream HDDs.
- Install the Skyway Bridge section of the pipe. This would require dredging through the causeway.
- Perform pipelay and diving operations towards the piggable-Y.
- Install the flowlines on the seafloor.
- After all tie-ins are complete, the pipeline would be buried or concrete mattresses would be installed where necessary.
- Testing of the pipeline would be conducted upon completion of the burial operations. This would include pigging the pipeline and then hydrostatically testing the line.
- Install the north and south PLEMs with pig receivers.

- Install the anchor piles and the mooring lines using the Main Installation Vessel.
- Install the STL Buoys.
- Install the two risers from the PLEMs. Demobilize the offshore construction equipment.

Description of Offshore Construction Equipment. A shallow-water lay barge, spud barge and clamshell dredge, and a jack-up barge would be mobilized for offshore pipe-laying activities. This equipment would be used where conventional installation methods are anticipated. An HDD spread, including four jack-up barges, three hopper barges, and two tugs for barge towing, would be used for the three planned HDDs. Four diving support vessels would also support tie-in and mattressing operations. All vessels would likely come from the GOM. Construction equipment would make one round trip to the Project location, staying on location for the duration of the Project. Work crew vessels and supply vessels would make on average two trips a day for the duration of offshore construction. Work crew and supply vessels are expected to make between 420 and 450 roundtrips to the offshore construction location from shore-based facilities for the duration of the Project.

Onshore Construction Methods. The Applicant would construct and install the onshore portion of the pipeline using the following methods: open trench, joint-by-joint stalking, HDDs, slick bore, and dry jack and bore (described below). Each construction method proposed for use by the Applicant is the industry standard for safe and effective pipeline installation. Each method involves different logistical considerations, specific construction equipment, work space requirements, and special considerations in order to install the pipeline (Port Dolphin 2008b).

- Open Trench. A method in which a trench is opened with a hydraulic excavator, a string of line pipe is welded out, a line pipe string is lowered in the open ditch with a pipelayer, and a track-type blade tractor is used to cover the excavation.
- Joint-by-Joint Stalking. Essentially the same as the open trench method, but the length of the pipe string is reduced due to special construction considerations.
- Horizontal Directional Drill. A method used to install pipe under areas that are inaccessible by the open trench method or that need to be avoided. Typical areas where HDD is used include rivers, streams, and environmentally sensitive areas.
- Dry Jack and Slick Bore. Boring or jacking are methods that use a horizontal jack to install the pipe in one pass. A hydraulic jack pushes the pipe segment by segment through the soil from a jacking pit to a receiving pit. Soil is excavated mechanically or manually at the pipe's leading edge.

Onshore Construction Sequence. The following list of activities would constitute the onshore construction sequence:

- Mobilize onshore construction equipment such as backhoes, dump trucks, cranes, bulldozers, and sidebooms
- ROW clearing, grubbing, and grading
- Unload and lay (string) the pipe along the corridor
- Ditching
- Install the onshore pipeline using open trench, joint-by-joint stalking, HDDs, slick bore, and dry jack and bore
- Make tie-ins and install cathodic protection test sites

- Backfill the ditch
- Conduct hydrostatic testing
- Dewater and dry the pipeline
- Install pipeline markers and signs
- Clean up and restore the work areas.

Description of Onshore Construction Equipment. Standard onshore pipeline construction equipment would be used for the onshore pipeline. Equipment would include backhoes, dump trucks, cranes, bulldozers, and side-booms. Side-booms are specially designed tractors with counter weights that have the capacity to lower segments of pipe into a trench. Special equipment would be used to bore under improved roadways and use the HDD under sensitive areas such as the FPL tank farm.

Functional Testing. During the construction of the SRVs and fabrication of the unloading buoy components, mating checks would occur to confirm the SRV is properly moored to the unloading buoy and that all piping has been pressure-tested in accordance with appropriate standards and requirements. Upon completion of offshore construction and availability of an SRV, the SRV would perform a trial connection to each unloading buoy and would verify the functionality of all components prior to initiating any discharge operations. The purpose of the functional testing would be to verify that all components are compatible and would function as designed, prior to the vaporization of LNG and send-out of natural gas. Particular attention would be given to the following:

- Confirmation of the operation of the unloading buoy acoustic position reporting system
- Onsite verification of the SRV thrusters and the dynamic positioning system
- Verification of the unloading buoy retrieval into the mating cone of the SRV and the mechanical connection between the SRV and the unloading buoy
- Verification of mooring line tensions in comparison with the predicted values
- Function test and verification of the gastight connection between shipboard equipment and the unloading buoy turret
- Confirmation of the ESD and the emergency buoy disconnect systems
- Verification of SRV disconnect from the unloading buoy.

Construction Schedule. Construction of the deepwater port and pipeline is expected to take 11 months. Many of the construction activities would be conducted in parallel to meet the in-service date. Construction of the pipeline would start from the interconnection stations and move towards to the Port. Start-up of commercial operations is expected in mid 2011. Total onshore construction is expected to be completed in 20 weeks (Port Dolphin 2008b).

2.3.12 Decommissioning

The Port would be designed to have a service life of 25 years. At the end of that period, the principal elements of the Port would be decommissioned.

Shuttle and Regasification Vessel. The SRV would be decommissioned by transporting it to a suitable facility for removal of LNG equipment that would be used on other LNGCs or shoreside facilities, or for salvage. The ship would likely be converted to another type of use. At the end of its useful life as a seagoing vessel, it would likely be salvaged for recycling of metal and other materials.

Unloading Buoy. At the end of the economic life of the Port, the subsea valves would be closed, the risers and control umbilicals would be disconnected from the riser manifolds, and the mooring lines would be disconnected from the unloading buoys and from the anchor points. Such major components would be removed from the Project area.

Offshore Pipeline System. The pipelines would be decommissioned in place. The owner of the pipelines would submit a pipeline decommissioning application to the MMS Regional Supervisor in accordance with 30 CFR §250.1750 through §250.1754. The MMS Regional Supervisor would determine whether the pipelines would constitute a hazard obstruction to navigation and commercial fishing operations, would unduly interfere with other uses of the OCS, or would have adverse environmental impacts. Decommissioning would include the following:

- Closing hot tap valves and plugging the end
- Pigging and flushing the pipelines
- Filling the pipelines with seawater
- Removing the manifolds and tie-in spools
- Cutting and plugging each end of the pipelines
- Burying each end of the pipelines under at least 1 m (3 feet) of cover or covering each end with protective concrete mats, if required by the MMS Regional Supervisor.

Onshore Pipeline System. Onshore portions of the pipeline and aboveground facilities would be decommissioned through the FERC abandonment process in accordance with FERC rules applicable at the time the Applicant applies to FERC to decommission the onshore pipeline.

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3. Affected Environment

The CEQ defines the affected environment as the portion of the EIS that "succinctly describes the environment of the area(s) to be affected or created by the alternatives under consideration" and states that those descriptions "…shall be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced" (40 CFR 1508.15).

In general the proposed Project would affect water, biologic, geologic, marine land, air quality and cultural resource areas off the western coast of Tampa Bay, the inlet passage to Tampa Bay, the nearshore waters and land in Manatee County, Florida. It would also impact navigation and transportation, noise, recreation and aesthetics, and socioeconomic resources in these areas. In the following sections, each of these resource areas is described in detail.

3.1 Water Resources

3.1.1 Definition of the Resource

For purposes of this assessment, water resources that might be affected by installation, operation, and eventual decommissioning of the Port and pipelines within the Project area encompass marine waters of the nearshore and offshore portions of the OCS near Tampa Bay, and groundwater and surface water resources associated with the 6.4-km (4-mi) onshore pipeline.

Marine waters, as defined in this document, include waters extending from 4.8 km (3 mi) offshore seaward to the Exclusive Economic Zone (EEZ) in the vicinity of the Project site, in Federal waters of the OCS, MMS PB blocks: PB545, PB546, PB547, PB548, PB504, PB505, PB506, PB507, PB463, and PB589 (see **Figure 2.3-4**), approximately 45 km (28 mi) offshore of Tampa, Florida, near 27.24°N/-83.12°W, in a water depth of approximately 30 m (100 feet). The region of influence for impacts to water resources within these marine waters includes the area within and directly adjacent to the Port location and the offshore pipeline route.

Groundwater resources potentially affected by this Project include aquifers, watersheds, and supply wells accessed by the public for drinking water, agriculture, and other uses. Surface water and wetland resources addressed in this document include those defined in the FERC Procedures (see **Section 2.3.9**). For this assessment, a waterbody is defined as any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies, such as ponds and lakes. The State of Florida has defined a surface water or waterbody as any water contained in bounds created naturally or artificially, including the Atlantic Ocean, the GOM, bays, bayous, sounds, estuaries, lagoons, lakes, ponds, impoundments, rivers, streams, springs, creeks, branches, sloughs, tributaries, and other watercourses.

Evaluation of existing water quality conditions is done by direct measurement of factors that are considered important to the health of the ecosystem or the existing or intended water use. For all of the water resources that could potentially be affected by this Project (marine, estuarine, fresh, and groundwater), the baseline water quality constituents include temperature, salinity, dissolved oxygen, nutrients, pH, hardness, contaminants, and turbidity (the load of suspended matter as it relates to water clarity). Trace constituents such as metals (inorganic) and organic compounds also affect marine water quality.

Altering the functions and values of the water resources through changes in these water quality parameters would constitute an impact. Such impacts could affect human health, and commercial and

recreational water use. Ecological impacts could result in population reductions of specific species, support of undesirable or exotic species, and possibly mass mortality. Such effects can either be localized or widespread.

The primary values that affect water quality are water temperature, total dissolved solids (salinity), suspended solids (turbidity), and nutrients. In marine and terrestrial waters, salinity and temperature parameters are affected by hydrodynamic mechanisms governed by the interaction of marine and terrestrial influences, including tides, nearshore circulation, freshwater discharges from rivers, and local precipitation. For fresh surface water and groundwater associated with the onshore portions of the Project, these parameters are primarily affected by interaction between the water and the soil or aquifer material, as well as by influx of precipitation. In addition to these natural inputs, human activities can affect water quality through a series of mechanisms including discharges, runoff, burning, dumping, air emissions, and oil or chemical spills. Local or regional water quality is determined by the relative contributions of natural processes (e.g., riverine input, nearshore currents, and mixing processes) and periodic or chronic anthropogenic inputs. Significant deviation from the natural variability in any of the parameters can adversely affect human and or ecological uses of the water, and can cause either localized or widespread alterations in indigenous populations and associated habitats.

3.1.2 Physical Setting

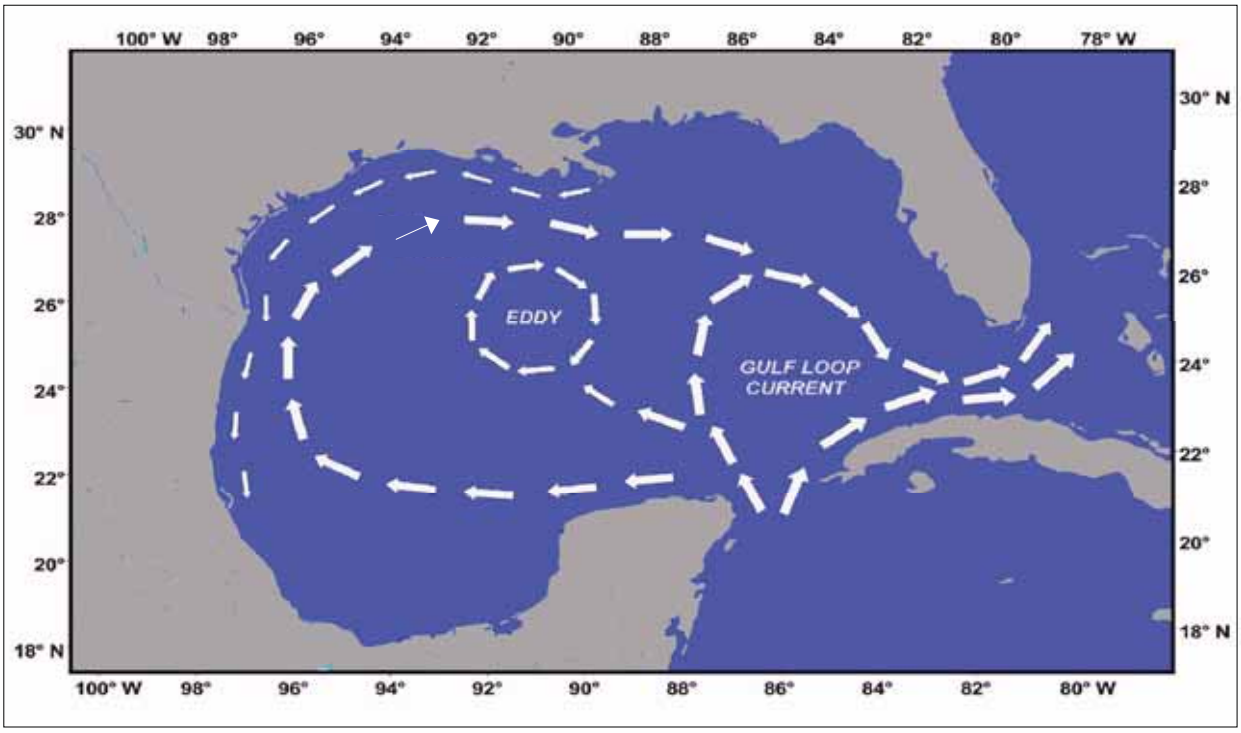
3.1.2.1 GOM Oceanography

The GOM is a marine waterbody bounded by Cuba on the southeast; Mexico on the south and southwest; and the U.S. Gulf Coast on the west, north, and east. The GOM has a total area of 564,000 square kilometers (km^2) (217,762 square miles [mi^2]). Shallow and intertidal areas (water depths of less than 20 m) compose 38 percent of the total area, with continental shelf (22 percent), continental slope (20 percent), and abyssal (20 percent) composing the remainder of the basin. The Project Site location is presented in **Figures 2.3-1, 2.3-2,** and **2.3-3.** The Project Site is located on the west Florida Shelf, a portion of the Inner Continental Shelf, an area of relatively low wave energy and tidal variation (Gore 1992).

The Gulf is separated from the Caribbean Sea and Atlantic Ocean by Cuba and other islands, and has relatively narrow connections to the Caribbean and Atlantic through the Florida and Yucatan Straits. The Gulf is composed of three distinct water masses, including the North and South Atlantic Surface Water (less than 100 m deep), Atlantic and Caribbean Subtropical Water (up to 500 m deep), and Subantarctic Intermediate Water.

Circulation within the GOM, and within the Project area, is dominated by the Loop Current, depicted in **Figure 3.1-1**. The Loop Current enters the GOM through the Yucatan Strait, flows towards the south along the Florida coast in the vicinity of the Project area, and exits the GOM through the Florida Straits. The velocity of the current in the Project area ranges between 1.56 and 15.16 cm per second in summer, and 1.79 to 25.36 cm per second in winter (APL 2006). The direction of flow in the Project area is generally south to southeast.

In shallow areas along the west Florida shelf, additional influences on water flow and circulation include wind stress, freshwater inflow, and variations in buoyancy (Gore 1992). Wind speeds at the Project Site range from 2.26 to 7.61 m per second in summer, and 2.85 to 11.04 m per second in winter (APL 2006). Tidal variation along Florida's west-central continental shelf is moderate, with an average range of approximately 2 feet (Gore 1992).



Source: NOAA 2007

Figure 3.1-1. Loop Current Flow within the GOM

Along the eastern edge of the Loop Current along the west Florida shelf, circulation patterns result in an upwelling of deep nutrient-rich water. This upwelling supports a high level of biological activity, producing large concentrations of plankton. Nutrient levels (primarily nitrogen and phosphorus) are also affected by runoff from agricultural and urbanized areas and from submarine groundwater discharge, leading to red tide conditions. In the Project area, red tide occurs on an almost annual basis (Hu et al. 2006). Red tides are caused by rapid growth of the species *Karenia brevis*, a toxic species which produces brevetoxins (a type of neurotoxin) that can accumulate in bivalves and cause mortality in marine organisms (Hu et al. 2006). The rapid growth of these organisms can also create a hypoxic zone (area with dissolved oxygen concentrations below 2 milligrams per liter [mg/L]), which can cause mortality among benthic communities, fish, turtles, birds, and marine mammals (Hu et al. 2006).

Extreme variations in water circulation patterns, tides, and wave heights can occur along the west Florida coast during periodic tropical storms and hurricanes. Warm water within the Loop Current can act as an energy source in summer and fall months, fueling the development of these storms. Features of these storms that can affect the natural circulation and topography include high winds, flooding, storm surges, and beach erosion.

3.1.2.2 Tampa Bay

Tampa Bay is an estuary formed by the rise of sea level into a former river valley. Tampa Bay consists of four subregions, including lower Tampa Bay, middle Tampa Bay, Old Tampa Bay, and Hillsborough Bay. The Project area would only occur at Port Manatee, within Lower Tampa Bay, near the outlet of the bay into the GOM. The bay covers an area of 1,030 km^2 within Hillsborough, Manatee, and Pinellas counties. Freshwater inflow to the bay occurs through four major river systems (Alafia, Hillsborough, Little Manatee, and Manatee), as well as more than a hundred minor creeks and rivers.

Water circulation within the bay is driven by freshwater inflow, tides, and winds. The bay has an average depth of 3.5 to 4 meters. The bay has well-developed horizontal stratification, with fresh water flowing along the surface out to sea, and denser saline water flowing into the bay along the bottom.

The Tampa Bay area has a population of more than 2 million people, and tributaries, habitat, runoff patterns, and water quality are all affected by urbanization. Specific actions that have affected the bay include removal of mangroves, dumping of sewage, artificial filling, and modification of runoff from paved surfaces (Peene et al. 1992).

3.1.2.3 Onshore Groundwater and Surface Water

Water resources within the onshore portion of the Project area include groundwater resources, surface waterbodies, and wetlands.

Groundwater resources along the onshore portion of the Project area exist within three separate aquifer systems. At the surface, the Surficial Aquifer System (SAS) consists of undifferentiated soils and the Peace River Formation, which compose a thickness of approximately 13 meters of silty and clayey sands. The SAS is unconfined, and is found within a few meters of the ground surface. The Intermediate Aquifer System (IAS) is composed of permeable zones within the Arcadia Formation. This zone is up to 74 m thick, and contains groundwater in confined and semi-confined porous zones. The Floridan Aquifer System (FAS) is a major regional aquifer which acts as the major water supply source for public, industrial, and irrigation purposes in Manatee County and adjacent areas of central Florida. The FAS is more than 300 meters thick, and contains groundwater within a network of cracks, joints, and solution cavities in several Tertiary-aged limestone units (Brown 1983). Groundwater wells for private water supply purposes are found within 50 m of the pipeline corridor at a location adjacent to Buckeye Road (Port Dolphin 2007b).

The number of wetlands along the proposed pipeline route initially identified in the Draft EIS has been reduced from 11 to 9 due to development in the area, unrelated to this Project, and a refined definition of jurisdictional wetlands. It is important to note that Wetland W-5 was recently disturbed and filled (as of May 13, 2008). No portion of this wetland remains in the Project area. Additionally, the FPL borrow pond was originally delineated as Wetland W-4, but according to both the State and Federal rules, a borrow pond constructed in upland habitat is not jurisdictional. Therefore, both Wetlands W-4 and W-5 are no longer included in the identified wetlands along the pipeline route. The wetlands can be primarily categorized into four classifications: (1) open water, (2) scrub-shrub, (3) emergent, and (4) forested. These classifications include both palustrine (freshwater) and estuarine (saltwater) sites. The total acreage of wetlands that could be disturbed by pipeline installation is 10.71 acres. A detailed discussion and inventory of these wetlands is provided in **Section 3.2.10**.

The pipeline corridor would be constructed in the area of two FDEP-classified surface waterbodies: Piney Point Creek (which would be crossed by the pipeline), and unnamed tributaries to Bishop Harbor. Piney Point Creek is designated as Class III waters, which are defined as waters designated for recreation, propagation, and maintenance of a healthy well-balanced population of fish and wildlife. The tributaries to Bishop Harbor are designated as Class II waters, defined as waters designated for shellfish propagation and harvesting.

3.1.3 Water Quality

3.1.3.1 Introduction

The Project area includes an area within the GOM, the pipeline corridor through the GOM to Port Manatee in Lower Tampa Bay, and the 6.2-km (4-mi) surface-based pipeline corridor from the pier bulkhead at Port Manatee to the proposed Gulfstream and TECO pipeline interconnections. Because the Project area encompasses three distinct geographic areas, resources that might be impacted include water quality in marine, estuarine, and terrestrial (including wetland and groundwater) environments.

Water quality data are available for all three areas through a combination of government agencies, private investigators, and the Applicant. A summary of the data sources is presented in **Section 3.1.3.2**. A summary of the relevant surface water and groundwater classifications and standards is presented in **Section 3.1.3.3**. Summaries of the available water quality data in the GOM, Tampa Bay, and onshore portion of the Project area are provided in **Section 3.1.3.4**.

3.1.3.2 Water Quality Monitoring Programs

For the GOM, existing water quality data are compiled or provided by NOAA's National Oceanographic Data Center (NODC) and the U.S. Naval Oceanographic Office's (USNOC) Generalized Digital Environmental Model. A summary of the available data through these sources for the GOM portion of the Project area is provided in **Section 3.1.3.4**. These data primarily consist of temperature and salinity information.

Water quality data within Tampa Bay are available from several sources, including the Tampa Bay Estuary Program (TBEP) and the U.S. Geological Survey (USGS). The TBEP is a multiagency effort conducted to monitor water quality throughout Tampa Bay. The TBEP is a combined effort of Manatee and Pinellas counties, the Environmental Protection Commission of Hillsborough County (EPCHC), the City of Tampa, the FDEP, Florida Marine Research Institute (FMRI), and the Southwest Florida Water Management District (SWFWMD). The TBEP was established in 1991, and began a program of studies called "Charting the Course" in 1998 (Holland et al. 2006). Through these studies, data regarding temperature, salinity, dissolved oxygen, pH, and nutrients are available. The latest comprehensive summary of water quality conditions in Tampa Bay was provided in the TBEP's *Baywide Environmental Monitoring Report, 1998-2001* (Pribble et al. 2003). These data are summarized in **Section 3.1.3.4**.

Project-specific water quality monitoring programs do not exist for the groundwater and surface water resources associated with the onshore portion of the Project area. Water quality in surface water tributaries to Tampa Bay is monitored by the FDEP. Existing data on water quality related to the onshore portion of the Project area are provided in **Section 3.1.3.4**.

3.1.3.3 Water Quality Regulations, Classifications, and Standards

The Project area would include components constructed and operating within Federal waters outside the state water boundary, within state waters, and onshore. Therefore, a variety of international, Federal, and state standards apply to various components of the proposed Project.

The Port itself, which would be the location of vessel operations, would be 45 km (28 mi) offshore. Therefore, discharges during vessel operations would be governed by the protocols defined by MARPOL. Federal requirements for facility construction and operation would include the following:

- National Pollution Discharge Elimination System (NPDES) permit administered by USEPA
- Operational guidelines for discharges administered by the USCG
- U.S. Rivers and Harbors Act Section 10 and CWA Section 404 permits administered by USACE
- A Joint Coastal Permit administered by USACE and FDEP.

Additional state regulatory requirements would apply to the nearshore and onshore portions of the Project area. Under Section 403.061(27) Florida Statutes, the FDEP was granted authority to designate Outstanding Florida Waters (OFW) to waterbodies which are worthy of special protection because of their natural attributes. For locations designated as OFW, FDEP cannot issue permits for direct pollutant discharges which would lower ambient water quality conditions, or indirect discharges that would degrade water quality for OFW. Under this regulation, permits for dredging and filling are only issued when clearly in the public interest, considering a variety of criteria that are protective of the OFW. In the Project area, OFW has been designated for areas within Lower Tampa Bay, Middle Tampa Bay, and the Manatee River. The pipeline corridor would pass directly through OFW in the area near the Terra Ceia AP.

3.1.3.4 Water Quality Monitoring Results

The trends and characteristics of conventional and toxic water quality parameters (e.g., temperature, dissolved oxygen, ammonia, nitrate, phytoplankton, clarity, and salinity) in the Project area are discussed below. The discussion is limited to those parameters that might be influenced by the Project.

GOM

Water. As described above, water quality and physical parameters in the GOM are influenced by regional meteorological and oceanographic conditions. Water quality parameters such as temperature and salinity vary on an annual cycle in response to changes in air temperature and circulation. In the Project area, temperature varies from an average of 16.7 °C for the month of January to 30 °C in August (NODC 2007). Temperature variations are greatest in the surface waters shallower than 10 m, with a seasonal thermocline developing during the months of May to August. During winter months, the difference in water temperature between surface (less than 10 m) and deeper water is approximately 1 to 2 °C, while the difference in summer months can be up to 6 to 7 °C (NODC 2007).

Salinity within the GOM near the Project area is approximately 35 to 36 parts per thousand (ppt). The salinity varies by location based on the proximity and volume of fresh water input. Salinity also varies seasonally based on circulation patterns from the Caribbean Sea, which has a higher salinity (up to 36.6 ppt) and has an increase of influx during the spring months (Gore 1992).

Dissolved oxygen data from the GOM are available through the USNOC NODC. The average dissolved oxygen concentration in the GOM is approximately 5 mg/L, which is a value that is sufficient to support healthy aquatic populations (NODC 2007). Some areas of the GOM, especially in the area of the Mississippi River, have dissolved oxygen levels that are too low to support aquatic organisms, and are referred to as dead zones. However, the dead zone associated with the Mississippi River discharge does not affect conditions in the Project area.

Turbidity and total suspended solids (TSS) concentrations in the GOM are primarily affected by suspension of sediments following storms, plankton blooms, and human factors such shore-based runoff or discharge of ship wastes, including gray water and sewage. No turbidity or TSS data specific to the GOM portion of the Project Site are available.

No data on toxic parameters such as metals or polychlorinated biphenyls (PCBs) have been collected for the specific Project area within the GOM. The Applicant has not conducted site-specific water column sampling. The general area has been subject to sampling investigations for other purposes. Beginning in 1974, the U.S. Department of the Interior performed the Eastern GOM OCS Benchmark Study to develop a baseline from which to evaluate impacts of oil and gas activities in the Mississippi, Alabama, and Florida (MAFLA) region. The objective of these studies was to identify concentrations of hydrocarbons and selected trace metals in the water column, sediments, and selected benthic microfauna. The study determined that the ecological, histopathological, and histochemical condition of the MAFLA area was pristine and healthy.

Sediment. Sediments within both the continental shelf and Tampa Bay portions of the Project area consist of a mixture of quartz sands eroded from older deposits and biogenic carbonates. The mean grain size of the sediment ranges from 0.18 to 0.5 mm, and is classified as fine- to medium-grained sand (Brooks and Doyle 1998). Overall, 82 to 96 percent of the sediment is classified as sand, with the remainder consisting of silt and clay (Locker et al. 1999).

Tampa Bay

Water. With a population of more than 2 million people, water quality in the Tampa Bay area is substantially influenced by urbanization. Habitats within the estuary, including mangroves, salt marshes, and submerged aquatic vegetation, have been affected by dredge and fill activities and degradation of water quality through agricultural runoff and sewage disposal. In recent years, improved wastewater and storm water treatment and limitations on dredging and filling have lead to an improvement in water quality conditions in the estuary (TBEP 2007).

Through the TBEP, water quality parameters routinely measured in Tampa Bay since 1974 include chlorophyll, phosphorus, nitrogen, salinity, temperature, turbidity, and dissolved oxygen. The only clear temporal trend in water quality is a general improvement, as indicated by a decrease in phosphorus concentrations. Comparison of the water quality measurements between the different portions of Tampa Bay indicate that Lower Tampa Bay (the location of the Project area) typically has better water quality than middle Tampa Bay, Old Tampa Bay, or Hillsborough Bay. This could result from the fact that Lower Tampa Bay is not as industrialized as the other portions of the bay, and is also subject to a greater degree of flushing due to its locations closer to the GOM.

Chlorophyll concentrations in Tampa Bay are an indicator of water clarity and biological productivity. The chlorophyll concentration in Lower Tampa Bay, near the Project area, has remained steady at approximately 5 micrograms per liter since measurements began in 1974 (Pribble et al. 2003). The concentrations in Lower Tampa Bay are lower than those in other parts of Tampa Bay, indicating higher water clarity near the mouth of the bay.

Phosphorus concentrations in the estuary are primarily due to man-made input from sewage treatment and phosphorus chemical plants, and have decreased from about 0.6 mg/L to 0.1 mg/L since 1974 (Pribble et al. 2003). Nitrogen is the primary pollutant in Tampa Bay, resulting from storm water runoff and agricultural runoff. Total nitrogen concentrations in Lower Tampa Bay have been variable since 1984, with no clear increasing or decreasing trend. Similar to chlorophyll, nitrogen and phosphorus concentrations are lower in Lower Tampa Bay than in the other portions of Tampa Bay. This appears to indicate that Lower Tampa Bay is not as affected by urbanization or is more prone to flushing due to its proximity to the GOM.

Similar to the GOM, salinity and temperature within Tampa Bay vary on annual cycles. Temperatures in Lower Tampa Bay range from approximately 22 to 30 °C (71.6 to 86 °F) (Yates et al. 2002). Due to the

shallow depth of Tampa Bay, there is little temperature variability with depth. Salinity within Tampa Bay averages approximately 27 ppt; lower than that of the GOM because of the influx of fresh water into the bay. Near Port Manatee, the salinity ranges from 30 to 35 ppt.

Turbidity and TSS within Tampa Bay might be associated with ship traffic, sediment runoff, dredging, or human discharges such as sewage outfalls. Measurements of turbidity within Tampa Bay since 1974 indicate that Lower Tampa Bay has lower turbidity values, and a lower range of values, than the other portions of Tampa Bay.

The Applicant has not conducted site-specific water column sampling within Tampa Bay. Anthropogenic sources of toxic contaminants to Tampa Bay include sanitary sewer wastes, atmospheric deposition from vehicles and industrial emissions, agricultural runoff, discharge from ships, and releases of hazardous substances. The monitoring programs summarized by the TBEP in the *Baywide Environmental Monitoring Report, 1998-2001* (Pribble et al. 2003) provide data only on water quality parameters, and not on toxic parameters.

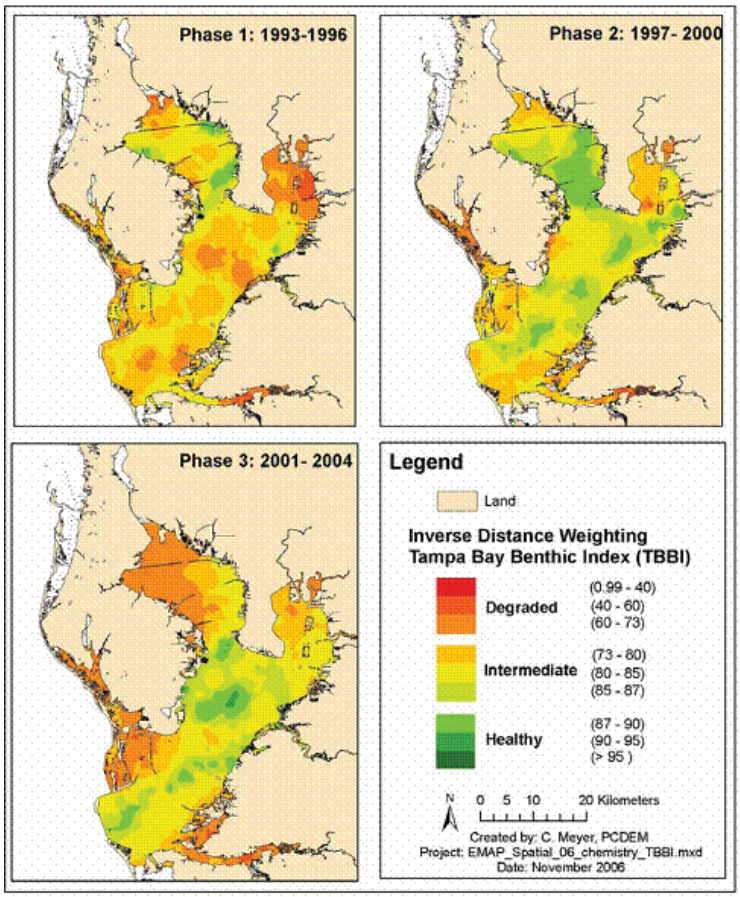
Sediment. The Applicant has not conducted site-specific sediment sampling within Tampa Bay. However, the monitoring programs summarized by the TBEP in the *Baywide Environmental Monitoring Report, 1998-2001* (Pribble et al. 2003) provide data on contamination of sediments within Tampa Bay.

Onshore Groundwater and Surface Water. Groundwater quality in the area of the proposed onshore pipeline corridor could be impacted by past industrial operations. Due to substantial urbanization, Tampa Bay is subject to input of contaminants including metals, pesticides, PCBs, and organic chemicals. However, the TBEP water and sediment quality summary states that Tampa Bay sediments remain relatively free of toxic contaminants, with the exception of hot spots near ports and industrial areas (TBEP 2007). In 2005 and 2006, the TBEP Sediment Quality Assessment Group developed a Tampa Bay Benthic Index to prioritize these hot spots for assessment and cleanup. A review of the most recent data (see **Figure 3.1-2**) indicates that the lower portion of the bay that would be crossed by the proposed pipeline route is classified as healthy to intermediate in water quality. Near the Piney Point Phosphate gypsum stack, removal of impacted groundwater is currently being conducted to prevent offsite seepage of process water (FDEP 2009). In order to avoid this area, the proposed onshore pipeline corridor has been designed to pass south of this area, and is not expected to encounter the groundwater plume (Port Dolphin 2007c).

Surface water quality within the tributaries to Bishop Harbor have been judged to be impaired with elevated levels of coliform bacteria in the water, and elevated levels of mercury within fish. This has led to the Bishop Harbor segment being designated as a low priority for the development of a Total Maximum Daily Load (TMDL) for mercury (FDEP 2007).

3.1.4 Overall Assessment and Conclusions

Water resources within the Project area include surface water, sediment, wetlands, and groundwater within a variety of offshore, nearshore, and onshore environments. Existing sampling data are primarily from Federal, state, and local programs that are not specifically oriented towards the collection of data for the evaluation of this Project. However, the locations of these samples are distributed throughout and adjacent to the Project area, and are expected to be representative of conditions within the Project area. These data indicate that water quality within the GOM is good, but water quality within Lower Tampa Bay and surface waterbodies crossed by the onshore portion of the pipeline corridor exhibit some man-made impacts.



Source: TBEP 2007

Figure 3-1.2. Tampa Bay Benthic Index

3.2 Biological Resources

3.2.1 Definition of the Resource

Biological resources include those species and habitats that could be directly or indirectly affected by construction or operation of the Project unloading buoy system, natural gas flowlines, natural gas transmission pipeline, SRVs, or support vessels (i.e., barges, tugboats, supply vessels). Within the Project area, support vessel operating areas would be defined by existing channel and navigational requirements.

In Notice to Lessees and Operators (NTL) No. 2004-G05, MMS stipulates that prior to drilling or the construction or placement of any structure, a lessee must submit a live-bottom survey report determining the presence or absence of live-bottom communities which could be impacted by the Project. For the purpose of this stipulation, "live-bottom areas" are defined as seagrass beds; areas containing sessile invertebrates (e.g., anemones, bryozoans, coral, hydroids, or sponges) living upon and attached to naturally occurring hard or rocky formations; or areas whose surfaces favor the accumulation of turtles, fish, or other fauna (e.g., lobsters or scallops) (MMS 2004).

Biological resources evaluated for this document include protected or sensitive species and habitats such as marine protected areas (MPAs), benthic communities, marine mammals, sea turtles, coastal and marine birds, plankton, fisheries resources, and federally listed threatened or endangered species. Fisheries resources include fish, ichthyoplankton (fish eggs and larvae), federally managed commercial and

recreational fisheries, and EFH. Determining which habitats and species occur in the Project area was accomplished through literature reviews and coordination with appropriate Federal and state regulatory agency representatives, resource managers, and other knowledgeable experts.

3.2.2 Applicable Regulations, Laws, and Executive Orders

The USCG plays an important role in protecting biological resources by serving as the primary maritime enforcer of U.S. laws within the EEZ. Several of these laws protect marine species and areas, including the ESA of 1973 (16 U.S.C. 1531–1534), MMPA of 1972 (16 U.S.C. 1361 et seq.), Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) of 1976 (16 U.S.C. 1801–1883), and National Marine Sanctuaries (NMSA) of 1974 (16 U.S.C. 1431–1445a). These are described below because they are most directly related to the Proposed Action.

3.2.2.1 Endangered Species Act

The ESA is administered by the USFWS and NMFS and establishes protection and conservation of threatened and endangered species and the ecosystems upon which they depend. Under the ESA, an "endangered species" is defined as any species in danger of extinction throughout all or a significant portion of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. "Critical habitat" is designated under the ESA as "a specific geographic area that is essential for the conservation of a threatened or endangered species and that could require special management or protection." Critical habitat can include an area that is not occupied by a species, but is needed for the recovery of that species. A "candidate" species is one that is the subject of either a petition to list or status review, and for which the NMFS or USFWS has determined that listing might be or is warranted. The NMFS is further charged with the listing of all "species of concern" that fall under its jurisdiction. A "species of concern" is one about which the NMFS has some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the ESA.

In addition to listing names of species and subspecies, the ESA also allows listing of "distinct population segments" of these species. For example, NMFS policy stipulates that a salmon population would be considered "distinct" for purposes of the ESA it if represents an Evolutionary Significant Unit (ESU) of the biological species. To qualify as an ESU, a population (or group of populations) must be (a) reproductively isolated from other populations of the same species, and (b) an important representative component in the evolutionary legacy of the species.

Section 7 of the ESA requires that all Federal agencies consult with the USFWS or NMFS, as applicable, before initiating any action that could affect a listed species. Section 7 states that any project authorized, funded, or conducted by any Federal agency should not "…jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined to be critical."

During an oil spill event which could affect listed species or critical habitat, emergency consultations under the ESA (50 CFR 402.05) are implemented for oil spill response actions. The Federal On Scene Coordinator (FOSC) initiates the emergency consultation by contacting NMFS and the USFWS. USFWS and NMFS representatives then provide the FOSC with any timely recommendations to avoid or minimize impacts on listed species and critical habitat. They might also be asked by the FOSC to participate within the Incident Command System. It is the FOSC's responsibility to notify USFWS and NMFS representatives in the Incident Command System of changes in response operations due to weather, extended operations, or some other circumstance. If an incidental take is anticipated, and if no means of reducing or avoiding this take are apparent, the FOSC should be advised, the incidental take

documented, and the USFWS and NMFS representatives notified. USFWS and NMFS would continue to offer recommendations, taking into account any changes, to avoid jeopardizing the continued existence of listed species or adversely modifying critical habitat, and to minimize the take of listed species associated with spill response activities.

The major responsibilities of the USFWS and NMFS under the ESA include (1) the identification of threatened and endangered species; (2) the identification of critical habitats for these species; (3) the implementation of research programs and recovery plans for these species; and (4) the consultation with other federal agencies concerning measures to avoid, minimize, or mitigate the impacts of their activities on these species (Section 7). Further duties of the USFWS and NMFS include regulating "takes" of listed species on public or private land (Section 9) and granting incidental take permits to agencies that might unintentionally "take" listed species during their activities (Section 10a). The ESA allows the designation of geographic areas as critical habitat for threatened or endangered species. The physical and biological features essential to the conservation of a threatened or endangered species are included in the habitat designation. Designation of critical habitat affects only Federal agency actions and federally funded or permitted activities.

3.2.2.2 Marine Mammal Protection Act

Under the authority of the MMPA of 1972 (16 U.S.C. §§ 1361 et seq.), the Secretary of Commerce is responsible for the protection of all marine mammals except walruses, polar bears, sea otters, manatees, and dugongs, which are the responsibility of the Secretary of the Interior. These responsibilities have been delegated to NMFS and the USFWS, respectively, and include providing overview and advice to regulatory agencies on all Federal actions that might affect these species.

The MMPA prohibits the "take" of marine mammals, with certain exceptions, in waters under U.S. jurisdiction and by U.S. citizens on the high seas. Under Section 3 of the MMPA, "take" is defined as "harass, hunt, capture, kill, or attempt to harass, hunt, capture or kill any marine mammal." In the 1994 amendments to the MMPA, two levels of "harassment" were defined. "Harassment" is defined as any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild (Level A); or any act that has the potential to disturb a marine mammal or marine mammal stock in the wild by disrupting behavioral patterns, including, but not limited to migration, breathing, nursing, breeding, feeding, or sheltering (Level B). In cases where U.S. citizens are engaged in activities, other than fishing, that result in "unavoidable" incidental take of marine mammals, the Secretary of Commerce can issue a "small take authorization." The authorization can be issued after notice and opportunity for public comment if the Secretary of Commerce finds negligible impacts. The MMPA requires consultations with NMFS if impacts on marine mammals are unavoidable.

Section 101(a)(5)(A) of the MMPA directs the Secretary of Commerce, upon request, to authorize the unintentional taking of small numbers of marine mammals incidental to activities (other than commercial fishing) when, after notice and opportunity for public comment, the Secretary (1) determines that total takes during a 5-year (or less) period have a negligible impact on the affected species or stock, and (2) prescribes necessary regulations that detail methods of taking and monitoring and requirements for reporting. The MMPA provides that the moratorium on takes may be waived when the affected species or population stock is at its optimum sustainable population and would not be disadvantaged by the authorized takes (i.e., be reduced below its maximum net productivity level). Section 101(a)(5)(A) also specifies that the Secretary has the right to deny permission to take marine mammals if, after notice and opportunity for public comment, the Secretary finds (1) that applicable regulations regarding taking, monitoring, and reporting are not being followed; or (2) that takes are, or might be, having more than a negligible impact on the affected species or stock.

3.2.2.3 Magnuson-Stevens Fisheries Conservation and Management Act

The MSFCMA calls for direct actions to stop or reverse the continued loss of fish habitats. Toward this end, Congress mandated the identification of habitats essential to managed species and measures to conserve and enhance this habitat. Under the MSFCMA, Congress directs NMFS and the eight regional Fishery Management Council (FMCs) (under the authority of the Secretary of Commerce) to describe and identify EFH in each Fishery Management Plan (FMP); minimize, to the extent practicable, the adverse effects of fishing on EFH; and identify other actions to encourage the conservation of EFH. EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

The MSFCMA requires cooperation among NMFS, the FMCs, fishing participants, and Federal and state agencies to protect, conserve, and enhance EFH. Section 305(b) of the MSFCMA mandates that Federal agencies must consult with the Secretary of Commerce on all proposed activities authorized, funded, or undertaken by the agency that might adversely affect EFH. NMFS recommends consolidated EFH consultations with interagency coordination procedures required by other statutes such as NEPA or the ESA to reduce duplication and improve efficiency (50 CFR 600.920(e)(1)).

3.2.2.4 National Marine Sanctuaries Act

Title III of the NMSA authorizes the Secretary of Commerce to designate and manage discrete marine areas of special national significance as National Marine Sanctuaries (NMSs). The purpose of these sanctuaries is to promote comprehensive long-term management of their conservation, recreational, ecological, historical, research, educational, or aesthetic values. NMSs are built around the existence of distinctive natural and cultural resources whose protection and beneficial use require comprehensive planning and management. Similar to underwater parks, NMSs are managed according to management plans, which are prepared by the NOAA on a site-by-site basis. The NOAA is the Federal agency responsible for administering the NMS Program.

The NMSA prohibits the destruction, loss of, or injury to any sanctuary resource managed under law or regulations for the sanctuary in questions and any violation of the act, any regulations, or permits issued there under (16 U.S.C. 1436). In addition, Section 304(d) of the NMSA (16 U.S.C. 1434(d)) requires Federal agencies to consult with the Secretary of Commerce, through NOAA, on Federal agency actions internal or external to any NMS that are likely to destroy, cause the loss of, or injure any sanctuary resource.

3.2.3 Marine Protected Areas

MPAs, as defined in EO 13158, *Marine Protected Areas*, dated May 26, 2000 (FR 2490), are "any area of the marine environment that has been reserved by Federal, State, territorial, tribal or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein." The purpose of EO 13158 is to strengthen the management, protection, and conservation of existing MPAs and establish new or expanded MPAs; develop a scientifically based, comprehensive national system of MPAs representing diverse U.S. marine ecosystems, and the Nation's natural and cultural resources; and avoid causing harm to MPAs through federally conducted, approved, or funded activities. The MPAs within the Project area are shown in **Figure 3.2-1** and also listed below:

- Boca Ciega Bay Aquatic Preserve
- Pinellas County Aquatic Preserve
- Terra Ceia Aquatic Preserve.

Tampa Bay is Florida's largest open-water estuary, covering almost 400 square miles (TBEP 2006). MPAs in the coastal and offshore vicinity of the Tampa Bay estuary include four state-designated and managed APs, three offshore National Wildlife Refuges (NWRs), two Federal Fishery Management Zones (FFMZs), and critical habitat for the Florida manatee and piping plover.

All APs and NWRs are designated as OFWs, per 62-302.700 Florida Administrative Code (F.A.C.). OFWs are defined as waters worthy of special protection because of their natural attributes, as designated by the Environmental Regulation Commission. The designation provides special protection for OFWs and that water designated as special waters and includes a provision that prohibits activities that could cause degradation to water quality.

3.2.3.1 Florida Aquatic Preserves

Pinellas County and Boca Ciega Aquatic Preserves. The Pinellas County AP includes all state-owned submerged lands within the legal boundaries of the county. These submerged lands encompass the western portion of Tampa Bay, all of Boca Ciega Bay, St. Joseph Sound, Clearwater Bay, and offshore waters to the limit of the county, as well as fresh waters such as Lake Tarpon and portions of Lake Seminole. Boca Ciega Bay AP runs along the southwestern coastline of the county and the remainder of the sovereign submerged lands in Pinellas County composes the Pinellas County AP. The Boca Ciega AP (22,000 acres) and Pinellas County AP (336,265 acres) were created by legislative action in 1969 and 1972 respectively. The Boca Ciega Bay area was designated as a preserve to aid in halting the wholesale dredging and filling of the bay, which occurred in conjunction with the finger fill developments of the 1950s. Pinellas County AP was designated to help prevent the Boca Ciega experience from being repeated elsewhere in the county (DE DEM 1987).

Habitats that are encompassed by these two preserves include active scallop beds, reefs, and seagrass beds. Mangroves occur along the fringe of the many of the islands in the preserves. The preserves also include some heavily impacted areas such as the Boca Ciega seawalled finger canals, which were once grass flats and mangrove-lined shores (DE DEM 1987).

Terra Ceia Aquatic Preserve. The Terra Ceia AP is in Manatee County and is comprised of approximately 21,736 acres of submerged lands along the east side of Tampa Bay. The Terra Ceia AP was designated on June 24, 1984, for the primary purpose of preserving the biological resources of the Terra Ceia area marshes and associated waters. The Terra Ceia AP boundary begins just south of the mouth of Little Redfish Creek and ends at Emerson Point on Snead Island. Preserve boundaries extend northwest from these points out to the Intracoastal Waterway or Manatee County line, which then cross and form the outermost corner of the preserve (DNR 1987a).

The Terra Ceia AP consists predominately of fringing mangroves and mangrove islands with some oyster bars, clam beds, and seagrasses. The preserve is important in protecting critical habitat to an extensive array of fish, birds, and other wildlife. Maintaining the continued health of the preserve would involve minimizing water pollution and losses of wetlands resulting from urban, residential, and industrial development in the region (DNR 1987a).

Cockroach Bay Aquatic Preserve. The Cockroach Bay AP was established July 1, 1976, and designated as an OFW on March 1, 1979. Cockroach Bay AP consists of 8,583 acres of submerged land established to preserve the biological resources of the Cockroach Bay area marshes and associated waters. The Cockroach Bay AP boundary begins within the mouth of the Little Manatee River. It then continues in a southwesterly direction along the mean high-water line until it reaches its southern limit at the Hillsborough/Manatee County Line. At its northern border it is bounded by the northern edge of the

Little Manatee River and to the south by the Manatee/Hillsborough County Line and Port Manatee (DNR 1987b).

Cockroach Bay AP consists predominately of fringing mangroves and mangrove islands with some oyster bars, clam beds, and seagrasses. The preserve is important in protecting critical habitat to an extensive array of fish, birds, and other wildlife (DNR 1987b).

3.2.3.2 National Wildlife Refuges

Passage Key NWR. Passage Key NWR is in Manatee County, offshore from the City of St. Petersburg, Florida. Passage Key, at one time a 63-acre wilderness area established in 1905, is one of the first NWRs in the system. When established, it was a mangrove island with a fresh water lake. A 1920 hurricane destroyed the island and today it is a 30-acre meandering barrier island. Passage Key is an important roosting and feeding site for thousands of shore birds and water birds. It provides nesting, feeding, and resting habitat for laughing gulls, royal terns, black skimmers, sandwich terns, brown pelicans, and oyster catchers. The island hosts the largest royal tern and sandwich tern nesting colonies in the State of Florida.

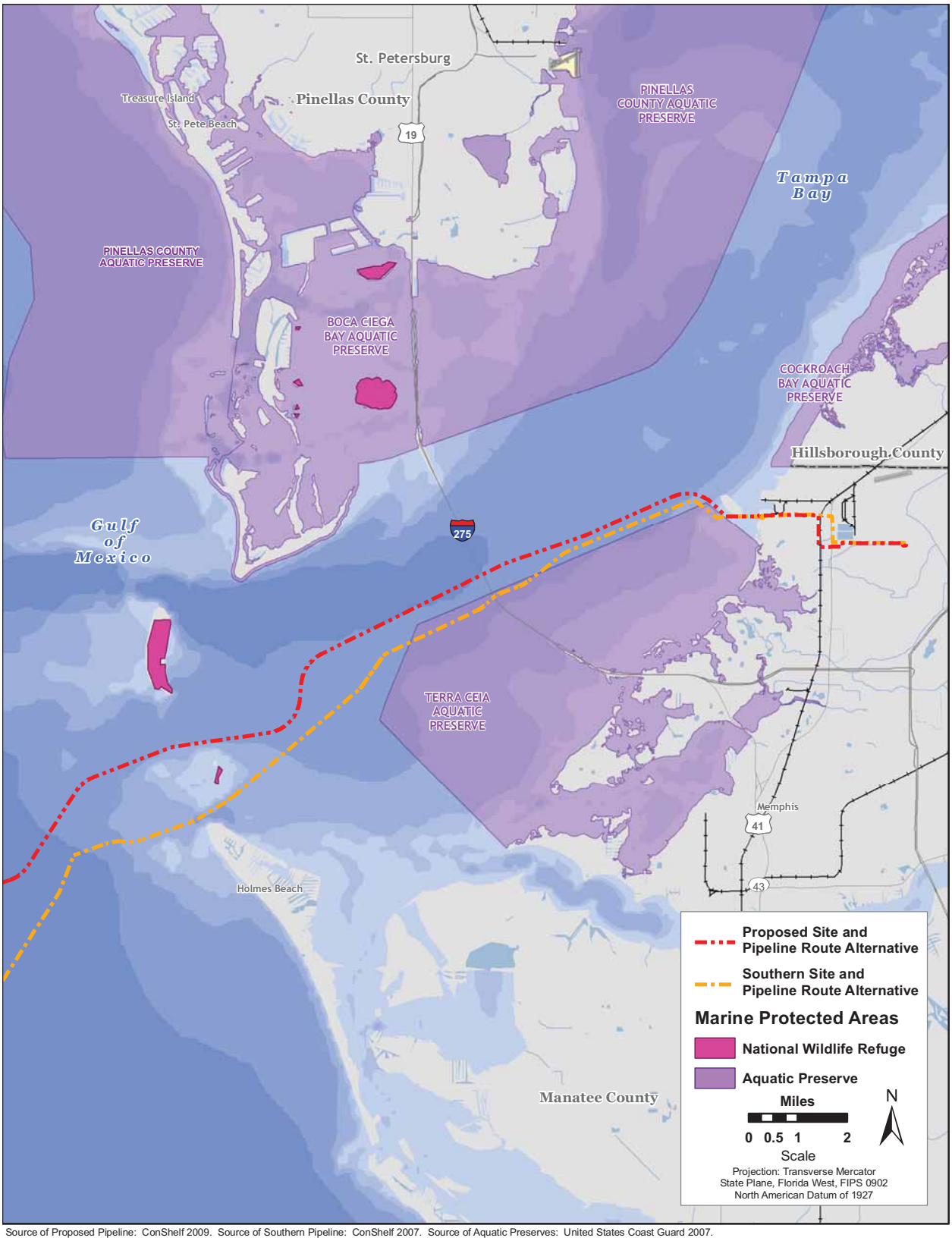
In June 1995, a refuge manager had observed a loggerhead sea turtle nesting on Passage Key NWR. This was apparently the first documented nest on the island, which is only infrequently visited by humans for the purpose of assessing seabird populations (Meylan et al. 2003). The island is accessible only by boat and is currently closed year-round to all public use (USFWS 2007a).

Pinellas NWR. Pinellas NWR is in Pinellas County, offshore from the City of St. Petersburg, Florida. This 394-acre refuge was established in 1951 as a breeding ground for colonial bird species. Pinellas Refuge consists of several islands including Indian, Tarpon, Mule, and Jackass keys. Species nesting on the island include brown pelican, heron, egret, cormorant, and numerous other species. Tarpon Key hosts the largest brown pelican rookery in the State of Florida. The flats surrounding the island are protected from motorized boating activity to protect the lush seagrass beds. The islands are currently closed year-round to all public use because of their small size and critical importance to coastal species (USFWS 2007a).

Egmont Key NWR. Egmont Key NWR is in Hillsborough County, offshore from the City of St. Petersburg, Florida. This 328-acre refuge was established in 1974 to provide nesting, feeding, and resting habitat for colonial nesting water birds, preserve and protect barrier island habitat and historical structures of national significance, provide public opportunities, and provide habitat and protection for endangered species such as manatees and sea turtles. The developed area includes the remnants of historic Fort Dade, a lighthouse and residence currently owned by the USCG, and 5 acres leased by the Tampa Bay Pilots Association. Commercial use on the refuge requires a Special Use Permit (USFWS 2007a).

3.2.3.3 Federal Fishery Management Zones

Reef Fish Stressed Area. The Reef Fish Stressed Area was originally established by the GOM Fishery Management Council (GMFMC) to help rebuild overfished reef fish from the EEZ to the inshore waters in the GOM (see **Figure 3.2-1**) (50 CFR 622.34). The use of fish traps, roller trawls (e.g., rock hopper trawl), and powerheads (e.g., a spear gun shaft with a fire arm ammunition replacing the spearhead) is prohibited in this part of the EEZ in order to reduce fishing pressure on snapper and grouper species. Some of these species were being harvested before they reached optimal harvest size. One of the criteria for delineating the stressed area was the need for special habitat protection. Therefore, the prohibited areas encompass the Florida coral reef tracts and seagrass beds. Additional benefits from this area include habitat conservation and minimization of user conflicts (GMFMC 2004).



Source of Proposed Pipeline: ConShelf 2009. Source of Southern Pipeline: ConShelf 2007. Source of Aquatic Preserves: United States Coast Guard 2007.

Figure 3.2-1. Marine Protected Areas in the Vicinity of the Port Dolphin Project

Reef Fish Longline/Buoy Gear Area Closure. The Reef Fish Longline/Buoy Gear area was established by the GMFMC to protect the larger red snapper spawning population. The use of long lines and buoy gear are prohibited inshore of 20 fathoms in Florida and inshore of 50 fathoms for the remainder of the GOM. This closure reduces the number of undersized red snapper harvested and the potential for gear conflicts between recreational fishermen and longliners (GMFMC 2004).

3.2.3.4 Critical Habitat

Critical habitat is designated under the ESA as "a specific geographic area that is essential for the conservation of a threatened or endangered species and that could require special management or protection." Critical habitat can include an area that is not occupied by a species, but is needed for the recovery of that species.

Critical habitat for the Florida manatee (*Trichechus manatus latirostris*) has been designated in two areas of the Project area: the Little Manatee River downstream from the U.S. Highway 301 bridge in Hillsborough County, and the Manatee River downstream from the Lake Manatee Dam in Manatee County.

Critical habitat for the wintering piping plover occurs along the Florida GOM shorelines. Six units of piping plover critical habitat occur within Pinellas and Hillsborough counties (USFWS 2007a). The closest unit to the Project area is on Egmont Key, Hillsborough County (FL-21). The majority of the unit is within Egmont Key NWR. This unit includes the entire island to mean lower low water (MLLW).

3.2.4 Threatened and Endangered Species

The ESA of 1973 (16 U.S.C. 1531–1534) establishes protection and conservation of threatened and endangered species and the ecosystems upon which they depend. The ESA is administered by the USFWS and NMFS. Under the ESA, an "endangered species" is defined as any species in danger of extinction throughout all or a significant portion of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. Section 7 of the ESA requires that all Federal agencies consult with the USFWS or NMFS, as applicable, before initiating any action that could affect a listed species. The Maritime Administration initiated informal consultation with both the USFWS and NMFS on August 24, 2007.

Under the ESA, the Maritime Administration has the responsibility to determine whether or not the Project would adversely affect federally listed threatened or endangered species and their critical habitat (discussed in **Section 3.2.2**). A BA has been prepared to identify the nature and extent of adverse impacts, and recommend measures that would avoid the habitat or species or reduce potential impacts to acceptable levels (see **Appendix E**).

The BA will be used in the interagency consultation as a basis for determining whether the adverse effects are likely to jeopardize any listed species or adversely affect their critical habitats. After consultation, the USFWS or NMFS would issue a BO expressing their opinion about the potential for impacts to occur. If their opinion is that the Project would not likely jeopardize any listed species or their designated critical habitat, they may also issue an incidental take statement as an exception to the prohibitions in the ESA. If, however, the Maritime Administration determines that no federally listed (or proposed) species or their designated critical habitat would be affected by the Project, no further action is necessary.

3.2.4.1 Threatened or Endangered Marine Mammal Species

Introduction

Seven of the marine mammal species occurring in the coastal and offshore vicinity of Tampa Bay are federally listed under the ESA. They include one sirenian and six cetacean species (see **Table 3.2-1**). Of these, only the West Indian manatee is common; rare occurrences of the North Atlantic right whale and the humpback whale are possible in the proposed Project area. The sei whale, blue whale, and fin whale are considered extralimital to the GOM, and though the sperm whale is common in the GOM, it is found only around and seaward of the shelf break in the GOM (Würsig et al. 2000). The additional protection of these species under the MMPA is discussed in **Section 3.2.6.**

Table 3.2-1. Threatened and Endangered Marine Mammals Occurring in the GOM and Tampa Bay Area

Common Name	Scientific Name	Federal ESA Status	Likelihood of Occurrence
Order Sirenia (dugongs, manatees, and sea cows)			
Florida manatee	*Trichechus manatus latirostris*	Endangered	Common inshore, rare offshore
Order Cetacea (whales, dolphins, and porpoises), Suborder Mysticeti (baleen whales)			
North Atlantic right whale	*Eubalaena glacialis*	Endangered	rare
Humpback whale	*Megaptera novaeangliae*	Endangered	rare
Sei whale	*Balaenoptera borealis*	Endangered	Not expected
Blue whale	*Balaenoptera musculus*	Endangered	Not expected
Fin whale	*Balaenoptera physalus*	Endangered	Not expected
Order Cetacea, Suborder Odontoceti (toothed whales)			
Sperm whale	*Physeter macrocephalus*	Endangered	Not expected

Marine Mammal Hearing

When considering the influence of various kinds of noise on the marine environment, it is necessary to understand that different kinds of marine life are sensitive to different frequencies of sound. Information on hearing in marine mammals is based on the frequencies of sounds produced, behavioral observations, anatomical evidence, and extrapolations from what is known about other marine mammal hearing. Marine mammal hearing varies among species; however, as a group, marine mammal hearing ranges are generally from 0.01 to 200 kHz. Broad generalizations can be made about groups of marine mammals. For example, most toothed whales (odontocetes) hear well in ultrasonic ranges, with functional hearing from 0.15 kHz to 180 kHz. Some toothed whales are able to hear frequencies as high as 200 kHz (NRC 2003). Southall et al. (2007) delineated three groups of cetaceans based on similarities in their hearing: Low-frequency cetaceans (0.007 Hz to 22 kHz), Mid-frequency cetaceans (150 Hz to 160 kHz), High-frequency cetaceans (0.2 kHz to 180 kHz).

Data on the hearing abilities of cetaceans are sparse, particularly for the larger cetaceans such as the baleen whales. The auditory thresholds of some of the smaller odontocetes have been determined in captivity (Ljungblad et al. 1982, Thomas et al. 1988, Houser et al. 2008). It is generally believed that cetaceans should at least be sensitive to the frequencies of their vocalizations. Comparisons of the

anatomy of cetacean inner ears and models of the structural properties and the response to vibrations of the ear's components in different species provide an indication of likely sensitivity to various sound frequencies. The ears of small-toothed whales are structurally optimized for receiving high-frequency sound, while baleen whale inner ears are best optimized for low to infrasonic frequencies (Ketten 1992, 1997). As such, baleen whales are considered to be low-frequency cetaceans (Southall et al. 2007).

The other two species of endangered marine mammals (i.e., North Atlantic right whales and manatees) likely hear in the low frequencies based on similarities to other baleen whale species and studies looking to the auditory thresholds of manatees. Ketten et al. (1992) felt that, based on the ear morphology and studies on other manatee subspecies (Klishin et al, 1990, Popov and Supin 1990) manatees likely hear best in the lower frequencies (1 kHz to 5 kHz) and are not likely to hear above 20 kHz. The only available behavioral audiogram for a sirenian is from the West Indian manatee, where peak sensitivity of hearing was between 16 and 18 kHz with functional hearing limits between 400 Hz and 46 kHz (Gerstein et al. 1999, Gerstein 2002). For information regarding marine mammal reactions to noise, including the Proposed Action, refer to Chapter 4.

Florida Manatee. Florida manatees are a subspecies of the endangered West Indian manatee and inhabit coastal marine, brackish, and fresh water habitats from Virginia to Brazil and are exclusively herbivorous, feeding on both submergent and emergent aquatic vegetation (Würsig et al. 2000). Surveys conducted by the Florida Fish and Wildlife Research Institute counted approximately 1,405 manatees in the waters off eastern Florida (FWRI 2007a). The Southwest management unit, which inhabits all areas between the Pasco-Hernando County line southward to Whitewater Bay in Monroe County, has declined at an estimated rate of 1.1 percent per year over the 8-year period prior to 2002 (Runge et al. 2004, 2007). Estimates of adult survival are lower than those of all other subpopulations, probably due to the combined effects of watercraft mortality and episodic mortality events.

Sightings of manatees tend to be restricted to warm fresh water, estuarine, and extremely nearshore coastal waters. Manatees occur in very shallow waters of 2 to 4 m depth (7 to 13 feet), generally close to shore (< 1 km) and in close proximity to seagrass beds (Lewis et al. 1984, Zoodsma 1991). Historically, the winter range of the Florida manatee was thought to focus on south Florida, with some animals ranging north of Charlotte Harbor on Florida's west coast and north of Sebastian on Florida's east coast (USFWS 2007). In summer, they inhabit estuaries and coastal bays, but in winter they migrate to warmer waters, or seek warmwater refugia, with appropriate food sources (Gannon et al. 2007, Laist and Reynolds 2005). During the cold months, manatees frequently aggregate at warmwater discharges of powerplants and at natural warmwater springs during the passage of cold fronts because they cannot tolerate water temperatures less that 20 °C (68 °F) (Irvine 1983, Laist and Reynolds 2005). During warm interludes, manatees leave these areas to feed on nearby seagrass beds (Hartman 1979, Stith et al. 2006).

During the winter months most manatees in Tampa Bay are typically found around the TECO Big Bend power plant discharge at Apollo Beach and the Florida Power Corporation's Bartow power plant discharge in St. Petersburg (Frisch et al. 2003). The number of manatees using Tampa Bay has steadily increased in the past decade, likely as a result of improved habitat and the presence of power plants that provide warmwater refuges for manatees wintering in the bay. More than 350 individuals have been counted in the bay in the winter months. About 150 animals are found in the bay in the summer, when the entire West Coast population is more scattered (TBEP 2006).

Vessel strikes can contribute to more than 30 percent of the documented annual mortalities of manatees (Ackerman et al. 1995). From 1998 through 2001, watercraft collisions attributed to 89 manatee deaths (approximately 26 percent) in Hillsborough, Manatee, and Pinellas counties (Frisch et al. 2003). During the period 2000 through 2006, 58 manatee deaths in Hillsborough, Manatee, and Pinellas counties were attributed to watercraft collisions (27, 14, and 17, respectively) (FWC MMPL 2007). In 2006, nearly one

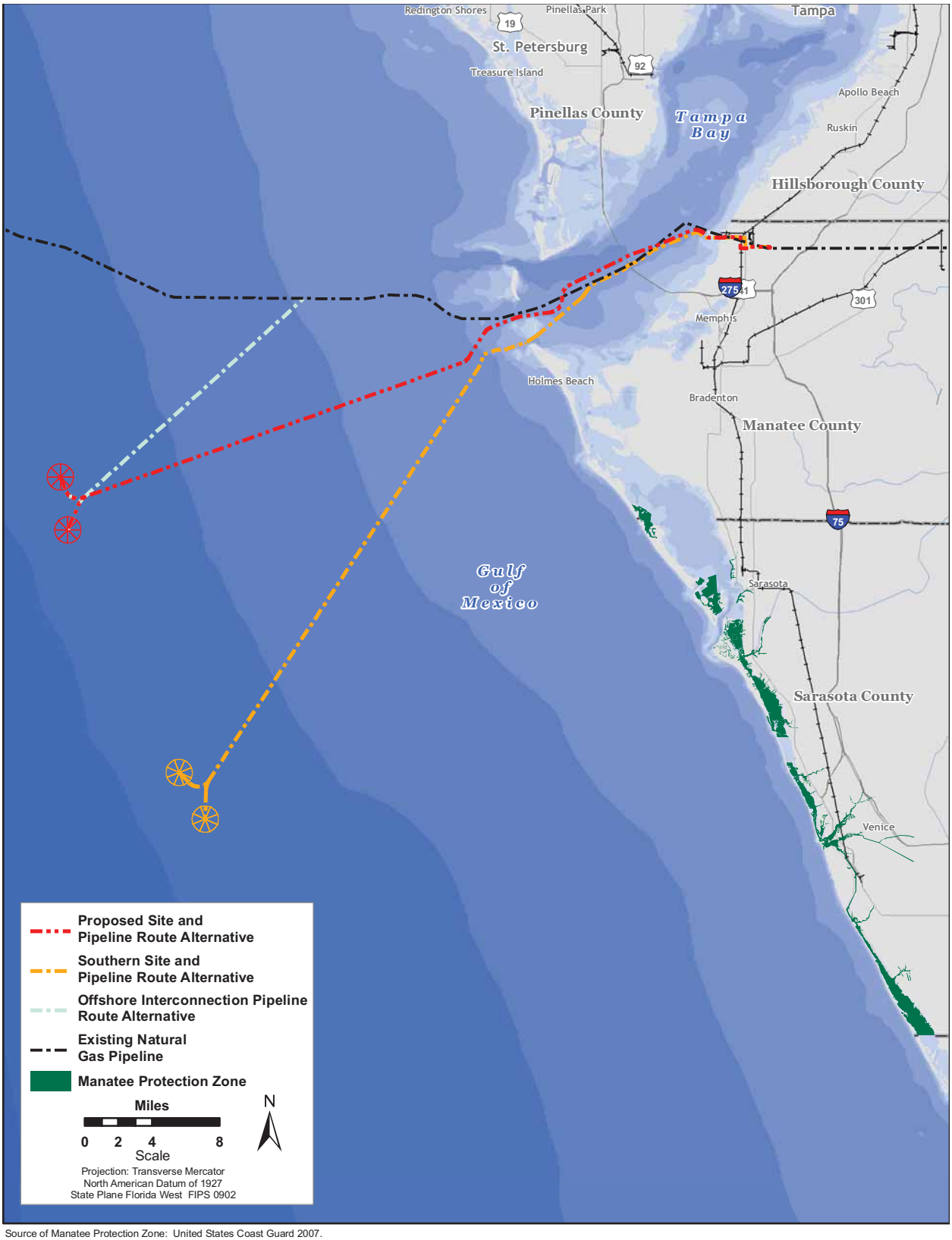
manatee per month was killed by watercraft in the three Tampa Bay counties (FWC MMPL 2007). However, these reported deaths do not take into account the latent impacts on feeding, mating, or birthing that are a direct result of a boat strike (Nowacek et al. 2004).

In addition to the critical habitat areas discussed in **Section 3.2.3**, a number of manatee protection areas have been created in the Tampa Bay region. Several year-round slow-speed zones have been created through state or local regulations, and two no-entry areas have been created around the power plant outfalls at Tampa Electric's Big Bend complex and the Bartow plant at Weedon Island. In addition, extensive shoreline speed zones are in place in Hillsborough County from Tampa's Rocky Point area south to the Gandy Bridge, from the Alafia River to E.G. Simmons Park south of Ruskin, in Terra Ceia Bay, the Manatee River, and in Pinellas County north of the Courtney Campbell Causeway to Oldsmar. Finally, Pinellas County has implemented seagrass protection zones at Fort DeSoto Park, Weedon Island, and north of the Courtney Campbell Causeway that also serve to protect manatees feeding and resting in the shallow grass beds (TBEP 2006). Manatee protection zones within the Tampa Bay area are illustrated in **Figure 3.2-2**.

North Atlantic Right Whale. The North Atlantic right whale is the most endangered large whale species in the world (Perry et al. 1999; IWC 2001a, 2001b; NMFS 2005) with between 350 and 400 known individuals left in the western North Atlantic population (Kraus et al. 2005, Waring et al. 2008). North Atlantic right whales feed on zooplankton and tend to prefer large calanoid copepods such as *Calanus sp*. (Kenney et al. 1985, Beardsley et al. 1996). Typical feeding grounds for right whales are areas where bottom topography, water column structure, currents, and tides combine to physically concentrate zooplankton into extremely dense patches. The majority of the North Atlantic right whale population leaves the feeding grounds for unknown habitats in the winter but returns to the feeding grounds coinciding with the return of cow-calf pairs (Waring et al. 2008). North Atlantic right whales are typically found in Cape Cod Bay in February through April; in Canadian feeding grounds from June through November; and in coastal waters off North Carolina, Georgia, and Florida from November through March (Waring et al. 2008).

North Atlantic right whales are most often sighted in nearshore and continental shelf waters between Florida and Nova Scotia. Right whales on the winter calving grounds are most often found in very shallow nearshore waters, in cooler temperatures inshore of a mid-shelf front (Kraus et al. 1993, Ward 1999). Most sightings of right whales have occurred within five high-use areas: the coastal waters of the southeastern United States (Georgia and Florida), Cape Cod and Massachusetts Bays, the Great South Channel, the Bay of Fundy, and the Nova Scotian Shelf (Winn et al. 1986, NMFS 2005). Calving occurs from December through March (NMFS 2005). Based on these areas of high occurrence, critical habitat has been designated for feeding grounds off Cape Cod and calving grounds off the Atlantic coast of Florida and Georgia (59 FR 28805). However, there are also rare occurrences in the GOM and nearshore sightings have included individual whale as well as mother-calf pairs (Moore and Clark 1963, Layne 1965, Smith and Windham-Reid 2004, NOAA and FWC 2006, Zoodsma 2006). These records likely represent extralimital strays from the wintering grounds or might even reflect a more extensive historic range beyond the known calving and wintering ground in the waters of the southeastern United States (Jefferson and Schiro 1997, Waring et al. 2008).

Humpback Whale. Humpback whales are not usually encountered in the GOM (Weller et al. 1996). In the North Atlantic Ocean, humpbacks are found from spring through fall on feeding grounds that are located from south of New England to northern Norway (NMFS 1991). The Gulf of Maine is one of the principal summer feeding grounds for humpback whales in the North Atlantic. The largest numbers of humpback whales are present from mid-April to mid-November. During the winter, most of the North Atlantic population of humpback whales is believed to migrate south to calving grounds in the



Source of Manatee Protection Zone: United States Coast Guard 2007.

Figure 3.2-2. Manatee Protected Areas in the Vicinity of the Port Dolphin Project

West Indies region (Smith et al. 1999, Stevick et al. 2003). Not all of the stock migrates to the West Indies every winter; since significant numbers of animals are found in mid- and high-latitude regions during the winter months (Waring et al. 2008). In recent years, there have been a number of wintertime humpback sightings in coastal waters of the southeastern United States including the GOM (Weller et al. 1996, Waring et al. 2008). Humpbacks occurring in the GOM are likely juveniles that have wandered here from the nearby Caribbean Sea and Atlantic Ocean during the breeding season or on their migration northward (Weller et al. 1996, Jefferson and Schiro 1997), although a review of the available records suggests that such occurrences could actually occur during any time of the year.

Humpback whales feed on a wide variety of invertebrates and small schooling fish. The most common invertebrate prey are euphausiids (krill); the most common fish prey are herring, mackerel, sand lance, sardines, anchovies, and capelin (*Mallotus villosus*) (Clapham and Mead 1999).

Humpback whales are classified as endangered under the ESA (NMFS 1991) and, therefore, are considered to be a strategic stock (Waring et al. 2008). The NOAA Stock Assessment Report states that the best estimate of abundance for the Gulf of Maine stock of humpback whales is 847 individuals (Waring et al. 2008). There is no critical habitat designated for the humpback whale.

3.2.4.2 Threatened and Endangered Sea Turtles

Worldwide, there are seven species of sea turtles in two distinct families, the Cheloniidae (i.e., hard-shelled sea turtles, six species) and the Dermochelyidae (i.e., leatherback sea turtle, one species). Of those seven species, six are found in U.S. waters: the green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*), loggerhead (*Caretta caretta*), and olive ridley (*Lepidochelys olivacea*). All six species found in U.S. waters are currently listed as either threatened or endangered under the ESA. **Table 3.2-2** outlines the turtle species that can be found in the vicinity of the Project and their status. Four of the six species of sea turtles (i.e, loggerhead, green turtle, Kemp's ridley, and hawksbill) occur in the Tampa Bay area. Loggerhead sea turtles are by far the most numerous in this area, but green, hawksbill, and Kemp's ridley turtles also are found (Meylan et al. 2003). Although there are currently no records for olive ridleys in the Tampa Bay area, extralimital occurrences are documented for the Florida Keys.

In the GOM, the number of turtle sightings is highest in continental shelf waters in summer and fall but sightings occur in the shelf and deeper waters throughout the study area in winter and spring (McDaniel et al. 2000). Reports by Lohoefener et al. (1990), Davis et al. (2000), McDaniel et al. (2000), and Mullin and Davis (2001) indicate that sea turtles are far more abundant in GOM waters east of the mouth of the Mississippi River than in waters to the west. Coastal waters of the GOM also serve as developmental habitat for juvenile Kemp's ridleys (Musick and Limpus 1997). Loggerhead sea turtles are the most abundant sea turtle in Florida and the GOM (FWRI 2006, USFWS and NMFS 2008). Leatherbacks are the most abundant along the northern GOM continental slope (Viada 2000). The hawksbill turtle occurs along all of the Gulf states and along the eastern seaboard as far north as Massachusetts, but sightings north of Florida are rare. Although hawksbill sea turtles are the least common sea turtle in the GOM, they have been recorded in waters of all of the states along the GOM (USFWS and NMFS 1993).

Sea turtle life history stages include eggs, hatchling, juvenile, and adult (MMS 2002a). In general, sea turtles nest along the entire GOM coastline. In the Project area, hatchling sea turtles move offshore in a swimming frenzy, immediately after hatching. Post-frenzy hatchling sea turtles move to areas of convergence or to sargassum mats and undergo passive oceanic migrations (Wyneken 2001). Juvenile sea turtles actively recruit to nearshore nursery habitat and move into adult foraging habitat when approaching sexual maturity.

Table 3.2-2. Sea Turtle Occurrence in the Tampa Bay Region

Species	ESA Status	Typical Adult Habitat	Juvenile/Hatchlings Potentially Present?
Family Cheloniidae			
Green sea turtle (*Chelonia mydas*)	T, E*	Shallow coastal waters; seagrass beds	Yes
Hawksbill sea turtle *(Eretmochelys imbricata)*	E	Shallow coastal waters; coral reefs	Yes
Kemp's ridley sea turtle (*Lepidochelys kempi*)	E	Shallow coastal waters; seagrass beds	Yes
Loggerhead sea turtle (*Caretta caretta*)	T	Estuarine, coastal, and shelf waters	Yes
Olive ridley sea turtle (*Lepidochelys olivacea*)	T, E*	Coastal, shelf, and slope waters	Yes
Family Dermochelyidae			
Leatherback sea turtle (*Dermochelys coriacea*)	E	Coastal, shelf, and slope waters	Yes

Source: Meylan et al. 2003

Notes:

E – Federally listed as "endangered" under the ESA of 1973.

T – Federally listed as "threatened" under the ESA of 1973.

* = Although the species as a whole is listed as threatened, the Florida and Mexican Pacific nesting stocks of the green turtle and the Mexican Pacific nesting stocks of the olive ridley turtle are listed as endangered. Since the nesting areas for green and olive ridley turtles encountered at sea often cannot be determined, a conservative approach to management requires the assumption that all greens and olive ridleys found in the study area are endangered.

At the onset of nesting, adults move between foraging habitats and nesting beaches. Mating habitat depends on species and might occur off nesting beaches or remotely. Females reside near nesting beaches during nesting season (MMS 2002a). Recent research has revealed that Tampa Bay is an important nursery area for young Kemp's ridley sea turtles (TBEP 2006). The bay serves as habitat for several life history stages of sea turtles, including foraging adults, foraging juveniles and subadults, and nesting females. The GOM waters adjacent to Anna Maria Island, Egmont Key, and all of Pinellas County can be expected to be visited by both reproductive males and females during the mating and nesting season (Meylan et al. 2003).

Loggerheads, greens, and leatherbacks nest regularly on Florida's beaches (Meylan et al. 1995, 2006). Approximately 350 sea turtles nest annually on beaches surrounding Tampa Bay (TBEP 2006). Nearly all ocean-facing (Gulf) sandy beaches in the Tampa Bay area are used as nesting habitat by sea turtles.

Surveys conducted by the FMRI recorded sightings of marine turtles in all sectors of Tampa Bay, with higher densities in the southern part of the bay, particularly in the area around Terra Ceia, just south of the Sunshine Skyway Bridge (Meylan et al. 2003). Based on stranding records, aerial surveys, and incidental captures, the occurrence of sea turtles in the Tampa Bay area suggests that turtles are common inhabitants of the bay. Their great mobility and tendency to remain submerged most of the time contribute to their inconspicuous nature. The following species were observed during the surveys (in decreasing order of abundance): loggerheads, Kemp's ridleys, greens, and hawksbills.

Strandings of dead or injured marine turtles along Florida's coastline are monitored by FMRI as part of the Sea Turtle Stranding and Salvage Network (STSSN). A total of 298 records of dead or injured turtles

exist for the inshore waters of the Tampa Bay area for 1980 through 2001. Loggerhead turtles are by far the species most frequently documented. Strandings of loggerheads were most numerous from March through June, with a smaller peak in October and November. Green turtle strandings were documented primarily outside the summer months, with a peak in February and March. Strandings of Kemp's ridleys have occurred in all months, with no obvious seasonal pattern. Dead or injured loggerheads and Kemp's ridleys have been recovered in all sectors of the bay; green turtle strandings have been far more restricted in distribution, with most occurring near the mouth of the bay. All hawksbill strandings have been in the outer bay area (Meylan et al. 2003).

Although they are all now protected by law from harvesting, it is clear from stranding records that numerous mortality factors are still operating. Many are human-related, such as boat collisions, entanglement, and incidental catch. Boat-related injuries (including propeller wounds and possible boat collision injuries), were the most frequently observed carcass anomaly for loggerheads; 16 Kemp's ridleys and 1 hawksbill also showed evidence of boat injuries. Seven cases of entanglement were reported, affecting all species (Meylan et al. 2003).

In 2004, sea turtle strandings in the Tampa Bay region accounted for 13.5 percent of the total offshore strandings and 14.7 percent of the inshore strandings in the entire GOM (see **Table 3.2-3**). A total of 107 sea turtle strandings were verified in the offshore and inshore areas of Tampa Bay, with loggerhead strandings accounting for 70 percent of the total.

Table 3.2-3. Offshore and Inshore Sea Turtle Strandings in Tampa Bay and the Entire GOM Region in 2004

Sea Turtles	Offshore		Inshore	
	Tampa Bay	GOM	Tampa Bay	GOM
Green	13	89	9	103
Hawksbill	1	20	0	1
Kemp's ridley	5	94	3	26
Leatherback	1	13	0	2
Loggerhead	55	322	20	77
Olive ridley*				
Unknown	0	19	0	8
Total	75	557	32	217

Source: STSSN 2004

Note:

The Tampa Bay area was characterized by the "zone 5" designation on the STSSN zone map.

*There are no records of this species in the area, only extralimital occurrences are recorded in Florida keys

There are no designated critical habitats or migratory routes for sea turtles in the GOM. However, NMFS recognizes many coastal areas as preferred habitat (i.e., important habitats for the species within a specific geographic area) for sea turtles. For example, nearshore or inshore areas are preferred habitat for green sea turtles, while bays are preferred habitat for Kemp's ridley sea turtles (MMS 2002a). Sargassum mats are also recognized as preferred habitat for juvenile sea turtles.

Green Sea Turtle. Green sea turtles are found throughout the GOM, where they inhabit shallow waters (except when migrating) inside reefs, bays, and inlets and tend to be found in areas with marine grass and

algae (USFWS 2002c). Green turtles nest on both island and continental beaches between 30ºN and 30ºS latitudes (Witherington et al. 2006). Early life stages are spent in open ocean pelagic habitats (bottom depths > 200 m), feeding primarily on planktonic animals (Musick and Limpus 1997). After several years of the early developmental stage, greens leave oceanic/pelagic habitats and recruit to neritic/benthic habitats (bottom depth < 200 m) also known as developmental areas, (where they forage on seagrasses and algae (Musick and Limpus 1997). During maturation, juveniles might pass through multiple developmental habitats in coastal waters (Witherington et al. 2006). Sexually mature turtles migrate between foraging areas and nesting areas every few years (Hirth 1997). Green turtles nest in Florida from June to late September on Florida's east coast. Nesting has been reported on Anna Maria Island (2002) and Longboat Key North (2003) in Manatee County and Fort DeSoto County Park (1994) and north Pinellas County Beaches (2000) in Pinellas County (FMRI 2006).

It is expected that green sea turtles would occur within offshore and nearshore waters of the Project area. The green sea turtle is currently listed as a threatened species internationally and as an endangered species in Florida. No critical habitat has been designated in the GOM.

Hawksbill Sea Turtle. The hawksbill turtle has a circumglobal distribution in tropical, and to a lesser extent, subtropical seas of the Atlantic, Pacific, and Indian oceans (MTSG 2007a). Early juveniles occur in open ocean habitats in sargassum or flotsam lines (Meylan and Redlow 2006). They recruit into a neritic developmental foraging habitat that can compose coral reefs or other hard-bottom habitats, sea-grass, algal beds, or mangrove bays and creeks (Musick and Limpus 1997). As they increase in size, immature hawksbills typically inhabit a series of developmental habitats, with some tendency for larger turtles to inhabit deeper sites (van Dam and Diez 1997, Bowen et al. 2007). Hawksbills use caves, crevices, and ledges for resting (Meylan and Redlow 2006). Coral reefs and hard-bottom areas are generally recognized as the resident foraging habitat for juveniles and adults (Meylan and Redlow 2006). Adult hawksbills feed on encrusting organisms such as sponges, tunicates, bryozoans, algae, mollusks, and a variety of other items such as crustaceans and jellyfish (Bjorndal 1997). Older juveniles and adults are more specialized and feed primarily on sponges. Sponges compose as much as 95 percent of their diet in some locations (Witzell 1983, Meylan 1988).

Nesting within the continental United States is limited to southeastern Florida and the Florida Keys (Viada 2000). Nesting on GOM beaches is extremely rare (NMFS 2002). One hawksbill nest was found on Longboat Key, in Manatee County, in 1980 (FMRI 2006). In most locations, nesting occurs between April and November, but varies depending on the area. Hawksbill nesting within the continental United States is limited to southeastern Florida and the Florida Keys.

The global population of hawksbill sea turtles has declined 80 percent over the past 100 years, with only approximately 15,000 females nesting worldwide (USFWS 2002b). It is expected that hawksbill turtles would occur within nearshore waters of the Project area. The hawksbill is listed as endangered. No critical habitat has been designated in the GOM.

Kemp's Ridley Sea Turtle. The Kemp's ridley is restricted to the North Atlantic (Márquez 1994). Adults are largely confined to the GOM, with moderate numbers along the U.S. Atlantic Coast as far north as Nova Scotia (Lazell 1980, Morreale et al. 1992). Offshore water temperatures play a major role in determining the number of Kemp's ridleys present in the North Atlantic Ocean. During the winter, Kemp's ridleys migrate to warmer waters and then return to their former habitat or bury themselves in mud bottoms to avoid low temperatures (Márquez 1994). Seasonal coastal migration occasionally brings them to overwinter in central to south Florida. Although Kemp's ridleys can be observed in Florida waters year-round, the highest abundances have been documented during December through March (Henwood and Ogren 1987). Kemp's ridley turtles overwintering in Florida waters can be expected to move north as water temperatures increase, foraging along the way, and return south to Florida in the fall

when temperatures cool. These seasonal movements may continue until turtles reach sexual maturity, at which time, turtles may return to breeding grounds in the GOM (Henwood and Ogren 1987). Kemp's ridley turtles feed primarily on portunids and other types of crabs but are also known to prey on mollusks, shrimp, fish, and plant material (Márquez 1994, Schmid and Barichivich 2006).

Kemp's ridleys travel near the coast and are considered relatively common within all sectors of Tampa Bay (Meylan et al. 2003). Stranding and capture records indicate that Kemp's ridleys were most often encountered in west Florida in the late spring and summer. This temporal pattern is likely due to migration or winter dormancy (Mahmoudi et al. 2002).

Nesting occurs primarily on a single nesting beach at Rancho Nuevo, Tamaulipas, Mexico (USFWS and NMFS 1992b), with a few additional nests in Texas, Florida, and the Carolinas (Schmid and Barichivich 2006). Nesting occurs from April into July (NMFS 2002a). Kemp's ridley nests were recorded within Pinellas County on Madeira Beach in 1989 (Meylan et al. 2003), 1994, and twice in 2002 (FMRI 2006).

It is expected that Kemp's ridley turtles would occur within offshore, nearshore, and coastal waters of the Project area. The Kemp's ridley is currently listed as an endangered species and is considered the most endangered sea turtle in the world (USFWS and NMFS 1992b). No critical habitat has been designated in the GOM.

Leatherback Sea Turtle. Leatherback sea turtles are the most abundant sea turtle on the northern GOM continental slope (Viada 2000). They are the largest, deepest diving, most migratory, widest ranging, and most pelagic sea turtle (USFWS 2002a). There is limited information available regarding the habitats utilized by early juvenile leatherbacks because this age class is entirely oceanic. However, scientists are relatively certain that these individuals do not associate with floating debris or vegetation (USFWS and NMFS 1992a). Late juvenile and adult leatherback turtles are known to range from mid-ocean to the continental shelf and nearshore waters (Schroeder and Thompson 1987, Shoop and Kenney 1992, Grant and Ferrell 1993, Starbird et al. 1993). Hatchlings and smaller-sized juveniles are limited to tropical waters, where temperatures are above 26 °C (Eckert 2002). Juvenile and adult foraging habitats include both coastal feeding areas in temperate waters and offshore feeding areas in tropical waters (Frazier 2001). Leatherbacks are highly migratory and can be found within convergence zones and upwelling areas in the open ocean, along continental margins, and in archipelagic waters (Morreale et al. 1996, Shoop and Kenney 1992). Leatherback sea turtles tend to stay in temperate waters to forage, with only the females returning to tropical beaches to lay eggs (USFWS and NMFS 1992a). The diet of the leatherback sea turtle generally consists of gelatinous zooplankton such as cnidarians (e.g., jellyfish and siphonophores) and tunicates (e.g., salps and pyrosomas) in the pelagic environment (Bjorndal 1997, James and Herman 2001, Stewart and Johnson 2006).

The leatherback has a wide nesting distribution in the tropical Pacific and Atlantic, especially on mainland shores, but with a somewhat widespread island nesting in the Antilles (TEWG 2007). Global abundance estimates of breeding female leatherbacks range from 70,000 to 115,000, and the number of nests reported in Florida ranges from 39 to 188 since 1979. Leatherbacks nest in Florida from April through July, but they are observed along Florida's west coast during all months except February and April. Sightings in southwestern Florida have been concentrated between 27 and 166 km from shore (Mahmoudi et al. 2002).

It is likely that leatherback sea turtles would occur within offshore waters of the Project area. Leatherbacks are listed as endangered but no critical habitat has been designated in the GOM.

Loggerhead Sea Turtle. Loggerhead sea turtles occur in subtropical and temperate regions of the Atlantic, Pacific, and Indian oceans (Dodd 1988). Although the major nesting concentrations in the

United States are found in South Florida, loggerheads nest from Texas to Virginia. The loggerhead turtle occurs worldwide in habitats ranging from coastal estuaries to waters far beyond the continental shelf (Dodd 1988). Long-term in-water studies indicate that late juvenile loggerheads reside in particular developmental foraging areas for many years (USFWS and NMFS 2008). Loggerheads often associate with natural and artificial hard substrates (e.g., live hard bottom, artificial reefs, shipwrecks), which provide an abundance of prey, as well as sheltered locations where they can rest (Dodd 1988, Makowski et al. 2006). Seasonal movements of juvenile loggerheads along the Atlantic coast, from more northerly resident areas during warmer months to more southerly or offshore resident areas during colder months, have been well-documented (USFWS and NMFS 2008). Results from satellite telemetry have demonstrated that a small proportion of the juvenile stage could return to the oceanic zone particularly in the winter (Mansfield 2006). Loggerhead turtle diet changes with age and size of the individual. The gut contents of post-hatchlings found in masses of sargassum contained parts of sargassum, zooplankton, jellyfish, larval shrimp and crabs, and gastropods (Richardson and McGillivary 1991). Juvenile and subadult loggerhead turtles are omnivorous, foraging on pelagic crabs, mollusks, jellyfish, and vegetation captured at or near the surface (Dodd 1988). Adults are generalized carnivores that forage on nearshore benthic invertebrates (Dodd 1988).

About 14,000 female loggerheads nest in the southeastern United States annually, and this species accounts for approximately 98 percent of the total sea turtle nesting activity in Florida. In 2006, 377 loggerhead nests were found in Manatee, Hillsborough, and Pinellas counties (191, 21, and 165, respectively) (FMRI 2006). Nests are documented annually on the barrier islands off Pinellas and Manatee counties, with Egmont Key providing the most pristine nesting beach remaining (an average of 44 loggerhead nests has been documented on the key annually from 1989 through 2001 (Meylan et al. 2003). Florida's west coast is also a major feeding area for nonnesting loggerheads. Nesting females remain in shallow areas near beaches during the nesting season. They then disperse to feeding grounds throughout the Bahamas, Cuba, Dominican Republic, north along the eastern U.S. coast and south through the Florida Keys and GOM (late April to September).

It is expected that loggerhead sea turtles would occur within offshore, nearshore, and coastal waters of the Project area. The loggerhead is currently listed as a threatened species.

Olive Ridley Sea Turtle. The olive ridley sea turtle has a circumtropical distribution, with nesting occurring throughout tropical waters (MTSG 2007b). Olive ridleys do not nest on U.S. beaches (USFWS and NMFS 2007). Shallow benthic waters also serve as foraging grounds for olive ridleys (Bjorndal 1997). An olive ridley satellite tagged and released off Andros in the Bahamas exhibited preferences for shallow areas (< 200 m) near the coast of western Andros and homogenous habitat (Bolten and Bjorndal 2006). Olive ridley turtles are omnivorous; identified prey include a variety of benthic and pelagic prey items such as shrimp, jellyfish, crabs, snails, and fish, as well as algae and seagrass (Reichart 1993, Bjorndal 1997, USFWS and NMFS 1998, Polovina et al. 2004). Crustaceans and fish serve as their primary food source.

Although there are currently no records for olive ridleys in the Tampa Bay area, extralimital occurrences are documented for the Florida Keys.

Sea Turtle Hearing. Sea turtle hearing sensitivity, in air and underwater, is not well-studied. Sea turtles do not have an external ear; rather the tympanum is a continuation of the facial tissue (Bartol and Musick 2003). Reception of sound is also through bone conduction, with the skull and shell acting as receiving structures (Lenhardt et al. 1983). Sea turtles appear to hear best in the lower-frequencies (< 1 kilohertz [kHz]) (Bartol and Ketten 2006). The effective dynamic hearing range for sea turtles is probably between 0.1 to 1 kHz (Ridgway et al. 1969; Lenhardt 1994; Bartol et al. 1994, 1999). Also, calculated in-water hearing thresholds appear to be high (160 to 200 dB re 1 µPa) (Lenhardt 1994). Research based on brain

physiology indicates that sea turtles are able to hear sounds with frequencies ranging from 0.08 to 2 kHz, with maximum sensitivity levels reported between 0.1 and 0.8 kHz and 0.3 and 0.4 kHz (Lenhardt 1994, NRC 2003). Bartol et al. (1999) reported that juvenile loggerhead turtles hear sounds between 250 (lowest frequency that could be tested due to equipment) and 1,000 hertz (Hz) (most sensitive at 250 Hz) using the auditory brainstem response (ABR) technique (that is, evoking an electrical signal in the brainstem by the presentation of a sound). Lenhardt (2002) found that adults can hear sounds from 30 Hz to 1 kHz (most sensitive at 0.4 to 0.5 kHz) using startle response (i.e., contract neck or dive) and ABR techniques. Loggerhead sea turtle hearing ranges from 0.25 to 0.75 kHz with peak sensitivity at 0.25 kHz (Richardson et al. 1995). ABR data analyzed in Bartol and Ketten (2006) found that subadult green turtles detect frequencies between 100 and 800 Hz and that their most sensitive hearing was between 0.2 and 0.7 kHz. Bartol and Ketten (2006) also found that two juvenile Kemp's ridley turtles had a more restricted range of between 100 and 500 Hz with their most sensitive hearing between 0.1 and 0.2 kHz (Bartol and Ketten 2006).

While sea turtles do not appear to be sensitive to the frequency ranges associated with the Proposed Action, they do show effects to lower frequencies. Lenhardt (2002) found that at received levels from 151 to 161 dB re 1 μPa, adult loggerheads showed a marked response (i.e., increased swimming speeds) and avoided areas where low frequency air guns were being used at up to 175 dB re 1 μPa. However, they eventually habituated to these received levels. During the same trials, one turtle exhibited temporary threshold shift (TTS) of more than 15 dB for up to 2 weeks after exposure to these received levels (Lenhardt 2002). Juveniles also have been found to avoid low-frequency sound (less than 1 kHz) produced by airguns (O'Hara and Wilcox 1990). In a separate study, green and loggerhead sea turtles exposed to seismic air guns began to noticeably increase their swimming speed, as well as swimming direction, when received levels reached 155 dB re 1 μPa^{2}-s for green turtles and 166 dB re 1 μPa^{2}-s for loggerhead turtles (McCauley et al. 2000). In terms of sound production, nesting leatherback turtles have been recorded producing sounds (sighs or belch-like sounds) up to 1.2 kHz with most energy ranging from 0.3 to 0.5 kHz (Mrosovsky 1972, Cook and Forrest 2005).

3.2.4.3 Threatened and Endangered Bird Species

The USFWS is responsible for coastal and marine bird protection and recovery under the authority of the ESA. The threatened and endangered birds that occur in the northern GOM and inhabit or frequent coastal areas and waters of the inner continental shelf include the piping plover (*Charadrius melodus*) and wood stork (*Mycteria americana*).

Piping Plover. Piping plovers are migrant shorebirds that overwinter along the southeastern U.S. and GOM coasts. Piping plovers from all three breeding populations winter along South Atlantic, Gulf Coast, and Caribbean beaches and barrier islands, primarily on intertidal beaches with sand or mud flats with no or very sparse vegetation. Plovers depart for the wintering grounds from mid-July through late October. Breeding and wintering plovers feed on exposed wet sand in wash zones; intertidal ocean beach; wrack lines; washover passes; mud-, sand-, and algal flats; and shorelines of streams, ephemeral ponds, lagoons, and salt marshes by probing for invertebrates at or just below the surface. They use beaches adjacent to foraging areas for roosting and preening (USFWS 2007b). Christmas Bird Count (CBC) census surveys during the 2006 to 2007 season recorded only three individuals within the St. Petersburg survey area, and none within the Alafia Banks Sanctuary, the Tampa survey area, and the Bradenton survey area (Audubon Society 2007). As discussed in **Section 3.2.3**, critical habitat has been designated for the piping plover.

Wood Stork. Wood storks are the only storks that regularly inhabit North America. These wading birds are year-round residents of Florida and Georgia, though sightings occur within the other Gulf coastal states. Wood storks frequent fresh water and brackish coastal wetland habitats. This endangered species nests at a single site in Tampa Bay, the Dot-Dash colony at the mouth of the Braden River. During the

1994 through 2001 census, numbers varied from about 40 to 160 pairs annually, with the high in 2000. In 1994 the colony was abandoned following disturbance by jet skiers, and numbers were reduced in 1995 (Paul and Paul 2003). CBC census surveys during the 2006 to 2007 season recorded 110 individuals within the St. Petersburg survey area, 83 individuals within the Alafia Banks Sanctuary, 30 individuals within the Tampa survey area, and 208 individuals within the Bradenton survey area (Audubon Society 2007). The wood stork is currently listed as endangered. No critical habitat has been designated for wood storks in the GOM.

3.2.4.4 Threatened and Endangered Fish Species

Under the authority of the ESA, USFWS and NMFS are responsible for the protection and recovery of endangered and threatened fish species. NMFS has jurisdiction over most marine and anadromous fish listed under the ESA. Marine fish spend their entire life in salt water; anadromous fish are born in freshwater, migrate to the ocean to grow into adults, and then return to freshwater to spawn. USFWS has jurisdiction over freshwater fish. NMFS has jurisdiction over smalltooth sawfish (a marine/estuarine fish). USFWS and NMFS share jurisdiction over Gulf sturgeon (an anadromous fish). The only ESA-listed species that have the potential to occur in the Project area are smalltooth sawfish (*Pristis pectinata*) and Gulf sturgeon (*Acipenser oxyrinchus desotoi*). Smalltooth sawfish are expected to be rare in the terminal area and offshore areas of the Pipeline, but will have a greater likelihood for interaction in the shallower, inshore areas of the pipeline, during construction. There are few documented captures of smalltooth sawfish north of Charlotte Harbor (which is more than approximately 40 NM south of Tampa Bay) on Florida's west coast (NMFS 2009). However, recent efforts to document sawfish encounters have increased the numbers of reported occurrences in the upper half of the west coast of the Florida Peninsula and in the area north of Charlotte Harbor (NMFS 2009). As of 2008, there had been 20 encounters of smalltooth sawfish in Tampa Bay in 10 years (FMNH 2008). Gulf sturgeon are expected to be rare in both the Terminal and pipeline areas.

Smalltooth Sawfish. Endangered smalltooth sawfish (*Pristis pectinata*) is one of seven sawfish species that occur worldwide in tropical and subtropical rivers, lakes, and coastal areas. Like sharks and rays, smalltooth sawfish are elasmobranchs, and share life history characteristics similar to sharks. They are long-lived, slow-growing, slow to mature, and bear few young. These traits make all sawfish vulnerable to overfishing and slow to recover from depletion (NMFS 2009).

Smalltooth sawfish range from Brazil through the Caribbean and Central America, the GOM, and the Atlantic coast of the United States, and have also been recorded in Bermuda. Forms of smalltooth sawfish have been reported from the eastern Atlantic in Europe and West Africa; the Mediterranean; South Africa; and the Indo-West Pacific, including the Red Sea, India, Burma, and the Philippines. However, it is unknown whether populations outside the Atlantic are truly smalltooth sawfish or closely related species (NMFS 2009).

The range of the smalltooth sawfish in the Atlantic has been reduced over the past century. The northwestern extent of this species' Atlantic range is found in the waters of the eastern United States. Records of this species north of Florida occur during spring and summer periods (May to August). These are likely seasonal migrants, wanderers, or colonizers from a historic Florida core population to the south (NMFS 2009). Peninsular Florida has been the U.S. region with the largest numbers of capture records of smalltooth sawfish and seems to be the primary area where the species historically occurred year-round. The region where the largest numbers of smalltooth sawfish occur is in southern and southwestern Florida from Charlotte Harbor through the Dry Tortugas (NMFS 2009).

Smalltooth sawfish occur on the west coast of Florida, north of Charlotte Harbor, but historically appear to never have been as common in this region as in the east coast lagoons and South Florida. One of the

earliest published records from the west coast was reported in 1883 from the Cedar Keys off the northwestern Florida peninsula, and hundreds of smalltooth sawfish were reported on the Gulf coast of peninsular Florida in the late 1800s. Other captures during the 1800's were documented in Tampa Bay and in the southwestern coast off Charlotte Harbor and San Carlos Bay. Records of capture since that time period have been limited. There are few documented captures of sawfish from the area north of Charlotte Harbor. However, the recent work to document sawfish encounters has increased the numbers of reported occurrences in the upper half of the west coast of the Florida Peninsula and in the area north of Charlotte Harbor (NMFS 2009).

Smalltooth sawfish are found very close to shore in muddy and sandy bottoms, seldom descending to depths greater than 10 m (32 feet). They are often found in sheltered bays, on shallow banks, and in estuaries or river mouths. Most encounters of smalltooth sawfish occurred on mud substrates. One study reported encounters with sawfish by type of substrate as 61 percent on mud, 11 percent on sand, 10 percent seagrass, 7 percent limestone, 4 percent rock, 4 percent coral reef, and 2 percent sponge. Smalltooth sawfish are also reported to be associated in areas around mangroves, seagrasses, and the shorelines. Encounter data have also demonstrated that smaller smalltooth sawfish occur in shallower water, and larger sawfish occur regularly at depths greater than 10 m (32 feet) (NMFS 2009).

The primary reason for the decline of the smalltooth sawfish population has been bycatch in various commercial and recreational fisheries. The secondary reason for the decline of the smalltooth sawfish population is habitat loss and degradation. Other threats to the species include entanglement in marine debris, injury from saw removal, pollution, and disturbance of natural behavior by divers and other marine activities (NMFS 2009). NMFS listed the U.S. population of the smalltooth sawfish as an endangered species on April 1, 2003 (68 FR 15674–15680). There is no critical habitat currently designated for smalltooth sawfish. NMFS proposed two units of critical habitat on November 20, 2008, approximately 40 NM from the Project area in Charlotte Harbor and south (73 FR 70290–70308). Critical habitat is not proposed within the Project area.

***Gulf Sturgeon*.** The threatened Gulf sturgeon is an anadromous fish with a partially cylindrical body imbedded with bony plates or scutes (USFWS and GSMFC 1995). The current population levels of Gulf sturgeon (*Acipenser oxyrinchus desotoi*) in rivers other than the Suwannee and Apalachicola are unknown, but are thought to be reduced from historic levels. Historically, the subspecies occurred in most major rivers from the Mississippi River to the Suwannee River, and marine waters of the central and eastern GOM to Florida Bay (USFWS and GSMFC 1995).

Tampa Bay was the location of the first recorded significant sturgeon fishery on the GOM coast; however it only lasted 3 years from 1886 through 1889, when only seven sturgeon were caught. Sturgeon catches have been reported sporadically since 1890. In the Tampa Bay basin, a commercial netter incidentally caught and released a Gulf sturgeon one mile west of Redington Beach near St. Petersburg in December 1992. Before this time, the most recent Gulf sturgeon catch reported from Tampa Bay was collected in December 1987 near Pinellas Point. Recent sightings have been limited to coastal Alabama, Mississippi, and the Florida Panhandle (USFWS 2004a).

As anadromous fish, Gulf sturgeon feed in estuarine waters and spawn in fresh water. Subadult and adult Gulf sturgeon are believed to spend 8 to 9 months in rivers and 3 to 4 months (the cooler months) in estuaries. Gulf sturgeon that are less than 2 years old remain in estuaries throughout the year. In the Suwannee River, the primary habitat is limestone and sand. In the rivers, Gulf sturgeon are known to congregate below springs and areas of turbulent flows. Open water habitats are believed to be muddy and soft bottom and possibly seagrass (USFWS and GSMFC 1995).

The decline of Gulf sturgeon was likely caused by overexploitation and exacerbated by damming of rivers (USFWS and GSMFC 1995). Critical habitat for Gulf sturgeon was designated in March 2003 (68 FR 13370–13494). There is no critical habitat for Gulf sturgeon in the Port area. The closest critical habitat for Gulf sturgeon is approximately 90 NM from the Project area.

3.2.5 Benthic Resources

Benthos refer to both substrate (habitat) and organisms that occupy that substrate. Benthic habitats are characterized by physical or structural features, such as topography, substrate type, sediment grain size, and water depth, and by the presence of emergent biogenic structures (i.e., structures formed by plants or animals), such as coral reefs, oyster reefs, and tube assemblages (GMFMC 2004).

In general, the benthic habitat on the west Florida Shelf is predominantly carbonate sediments, with low-relief hard bottom, coralline algal nodules and pavement, and unconsolidated shell rubble. Sediments are composed of quartz-shell sand (i.e., greater than 50 percent quartz), shell-quartz sand (i.e., less than 50 percent quartz), shell sand, and algal sand. The west Florida shelf provides a large area of scattered hard substrates, some emergent, but most covered by a thin veneer of sand. Hard substrates are colonized by a variety of hardy, tropical reef biota, such as algae, sponges, stony corals, hydroids, octocorals, anemones, and bryozoans intermingled with sand bottoms (GMFMC 1998).

The offshore hard-bottom communities of the West Florida shelf can be grouped into various assemblages based on similarities and dissimilarities. The assemblages that would occur in the Project area include Inner and Middle Shelf Live Bottom Assemblage II identified in water depths of 75 m (246 feet) to 25 m (82 feet) and the Inner Shelf Live Bottom Assemblage I identified in water depths of 27 m (89 feet) to 20 m (66 feet) (GMFMC 2004).

The Inner and Middle Shelf Live Bottom Assemblage II consists of algae, sea squirts, bryozoans, hard corals, small sea fans, hydrozoans, and several sponges. This assemblage is characterized by a higher number of sponges than the Inner Shelf Live Bottom Assemblage I. The Inner Shelf Live Bottom I consists of patches of algae, ascidians, large sea fans, hydrozoans, and sponges. This assemblage generally has larger organisms and a higher biomass per unit area than the Inner and Middle Shelf Live Bottom II (GMFMC 2004).

The nearshore benthic habitat (from depths of 18 m [60 feet] to shore) on the west Florida shelf is characterized by spotty sediment covering large expanses of limestone, with rock ledges and sinkholes. Rocky bottom is colonized by sponges, soft corals, true corals, and anemones. These provide commercially important fish and shellfish habitat (GMFMC 2004).

Approximately 80 percent of Tampa Bay is covered by sand or mud bottom, including hard-packed sand and shell. These sediments support a large variety of organisms, including parchment worms, clams, sea squirts, and conchs. In 1993, more than 500 types of macroinvertebrates were identified baywide, with an average density of 10,000 organisms per square meter (SWFWMD 1999).

Hard-bottom habitats also occur in Tampa Bay. Sessile invertebrates such as corals, barnacles, sponges, and algae colonize natural outcroppings of rock or limestone—or man-made bridge pilings or reefs in these habitats. More than 850 acres of hard-bottom communities were identified in the shallow areas of Tampa Bay in 1994. It is likely that additional hard-bottom communities are associated with deeper areas of the Tampa Bay ship channel where rock has been exposed due to dredging (Savercool and Lewis 1994). Three distinct hard-bottom habitats that were identified by aerial photographs in shallow areas: native limestone outcroppings, artificial habitat such as concrete bridge rubble, and living oyster reefs. Similar organisms with slight variations occur within each habitat type. Hard corals and macroalgae

(*Sargassum filipendulum* and *Caulerpa mexicana*) only occurred in the native limestone. However, the native limestone was the only habitat type that did not support amphipods. Oysters only occurred in the oyster reef habitat (Savercool and Lewis 1994). Long-term trends and current hard bottom coverage in Tampa Bay are not available. However, eight artificial reefs have been established in Tampa Bay to expand natural hard bottom and enhance fishing (SWFWMD 1999).

Seagrasses (vascular plant) and macroalgae (nonvascular plant) are important primary producers in the marine environments. They also provide nursery grounds to important recreational and commercial fish species and habitat for many larval and adult invertebrates. Five species of seagrass are common to the GOM. These include turtle grass (*Thalassia testudinium*), shoal grass (*Halodule wrightii*), manatee grass (*Syringodium filiforme*), star grass (*Halophila engelmanni*), and paddle grass (*Halophila decipens*). Widgeon grass (*Ruppia maritima*) is also common, but not considered a true seagrass. It is a fresh water species that is capable of living in a saline environment but also occurs in the GOM. Macroalgae species of *Caulerpa*, *Udotea*, *Penicillus*, and *Sargassum* are also common to this area of the GOM (GMFMC 1998).

Benthic Community Survey. The Applicant performed a 27,985-acre benthic survey at the proposed buoy system array footprint and proposed pipeline corridor (Port Dolphin 2008d). Side-scan sonar, photodocumentation (video and still photographic data), and diver surveys were used to identify marine benthic communities within the Project area. Surveyed habitats were classified into six habitat types, presented in **Table 3.2-4**. Approximately 33 percent of the proposed Route Alternative was hard- or live-bottom habitat. Five of these six habitat types were identified in the survey: soft substrate/sand; Types A, B, and D; and seagrass. Approximately 6 percent was Type A habitat, 17 percent was Type B habitat, and 10 percent was Type D habitat. **Appendix D** presents detailed maps of the hard-bottom areas in the proposed Port Site and pipeline route Alternative. Organisms that were characteristic to the hard-bottom habitat in the survey are presented in **Table 3.2-5** (Port Dolphin 2007d). Organisms characteristic of soft-bottom habitat are presented in **Table 3.2-5a**. Soft-bottom species were not quantified because survey protocols from both MMS and FDEP required that quantitative photos only be taken of live-bottom areas, not soft-bottom. Many of the organisms observed in the soft-bottom areas are motile species that move along the seafloor.

Table 3.2-4. Habitat Types Identified in the Benthic Survey

Habitat Type		Description
Hard- or Live-Bottom	Type A	20 percent to 100 percent cover by attached epibenthic biota or hard bottom with greater than or equal to 0.25 m (0.8 feet) in relief, inclusive of sand components integral to these habitats. EFH, Habitat Area of Particular Concern
	Type B	5 percent to 20 percent cover by attached epibenthic biota or hard bottom with less than 0.25 m (0.8 feet) in relief, inclusive of sand components integral to these habitats. EFH, Habitat Area of Particular Concern
	Type C	Breakwater spoil area. EFH, Habitat Area of Particular Concern
	Type D	Sand (soft substrate/sedimentary habitat) in proximity to reef/hard-bottom resources, a sandy veneer over hard substrate with less than 5 percent epibenthic coverage. EFH
Soft Substrate/Sand		Soft substrate/sedimentary habitats not associated with hard-bottom ecotones.
Seagrass		Areas that contained turtle grass, manatee grass, and shoal grass, as determined by dive surveys.

Source: Port Dolphin 2007d

Table 3.2-5. Species Characteristic of Hard-bottom Habitat

Scientific Name	Common Name
Cnidaria	
Cladocora arbuscula	Tube coral
Dichocoenia stokesii	Elliptical star coral
Oculina robusta	Robust ivory tree coral
Scolymia cubensis	Artichoke coral
Siderastrea sidereal	Massive starlet coral
Siderastrea radians	Lesser starlet coral
Solenastrea bournoni	Smooth star coral
Solenastrea hyades	Knobby star coral
Stephanocoenia intercepta	Blushing star coral
Pseudopterogorgia sp.	Sea plumes
Pterogorgia sp.	Sea whip
Carijoa riisei	White telesto
Leptogorgia sp.	Sea whip
Caryophylliidae	Unidentified cup corals
Zoanthidae	Unidentified zoanthids
Hydroida	Unidentified hydroids
Porifera	
Axinella sp.	Finger sponge
Cinachyra sp.	Orange ball sponge
Halicondria sp.	Unknown
Callyspongia sp.	Vase sponge
Cliona sp.	Yellow boring sponge
Spirastrella sp.	Encrusting sponge
Geodia sp.	Leathery barrel sponge
Placospongia sp.	Unknown
Pseudaxinella sp.	Unknown
Tethya crypta	None
Speciospongia sp.	Loggerhead sponge
Porifera	Unidentified sponges
Urochordata	
Ascidacea	Unidentified tunicates
Bryozoa	
Bryozoa	Unidentified bryozoans
Algae	
Caulerpa sertuloides	Green algae
Caulerpa sp.	Green algae
Halimeda sp.	Calcified green algae
Codium sp.	Green algae
Valonia sp.	Green algae
Macroalgae	Unidentified algae

Source: Port Dolphin 2007d

Table 3.2-5a. Species Characteristic of Soft-bottom Habitat

Scientific Name	Common Name
Algae	
Caulerpa prolifera	Oval blade alga
Caulerpa sertularoides	Green feather alga
Caulerpa mexicana	Flat green feather alga
Udotea sp.	Green algae
Halimeda sp.	Green algae
Codium sp.	Green algae
Dictyota sp.	Brown algae
Gracilaria sp.	Red algae
Macroalgae	Unidentified algae
Echinodermata	
Lytechinus variegatus	Variegated sea urchin
Astropecten articulatus	Royal sea star
Clypeaster sp.	Sea biscuit
Oreaster reticulates	Cushion sea star
Crustacea	
Callinectes sapidus	Blue crab
Portunidae	Unidentified swimming crab
Calappidae	Unidentified box crab
Mollusca	
Busycon perversum	Lightning whelk
Cassis tuberosa	Helmet conch
Cnidaria	
Pennatulacea	Sea pen
Plexauridae	Unidentified soft coral
Porifera	
Ircinia sp.	Sponge
Cliona sp.	Yellow boring sponge
Fish	
Diplectrum formosum	Sand perch

Survey results indicate that the majority of hard-bottom areas were offshore in water depths of 12 to 15 m (40 to 50 feet) and water depths from 21 to 27 m (70 to 90 feet). The relief ranged from 0 to 2.0 m (0 to 6.5 feet) and was generally oriented northeast to southwest. In depths of 12 to 15 m (40 to 50 feet), communities were dominated by macroalgae (accounting for 34 to 68 percent of benthic cover). Therefore, habitats within this depth range were classified as Type A, although nonalgal coverage composes 0 to 6 percent of the total benthic cover. The Applicant based their habitat characterization in the survey area on structural relief and nonalgal benthic biotic coverage. In deeper waters > 30.5 m (> 100 feet) macroalgal abundance was less pronounced and emergent substrate was uncommon to rare

(Port Dolphin 2007d). Smaller sporadic patches of paddle grass (*Halophila decipiens*) and *Caulerpa* sp. were observed in deeper offshore areas of the proposed Site and pipeline route. These patches account for approximately 0.7 percent of the surveyed offshore portion of the pipeline route (Port Dolphin 2008a). Unavoidable impacts on seagrass would be avoided and minimized to the extent practicable.

The Southern Route Alternative for the pipeline was similar to the proposed Route Alternative. Approximately 37 percent was hard- or live-bottom habitat. The primary difference was that there was less Type B habitat and more Type D habitat in the Southern Route Alternative. Approximately 4 percent was Type A habitat, 5 percent was Type B habitat, and 28 percent was Type D habitat. Survey results in Tampa Bay were similar for both the revised inshore pipeline route (proposed Pipeline route) and the original inshore pipeline route (Pipeline Alternative). Soft substrate/sand was the dominant habitat type within Tampa Bay for both routes. Small areas of sporadic hard bottom were scattered throughout the bay for both routes. Hard-bottom communities included octocorals, sponges, hydroids, bryozoans, and various other invertebrates. Fields of one species of tunicate were observed in Tampa Bay, but not offshore. It is not known whether this species is native or nonnative. Paddle grass and *Caulerpa* sp. accounted for approximately 4.8 percent of the surveyed offshore portion of the Southern Route Alternative (Port Dolphin 2008a).

Artificial substrate in the proposed Site and pipeline route were areas of dredge spoil (colonized primarily by sponges, tunicates, macroalgae, and some octocorals) and an artificial reef created as mitigation for hard- or live-bottom for impacts associated with installation of the Gulfstream Pipeline. These were both classified as Habitat Type A (Port Dolphin 2007b). Artificial substrate, such as mitigation reefs, bridge rubble, miscellaneous debris, and an unidentified "dome" structure (possibly oceanographic equipment), was also observed in the Pipeline Alternative. Bridge rubble was colonized by octocorals, sponges, macroalgae, and other various invertebrates in the Pipeline Alternative (Port Dolphin 2007d).

Approximately 1 percent of the area surveyed for the inshore portion of the Alternative Route (195 acres) was seagrass habitat identified off Port Manatee (Port Dolphin 2007b). This area overlaps soft substrate/sand habitat. The benthic survey confirmed that turtle grass, manatee grass, shoal grass, widgeon grass, and star grass were present along the inshore portion of the Pipeline Alternative in depths less than 2.1 m (7 feet) and concentrated in shallow waters around Manbirdtee Island, south of Port Manatee.

3.2.6 Nonthreatened and Nonendangered Marine Mammals

Introduction

Under the authority of the MMPA of 1972 (16 U.S.C. 1361 et seq.), the Secretary of Commerce is responsible for the protection of all marine mammals except walruses, polar bears, sea otters, manatees, and dugongs, which are the responsibility of the Secretary of the Interior. These responsibilities have been delegated to NMFS and the USFWS, respectively, and include providing overview and advice to regulatory agencies on all Federal actions that might affect these species.

The MMPA prohibits the "take" of marine mammals, with certain exceptions, in waters under U.S. jurisdiction and by U.S. citizens on the high seas. Under Section 3 of the MMPA, "take" is defined as "harass, hunt, capture, kill, or attempt to harass, hunt, capture or kill any marine mammal." "Harassment" is defined as any act of pursuit, torment, or annoyance that has the potential to injure marine mammal stock in the wild; or has the potential to disturb marine mammal stock in the wild by disrupting behavioral patterns, including migration, breathing, nursing, breeding, feeding, or sheltering. In cases where U.S. citizens are engaged in activities, other than fishing, that result in "unavoidable" incidental take of marine mammals, the Secretary of Commerce can issue a "small take authorization." The

authorization can be issued after notice and opportunity for public comment if the Secretary of Commerce finds minor impacts.

Two baleen whales and 20 toothed whales (e.g., dolphins) have documented occurrences in the GOM (Würsig et al. 2000). Of these 22 cetacean species, and based on available survey data, only the bottlenose dolphin, Atlantic spotted dolphin, and rough-toothed dolphin occur on the continental shelf in the eastern GOM (Fulling et al. 2003). Other species of dolphins and an occasional whale are sometimes observed in nearshore GOM waters and might infrequently strand on Gulf and bay beaches, but these are not considered normal occurrences for those deepwater species that occur more regularly in waters around and seaward of the continental shelf break (Mullin and Fulling 2003a, Mullin et al. 2004). The remainder of the document focuses on those marine mammal species with the greatest likelihood of occurrence in the Proposed Action area. **Table 3.2-6** outlines those species documented within the northern GOM.

Table 3.2-6. Nonendangered and Nonthreatened Marine Mammal Species with Documented Occurrence in the Northern GOM

Common Name	Scientific Name	Strategic Stock?
Order Cetacea (whales, dolphins, and porpoises), Suborder Mysticeti (baleen whales)		
Minke whale	*Balaenoptera acutorostrata*	--
Bryde's whale	*Balaenoptera brydei*	--
Order Cetacea, Suborder Odontoceti (toothed whales)		
Pygmy killer whale	*Feresa attenuata*	N
Short-finned pilot whale	*Globicephala macrorhynchus*	N
Risso's dolphin	*Grampus griseus*	N
Pygmy sperm whale	*Kogia breviceps*	N
Dwarf sperm whale	*Kogia sima*	N
Fraser's dolphin	*Lagenodelphis hosei*	N
Sowerby's beaked whale	*Mesoplodon. bidens*	Y
Blainville's beaked whale	*Mesoplodon densirostris*	-Y
Gervais' beaked whale	*Mesoplodon europaeus*	-Y
Killer whale	*Orcinus orca*	N
Melon-headed whale	*Peponocephala electra*	N
False killer whale	*Pseudorca crassidens*	N
Pantropical spotted dolphin	*Stenella attenuata*	N
Clymene dolphin	*Stenella clymene*	N
Striped dolphin	*Stenella coeruleoalba*	N
Atlantic spotted dolphin	*Stenella frontalis*	N
Spinner dolphin	*Stenella longirostris*	N
Rough-toothed dolphin	*Steno bredanensis*	N
Bottlenose dolphin	*Tursiops truncatus*	Y*
Cuvier's beaked whale	*Ziphius cavirostris*	N

Note: *The GOM bay, sound, and estuarine stocks, and each management unit in the northern GOM coastal stock are considered strategic stocks. The northern GOM oceanic stock, and the northern GOM continental shelf stock are not considered strategic stocks.

Marine Mammal Hearing

When considering the influence of various kinds of noise on the marine environment, it is necessary to understand that different kinds of marine life are sensitive to different frequencies of sound. Information on hearing in marine mammals is based on the frequencies of sounds produced, behavioral observations, anatomical evidence, and extrapolations from what is known about other marine mammal hearing. Marine mammal hearing varies among species; however, as a group, marine mammal hearing ranges are generally from 0.01 to 200 kHz. Broad generalizations can be made about groups of marine mammals. For example, most toothed whales (odontocetes) hear well in ultrasonic ranges, with functional hearing from 0.15 kHz to 180 kHz. Some toothed whales are able to hear frequencies as high as 200 kHz (NRC 2003). Southall et al. (2007) delineated three groups of cetaceans based on similarities in their hearing: low-frequency cetaceans (0.007 Hz to 22 kHz), mid-frequency cetaceans (150 Hz to 160 kHz), and high-frequency cetaceans (0.2 kHz to 180 kHz).

Data on the hearing abilities of cetaceans are sparse, particularly for the larger cetaceans such as the baleen whales. The auditory thresholds of some of the smaller odontocetes have been determined in captivity (Ljungblad et al. 1982, Thomas et al. 1988, Houser et al. 2008). It is generally believed that cetaceans should at least be sensitive to the frequencies of their vocalizations. Comparisons of the anatomy of cetacean inner ears and models of the structural properties and the response to vibrations of the ear's components in different species provide an indication of likely sensitivity to various sound frequencies. The ears of small-toothed whales are structurally optimized for receiving high-frequency sound, while baleen whale inner ears are best optimized for low to infrasonic frequencies (Ketten 1992, 1997). As such, baleen whales are considered to be low-frequency cetaceans (Southall et al. 2007).

All of the delphinid species potentially occurring in the Proposed Action area would fall into the category of mid-frequency cetaceans as defined by Southall et al. (2007). Ketten et al. (1992) felt that, based on the ear morphology and studies on other manatee subspecies (Klishin et al. 1990, Popov and Supin 1990) manatees likely hear best in the lower frequencies (1 kHz to 5 kHz) and are not likely to hear above 20 kHz. The only available behavioral audiogram for a sirenian is from the West Indian manatee, where peak sensitivity of hearing was between 16 and 18 kHz with functional hearing limits between 400 Hz and 46 kHz (Gerstein et al. 1999, Gerstein 2002).

See **Section 3.2.4.1** for general information on marine mammal hearing. All of the delphinid species potentially occurring in the Proposed Action area (bottlenose dolphin, Atlantic spotted dolphin, and rough-toothed dolphin) would fall into the category of mid-frequency cetaceans (as defined by Southall et al. 2007).

Bottlenose Dolphin. The bottlenose dolphin is a common inhabitant of both the continental shelf and slope in the GOM, generally in waters less than 20 m (66 feet) (Griffin and Griffin 2003). The species is also distributed throughout the bays, sounds, and estuaries of the GOM (Mullin et al. 1990). As noted by Waring et al. (2008), the identification of biologically meaningful "stocks" of bottlenose dolphins in these waters is complicated by the high degree of behavioral variability exhibited by this species and by the lack of requisite information for much of the region. Distinct stocks are provisionally identified in each of 33 areas of contiguous, enclosed or semi-enclosed bodies of water adjacent to the GOM.

For management purposes, the bottlenose dolphin stocks in the northern GOM coastal waters have been divided into separate stocks: eastern, northern, and western. Waring et al. 2008 then further refines these animals into "communities" (as defined in Wells et al. 1987). The eastern coastal bottlenose dolphin stock area extends from 84°W longitude to Key West, Florida (Waring et al. 2008); this stock, along with animals from the GOM bay, sound, and estuarine stocks, are expected in the Proposed Action area. All of these stocks are designated as strategic stocks because the removal of a small number of animals, not

including natural mortalities, could potentially drop the populations to levels that would decrease their ability to maintain optimum sustainable population levels. In the vicinity of the Proposed Action, there are distinct geographic subdivisions with year-round resident animals from Tampa Bay, Sarasota Bay, and Charlotte Harbor as well as a seasonal coastal stock (1 to 12 km [0.5 to 6.5 NM] offshore) with mixing on a limited basis (Wells et al. 1996, Wells and Scott 2002, Sellas et al. 2005). The Sarasota community's range extends from southern Tampa Bay southward through Sarasota Bay, and into the GOM about 1 km (0.5 NM) offshore. Waring et al. (2008) identified the animals in Tampa Bay as having a best estimate of abundance of 559 individuals and those in Sarasota Bay as having a best abundance estimate of 97 individuals. Tursiops are opportunistic feeders, taking a wide variety of fish, cephalopods, and shrimp (Wells and Scott 1999) and using a wide variety of feeding strategies (Shane 1990). In the GOM, bottlenose dolphins often feed in association with shrimp trawlers (Fertl and Leatherwood 1997). In addition to use of active echolocation to find food, bottlenose dolphins likely detect and orient to fish prey by listening for the sounds they produce—so-called "passive listening" (Barros and Myrberg 1987, Gannon et al. 2005). Nearshore bottlenose dolphins prey predominately on coastal fish and cephalopods, while offshore individuals prey on pelagic cephalopods and a large variety of epi- and mesopelagic fish species (Van Waerebeek et al. 1990, Mead and Potter 1995).

Atlantic Spotted Dolphin. There are two species of spotted dolphin in the Atlantic Ocean, the Atlantic spotted dolphin (*Stenella frontalis*) and the pantropical spotted dolphin (*S. attenuata*). Where they co-occur, Atlantic spotted dolphins are often times hard to distinguish from the pantropical spotted dolphin (Waring et al. 2008, Herzing et al. 2003).

Currently, Atlantic spotted dolphins in U.S. waters are managed as two separate units designated as GOM and western North Atlantic stocks, respectively (Waring et al. 2008). The best abundance estimate for Atlantic spotted dolphins on the OCS in the GOM is 27,393 (Fulling et al. 2003, Waring et al. 2008). Atlantic spotted dolphins in the northern GOM are abundant in continental shelf waters from between 10 and 200 m (33 to 656 feet) to slope waters < 500 m (1,640 feet) (Fulling et al. 2003, Mullin and Fulling 2003a). Griffin and Griffin (2003) reported that on the West Florida shelf they are more common in waters from 20 to 180 m (66 to 591 feet), while Mullin et al. (2004) found that Atlantic spotted dolphins were sighted in waters with a bottom depth typically < 300 m (984 feet). Griffin and Griffin (2004) reported higher abundances of spotted dolphins on the west Florida Shelf between the months of November and May than during the rest of the year.

Atlantic spotted dolphins in the GOM have been seen feeding cooperatively on clupeid fishes and are known to feed in association with shrimp trawlers (Fertl and Würsig 1995, Fertl and Leatherwood 1997, respectively). In the Bahamas, this species has been observed to chase and catch flying fish (MacLeod et al. 2004). The only information on dive depth for this species is based on a satellite-tagged individual from the GOM (Davis et al. 1996). This individual made short, shallow dives (more than 76 percent of the time to depths < 10 m) over the continental shelf, although some dives were as deep as 40 to 60 m (Davis et al. 1996).

Rough-toothed dolphin. The rough-toothed dolphin is typically considered to be an oceanic species, occurring seaward of the shelf break, although this species is known to come into shallower waters. Tagging and sighting data document occurrence of this species in waters over the continental shelf off the Gulf Coast of Florida (Wells et al. 1999, Fulling et al. 2003).

The best estimate of abundance for rough-toothed dolphins is 2,942 individuals (Waring et al. 2008).

Cephalopods and fish, including large fish, such as dorado (*Coryphaena hippurus*), are prey (Miyazaki and Perrin 1994). Stomach content analyses of a group of rough-toothed dolphins that stranded during

May 1961 in the northern GOM revealed that blanket octopus (*Tremoctopus violaceus*) had been taken by some of the animals (Würsig et al. 2000).

3.2.7 Nonthreatened and Nonendangered Coastal and Marine Birds

The waters and adjacent coastal areas of the northern GOM are inhabited by a diverse assemblage of resident and migratory birds (Clapp et al. 1982). There are four groups of coastal and marine birds that inhabit these areas: seabirds, shorebirds, marsh and wading birds, and waterfowl (MMS 2001). Most of the migrant birds overwinter in tropical Central America and South America, breed in eastern North America, and directly cross the GOM (trans-Gulf migration) or move north or south by traversing the GOM coast or the Florida Peninsula (MMS 2002b). Examples of birds occurring in the Tampa Bay region are presented in **Table 3.2-7**, but discussion is limited to those species that might occur within coastal margins and nearshore and offshore waters in the vicinity of Tampa Bay. Federally listed coastal and marine bird species are discussed in **Section 3.2.4.3**.

Three colonies in Tampa Bay: Alafia Bank in Hillsborough Bay at the mouth of the Alafia River, Washburn Sanctuary in Terra Ceia AP, and Tarpon Key in Boca Ciega Bay are among the most diverse colonies in the United States.

The Tampa Bay system is home to 28 species of colonial waterbirds and allies, annually totaling about 30,000 to 45,000 breeding pairs and their young, or nearly 200,000 individuals. As many as half of these species breed in Hillsborough Bay, and Audubon of Florida manages some 15 critically important natural or man-made islands in the Tampa Bay system. Beach-nesting species such as terns, plovers, and black skimmers warrant special attention as their habitat is increasingly limited by coastal development, as do species such as the white ibis (*Eudocimus albus*), which are especially vulnerable to losses of fresh water wetlands that provide food for their young (TBEP 2006).

Many rare or coastal species nesting in Tampa Bay experienced sustained population increases between 1994 and 2001, including reddish egret (*Egretta rufescens*); roseate spoonbill (*Platalea ajaja*); American oystercatcher (*Haematopus palliatus*); and caspian (*Hydroprogne caspia*), royal (*Thalasseus maximus*) and sandwich (*Thalasseus sandvicensis*) terns. El Niño rains created extremely advantageous foraging conditions in 1998, and breeding populations of some species, such as white ibis, almost tripled before returning to pre-1998 conditions in 1999 (TBEP 2006).

3.2.7.1 Seabirds

Seabirds are defined as those species that spend extended periods away from land and obtain all or most of their food from the sea while flying, swimming, or diving. Five taxonomic orders of seabirds (broadly defined as those species that spend a large portion of their lives on or over seawater) are found in both offshore and coastal waters of the GOM. Some species of this group inhabit only pelagic habitats in the GOM (OCS and beyond) (e.g., boobies, petrels, and shearwaters). Most GOM seabird species, however, inhabit waters of the continental shelf, and adjacent coastal and inshore habitats (Clapp et al. 1982).

GOM seabirds are categorized into four broad categories: summer migrant pelagics, summer residents, wintering marine species, or permanent residents (Fritts and Reynolds 1981). Summer migrant pelagic species are those that are present in the GOM during the summer but breed primarily elsewhere. Examples include black terns, boobies, shearwaters, storm petrels, and tropicbirds. Summer residents are those that are present during summer months but also breed in the GOM. Examples include least terns, sandwich terns, and sooty terns. Wintering marine bird species are those that can be found in the GOM only during winter months. Examples of wintering species include herring gulls, ring-billed gulls,

Table 3.2-7. Coastal and Marine Birds Breeding in the Tampa Bay Area

Category	Common Name	Scientific Name	Number of Nesting Pairs*
Seabirds	Black skimmer	*Rhynchops niger*	600 to 700 pairs
	Brown pelican	*Pelicanus occidentalis*	1,000 pairs
	Double-crested cormorant	*Phalacrocorax auritus*	fewer than 400 pairs
	Laughing gull	*Larus atricilla*	10,000 to 15,000 pairs
	Caspian tern	*Sterna caspia*	90 pairs
	Gull-billed tern	*Gelochelidon nilotica*	0 to 10 pairs
	Least tern	*Sterna antillarum*	100 to 150 pairs
	Roseate tern	*Sterna dougalii*	NC
	Royal tern	*Sterna maxima*	3,700 pairs
	Sandwich tern	*Sterna sandvicensis*	750 pairs
Shorebirds	American oystercatcher	*Haematopus palliatus*	minimum of 125 pairs
	Piping plover	*Charadrius melodus*	NC
	Southeastern snowy plover	*Charadrius alexandrinus*	maximum of 3 pairs
	Wilson's plover	*Charadrius wilsonia*	100 pairs
Marsh and Wading Birds	Anhinga	*Anhinga anhinga*	200 to 300 pairs
	Cattle egret	*Bubulcus ibis*	5,000 pairs
	Great egret	*Ardea alba*	500 to 800 pairs
	Reddish egret	*Egretta rufescens*	60 to 75 pairs
	Snowy egret	*Egretta thula*	800 to 1,000 pairs
	Black-crowned night heron	*Nycticorax nycticorax*	200 to 250 pairs
	Great blue heron	*Ardea herodias*	NC
	Green heron	*Butorides virescens*	NC
	Yellow-crowned night heron	*Nyctanassa violacea*	90 to 190 pairs
	Little blue heron	*Egretta caerulea*	300 pairs
	Tricolored heron	*Egretta tricolor*	500 to 700 pairs
	Glossy ibis	*Plegadis falcinellus*	400 to 600 pairs
	White ibis	*Eudocimus albus*	6,000 to 11,000 pairs
	Wood Stork	*Mycteria americana*	40 to 160 pairs
	Roseate spoonbill	*Ajaia ajaja*	110 to 180 pairs
	Wouldet	*Catoptrophorus semipalmatus*	100 pairs

Source: Paul and Paul 2003

Notes:

*Censused annually in the Tampa Bay region from 1994 through 2001.

NC = Not censused

jaegers, and the northern gannet. Ring-billed gulls are common within the Project area. Permanent resident species are found in the GOM year-round. Examples of permanent residents include bridled terns, laughing gulls, magnificent frigate birds, royal terns, and double-crested cormorants. Laughing gulls are common and abundant within the Project area. CBC surveys conducted during 2006 to 2007

recorded densities of approximately 1,760 individuals within the Alafia Bank Bird Sanctuary, 2,300 individuals within the Tampa survey area, and 6,500 individuals within the Bradenton survey area (Audubon Society 2007).

Shorebirds. Shorebirds include members of the Order Charadriiformes, which outside of their migratory cycles are generally restricted to coastline margins. Shorebirds are among the world's greatest migratory animals. Many North American shorebirds seasonally traverse between the high Arctic and South America, and occasionally spill over into Asia and Europe. Certain coastal and adjacent inland wetland habitats of the GOM serve as vital overwintering habitats and temporary "staging" habitats for shorebirds. Staging birds (those migrant species that reside temporarily along the Gulf Coast) forage within coastal habitats in an effort to accumulate energy reserves necessary for the completion of their migratory efforts (MMS 2001). Many shorebird species typically aggregate in large numbers within select GOM coastal habitats. In addition, many of the overwintering shorebird species remain within specific areas throughout the season and return to the same areas each year. These species are susceptible to localized habitat loss or degradation.

From CBC surveys, seasonally common and abundant shorebirds in the Project area include wouldet, black-bellied plover, sanderling, dunlin, short-billed dowitcher, least sandpiper, and killdeer (Audubon Society 2007).

Marsh and Wading Birds. The wetland bird group includes a diverse array of species that typically inhabit most Gulf coast aquatic habitats, ranging from fresh water swamps and waterways to brackish and saltwater wetlands and embayments. Many wetland birds are year-round residents on the GOM coast. Common and abundant wetland bird species within the Project area include white ibis, common moorhen, and American coot (Audubon Society 2007).

Waterfowl. Waterfowl are members of the order Anseriformes that inhabit fresh water and marine aquatic habitats. Many of these birds are migrant species that, primarily during winter months, inhabit coastal waters, beaches, flats, sandbars, and wetland habitats along the GOM (MMS 2001). Seasonally common and abundant waterfowl species within the Project area include mallard, lesser scaup, and northern shoveler (Audubon Society 2007).

Migratory Birds. The GOM is an important pathway for migratory birds, including many coastal and marine species, and large numbers of terrestrial species. Most migrant birds that overwinter in tropical Central and South America and breed in eastern North America either directly cross the GOM or move north or south by traversing the Gulf coast or the Florida peninsula.

3.2.8 Plankton

Plankton are free-floating or weakly swimming organisms that are suspended in the water column. They have such limited powers of locomotion that they passively drift at the mercy of the prevailing water movements. Phytoplankton are the tiny plants and microscopic algae capable of photosynthesizing organic material from water, CO_2, and light (i.e., primary production). Zooplankton are small animals such as the single-celled protozoans and the larval or adult forms of marine invertebrates and other higher animals (Thurman and Weber 1984).

Holoplankton (e.g., copepods) spend their entire life as plankton, while meroplankton spend only a portion of their life cycles as plankton. Meroplankton include both the egg and larval stages of benthic invertebrates and fish (i.e., ichthyoplankton). Hereafter, holoplankton would be referred to as "zooplankton" and meroplankton would be referred to as "planktonic fish and shellfish" or "ichthyoplankton" (when referring to planktonic fish only).

3.2.8.1 Phytoplankton

Phytoplankton form the base of the pelagic marine food web by directly and indirectly supporting communities of zooplankton, nekton (i.e., free swimming organisms), and microbes (i.e., bacteria). Because phytoplankton are photosynthetic, their occurrence is generally limited to the euphotic zone (i.e., depth of light penetration sufficient for primary production) (Thurman and Weber 1984). The phytoplankton of the west Florida shelf consists mainly of diatoms and dinoflagellates. However, blue-green algae and other microscopic bacterioplankton are thought to be 10 to 60 times more productive than phytoplankton (Okey and Mahmoudi 2002).

The dominant diatoms in the oceanic waters of western Florida include species of *Ethmodiscus*, *Gossleriella*, and *Planktoniella*. The dominant dinoflagellates in oceanic waters are species of *Amphisolenia*, *Heterodinium*, and *Pyrocystis*. Species of the blue-green algae, *Oscillatoria* are also common in oceanic waters (Vargo and Hopkins 1990).

The dominant diatom species in western Florida estuaries is *Skeletonema costatum*. Other dominant estuarine diatom species include *Chaetoceros* spp., *Asterionellopsis glacialis*, *Rhizosolenia* spp., and *Bellerochea malleus*. Common dinoflagellate species in estuaries were *Ceratium furca*, C. hircus, *Alexandrium balechii*, *Gynodinium splendens*, and several *Peridinium* and *Procentrum* species. *Gymnodinium breve* is a toxic algae that is dominant during red tide blooms (Vargo and Hopkins 1990).

3.2.8.2 Zooplankton (Holoplankton)

Zooplankton can occur throughout the water column from surface to bottom, and exhibit diurnal migrations throughout various depths. They represent a vital link between the primary producing phytoplankton and larger marine organisms (e.g., invertebrates and fish) in the marine food web, and they support a variety of commercially important finfish and shellfish species (Thurman and Weber 1984). On the western Florida shelf, the highest zooplankton abundance is associated with a salinity gradient in nearshore waters, a vertical density gradient (due to temperature and salinity) (i.e., zooplankton is more abundant in cooler upwelled water than warmer surface water) in offshore waters, and with an increase in particulate matter (Okey and Mahmoudi 2002).

The zooplankton community of the GOM shelf waters is less diverse and more abundant than in deeper oceanic waters. In the shelf waters, zooplankton is dominated by calanoid copepod species such as *Centropages*, *Eucalanus, Labidocera,* and *Paracalanus*. Euphausiids (krill) and chaetognaths are also common. Dominant Euphasiids include species of *Euphausia* and *Stylocheiron,* while the most common chaetognath species is *Saggitta helenae*. Biomass of oceanic zooplankton decreases with depth and varies throughout the day because of diel vertical migrations (Vargo and Hopkins 1990).

In the estuaries of western Florida, meroplankton are more important than in the shelf waters although holoplankton are still present in estuarine waters. The most important copepod species of Tampa Bay are *Acartia tonsa*, *Parvocalanus crassirostris*, *Oithona colcarva,* and *O. nana*. The chaetognaths *Saggitta hispida* and *S. tenuis* are also common (Vargo and Hopkins 1990).

3.2.8.3 Planktonic Fish and Shellfish

Many commercially, recreationally, and ecologically important fish and invertebrate species are planktonic as eggs and larvae (i.e., meroplankton). Fish eggs and larvae are also called ichthyoplankton. The following sections characterize the plankton of the GOM and the proposed Project area that eventually grow to become free-swimming or benthic fish and invertebrate species.

Commercially important shellfish species on the western Florida shelf include pink shrimp (*Panaeus duorarum*), rock shrimp (*Sicyonia brevierostris*), spiny lobster (*Panulirus argus*), stone crab (*Menippe mercernaria*), blue crab (*Callinectes sapidus*), calico scallop (*Argopecten gibbus*), and squid (*Loligo brevis*). Commercially important fish species on the outer western Florida shelf include round scad (*Decapterus punctuatus*), rough scad (*Trachurus lathami*), and striped mullet (*Mugil cephalus*). On the inner shelf commercially important (as bait fish) species include menhaden (*Brevoortia* spp.), Spanish sardine (*Sardinella aurita*), Atlantic thread herring (*Opisthonema oglinum*), and Atlantic bumper (*Chloroscombrus chrysurus*). Examples of species that are not commercially important across the western Florida shelf are two spot flounder (*Bothus robinsi*), gray flounder (*Etropus rintosus*), and sand perch (*Diplectrum formosum*). Commercially unimportant species that occur on the inner shelf are pigfish (*Orthopristis chrysoptera*) and spotted whiff (*Citharchthys macrops*) (Vargo and Hopkins 1990).

Commercially important shellfish species that occur in western Florida estuaries include pink shrimp. However, planktonic shellfish and benthic invertebrate species include cirripedes (barnacles), echinoderms, gastropods, bivalves, and polychaetes. Commercially important species include anchovies (Family Engraulidae), herrings (Family Clupeidae), and drums (Family Sciaenidae). Striped anchovies (*Anchoa hepsetus*) were more abundant in the lower estuary where salinity is higher, while bay anchovies (*A. mitchili*) were abundant in the upper estuaries where salinity is lower. Anchovies are more abundant during summer months. Atlantic thread herring and menhaden spawn offshore and the larvae are carried into the estuaries. Menhaden are more abundant in the winter and Atlantic thread herring are more abundant in the summer. Sand sea trout (*Cynoscion arenarius*) are abundant throughout the year with peaks in March and October. Spotted sea trout (*C. nebulosus*) are abundant in all seasons but winter with a peak in late spring. These two sea trout are recreationally important drums (Family Sciaenidae). Species of gobies (Family Gobiidae), blennies (Family Bleniidae), and silver perch (*Bairdiella chrysoura*) (Family Sciaenidae) are also examples of species that are not commercially important and occur in western Florida estuaries (Vargo and Hopkins 1990).

Distribution in the Project Area. Research indicates that eggs and yolk-sac larvae are only planktonic for a few days after being spawned, although the exact duration depends on the species. The presence of these life stages is an indication of spawning areas and seasonal spawning migrations of adults (Ditty et al. 1988). Water temperature often triggers spawning and is therefore a major influence on the distribution of larval fish (MMS 2002a). Larval densities are lowest during winter and peak during the summer as indicated by **Table 3.2-8**. Most fish species would be in the Project area in the spring, late spring, and early fall. On the Florida continental shelf, many taxa are present earlier and later compared to the northernmost GOM. Examples include scaled sardine (*Harengula jaguana*) and Atlantic thread herring (*Opisthonema oglinum*) (Ditty et al. 1988).

Ichthyoplankton distribution is also influenced by currents that facilitate ichthyoplankton transport. These hydrographic features include tidal transport, duration of the pelagic period, larval behavior (e.g., diel migration), and larval mortality and growth. Two of the most important hydrographic features in the GOM are the Mississippi River discharge plume and the Loop Current. Researchers hypothesize that ichthyoplankton aggregate at the frontal zone of the Mississippi River, and that the discharge plume might indicate that frontal waters provide feeding and growth opportunities for larvae (MMS 2002b). Evidence indicates that eddies that spin off the loop current transport deepwater fish larvae onto the Florida shelf (Houde et al. 1979).

Daily or diel migrations might result from changes in light intensity, nutrients, and density gradients in the water column (Nybakken 1997). Vertical diel migrations of larvae have been documented for red drum (*Sciaenops ocellatus*), as well as for a wide range of other marine taxa (Helfman et al. 1997). Most commonly, larval fish migrate to lower depths during daytime; however, reverse migrations, where larvae

Table 3.2-8. Monthly and Peak Seasonal Occurrence of Larval Fish (< 10-mm standard length) in the North-Central GOM

Family (common name)	Taxa (common name)	Scientific Name	J	F	M	A	M	J	J	A	S	O	N	D
Herring and Menhaden	Gulf menhaden	*Brevoortia patronus*	*	*	X	X	--	--	--	--	X	X	X	*
	Round herring	*Etrumeus teres*	*	*	*	X	X	X					X	X
	Atlantic thread herring	*Opisthonema oglinum*			X	X	*	*	*	*	X	X	X	
Anchovy	Striped	*Anchoa hepsetus*	X	X	*	*	*	*	*	*	*	X	X	X
	Bay	*Anchoa mitchilli*	X	X	*	*	*	*	*	*	*	X	X	X
	Longnose	*Anchoa nasuta*	X	X	*	*	*	*	*	*	*	X	X	X
Sea Bass and Grouper	Sand perch	*Diplectrum formosum*	X	X	X	X	*	*	*	*	X	X	X	X
	Pygmy sea bass	*Serraniculus pumilio*	--	--	--	--	X	*	*	*	*	X	X	--
Jacks, Scads, Pompanos, and relatives	Blue runner	*Caranx crysos*	--	--	X	X	X	*	*	*	X	X	X	--
	Atlantic bumper	*Chloroscombrus chrysurus*	--	--	--	X	X	*	*	*	*	X	--	--
	Round scad	*Decapterus punctatus*	--	--	X	*	*	*	*	*	*	X	X	--
	Rough scad	*Trachurus lathami*	*	*	X	X	X	--	--	--	--	--	X	X
	Dolphin	*Coryphaena hippurus Linnaeus*	--	--	--	--	X	X	X	X	X	X	X	--
Snapper	Red	*Lutjanus campechanus*	--	--	--	X	X	*	*	*	X	X	X	--
	Gray	*Lutjanus griseus*	--	--	--	X	X	*	*	*	X	X	X	--
	Lane	*Lutjanus synagris*	--	--	--	X	X	*	*	*	X	X	X	--
Mojarras	Pigfish	*Orthopristis chrysoptera*	X	X	*	X	X	--	--	--	--	--	--	--
Porgies	Sheepshead	*Archosargus probatocephalus*	X	*	*	*	X	--	--	--	--	--	--	--
	Pinfish	*Lagodon rhomboides*	*	*	X	X	--	--	--	--	--	X	X	*
Drums, Croakers, Sea Trout	Spotted sea trout	*Cynoscion nebulosus*	--	X	X	*	*	*	*	*	X	X	--	--
	Spot	*Leiostomus xanthurus*	*	X	X	X	--	--	--	--	--	X	X	*
	Atlantic croaker	*Micropogon undulates*	*	X	X	X	--	--	--	--	X	*	*	*
	Red drum	*Sciaenops ocellatus*	--	--	--	--	--	--	--	X	*	*	X	--
Spadefish	Atlantic spadefish	*Chaetodipterus faber*	--	--	--	X	X	*	*	*	X	--	--	--
Mackerels, Tunas, Wahoo	Bullet mackerel	*Auxis rochei*	X	X	X	X	*	*	*	*	*	X	X	--
	Little tunny	*Euthynnus alletteratus*	--	--	--	X	*	*	*	*	*	X	X	--
	Skipjack tuna	*Euthynnus pelamis*	--	--	--	X	X	X	X	X	X	X	--	--
	King mackerel	*Scomberomorus cavalla*	--	--	--	--	X	X	X	*	*	X	X	--
	Spanish mackerel	*Scomberomorus maculatus*	--	--	--	X	X	X	X	*	*	X	--	--
	Bluefin tuna	*Thunnus thynnus*	--	--	--	X	X	X	--	--	--	--	--	--
Butterfish	Gulf butterfish	*Peprilus burti*	*	*	*	X	X	X	X	X	X	X	*	*

Source: Ditty et al. 1988

Notes:

X = Seasonality

* = Peak Seasonal Occurrence

migrate towards the surface during the daytime, have also been documented (Schultz et al. 2003, Lyczkowski-Shultz et al. 1991, Jenkins et al. 1998).

In offshore waters, many ichthyoplankton taxa are collected within specific depth contours. Inshore demersal species, such as Atlantic bumper (*Caranx ruber*) (an important forage species), spotted sea trout (*Cynoscion nebulosus*), pigfish (*Orthopristis chrysoptera*), and black drum (*Pogonias cromis*), are found in water depths shallower than 25 m (82 feet). Several clupeids (herrings) (*Brevoortia patronus*, *Opisthonema oglinum*, and *Sardinella aurita*) and serranids (sea basses) (*Centropristis striata*, *Diplectrum formosum*, and *Serraniculus pumilio*) are found at depths less than 50 m (164 feet). Species collected exclusively at depths of 50 to 200 m (164 to 656 feet) were tuna (*Auxis* sp. and *Euthynnus alletteratus*), blue runner (*Caranx crysos*), round herring (*Etrumeus teres*), red barbier (*Hemanthias vivanus*), red snapper (*Lutjanus campechanus*), king mackerel (*Scomberomorus cavalla*), and rough scad (*Trachurus lathami)*. Wide-ranging epipelagic species, collected in water depths exceeding 150 m (492 feet), include skipjack tuna (*Euthynnus pelamis*), sailfish (*Istiophorus platypterus*), and Atlantic swordfish (*Xiphias gladius*). **Table 3.2-9** presents the primary depth distribution of larvae of some abundant fish species in the northern GOM. Species likely to occur in the Project area are the species distributed in water depths of less than 30 m (100 feet) (Ditty et al. 1988).

Abundance in the Project Area. Plankton survey data are used to characterize the abundance of fish eggs and larvae around the proposed Port Dolphin Terminal. South East Area Monitoring and Assessment Program (SEAMAP) data are used to characterize ichthyoplankton abundance. Plankton surveys have been conducted in the GOM as part of SEAMAP since 1982. Plankton is collected using both neuston nets and bongo nets. The neuston net has a 1-by-2-m (3.28-by-6.56-foot) mouth opening and a mesh size of 0.950 mm. This net is fished at a depth of 0.5 m (1.64 feet) along the surface of the water. Neuston net data cannot be expressed in terms of water volume and were not used for this analysis. The bongo net has a 60-cm (23.6-inch) diameter mouth opening and carries 0.333-mm mesh netting. The bongo net is fitted with a flowmeter that allows the volume of water filtered during the tow to be measured. This net is fished from approximately 1 to 5 m (3.28 to 16.4 feet) off the bottom to the water's surface and yields a sample from the water column that is integrated over depth (i.e., an oblique tow).

The center of the proposed location of the Port Dolphin Buoys is approximately 27.41 degrees (°) latitude and -83.20° longitude. Ichthyoplankton abundance was estimated using SEAMAP bongo net samples (oblique tows taken throughout the water column) between the 36.6-m and 91.4-m (120-foot and 300-foot) isobaths within a rectangle around the proposed location with corners positioned as follows (see **Appendix F** for a detailed explanation of the SEAMAP data analysis):

- Northwest corner: 28.225° latitude/-84.015° longitude
- Northeast corner: 28.225° latitude/-82.385° longitude
- Southwest corner: 26.595° latitude/-84.015° longitude
- Southeast corner: 26.595° latitude/-82.385° longitude.

The larvae in the proposed Port Dolphin deepwater Port samples represent 217 taxa (i.e., larvae identified to the lowest taxon possible). These taxa are presented in **Table 4-1 of Appendix G**. The 10 most abundant taxa, in order of decreasing abundance, are gobies (Family Gobiidae), Spanish sardine (*Sardinella aurita*), round scad (*Decapterus punctatus*), Atlantic thread herring (*Opisthonema oglinum*), lizardfish (Family Synodontidae), scorpionfish (Family Scorpaenidae), unidentified fish, cusk eels (Family Ophidiidae), codfish (*Bregmaceros sp.*), and perch (Order Perciformes).

Table 3.2-9. Primary Depth Distribution of Larval Fish (< 10-mm standard length) in the GOM, North of 26°N Latitude

Common Name	Scientific Name	< 25 m (< 82 feet)[a]	< 50 m (< 164 feet)[a]	< 100 m (< 328 feet)[a]	50–200 m (164–656 feet)[a]	> 150 m (> 492 feet)[a]
Sheepshead	*Archosargus probatocephalus*[b]	X				
Atlantic spadefish	*Chaetodipterus faber*	X				
Atlantic bumper	*Chloroscombrus chrysurus*	X				
Sand sea trout	*Cynoscion arenarius*	X				
Spotted sea trout	*C. nebulosus*[b]	X				
Pigfish	*Orthopristis chrysoptera*	X				
Northern harvestfish	*Peprilus paru*	X				
Black drum	*Pogonias cromis*[b]	X				
Anchovies	*Anchoa* spp.	X	X			
Gulf menhaden	*Brevoortia patronus*[b]	X	X			
Black sea bass	*Centropristis striata*	X	X			
Sand perch	*Diplectrum formosum*	X	X			
Scaled herring	*Harengula jaguana*	X	X			
Pinfish	*Lagodon rhomboides*[b]	X	X			
Spot	*Leiostomus xanthurus*[b]	X	X			
Atlantic croaker	*Micropogonias undulatus*[b]	X	X			
Atlantic thread herring	*Opisthonema oglinum*	X	X			
Round sardine	*Sardinella aurita*	X	X			
Spanish mackerel	*Scomberomorus maculates*	X	X			
Pygmy sea bass	*Serraniculus pumilio*	X	X			
Round scad	*Decapterus punctatus*	X	X	X		
Gulf butterfish	*Peprilus burti*	X	X	X		
Mackerel	*Auxis spp.*				X	
Blue runner	*Caranx crysos*				X	
Round herring	*Etrumeus teres*				X	
Little tunny	*Euthynnus alletteratus*				X	
Red barbier	*Hemanthias vivanus*				X	
Red snapper	*Lutjanus campechanus*				X	
King mackerel	*Scomberomorus cavalla*				X	
Rough scad	*Trachurus lathami*				X	
Skipjack tuna	*Euthynnus pelamis*					X
Sailfish	*Istiophorus* spp.					X
Swordfish	*Xiphias gladius*					X

Source: MMS 2002b

Notes:

a. Depth ranges are those at which more than 75 percent of larvae were collected.

b. Estuarine-dependent species.

X = Seasonality

As presented in **Table 3.2-10**, samples from the Port Dolphin study area indicate that, on average, 3,398 eggs and 12,084 larvae occur per 1 million gallons of seawater. Between 1982 and 1999, 143 sampling trips occurred in the study area. Eggs and larvae were collected on all 143 sampling trips, which occurred during the months of May to November. There were no trips reported with egg samples in 1995. There were no trips with larval samples in 2000. A summary of the sampling trips that caught eggs and larvae is presented in **Appendix G** (see **Table 3.1 in Appendix G**).

Table 3.2-10. Estimate of Egg and Larval Abundance at the Proposed Site for Port Dolphin, Based on SEAMAP Data

Life Stage	Number of Samples	Number of Eggs or Larvae/Million Gallons of Seawater	
		Mean	Standard Error
Eggs	143	3,398	486
Larvae	143	12,084	1,028

Estimates of abundance indicate that the density of larvae is higher than the density of eggs, which is not expected, as fecundity and survival rates of eggs result in fewer numbers of larvae. Limitations of the sampling method, including sampling frequency, could contribute to this. The distribution of fish eggs and larvae depends on spawning behavior of adults, hydrographic structure and transport on a variety of scales (e.g., tidal and current transport and diel migrations), and duration of the egg stage (e.g., for many GOM species only 1 or 2 days). These factors can result in the patchy distribution of eggs and account for a lower egg density than larval density.

Data Limitations and Adjustments. While the estimates of ichthyoplankton abundance are based on the best available data, estimates of population size, distribution, and density are subject to measurement errors and limitations. Measurement errors can result from the inherent patchiness of plankton distribution, too few samples, limitations (bias) of the sampling methods, inconsistent sampling techniques, and different sampling gear. Limitations of the sampling method and sampling gear include a lack of data on the vertical distribution of ichthyoplankton; a lack of data throughout the year and seasons; and sampling gear mesh size that can underestimate smaller eggs, larvae, and zooplankton. Measurement errors can mean that estimates do not accurately reflect the true population size and distribution and are too high or too low. Several attempts were made to account for these sources of uncertainty and variability in the estimates of abundance.

Bongo nets were used to sample plankton data for the SEAMAP survey. The SEAMAP bongo nets have a mesh size of 0.333 mm (0.013 inches). This mesh size could potentially undersample fish eggs and larvae by allowing the smallest larvae to escape the net. For example, a comparison of ichthyoplankton samples taken with 0.333- and 0.202-mm (0.0008-inch) mesh nets indicate the smallest red drum larvae sampled were 5 to 8 times more numerous when collected with the finer mesh net. These results are expected to be applicable to larvae of other species (Lyczkowski-Shultz 2003). To account for this underestimation, the mean, upper, and lower abundances estimated from the SEAMAP and LOOP data are multiplied by 3, resulting in adjusted estimates (Wolff and Wormuth 1984). Oblique tows (i.e., from the bottom to the top of the water column) that are used in the SEAMAP survey provide an estimate of ichthyoplankton that occur throughout the water column. However, oblique tows do not give an indication as to whether densities of ichthyoplankton are stratified or different throughout the water column. Stratified tows would provide information on where an organism is located in the water column (Helfman et al. 1997). It is documented that ichthyoplankton are stratified in deeper waters. However,

sources are unclear as to whether ichtyoplankton are well-mixed in the shallower waters, as in the Project area.

One study indicates that certain species of larvae are found in different locations within the water column (Ditty 1986). The study area was at a water depth of 10 to 12 m (33 to 40 feet). The study made general conclusions about the distribution of larvae species throughout the water column. Most anchovy (Engraulidae) larvae were collected at mid-depth, with some (11 percent) collected at the bottom. From the family Sciaenidae, most Atlantic croaker (*Micropogonias undulatus*) larvae were collected at mid-depth and sand sea trout (*Cynoscion arenarius*) were collected near the bottom. From the family Clupeidae, scaled sardines (*Harengula jaguana*) were collected near the surface, menhaden (*Brevoortia* spp.) were collected at all depths, and Atlantic thread herring (*Opisthonema oglinum*) were collected at mid-depth. From the family Carangidae, Atlantic bumper (*Chloroscombrus chrysurus*) were most abundant near mid-depth. From the family Scombridae, Spanish mackerel (*Scomberomorus maculatus*) were collected at mid-depth (Ditty 1986).

Despite its limitations, the data and methodology used represent the best available data. The sampling period of 17 years captures annual variability that cannot be captured in 1 or 2 years of sampling at the proposed Project site. Additionally, the methodology was developed in conjunction with NMFS Gulf Landing LLC Deepwater Port Application EIS (USCG and MARAD 2004, USCG 2005).

3.2.9 Fish and Fisheries Resources

The northern GOM has traditionally been one of the most productive fishery areas in North America (Gunter 1967). The GOM's marine habitats, ranging from coastal marshes to the deep-sea abyssal plain, support a varied and abundant fish fauna. Coastal pelagic and demersal fish assemblages are recognized within broad habitat classes for the continental shelf and oceanic waters of the GOM. Many species within these two groups are also estuarine dependent, meaning they spend at least some part of their life cycle in estuaries. Other fish can be found in the lower reaches of an estuary, but do not depend on them to complete their life cycle. These are commonly referred to as nondependent marine fish (Moyle and Cech 1996).

Three fish assemblages occur on the western Florida shelf, off the coast of Tampa Bay, offshore, inshore, and northern inshore assemblages. The offshore assemblage is composed of reef fish including porgies (Family Sparidae), grunts (Family Haemulidae), sea basses (Family Serranidae), and snappers (Family Lutjanidae); and coastal pelagic species such as round scad (*Decapturus punctatus*) and round sardine (*Sardinella aurita*). The inshore assemblage is primarily composed of small coastal pelagics including round sardine, Atlantic thread herring (*Opisthonema oglinum*), scaled herring (*Harengula jaguana*), and Atlantic bumper (*Chloroscombrus chrysurus*). The northern inshore assemblage was mostly composed of forage fish such as pinfish (*Lagodon rhomboides*), mojarras (*Eucinostomus* spp.), grass porgies (*Calamus arctifrons*), and spottail pinfish (*Diplodus holbrooki*) (Alevizon and Bannerot 1990). The offshore and inshore assemblages include fish that are both commercially and recreationally important. The inshore and northern inshore assemblages are ecologically important as forage or prey species.

Coastal Pelagic Fish. Coastal pelagic fish inhabit the continental shelf waters of the GOM throughout the year. The major coastal pelagic fish in the GOM include requiem sharks, ladyfish, anchovies, herrings, mackerels and tunas, jacks, mullet, bluefish, and cobia. Some species form large schools (e.g., Spanish mackerel), while others travel independently or in smaller groups (e.g., cobia). Gulf menhaden and bay anchovies are examples of coastal pelagic fish that are estuarine-dependent. Coastal pelagic fish that can be found in the lower reaches of an estuary, but do not depend on them to complete their life cycle, include Spanish mackerel, cobia, dolphin, and bluefish.

Coastal pelagic fish can be divided into two ecological groups: predators and planktivores. The predators include species such as king and Spanish mackerels, bluefish, cobia, dolphin, jacks, and little tunny. These species typically undergo migrations, grow rapidly, mature early, and exhibit high fecundity. Some large predator species (particularly bluefish, Spanish mackerel, and blue runner) might be attracted to large concentrations of anchovies, herrings, and silversides that congregate in nearshore areas. The planktivores have similar life history characteristics, but the species are smaller in body size. This group includes Gulf menhaden, Atlantic thread herring, Spanish sardine, round scad, and anchovies (MMS 1999, MMS 2002a).

Demersal Fish. Bottom-oriented or demersal fish and other demersal fauna of the GOM are characterized by substrate composition and water depth (Gallaway 1981). Demersal fish species would be expected to inhabit hard-bottom habitats, soft sediments, and seagrass beds. Dominant fish species identified in historical surveys on the western Florida shelf include left eye flounders (Family Bothidae), grunts (Family Haemulidae), eagle rays (Family Myliobatidae), drums (Family Sciaenidae), sea basses (Family Serranidae), and porgies (Family Sparidae) (Alevizon and Bannerot 1990). Demersal fish that are considered estuarine-dependent include red drum, gag grouper, gray snapper, and lane snapper. Red snapper is an example of a demersal fish that can be found in the lower reaches of an estuary, but does not depend on them to complete their life cycle.

Hearing Capabilities. Hearing sensitivity is known for approximately 100 of the 250,000 extant species of fish (NRC 2003). The hearing sensitivity of fish ranges from 0.5 to 200 kHz; however, most fish detect sound within 0.5 to 1 kHz (NRC 2003). It has been reported that clupeid fish, such as Gulf menhaden (*Clupea harengus*) and American shad (*Alosa sapidissima*), respond to frequencies as high as 180 kHz, with thresholds for American shad around 155 dB sound pressure level (SPL) and for Gulf menhaden around 180 dB SPL (Mann et al. 2001). These species can also hear within lower frequencies (below 10 kHz), with thresholds being around 120 to 130 dB SPL. Some known hearing sensitivities for fish are presented in **Table 3.2-11**.

3.2.9.1 Federally Managed Fish and Shellfish Species

Commercial and recreational fisheries resources in Federal waters of the GOM are managed by the GMFMC and NMFS. The GMFMC is one of eight regional FMCs established by the MSA. FMPs developed by the GMFMC include the following:

- Shrimp Fishery of the GOM, U.S. waters
- Red Drum Fishery of the GOM
- Reef Fish of the GOM
- Coastal Migratory Pelagic Resources (Mackerels) in the GOM
- Stone Crab Fishery of the GOM and South Atlantic
- Spiny Lobster in the GOM and South Atlantic
- Coral and Coral Reefs of the GOM.

Secretarial FMPs have been developed by NMFS for highly migratory species and include Amendment 1 to the Atlantic Billfish FMP; Final FMP for Atlantic Tuna, Swordfish, and Sharks; and the Final Consolidated Atlantic Highly Migratory Species FMP (NMFS 1999a, NMFS 2006a, NMFS 1999b).

Table 3.2-11. Reported Hearing Sensitivities of Marine Fish

Order	Description of Order	Common Name	Scientific Name	Hearing Range (kHz)
Perciformes *	Tunas (Scombridae)	Yellowfin	*Thunnus albacores*	0.05–1.1 (best hearing from 0.3–0.5)
		Kawakawa	*Euthynnus affini*	0.05–1.1 not as sensitive as *Thunnus albacares*
	Damselfish (Pomacentridae)	Various species	*Eupomacentrus* spp.	0.1–1.2 (best hearing from 0.3–0.6)
		Goby	*Gobius niger*	0.1–0.16
		Perch	*Perca fluviatilis*	0.1–0.16
		Pike perch	*Lucioperca Sandra*	0.1–0.16
	Serranidae (Sea basses)	Red hind	*Epinephalus guttatus*	0.1–1 (best hearing from 0.2–0.4)
	Snappers	Schoolmaster	*Lutjanus apodus*	0.1–1 (best hearing from 0.2–0.6)
	Drums and croakers (Sciaenidae)	Chubbyu	*Equetus acuminatus*	0.1–2 (best hearing from 0.2–1)
	Grunts (Haemulidae)	Blue-striped grunt	*Haemulon sciurus*	0.75–1.0 (best hearing from 0.75–0.8)
	Wrasses (Labridae)	Blue-head wrasse	*Thalossoma birasciatum*	0.1–1.2 (best hearing from 0.2–0.4)
		Tautog	*Tautoga onitis*	0.1–0.16
Batrachoidformes	Toadfish	Oyster toadfish	*Opsanuss tau*	0.1–0.16
Scorpaeniformes	Searobins	Slender searobin	*Prionotus scitulus*	0.1–0.6 (best hearing from 0.3–0.4)
Pleuronectiformes	Flounders, sole, halibut	Plaice	*Pleuronectes platessa*	0.03–0.2
		Dab	*Limanda limanda*	0.1–0.2
Anguilliformes	Eels	American eel	*Anguilla anguilla*	up to 0.3
Abuleiformes	Bonefish	Bonefish	*Abula vulpes*	0.05–0.7
Salmoniformes	Salmon, trout, char	Atlantic salmon	*Salmo salar*	0.03–0.4

Order	Description of Order	Common Name	Scientific Name	Hearing Range (kHz)
Gadiformes	Cods, hakes, haddock, pollock	Atlantic cod	*Gadus morhua*	0.01–0.5
		Haddock	*Melanogrammus aegelfinus*	0.03–0.47
		Pollock	*Pollachius pollachius*	0.03–0.47
		Ling	*Molva molva*	0.04–0.55
Siluriformes	Fresh water catfish	Fresh water catfish	*Ictalurus nebulosus*	0.05–3+
Cypriniformes	Minnows, suckers, carp	Goldfish	*Carassius auratus*	
		Chub	*Semotilus atromaculatus*	
		Japanese carp	*Cyprinus carpio*	
Beryciformes	Squirrelfish		*Myripristis kuntee*	0.1–3 (best hearing from 0.3–2)
			Holocentrus ascencionis	0.3–2
			Holocentris vexillaris	0.1–1.2
			Adioryx xantherythrus	≤ 1
Clupeiformes	Herrings, shads, sardines, and anchovies	American shad	*Alosa sapidissima*	10–180+
		Blueback herring	*Alosa aestivalis*	200+
		Herring	*Clupea harengus*	0.03–4 (best hearing from 0.3–1)
		Gulf menhaden	*Brevoortia patronus*	10–180+
		Sardines and anchovies	*Harengula* sp., *Anchoa* sp., *Sardinella* sp.	< 4
Acipenseriformes	Sturgeon	Lake sturgeon	*Acipenser fulvescens*	0.1–2 (best hearing at 0.1– 0.4)
Heterodontiformes	Bullhead sharks	Horn shark	*Heterdontus francisci*	0.02–0.16
Carcharhiniformes	Ground sharks	Bull shark	*Carcharhinu leucas*	0.4–0.6

Sources: NPS 2003, NRC 2003, Mann et al. 2001, Plachta and Popper 2003, Tavolga et al. 1981, Mann et al. 1998, Meyer and Popper 2002

Note: * Perciformes is such a diverse group of fish that they are broken down by taxonomic family.

3.2.9.2 Essential Fish Habitat

EFH has been designated for shrimp, red drum, reef fish, coastal migratory pelagic species, stone crabs, spiny lobster, and coral in the GOM by the GMFMC in the *Generic Amendment Number 3 for Addressing Essential Fish Habitat Requirements, Habitat Areas of Particular Concern, and Adverse Effects of*

Fishing (GMFMC 2005). EFH consists of the following waters and substrate areas in the GOM (GMFMC 2005):

- Red Drum FMP: All estuaries; Vermilion Bay, Louisiana, to the eastern edge of Mobile Bay, Alabama, out to depths of 25 fathoms; Crystal River, Florida, to Naples, Florida, between depths of 5 and 10 fathoms; and Cape Sable, Florida, to the boundary between the areas covered by the GMFMC and the South Atlantic Fishery Management Council (SAFMC) between depths of 5 and 10 fathoms (GMFMC 2005). Early life history stages of red drum are pelagic, while juvenile and adult red drum are found over a variety of salinities including habitats such as seagrass, sand, mud, and oyster reefs (GMFMC 2004).
- Reef Fish and Coastal Migratory Pelagic Species FMPs: All estuaries; the U.S./Mexico international border to the boundary between the areas covered by the GMFMC and the SAFMC from estuarine waters out to depths of 100 fathoms (GMFMC 2005). Early life history stages of most reef fish are considered pelagic, while juvenile and adult life stages are considered demersal and associated with structure. All life history stages of most coastal migratory pelagic species would be considered pelagic (GMFMC 2004).
- Shrimp FMP: All estuaries; the U.S./Mexico international border to Fort Walton Beach, Florida, from estuarine waters out to depths of 100 fathoms; Grand Isle, Louisiana, to Pensacola Bay, Florida, between depths of 100 and 325 fathoms; Pensacola Bay, Florida, to the boundary between the areas covered by the GMFMC and the SAFMC out to depths of 35 fathoms, with the exception of waters extending from Crystal River, Florida, to Naples, Florida, between depths of 10 and 25 fathoms and in Florida Bay between depths of 5 and 10 fathoms (GMFMC 2005). The egg, juvenile, and adult life history stages of shrimp are considered demersal, while the larval stages are considered pelagic (GMFMC 2004).
- Stone Crab FMP: All estuaries; the U.S./Mexico international border to Sanibel, Florida, from estuarine waters out to depths of 10 fathoms; and from Sanibel, Florida, to the boundary between the areas covered by the GMFMC and the SAFMC from estuarine waters out to depths of 15 fathoms (GMFMC 2005). Stone crab eggs are carried under the female's abdomen. Stone crab larvae are pelagic, while juvenile and adult stone crabs are benthic. Juvenile stone crabs are associated with shell bottom, sponges, sargassum mats, channels, and deep flats. Adult stone crabs are associated with burrows, rock ledges, coral heads, dead shells, and seagrass patches (GMFMC 2004).
- Spiny Lobster FMP: From Tarpon Springs, Florida, to Naples, Florida, between depths of 5 and 10 fathoms; and Cape Sable, Florida, to the boundary between the areas covered by the GMFMC and the SAFMC out to depths of 15 fathoms (GMFMC 2005). Spiny lobster larvae are pelagic and require optimal temperature and salinity and low levels of suspended sediments and pollutants. The principal habitat used by juvenile and adult spiny lobster is offshore coral reefs. Spiny lobsters spawn in offshore waters in the deeper reef fringes (GMFMC 2004).
- Coral FMP: The total distribution of coral species and life stages throughout the GOM including coral reefs in the North and South Tortugas Ecological Reserves, East and West Flower Garden Banks, McGrail Bank, and the southern portion of Pulley Ridge; hard-bottom areas scattered along the pinnacles and banks from Texas to Mississippi, at the shelf edge and at the Florida Middle Grounds, the southwestern tip of the Florida reef tract, and predominant patchy hard bottom offshore of Florida from approximately Crystal River south to the Florida Keys (GMFMC 2005). Corals are broadcast spawners and larval corals are pelagic. Corals occupy limestone outcroppings on the western shelf of Florida (GMFMC 2004).

EFH occurs in the proposed Project area for all of the species managed by the GMFMC. EFH for reef fish, coastal migratory pelagic species, and corals occurs in the area of the proposed buoy array. EFH for red drum, reef fish, coastal migratory pelagic species, shrimp, stone crabs, and spiny lobster occurs along the pipeline route. No Habitat Areas of Particular Concern occur in the proposed Project area (GMFMC 2005).

EFH for highly migratory species is described the *Final Consolidated Atlantic Highly Migratory Species Fishery Management Plan* (NMFS 2006a). EFH occurs in the area of the proposed buoy array and along the pipeline route for larval bluefin tuna, adult great hammerhead, juvenile and adult nurse sharks, blacktip shark (all life stages), bull shark (all life stages), juvenile and adult lemon sharks, sandbar sharks (all life stages), neonate spinner sharks, juvenile tiger sharks, juvenile bonnethead sharks, and blacknose sharks (all life stages) (NMFS 2006a). Larval bluefin tuna are pelagic. Adult great hammerheads are found in open ocean and shallow coastal waters. Juvenile and adult nurse sharks, sandbar sharks, neonate spinner sharks, juvenile tiger sharks, blacktip sharks, and blacknose sharks inhabit shallow coastal waters. Lemon sharks, bull sharks, and juvenile bonnethead sharks inhabit shallow coastal waters, inlets, and estuaries (NMFS 2006a).

Appendix G contains detailed descriptions of EFH, including predator prey relationships, for species that have EFH designated within the Project area.

3.2.10 Terrestrial Resources

The onshore proposed pipeline project site begins at the pier bulkhead at Port Manatee and terminates at the Gulfstream/TECO interconnection station. The description of existing conditions is based on surveys conducted specifically for this Project.

3.2.10.1 Wetlands

Wetlands play a critical role in the global water, nitrogen, and sulfur cycles. Wetlands are integral in the development of organisms that form the base of the food web and feed many species. They provide habitat for species of fish, amphibians, shellfish, and insects that rely on wetlands for food, water, and shelter, especially during migration and breeding. Furthermore, wetlands provide valuable ecosystem functions such as water filtration and storage.

For regulatory purposes under the CWA, the term wetlands means “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas” (40 CFR 230.3[t]). Wetlands are characterized by plants (hydrophytes), soils (hydric soils), and frequency of flooding. The FERC also defines wetlands as any area that is not actively cultivated or rotated cropland and that satisfies the requirements on the current methodology for identifying and delineating wetlands.

The wetlands observed on the site can be primarily categorized into four classifications: (1) open water, (2) scrub-shrub, (3) emergent, and (4) forested. These classifications include both palustrine (fresh water) and estuarine (saltwater) sites (Cowardin et al. 1979). Many of the wetland sites could not be identified by a single plant community classification; therefore, a combination of appropriate classifications was applied, with the dominant site characteristics listed first. The remaining classifications listed are sites with open water, river, or other deepwater habitats identified as the primary site characteristic (Port Dolphin 2007b). Photographs of the wetlands crossed by the pipeline appear in **Appendix E** (see **Section 7 of Appendix E**).

Estuarine Open Water/Scrub-Shrub. Estuarine open water includes coastal canals that have little vegetation and the surface water supports estuarine fish and wildlife species. Estuarine scrub-shrub wetlands are coastal marshes periodically flooded by tidal waters. The tidal flushing is an important characteristic providing the wetland with mixing of soils, seed banks, and nutrients. The estuarine open-water habitat includes the tidal canal in Port Manatee. This canal contains a few small red mangroves (*Rhizophora mangle*) along the banks. Due to the presence of two different habitats, this wetland is listed as a combination of both open-water and scrub-shrub classification.

Palustrine Forested. Palustrine forested habitats are characterized by sites containing woody vegetation at least 6 m (20 feet) tall. All water regimes are included except subtidal. Due to the presence of Brazilian pepper (*Schinus terebinthifolius*) trees throughout the majority of wetland sites, no wetland was classified as only forested (Port Dolphin 2007b).

Palustrine Scrub-Shrub. Scrub-shrub wetlands are dominated by woody vegetative species. Scrub-shrub wetlands are similar to forested wetlands in species composition; however, they have a reduced forested component or immature tree species, leading to vegetation less than 6 m (20 feet) in height.

Palustrine Emergent. Emergent wetlands are dominated by herbaceous vegetation exhibiting stems that are erect, rooted, and soft. Emergent wetlands can show a diverse variety of nonwoody species including grasses, sedges, or other emergent hydrophytes. Periodic nontidal flooding can occur, leaving wetland soils saturated or inundated.

The number of wetlands along the proposed pipeline initially identified in the Draft EIS route has been reduced from 11 to 9 due to development in the area, unrelated to this Project, and a refined definition of jurisdictional wetlands. It is important to note that Wetland W-5 was recently disturbed and filled (as of May 13, 2008). No portion of this wetland remains in the Project area. Additionally, the FPL borrow pond was originally delineated as Wetland W-4, but according to both the State and Federal rules, a borrow pond constructed in upland habitat is not jurisdictional. The borrow pond is considered to be a waterbody and would be crossed as such according to the FERC Procedures. Therefore, both Wetlands W-4 and W-5 are no longer included in the identified wetlands along the pipeline route. For clarity, the complete discussion of the existing environment is included below.

NWI and Florida Land Use, Cover, and Classification System (FLUCCS) maps were reviewed to determine the potential presence of wetland habitats within the pipeline Project area. NWI or FLUCCS maps indicated that nine wetlands were present along the corridor Field surveys were conducted to verify NWI and FLUCCS classifications. Wetlands were reclassified, as appropriate, based on current condition determined during the field survey. Wetlands were classified in accordance with the Wetlands and Deepwater Habitat Classification System provided by NWI and FLUCCS code.

Wetlands surveys were conducted over most of the onshore proposed Port Dolphin Project area. Certain parcels were not delineated due to denial of ROW access; these areas were assessed via aerial interpretation and ground-truthing conducted from the adjacent FPL ROW areas. Field surveys were conducted along the proposed pipeline route to identify and delineate State and Federal jurisdictional wetlands. The basis for wetlands delineations was obtained from the 1987 USACE Wetland Delineation Manual and Florida State Rule 62-340, F.A.C.

3.2.10.2 Vegetation

Plant communities found along the proposed onshore route are dominated by disturbed and ruderal sites; however, a variety of habitat types would be traversed. The proposed pipeline route would be located parallel to and cross large sections of existing ROWs, roadways, excavated sites, and drainage canals.

Due to previous disturbances, nuisance and exotic species have spread into these areas. Brazilian pepper, specifically, has become the dominant species throughout the majority of the sites, including wetlands, within the proposed pipeline route (Port Dolphin 2007b).

Other nonwetland sites along the proposed pipeline corridor include industrial sites, such as Port Manatee, railroad and transportation ROWs, agricultural fields, maintained grass fields, and previous mining land. Many of these sites have reduced or no vegetation due to the respective land uses or maintenance activities (Port Dolphin 2007b).

Small areas of upland forest exist on either side of U.S. Highway 41. The area immediately west of U.S. Highway 41 contains temperate hardwood components including live oak (*Quercus virginiana*), Southern red cedar (*Juniperus virginiana*), hackberry (*Celtis occidentalis*), and cabbage palm (*Sabal palmetto*). The area immediately east of U.S. Highway 41 is composed primarily of Australian pine (*Casuarina equisetifolia*) (Port Dolphin 2007b).

The wetlands sites have the greatest abundance of vegetation along the proposed pipeline route. A number of wetland types would be traversed including exotic wetland hardwood, wetland scrub, vegetated nonforested wetlands, and fresh water marsh wetlands. Many of these wetland sites have been subjected to disturbances from adjacent conditions and an influx of nuisance/nonnative species (Port Dolphin 2007b).

Nonnative wetland hardwoods and mixed wetland forests are present along the pipeline route (Wetlands 2 and 3). The interior portions of these habitats contain thick tangles of Brazilian pepper, while the outer edges contain a mixture of forested and herbaceous species. Forested species include red maple (*Acer rubrum*), cabbage palms, swamp tupelo (*Nyssa sylvatica*), and live oak. Ground cover and herbaceous species include leather fern (*Acrostichum danaeifolium*), Virginia chain fern (*Woodwardia virginica*), saw palmetto (*Serena repens*), switch grass (*Panicum virgatum*), elephant grass (*Pennisetum purpureum*), beggar tick (*Bidens alba*), frog fruit (*Phyla nodiflora*), and saltmarsh aster (*Aster subulatus*) (Port Dolphin 2007b).

The vegetated nonforested wetlands and fresh water marshes are located on the eastern portion of the pipeline. True forested components are absent in these wetlands. Wetland 6 is a man-made ditch most likely created for the adjacent agricultural fields. This ditch is dominated by blue maidencane (*Amphicarpum muhlenbergianum*) and leads into a Brazilian pepper forest (Port Dolphin 2007b).

The middle section of Wetland 8 contains a fresh water scrub-shrub habitat dominated by nonnative species that includes primrose willow (*Ludwigia peruviana*). Wetland 9 contains a fresh water component within and adjacent to the extractive land use area. This area was heavily disturbed due to past sand mining activities. This disturbance has caused an influx of cattail (*Typha* sp.) along the reservoir banks. Other species found in these wetland habitats include primrose willow, flat sedge (*Cyperus* spp.), beggar tick, bushy bluestem (*Andropogon glomeratus*), saltbush (*Baccharis hamilifolia*), Brazilian pepper, Caesar weed (*Urena lobata*), dog fennel (*Eupatorium capillifolium*), foxtail (*Setaria geniculata*), Carolina willow (*Salix caroliniana*), frog fruit, maidencane (*Panicum hemitomon*), soft rush (*Juncus effusus*), rosey camphorweed (*Pluchea rosea*), and Bermuda grass (*Cynodon dactylon*) (Port Dolphin 2007b).

A mangrove swamp is adjacent to the proposed route in Port Manatee. Mangroves do exist adjacent to the pipeline route, on the southern bank of the tidally influenced canal (south conveyance ditch) within Port Manatee. Red, black (*Avicennia germinans*), and white (*Laguncularia racemosa*) mangroves are found within the site. The banks of the canal also contain grass and herbaceous species such as saltgrass

(*Distichlis spicata*), samphire (*Blutaparon vermicluane*), golden rod (*Solidago* sp.), cattail, saltbush, and frog-fruit (Port Dolphin 2007b).

Table 3.2-12 provides a list of vegetation species observed along the proposed onshore route.

3.2.10.3 Wildlife

Potential fishery resources in the terrestrial portion of the Project include a brackish tidally influenced canal adjacent to the mangroves, a small creek (Curiosity Creek), drainage ditches, multiple open water reservoirs, and seasonally flooded wetland sites. The brackish tidally influenced canal is located in Port Manatee (southern conveyance ditch). The canal is a shallow, man-made canal that connects to Tampa Bay to the west and culverted drainage ditches to the east. In the western section of the canal, little vegetation is present. However, the canal parallels a mangrove swamp and further east contains small mangrove trees along the banks. The eastern section of the canal appears to have a lower salinity, and fresh water wetland species such as cattails are present along the banks. This canal can support juvenile estuarine fish species such as those in the Snapper-Grouper complex that can tolerate lower salinities. Fish in the Snapper-Grouper complex are known to be important commercial and recreational fish species (Myers and Ewel 1990).

Many drainage ditches along the proposed pipeline route had standing water at the time of the field investigation; however, no aquatic life was observed. There is, however, the potential for the presence of mosquitofish (*Gambusia affinis*). The reservoirs present along the pipeline route are previously excavated sites and fish were observed during the field investigation (Port Dolphin 2007b).

The tidally influenced canal (south conveyance ditch) contained the largest volume of water. A variety of fish species and invertebrates were observed within the canal. The canal has the potential to sustain fishery resources due to the connectivity to the GOM and close proximity to the mangrove wetlands (Port Dolphin 2007b).

The areas of potentially greater wildlife utilization are the wetland sites. The adjacent mangrove wetland provides habitat for wading birds, fish, invertebrates, amphibians, and reptiles. The emergent wetlands provide foraging opportunities for small mammals and wading birds, while the open water areas provide habitat for invertebrates, reptiles, and amphibians. The storm water ditches and open water sites provide habitat that would most likely be utilized by a variety of aquatic animals and bird species. The forested sites also provide foraging opportunities for larger mammals, birds, and reptiles. Wildlife can also utilize these sites for shelter, roosting, and nesting in the canopy and subcanopy stratums (Myers and Ewel 1990).

Most of the remainder of the proposed pipeline corridor consists of disturbed lands. The proposed pipeline corridor traverses Port Manatee, along cropland and pastureland, across industrial land, under railroad and road easements, across recreation land, and across extractive land. These areas would have minimal wildlife use due to the lack of shelter, foraging ground, and increased human interaction. Wildlife expected to use these areas are raccoons (*Procyon lotor*), striped skunk (*Mephitis mephitis*), wild pigs (*Sus scrofa*), armadillo (*Dasypus novemcinctus*), and various reptiles and birds (Myers and Ewel 1990).

Table 3.2-13 provides the habitat types and representative wildlife species along the proposed onshore route.

Table 3.2-12. Vegetation Species Found Along the Proposed Onshore Route

Common Name	Scientific Name
Saltbush	*Baccharis hamilifolia*
Live oak	*Quercus virginiana*
Southern red cedar	*Juniperus salicicola*
Hackberry	*Celtis occidentalis*
Red maple	*Acer rubrum*
Swamp tupelo	*Nyssa sylvatica*
Brazilian pepper*	*Schinus terebinthifolius*
Australian pine*	*Casuarina equisetifolia L.*
Red mangrove	*Rhizophora mangle*
Black mangrove	*Avicennia germinans*
White mangrove	*Laguncularia racemosa*
Cabbage palm	*Sabal palmetto*
Saw palmetto	*Serena repens*
Primrose willow*	*Ludwigia peruviana*
Carolina willow	*Salix caroliniana*
Beggar tick	*Bidens alba*
Castor bean*	*Ricinus communis*
Air potato*	*Dioscorea bulbifera*
Cattail*	*Typha* sp.
Caesar weed*	*Urena lobata*
Dog fennel	*Eupatorium capillifolium*
Foxtail	*Setaria geniculata*
Rosey camphorweed	*Pluchea rosea*
Climbing cassia*	*Senna pendula*
Erect sword fern*	*Nephrolepis cordifolia*
Giant brake fern*	*Pteris tripartita*
Leather fern	*Acrostichum danaeifolium*
Virginia chain fern	*Woodwardia virginica*
Bahia grass*	*Paspalum notatum*
Torpedo grass*	*Panicum repens*
Vasey's grass*	*Paspalum urvillei*
Bermuda grass*	*Cynodon dactylon*
Switch grass	*Panicum virgatum*
Flat sedge	*Cyperus* spp.
Soft rush	*Juncus effusus*
Elephant grass	*Pennisetum purpureum*
Maidencane	*Panicum hemitomon*
Blue maidencane	*Amphicarpum muhlenbergianum*
Golden rod	*Solidago* sp.
Samphire	*Blutaparon vermicluane*
Saltgrass	*Distichlis spicata*
Frog fruit	*Phyla nodiflora*
Saltmarsh aster	*Aster subulatus*
Bushy bluestem	*Andropogon glomeratus*

Source: Port Dolphin 2007b

Note: * Invasive and or nonnative species.

Table 3.2-13. Habitat Types and Representative Wildlife Species Found Along the Proposed Onshore Route

Habitat Type	Common Name	Scientific Name
Open Water and Wetlands	White ibis	*Eudocimus albus*
	Osprey	*Pandion haliaetus*
	Bald eagle	*Haliaeetus leucocephalus*
	Brown pelican	*Pelecanus occidentalis*
	Wood stork	*Mycteria americana*
	Cormorant	*Phalacrocorax auritus*
	Great egret	*Ardea alba*
	Snowy egret	*Egretta thula*
	Roseate spoonbill	*Platalea ajaja*
	Little blue heron	*Egretta caerulea*
	Black-crowned night heron	*Nycticorax nycticorax*
	Great blue heron	*Ardea herodias*
	Mangrove tree crab	*Aratus pisonii*
	Sand fiddler crab	*Uca pugilator*
	Mangrove salt marsh snake	*Nerodia fasciata compressicuada*
	Raccoon	*Procyon lotor*
	Striped skunk	*Mephitis mephitis*
	River otter	*Lutra Canadensis*
	White ibis	*Eudocimus albus*
	Least bittern	*Ixobrychus exilis*
	American coot	*Fulica Americana*
	Green-backed heron	*Butorides striatus*
	Marsh wren	*Cistothorus palustris*
	Red-winged blackbird	*Agelaius phoeniceus*
	Wood stork	*Mycteria americana*
	Great blue heron	*Ardea herodias*
	Green tree frog	*Rana castebeiana*
	Cuban tree frog	*Osteopilus septentrionalis*
	Various frogs	*Rana* spp.
	American alligator	*Alligator mississippiensis*
	Cottonmouth	*Seminatrix pygaea*
	Mosquitofish	*Gambusia affinis*
Upland Forest	Black racer	*Coluber constrictor*
	American crow	*Corvus brachvrhvnchos*
	Nine-banded armadillo	*Dasypus novemcinctus*
	Red rat snake	*Elaphe guttata guttata*
	Striped skunk	*Mephitis mephitis*
	Raccoon	*Procyon lotor*
	Ground skink	*Scincella lateralis*
	Gray squirrel	*Sciurus carolinensis*
	Wild boar	*Sus scrofa*

Habitat Type	Common Name	Scientific Name
Disturbed	Florida box turtle	*Terrapene carolina bauri*
	Green anole	*Anolis carolinensis*
	Brown anole	*Anolis sagrei*
	Southern toad	*Bufo terrestris*
	Green tree frog	*Rana castebeiana*
	Cuban tree frog	*Osteopilus septentrionalis*
	Bobcat	*Lynx rufus*
	Eastern cottontail rabbit	*Sylvilagus floridanus*
	Raccoon	*Procyon lotor*
	Striped skunk	*Mephitis mephitis*
	White-tailed deer	*Odecoileus virginianus*

Sources: FNAI 2007, Port Dolphin 2007l, Myers and Ewel 1990

3.2.10.4 Threatened and Endangered Species

Threatened and endangered species or species of special concern have been observed in the Project area. During the field investigations conducted by the Applicant, a snowy egret (*Egretta thula*) and American alligator (*Alligator mississippiensis)* were observed at the open water (reservoir) site. During the field survey of the tidally influenced canal (south conveyance ditch) and adjacent mangrove site, multiple tricolored herons (*Egretta tricolor*), wood storks (*Mycteria americana*), an American kestrel (*Falco sparverius*), and an American alligator were observed. A wildlife survey conducted by the Applicant indicated the presence of a gopher tortoise on the property where the interconnection station would be located. Prior to initiation of construction, additional wildlife surveys would be completed to determine if the gopher tortoise is present. If the gopher tortoise is present, the Applicant would initiate coordination with Florida Fish and Wildlife Conservation Commission (FWC). Coordination with the FWC would determine if an additional survey is necessary to confirm the presence of the gopher tortoise (a state species of special concern) and the southeastern American kestrel (a state threatened species) within the proposed onshore pipeline route.

Additional surveys were performed to investigate the presence or absence of suspected threatened and endangered species. Species-specific surveys were conducted from May 13 to 17, 2008, for state and federally listed species. The surveys were conducted to address the potential presence of southeastern American kestrel (*Falco sparverius paulus*), gopher tortoise (*Gopherus polyphemus*), Florida scrub jay (*Amphelecoma coerulescens*), and listed wading birds within potential habitats for these species along the proposed pipeline corridor. The species-specific survey for scrub jays was performed utilizing the standard protocols as outlined by the USFWS and the FWC. No scrub jays or evidence of presence of the species were observed. Pedestrian transects were surveyed along the length of the ROW for highly visible species such as alligators and wading birds. Any species observed during the survey was noted and the location marked with a Global Positioning System (GPS) unit.

State- and federally listed threatened, endangered, and species of special concern that can be found either within or adjacent to the onshore Port Dolphin pipeline area, based on habitat types, are presented in **Table 3.2-14**. State- and federally listed species present in Manatee County that are not present in the Project area are not included in **Table 3.2-14**. This species listing was developed based on a search of the FNAI tracking list for Manatee County for protected species observed and the beta-test version of the FWC's wildlife tool.

Table 3.2-14. State and Federally Listed Species Potentially Occurring in the Proposed Onshore Route

Common Name	Scientific Name	Federal Status	State Status	Habitat
Mammals				
Florida mouse	*Peromyscus floridanus*		SSC	Fire-maintained, xeric, upland vegetation occurring drier pine flatwoods that are not present
Birds				
Audubon's crested caracara	*Caracara cheriway*	T	T	Open lands, pastureland, arid and moist habitats
Brown pelican	*Pelecanus occidentalis*		SSC	Mangroves
Florida burrowing owl	*Speotyto cunicularia floridana*		SSC	Open, well-drained areas with herbaceous ground cover
Little blue heron	*Egretta caerulea*		SSC	Shallow fresh water, brackish and saltwater environments
Peregrine falcon	*Falco peregrinis*		E	Prairies, coastal ponds, marshes, and urban areas
Roseate spoonbill	*Platalea ajaja*		SSC	Mangroves
Snowy egret	*Egretta thula*		SSC	Coastal and inland wetlands, mangroves
Southeastern American kestrel	*Falco sparverius paulus*		T	Open fields, forest edges, and marshes; require perching apparatus
Tricolor heron	*Egretta tricolor*		SSC	Mangroves and willow thickets
White ibis	*Eudocimus albus*		SSC	Fresh water, brackish, and saline environments
Wood stork	*Mycteria americana*	E	E	Wetlands and other waterbodies
Reptiles				
American alligator	*Alligator mississippiensis*		SSC	Water-retaining habitats
Eastern indigo snake	*Dymarchon corais couperi*	T	T	Dry habitats bordered by water
Gopher tortoise	*Gopherus polyphemus*		SSC	Sandy, open scrub habitats
Amphibians				
Florida gopher frog	*Rana capito*		SSC	Sandy scrub wet areas

Source: USFWS 2007a, FNAI 2007, Rogers et al. 1996, Ashton and Ashton 1981

Notes: T = Threatened; E = Endangered; SSC = Species of Special Concern

Southeastern American Kestrel. The kestrel is the smallest and most common of the falcons. The back and tail of the kestrel are russet, the wings blue-gray. Two lines of onyx tears mark the sides of its white face. Two subspecies of American kestrel (*Falco sparverius*) occur in Florida: a northern subspecies (*Falco sparverius sparverius*) that winters between September and April; and a resident, nonmigratory subspecies, the southeastern American kestrel (*Falco sparverius paulus*), which is listed as state threatened. Kestrels seen in Florida during May through June are resident southeastern American kestrels (FWC 2007e).

American kestrels often perch on telephone wires at the edge of a field or other open area. From this vantage point they hunt for insects (especially grasshoppers and dragonflies), lizards, and small mammals. Sometimes they can be seen hovering like helicopters above their prey (FWC 2007e). American kestrels nest in cavities that they do not excavate. Instead, they must depend on woodpeckers and natural processes to create holes in trees. Kestrels nest predominantly in dead but standing longleaf pine trees, called snags, usually in the abandoned cavities of pileated woodpeckers (*Dryocopus pileatus*). Kestrels nest between mid-March and early June, raising about four chicks during a season (FWC 2007e).

Several songbirds such as mockingbirds and red-winged blackbirds were observed during the spring follow-up survey, but no kestrel was noted during any of the investigations. As a result, it can be concluded that the unidentified kestrel observed during the November 2007 survey was an American kestrel, which is not protected in Florida.

Audubon's Crested Caracara. The caracara is a large, long-legged, hawklike bird that is often seen on the ground. It is a scavenger and has a varied diet and often seen eating fresh kills or carrion with vultures. Caracaras are found in open grassland habitats such as dry prairies and improved rangeland. Breeding is from January through March. The nest is bulky and constructed of slender vines and sticks and is usually found in a cabbage palm (Farrand and Bull 1994).

Florida Burrowing Owl. These small birds (9 inches tall) spend the majority of their time on the ground or perched near its burrow. Burrowing owls use burrows year-round; for roosting during the winter and for raising young during the breeding season (February to July). Eggs are primarily laid in March but nesting can occur from October through May. Florida's owls typically dig their own burrows but would use gopher tortoise or armadillo burrows. Burrows extend 4 to 8 feet underground and are lined with materials such as grass clippings, feathers, paper, and manure. They inhabit prairies, pastures, and agricultural fields. They feed on insects, small reptiles, and amphibians. Other important foods are snakes, birds, and rodents (FWC 2007a).

Brown Pelican. These birds are distinguished by their large stocky size and long flat bill. They are found in coastal environments where they feed on fish. Breeding in colonies takes place from December to February (Farrand and Bull 1994).

Wood Stork. Wood storks are the only storks that regularly inhabit North America. These wading birds are year-round residents of Florida and Georgia, though sightings occur within the other Gulf coastal states. Wood storks frequent fresh water and brackish coastal wetland habitats. This endangered species nests at a single site in Tampa Bay, the Dot-Dash colony at the mouth of the Braden River (Paul and Paul 2003). During the field survey of the tidally influenced canal (south conveyance ditch) in and adjacent mangrove site in the Project area, multiple wood storks were observed (Port Dolphin 2007b).

Florida Scrub Jay. The species-specific survey for scrub jays was performed utilizing the standard protocols as outlined by the USFWS and the FWC. No scrub jays or evidence of presence of the species was observed. As stated in USFWS and FWC Florida scrub jay survey protocols, the Port Dolphin scrub jay surveys were conducted within a few hours of sunrise for 5 days across potential habitat. Pedestrian transects were surveyed in suitable scrub jay habitat, which included the Shrub and Brushland habitat (FLUCCS 320) located at the very end of the proposed Project area. Each transect was walked, and specific locations were chosen for playback of scrub jay vocalizations.

Wading Birds. Wading birds, such as the white ibis, roseate spoonbill, the snowy egret, the tricolor heron, and the little blue heron, are common in the wetland marshes and mangroves. They feed on aquatic prey in shallow waters of the wetlands and use wetland shrubs and trees for nesting.

During the follow-up spring surveys at the conveyance ditch, two species of wading birds were noted. A roseate spoonbill (*Platalea ajaja*) and a white ibis (*Eudocimus albus*) were observed foraging in the conveyance ditch in May 2008. The Florida Natural Areas Inventory (FNAI) database report did not show the presence of any wading bird rookeries in or within close proximity to the Port Dolphin Project area. Due to the temporary nature of the majority of the impacts from the proposed Project, the mobility of wading bird species, the lack of known rookeries in close proximity to the Project area, and the presence of suitable habitat located outside of the influence of construction, it is anticipated that the proposed Port Dolphin project would result in no impact on wading birds or their habitat.

American Alligator. The American alligator is a large reptile weighing up to 500 pounds. Females average 8 feet long and males average 11 feet. The length of an alligator can be estimated by estimating the length of their snout. Each inch from the tip of the snout to the eyes, equals about 1 foot of length. They can be found in shallow lakes, ponds, and rivers. They eat turtles, snakes, birds, and small mammals, often feeding at night (FWC 2007b).

In the wild, alligators can live for 30 to 35 years. Courtship and breeding take place from April to May. In June and July, female alligators lay 20 to 50 eggs in nests of mounded vegetation, where the eggs incubate for 2 months. The female remains in the area to defend the nest against raccoons and other egg-eating predators. Six- to 8-inch-long alligators hatch out in mid-August to mid-September; unlike the adults, these youngsters are banded or splotched with yellow, though they darken as they mature (FWC 2007b).

Eastern Indigo Snake. The Eastern indigo snake is a large, docile, nonpoisonous snake growing to a maximum length of about 8 feet. The color in both young and adults is shiny bluish-black, including the belly, with some red or cream coloring about the chin and sides of the head. They feed on an assortment of amphibians, reptiles, and small mammals. Eastern indigo snakes are most notably found in dryer habitats (like gopher tortoise burrows), and also inhabit hydric hammocks and areas around ponds. In wetter habitats that lack gopher tortoise burrows, Eastern indigo snakes can take shelter in hollowed root channels, hollow logs, or the burrows of rodents. In central and coastal Florida, they are mainly found within many of the State's high, sandy ridges. The Eastern indigo snake has been observed laying eggs in gopher tortoise burrows in high pineland areas, and in stump holes in flatwoods and pond edge habitats. Based on observations of captive indigos at Auburn University, mating begins in November, peaks in December, and continues into March. Clutches averaging eight to nine eggs laid in late spring hatch approximately 3 months later. The snakes remain active to some degree throughout the winter, often emerging from their dens whenever air temperatures exceed 50 °F (USFWS 1991).

Gopher Tortoise. The gopher tortoise averages 9 to 11 inches long, but can attain lengths of 15 inches. It can weigh up to 15 pounds. It occurs throughout Florida but prefers sandy, well-drained upland areas.

Tortoises can also be found in habitats such as utility line ROWs, fence rows, pastures, and field edges. They eat grasses, bean-family plants, fruits, and grasslike plants of the sunflower family. Gopher tortoises excavate burrows averaging 15 feet in length, but some burrows can be up to 48 feet long and about 6 feet deep. Gopher tortoise burrows can be used by many other species, including the Florida gopher frog and Eastern indigo snake (FWC 2007c).

The majority of the habitat along the proposed pipeline corridor contains disturbed lands dominated by Brazilian pepper and other exotic and nuisance species. As a result, only minimal habitat is available for gopher tortoises along the pipeline route. No gopher tortoises or burrows were observed at the time of the initial investigations and, as a result, no follow-up survey was scheduled. However, during the species-specific surveys, a gopher tortoise burrow was observed. The investigations were conducted at the scrub

and brushland habitat (FLUCCS 210) in the location proposed for the Interconnection Station in May 2008. The burrow was marked via a GPS and classified as active.

Florida Gopher Frog. The Florida gopher frog is a stout-bodied frog from 2 to 4 inches long found throughout most of the Florida peninsula. It is cream- to brown-colored, with irregular dark spots on its back and sides (FWC 2007d). Gopher frogs travel great distances, as much as a mile or more, to breed in temporary ponds year-round, laying eggs in shallow water. As adults, they hop into surrounding uplands, where they find a home in the active burrow of a gopher tortoise. They might also use a stump hole or the abandoned burrow of a small rodent. They are nocturnal, and seldom range far from their daytime retreat (FWC 2007d). Their call is a deep guttural snore, and heavy rains at any season can stimulate choruses, many of them calling at once. Because of habitat destruction, the gopher frog is very rare in its traditional southern range (FWC 2007d).

3.3 Cultural Resources

3.3.1 Definitions of a Resource

Cultural resources include historic properties, which are defined under the NHPA as prehistoric or historic sites, districts, structures, buildings, objects, or features that are made or modified in the course of human activities. Their discovery, assessment, and management are mandated through Section 106 of the NHPA, which requires agencies to take into account the effect of their undertakings on properties listed in, or eligible for listing in, the NRHP and to afford the ACHP an opportunity to comment on the undertaking. For onshore, nearshore, and offshore project components, the SHPO aids in the determination of NRHP eligibility of cultural resources and provides guidance and recommendations concerning identified historic properties. Other pertinent authorities and guidelines applicable to cultural resources are the Archeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, the Archeological and Historic Preservation Act, the Abandoned Shipwreck Act of 1987, the EO for the Protection and Enhancement of the Cultural Environment (EO 11593), the Florida Historical Resources Act (Chapter 267, F.S., rev. 2004), and the Florida Division of Historical Resources' *Performance Standards for Submerged Remote Sensing Surveys* (v. 2.1 [2001]).

For onshore project components, the SHPO aids in the determination of impacts on cultural resources. The FERC has issued *Guidelines for Reporting on Cultural Resources Investigations for Pipeline Projects* (2002) for projects requiring a FERC certificate under Sections 3 and 7 of the NGA. In this EIS, the FERC is assisting the USCG in the review of cultural resources. Cultural resources onshore in Florida might include prehistoric and historic archeological sites; built resources; landscapes; and resources of traditional, religious, or cultural significance to Native American tribes. Any cultural resources that are identified onshore during the survey must be avoided or have their eligibility for listing in the NRHP assessed against significance criteria developed by the NPS. In addition, other important aspects of archeological surveys, such as its research design and scope, are discussed and agreed to in consultation with the SHPO in anticipation of, and prior to, conducting archeological surveys.

For nearshore project components in Florida state waters, the SHPO's role is essentially the same as that for the onshore project elements, and is guided by the Florida Historical Resources Act (Chapter 267, F.S., rev. 2004), the Florida Division of Historical Resources' *Performance Standards for Submerged Remote Sensing Surveys* (v. 2.1 [2001]).

The Maritime Administration is responsible under Section 106 for assessing impacts of the proposed offshore activities on submerged archeological resources. Although deepwater ports are not regulated by MMS, the Applicant would follow MMS guidance for ensuring compliance with the requirements of Section 106 as provided through NTL No. 2005-G07, *Archeological Resource Surveys and Reports*, as

well as through its other published guidelines, including NTL No. 2007-G01, *Revisions to the List of OCS Lease Blocks Requiring Archeological Resource Surveys*, and the NTL 2008-G05, *Shallow Hazards Program*. MMS has issued regulations at 30 CFR 250.194, 250(b)(15), 250.203(o), 250.204(b)(8)(v)(a), 250.204(s), and 250.1007(a)(5) that require preparation of an archeological resources report based primarily on the assessment of data obtained from the remote sensing survey. This survey would provide adequate information to determine the existence of archeological resources potentially affected by a proposed project (MMS 1999, 2005).

Determination of an archeological survey is based on whether the proposed Project area is within an MMS Lease Block included on the Archaeology Survey Blocks list on the MMS Internet Web site: http://www.gomr.mms.gov/homepg/regulate/environ/archeological/surveyblocks.pdf. For offshore prehistoric resources, all leases shoreward of the 45-m (146-foot) bathymetric contour require an archeological survey before initiating exploration and development activities. Archeological resources in the GOM that could be affected by the Proposed Action or Alternatives include inundated prehistoric sites and offshore historic shipwrecks.

If the Section 106 survey finds evidence of a possible archeological resource within nearshore (state) or offshore (Federal) waters in the ROW or lease area, the Applicant or Lessee must either redesign the proposed activity to avoid impacting the possible resource or conduct further investigations to determine if an archeological resource actually exists at the location and whether it is NRHP-eligible. If an NRHP-eligible archeological resource is present at the location of a proposed activity and project-related impacts on the resource cannot be avoided, the Applicant would consult with the USCG and the MMS GOM Regional Supervisor to determine the procedures required to mitigate or minimize impacts on the resource.

3.3.2 Port Site and Offshore Routes

The area of potential effect (APE) is defined under 36 CFR 800.16(d) as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." The APE is influenced by the scale and nature of an undertaking and might be different for different kinds of effects caused by the undertaking. The Port Dolphin Project APE encompasses all areas wherein construction, operation, and decommissioning activities might occur. For cultural resources, the surveyed APE for the marine portion of the Project is composed of offshore and nearshore elements. The offshore element is located in Federal waters and consists of the Port (i.e., the North and South LNG buoy moorings situated in MMS PB blocks PB545 and PB589, their anchors, and their feeder lines suspended off of the seafloor that depart the buoys and meet at a piggable-Y), and a segment of the connecting 36-inch pipeline. The nearshore element consists of the remaining length of the 36-inch pipeline that extends through state waters from the Federal-State waters boundary to the route's landfall at Port Manatee in Tampa Bay. The survey area for the Port encompasses approximately 22 acres. The survey area for the pipeline covers an approximately 42 mile-long-by-3,000-foot-wide corridor centered on the pipeline's route, extending from a point 46.4 km (29 mi) west-southwest of the entrance to Tampa Bay, Florida, to an HDD landfall between the Gulfstream Pipeline and the Port Manatee Shipping Channel in southeastern Tampa Bay at Port Manatee.

Archeological resources potentially present in the marine APE would include not only material lost or discarded in the course of maritime activity, but also artifacts from human settlements in the area when sea level was lower and dry land capable of supporting human settlement was present. MMS baseline studies (CEI 1977, Garrison et al. 1989, Pearson et al. 2003) and the research conducted for this Project indicate a high probability of archeological resources dating from the pre- through post-contact periods.

Predictive models based on correlations between prehistoric archeological sites and geomorphic landforms suggest that PaleoIndian and Archaic Period sites in Florida might be associated with natural levees, margins, point bars, and terraces of alluvial streams; the margins of bays, lakes, and estuaries; sinkholes; and relict beach ridges. Consequently, these or related landforms in presently submerged areas represent "archeologically sensitive" high probability zones for the occurrence of archeological sites from these time periods. Based on the estimated location of the PaleoIndian shoreline, coinciding with the approximately 130-foot isobath submerged offshore of the western coast of Florida, the marine portion of the Project APE is situated within the portion of the OCS that could contain undisturbed remnants of the formerly exposed landscape that was available for human occupation and settlement between circa 12,000 and 3,000 years before present (BP). Archival research performed for the Project indicates that there are no previously recorded submerged prehistoric archeological resources or NRHP-eligible or NRHP-listed sites in the marine APE (LAI 2007).

Archival research to determine the presence or reported incidence of historic shipwrecks within the marine APE and adjacent waters identified numerous reported wrecks/obstructions off of the West Coast of Florida and in the approaches to the Tampa Bay area. These reported items include vessels dating from the earliest period of European colonization through the present day, some of which might qualify as NRHP-eligible resources. The locations are in most cases vague or undetermined. Vessel casualty lists primarily include large commercial craft from the late 19th and 20th centuries; older and smaller vessels might not be listed. No references to lists and charts published by the U.S. Department of Transportation, USCG Local Notices to Mariners, the National Ocean Service Navigation Charts, the NOAA's AWOIS (Automated Wreck and Obstruction Information System) online database (2007), as well as a review of Berman (1972), Marx (1985), Potter (1988), Singer (1992), and the MMS' Shipwreck Database (Pearson et al. 2003) document any vessel casualties specifically within the Project area. No sites listed in the NRHP or eligible for listing in the NRHP are reported in the Project area. Documented 19th- and 20th-century vessel casualties in the vicinity of the Tampa Bay portion of the marine APE include *Isis* (1842), *Eugene Batty* (1906), *Wave* (1908), *Davy Crockett* (1909), *Water Boy* (1911), *City of Sarasota* (1919), *Thomas B. Garland* (1921), *Bon Temps* (1921), *Gwalia* (1925), *Stranger* (1927), *Belmont* (1940), *Kim Too* (1955), *Barge No. B-29* (1955), *Miss Powerama* (1962), *Buhnday* (1966), and *Ranger III* (1966). Four obstructions are listed in the AWOIS files of the survey area: Nos. 10318, 9833, 10310, and 10312. No. 10318 was reported to be a cylindrical tank. No. 9833 was a metal-hulled watercraft identified as similar to an aluminum SeaArk boat. No. 10310 was found to represent several chunks of concrete, while No. 10312 represents a metal tank.

Previous Cultural Resources Surveys. In October and November 2006, the Applicant conducted a comprehensive remote sensing survey of the offshore portion of the Project using an echo sounder, side-scan sonar (i.e., 100 and 500 kHz frequencies collected simultaneously), marine magnetometer, and subbottom profilers. The survey grid over the buoy mooring area was composed of primary track lines spaced 100 m apart with six tie lines about 1,000 m apart. In Federal waters, the corridor width of 3,000 feet was covered by parallel track lines spaced 50 m apart. In Florida state waters, the line spacing decreased to a 25-m interval. Additional track lines were surveyed in Tampa Bay parallel to the fishing pier and the Sunshine Skyway Bridge. In the west-central portion of the mooring area, buried fluvial channels were recorded that do not appear significantly affected by erosion and therefore are identified as high probability areas for prehistoric archeological sites. Eleven unidentified sonar contacts were recorded during the survey, including three in Federal waters and two in Florida waters. The Phase 1 geophysical survey magnetometer and side-scan sonar data cultural resources evaluation resulted in the identification of three unidentified side-scan sonar contacts (one in Federal waters) and 15 unidentified magnetic anomalies (all but one in Florida waters) interpreted as possible historic shipwreck remains.

The Proposed Site and Route Alternative and the Southern Site and Route Alternative were surveyed in sections between October 3 and 31, 2006; November 1 and 15, 17 and 21, and 23 and 26, 2006; and

September 10 and 17, 20 and 24, and 26 and 29, 2007. Archeologically sensitive areas that were identified during surveys and recommended for avoidance during construction, operation, and decommissioning of the Project include the following:

- Margins of buried relict fluvial channels in the Port's buoy mooring area in MMS PB blocks PB545 and PB589 that retain geomorphic features representing high-probability areas for prehistoric archeological sites should be avoided by a distance of 250 feet, as delineated on Map 2, Sheet 1 of LAI's (2006) Appendix A: Archeological Assessment report (Confidential Document).
- Three unidentified side-scan sonar contacts and 15 unidentified magnetic anomalies that might represent possible historic shipwreck remains. Sonar Contacts 1, 6, and 9 should be avoided by a distance of 300 feet. Magnetic anomalies Nos. 15, 18, 28, 29, 50, 53, 100, 185, 186, 196, 197, 200, 212, 213, 283, and 287 should all be avoided by a distance of 200 feet (LAI 2006).
- No geomorphic features representing high-probability areas for prehistoric archeological sites were recorded in the data sets associated with the realigned proposed or alternative routes.
- One unidentified side-scan sonar contact associated with three unidentified magnetic anomalies representing possible historic shipwreck remains. Alternative Route Sonar Contact 1 and magnetic anomalies Nos. 874, 889, and 915 should be subjected to physical examination to conclusively identify and determine their source, or avoided by a distance of 1,000 feet, as per MMS's recommendation (included in their February 29, 2008, comments on the Interim Draft EIS), rather than simply avoided by a distance of 500 feet, as recommended and delineated in LAI's 2007 Appendix A: Archeological Assessment report (Confidential Document) for Alternative A (the proposed nearshore route).

3.3.3 Onshore Route

The onshore portion of the pipeline would make landfall at the pier bulkhead at Port Manatee, and continue inland approximately 6.4 km (4 mi) to an interconnect with the Gulfstream Natural Gas System, LLC pipeline system, and the TECO Bayside Gate System. The APE for this pipeline corridor option includes the 6.4-km (4-mi) length of the proposed pipeline and a corridor width of 100 feet, areas designated for temporary work spaces, and the interconnections stations.

Previous Cultural Resources Surveys. Review of the Florida Master Site File (FMSF) shows two previously recorded prehistoric sites (8MA1228, 8MA1478) within the APE for the onshore route, which is the same for both the Proposed Route and the Southern Route Alternative. Three additional prehistoric sites (8MA1165, 8MA1166, 8MA1227) are within one-half mile of the onshore route. The majority of the sites surrounding the onshore routes are prehistoric sites with unspecified associations and time periods. One exception is site 8MA1166, which is north of the APE near Piney Point. This site was recorded as a "late prehistoric earthwork" feature. However, subsequent survey results did not support the earthwork hypothesis; the SHPO has determined that the site is not eligible for the NRHP.

No previously recorded structures are within the APE. Two historic structures were identified within one-half mile of the APE for the proposed onshore route, south of the western segment of the Pipeline survey area. Both of these structures (8MA1210 and 8MA1211) date to the early 20th century, 1911 and 1921, respectively. Neither structure is eligible for listing in the NRHP, and neither was found to be locally or regionally significant. A third recorded structure (8MA1324) lies more than one-half mile southeast of the TECO Interconnection Station and the TECO Bayside Gate station. This house dates to the 1940s and has not been evaluated by the SHPO's office.

In September 2003, Archeological Consultants, Inc. conducted a survey (FMSF Survey 9110) that included parts of the Pipeline Project area within Sections 10 and 11 of Township 33 South, Range 18 East. This survey included both pedestrian surface and subsurface investigation. The Project area included parts of the proposed Port Dolphin Pipeline corridor from I-75 to Grass Farm Road (the section line between Sections 10 and 9, misidentified as Bud Rhoden Road in the FMSF report), south of Buckeye Road. According to the shovel test map, approximately 10 shovel tests were placed within or adjacent to the pipeline Project area. No cultural material was recovered from the area, which was described as old orange groves and improved pasture. Though the authors do not specify the degree of disturbance and modification, the presence of pumphouses and drainage canals suggests extensive disturbance.

In June 1990, Piper Archaeology investigated an area that overlaps a portion of the APE for all three pipeline corridor options discussed below. This survey project, designated FMSF 2443, totaled 1,100 acres within Section 9, Township 33 South, Range 18 East. The area investigated lies south of Buckeye Road, from the section line separating Sections 9 and 10 to an unnamed road through orange groves in the west. This survey describes extensive modification of the land including 60- to 80-cm deep furrows between every other row of trees. The survey's goal was the relocation and reevaluation of site 8MA49, previously recorded as an aboriginal earthwork. Shovel tests were excavated in transects and placed judgmentally throughout the Project area. In the opinion of Piper Archaeology, site 8MA49 was either misreported on the site file form, destroyed, or a misidentified late historic "water control feature." Although Piper Archaeology dug only 20 shovel tests within Section 9, its opinion was that this adequately covered the area due to the degree of disturbance.

In late 2000, Louis Berger Group, Inc., conducted a survey (FMSF Survey 6510) of 120 acres in Sections 6 and 7, Township 33 South, Range 18 East. The Project included the area west of Bud Rhoden Road, south of Buckeye Road, and was bounded on the west by property lines. No cultural materials were recovered from shovel tests. The most extensive testing occurred within a 25-acre area, with shovel test placement following a 30-m grid. The investigators state the area's soils have been disturbed from agricultural activity, including the creation and maintenance of drainage ditches.

Much of the Proposed Route Alternative follows the existing pipeline previously investigated by Janus Research. A review of the relevant survey reports (FMSF Surveys 6297, 6332, and 7328) reveals an adequate level of testing for much of the Proposed Route Alternative currently under investigation. Janus Research registered two archeological sites (8MA1227 and 8MA1228) within or near the Pipeline Project area. Each site consisted of a single shovel test producing a lithic flake. The delineation of these sites included substantial testing within the Port Dolphin pipeline APE. The reported level of disturbance and modification to the corridor limits the likelihood of intact archeological sites.

In 1982, Archeological Consultants, Inc. conducted an archeological survey (FMSF Survey 788) that includes part of the Pipeline Project area. The investigation used both pedestrian surface survey and subsurface testing. The authors reported no cultural materials, listed all shovel testing as "judgmental," and did not provide a map or description of shovel test locations. Both the date and the text of the survey suggest this was not a systematic inventory. This survey extends from the point at which the Proposed Route Alternative crosses South Bay (or Del Monte) on the west to the point at which the Pipeline corridor returns south of South Bay, just before reaching U.S. Highway 41.

Known Cultural Resources along the Proposed and Alternative Onshore Route. The onshore portion of the pipeline would make landfall at the pier bulkhead at Port Manatee, and continue inland approximately 6.4 km (4 mi) to an interconnect with the Gulfstream Natural Gas System, LLC pipeline system and the TECO Bayside Gate System. The APE for this pipeline corridor option includes the 6.4-km (4-mi) length of the proposed pipeline and a corridor width of 100 feet.

In January and November 2007, Southeastern Archeological Research, Inc. (SEARCH) conducted a Phase 1 cultural resources survey of the APE for the pipeline corridor. The APE was defined as the length of the corridor and the 100-foot width of the construction ROW. A pedestrian survey and 138 shovel tests were excavated along the route corridor, with the bulk of the APE subjected to 25- and 50-m testing. The eastern third was tested at 100-m intervals, due to low expectation of archeological resources, and the fact that this segment had been previously surveyed by Janus Research (FMSF Surveys 6297, 6332, and 7328). No historic structures were encountered within the APE. The survey indicates that the 100-foot width of route has been subjected to large amounts of ground disturbance from utility and previous pipeline installation, roadwork, and drainage activities.

Two of the SEARCH shovel tests contained historic or prehistoric artifacts that were designated as Archeological Occurrences (AOs). The two AOs are in disturbed contexts and are not eligible for listing in the NRHP. The Florida SHPO concurred with these recommendations on February 18, 2008 (see **Appendix B**).

Interconnection Station, Valve Station, and Work Spaces. The APE for the onshore portion of the Project also includes the footprints for the valve station, extra workspaces, and one interconnection station. The onshore valve station would be located just east of the Gulfstream valve station within Port Manatee property. The valve station is 0.07 acres in area (50 feet by 60 feet). The Interconnection Station parcel is in a general agricultural zoned area beside the Buckeye Road and measures 3 acres. It is adjacent to the existing Gulfstream station. Staging areas, the pipe yard, and the concrete batch plant and storage facility would be located within Port Manatee. On February 17, 2009, the SHPO concurred that no further survey work was required for these areas within Port Manatee. Installation of the onshore pipeline would also require a number of small workspaces for road and stream crossings along the pipeline route.

Native American Consultation. Independent research was conducted into which Native American tribes historically used the pipeline Project area. The federally recognized tribes listed on the Native American Consultation Database as having an interest in the Pipeline corridor location are the Miccosukee Tribe of Indians of Florida, Muscogee (Creek) Nation of Oklahoma, Poarch Band of Creek Indians, Seminole Nation of Oklahoma, and Seminole Tribe of Florida. Consultation letters were sent with a set of the maps showing the pipeline Project area location and the pipeline corridor in April 2007 and again in January 2008 as part of the offshore geophysical survey (see **Section 3.4.3**) for the December 2007 Port Dolphin Energy Deepwater Port Application Addendum *Environmental Evaluation*.

3.4 Geological Resources

3.4.1 Definition of the Resource

Geological resources within a given physiographic province consist of the surface and near-surface materials (i.e., rock and soil) of the earth and regional or local forces by which they are formed. These resources are typically described in terms of regional and local geology, soil resources, topography, mineral (paleontological, if applicable) resources, and geologic hazards. Regional and local geological resources comprise earth materials within a specified region and the forces that have shaped them. This includes bedrock or sediment type and structure, unique geologic features, depositional or erosional environment, and age or history. Soil resources are the unconsolidated, terrestrial materials overlying the bedrock or parent material and are typically described in terms of their complex type, slope, and physical characteristics (i.e., strength, expansion potential, cohesion, grain size, and organic composition). Bathymetry is the discussion of the geomorphic characteristics of the seafloor surface, including elevations, relationship with adjacent land features, and geographic location. Mineral and paleontological resources include usable geological materials that have some economic or academic value and significant

artifacts. Geological hazards comprise the regional or local forces or conditions that could affect a proposed development or use (e.g., seismicity, slope stability, competency of bedrock, and subsidence or settlement).

The study area for this analysis includes both onshore and offshore components. Offshore, the major components of the Project, the STL buoy system and proposed pipeline, would be a distance of approximately 67.6 km (42-mi) from Tampa Bay (i.e., the distance from the offshore facilities east to landfall in Manatee County, Florida). The Port would be located in a water depth of approximately 30.5 m (100 feet) and, more specifically, would consist of two submersible unloading buoys and two flowlines, each connecting the two buoys to a natural gas transmission pipeline. The flowline from the north buoy is approximately 3.2 km (2 mi) in length. The flowline from the south buoy is approximately 3.2 km (2 mi) in length. Equipment aboard vessels built specifically to transport and revaporize LNG using onboard equipment would regasify LNG, and a pipeline from the Port would deliver the natural gas to the Gulfstream and TECO pipelines.

Onshore, the pipeline would proceed east across Port Manatee property through a tidally influenced conveyance ditch through Reeder Road to just west of the CSX railroad. At that point the pipeline would turn south on the west side of U.S. Highway 41 through the FPL tank farm before turning east again. The pipeline would turn east again to cross the CSX railroad and U.S. Highway 41. The pipeline would end at the interconnection with Gulfstream and TECO pipelines within the Margaret Mock Industrial property.

3.4.2 Offshore Regional Geology

The Florida peninsula is the emergent portion of the wide, relatively flat geologic feature called the Florida Platform, which separates the waters of the GOM and the Atlantic Ocean. The edge of the Florida Platform is arbitrarily defined to be where water depth is 300 feet (91.44 m). On the central coast of Florida, the edge of the platform lies more than 100 mi (160 km) west of Tampa (USGS 2001).

Early development of the carbonate Florida Platform began during the Cretaceous period. During the late Paleogene, the Appalachian Mountains were uplifted, causing an increase in the erosion and deposition of siliciclastic sediments into the Gulf Trough. The siliciclastic invasion, as it is commonly known, whereby quartz sand moves south along the beaches that border Florida, is a process that continues to this day. There is, however, no mechanism by which siliciclastic sediments move toward the western edge of the Platform, resulting in a transition from quartz-rich sediments on the eastern edge of the peninsular to carbonate-rich sediment toward the west.

The inner shelf off the west-central barrier-island system forms part of that quartz carbonate transition (USGS 2003), with a thin veneer of sediments generally less than 3 m (10 feet) thick. As expected, these unconsolidated sediments fill in areas where outcrops of the underlying limestone surface are not exposed.

At least 50 percent of the inner-central West Florida shelf is covered with extensive networks of hard-bottom formations referred to locally as “ledges.” These ledges can show up to 13 feet (4 m) of relief. Two types of rock (dolomitric and calcitic) form these ledges, which lie roughly parallel to shore (USGS 2003). Several studies have indicated that the inner shelf is overlain by northwest-southeast-trending quartz-rich sand ridges that extend more than 12.4 mi (20 km) out onto the shelf (USGS 2003).

A timeline highlighting important geologic events in the history of Florida is provided in **Table 3.4-1.**

Table 3.4-1. Important Geologic Events in the History of Florida

Era	Period	Epoch (million years ago)	Important Geologic Events in Florida
Cenozoic	Quaternary	Pleistocene (1.6)	Intervals of climate cooling and warming occurred as a result of glaciers covering then retreating over most of North America. Glaciers did not extend to the southeastern states. Glaciers had the effect of rising and falling sea levels in southern states.
	Tertiary	Pliocene (5)	Quartz sand extended from the north to the extreme southern margin of the Florida platform.
		Miocene (24)	A river delta up to 393 feet (120 m) thick filled accommodation space within the south-central platform (USGS 2003).
		Oligocene (36)	Northern Florida and Georgia (Gulf Trough area) infilled. Initial phase of Florida's siliciclastic invasion begins, moving quartz sand south along the beaches bordering peninsular Florida (USGS 2003).
		Eocene (58)	-
		Paleocene (65)	Appalachian Mountains uplifted, erosion increased, and siliciclastic sediment filled the Gulf Trough.
Mesozoic	Cretaceous	145	Early development of the carbonate Florida Platform (USGS 2003). Western portion of Florida Platform drowned, sea levels rise (occurring during Mid-Cretaceous period).
	Jurassic	208	Rifting complete, mid-Atlantic ridge developing, North American continental plate forced away from Africa. Gigaplatform system begins developing.
	Triassic	245	Pangaea beginning to divide into two major continents. Atlantic Ocean beginning to spread.
Paleozoic	Permian	286	-
	Pennsylvanian	320	-
	Mississippian	360	-
	Devonian	417	Acadian Mountains developing, eventually known as the northern Appalachian mountains.
	Silurian	443	Erosion and deposition of sediments and an accumulation of sedimentary rocks occurred in the southeast.
	Ordovician	495	Volcanic activity and deposition of marine sediments in northwestern Africa, an area that would eventually become Florida.
	Cambrian	545	-
Precambrian Eon	Proterozoic Eon	2,500	700 million years ago: collision and rifting of supercontinent Gondwana.
	Archean Eon	(billion years ago)	-

Sources: Lane 1994; USGS 2003; FDEP 2006b.

Bathymetry. Bathymetry of the central-west shelf indicates northwest-southeast-trending ridges exist nearshore. A second set of ridges are further offshore, oriented in a similar trend as the inshore ridges. Tampa Bay marks the northern extent of these shelf-valley depressions. This shelf-valley system appears to disappear between 65 to 98 feet (20 to 30 m) water depth west of the present mouth of the bay (USGS 2003).

Bedrock. Holocene sediments (Qh) make up the geology of much of the Tampa Bay, the mouth of the bay and immediate surrounding coastal barrier islands and keys. Shelly sediments of the Plio-Pleistocene age (TQsu) are identified southeast of the Terra Ceia AP (Rattlesnake Key, Terra Ceia Bay, Palma Sola, and Miguel Bay) (Scott et al. 2007a, 2007b).

Mineral Resources. A review of the USGS topographic quadrangles for the Project site and other geologic and nautical maps of the area indicate that there are several mining operations occurring in Tampa Bay. In the Hillsborough Bay section of Tampa Bay (northeast subdivision of the bay), large deposits of oyster shells underlie the bay and have been mined for many years for fill material (SWFWMD 1999). As is evident from the Anna Maria 7.5-minute series USGS topographic quadrangle, discontinued disposal and spoil areas are mapped south of the Egmont Channel.

The only active mineral resource use in the region consists of dredging of nearshore sand deposits for beach renourishment and other coastal engineering projects in Florida (Hatchett et al. 2006). Active mining permits have been issued for land south of the proposed pipeline (Port Dolphin 2007l). Three inactive mining areas are depicted on the Cockroach Bay 7.5-minute series USGS topographic quadrangle within the Project area. Vacant land south of the proposed pipeline route might be candidate sites for future mining of sandy soils.

No significant oil or natural gas finds have occurred during exploratory borings drilled off the central West Florida Shelf south of the Panhandle area. Currently, there is a moratorium on petroleum exploration in Federal waters off the West Florida shelf (Port Dolphin 2007c).

Seismicity. A review of the United States Earthquake Hazards Map that is published by the USGS indicates that southeastern United States is considered an area of low earthquake hazards. The USGS Seismic Risk Map of Florida shows the proposed pipeline route is located in Zone 0, meaning there is no expected damage from an earthquake. The USGS Earthquake Probability Mapping tool identifies the pipeline route as having between a 0.006 and 0.007 probability of a magnitude 4.75 quake occurring in the next 50 years (USGS 2008).

The Florida Platform is considered a seismically stable area, and only two quakes have been felt in Florida since 1990. In 2006, two quakes were reported from the same location (February 10 and September 11, 2006) with magnitudes of 5.2 and 6.0 respectively, and both quakes centered about 416 Km (260 mi) southwest of Tampa. The magnitude 6.0 quake was reported to be the largest earthquake to occur on the eastern GOM in the past 30 years.

No active or inactive faults exist in the Project area, but several karst features have been reported from the eastern area of Tampa Bay (FERC 2001b). **Figure 3.4-1** depicts the USGS Earthquake Hazards Map and **Table 3.4-2** outlines a chronology of reported earthquakes in and around Florida.

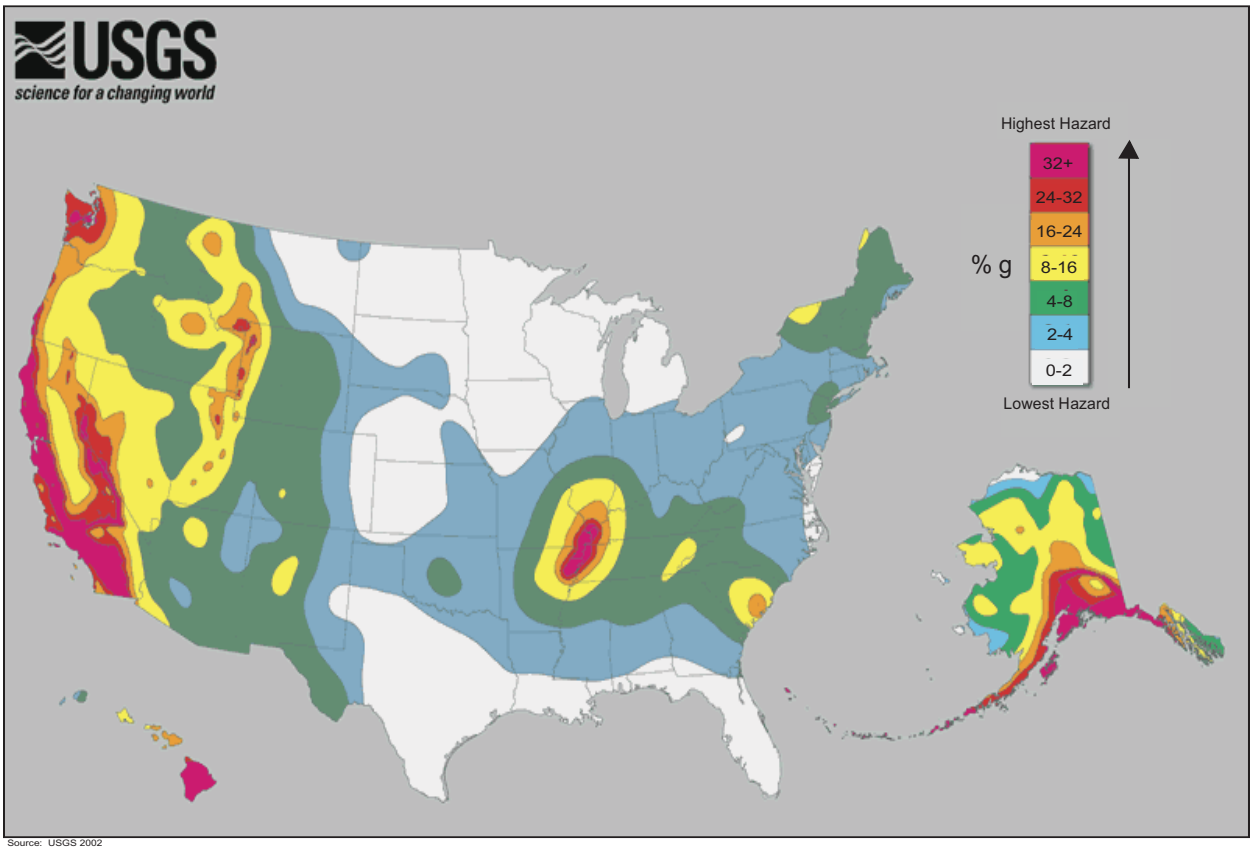


Figure 3.4-1. USGS Earthquake Hazards Map

Table 3.4-2. Timeline of Earthquakes in Florida

Date	Occurrence
October 29, 1727	Unofficial sources reported a severe quake, of intensity MM VI (Modified Mercalli VI), in St. Augustine, but the original record has not been located (recorded as one of the largest earthquakes in Florida history.) New England had a severe shock about 10:40 a.m. on this date, and a quake was reported on the island of Martinique, in the Caribbean, on the same day.
February 6, 1780	Pensacola felt a tremor described as "mild."
May 8, 1781	Pensacola suffered a "severe" tremor that shook ammunition racks from barrack walls and leveled houses, but no fatalities.
February 8, 1843	Earthquake in West Indies, felt in United States, intensity unknown.
January 12, 1879	Earthquake felt through north and central Florida bounded by a line drawn from Fort Myers to Daytona on the south, to a line drawn from Tallahassee to Savannah, Georgia, on the north, an area of about 25,000 square miles. Intensity MM VI near Gainesville. Recorded as one of the largest earthquakes in Florida's history. At 11:30 p.m. in Tampa, the quake was felt followed by rumbling sounds. Two shocks were reported in other areas at 11:45 p.m. and 11:55 p.m.
January 22–23, 1880	Earthquake in Cuba of intensity MM VII, about 192 km (120 mi) east of Havana. It was also felt in Florida.
January 27, 1880	Several shocks of intensity MM VII to MM VIII were felt in Key West resulting from a disastrous earthquake at Vuelta Abajo, about 80 miles west of Havana, Cuba.

Date	Occurrence
August 31, 1886	The great earthquake in Charleston, South Carolina, MM X. This quake was felt all over north Florida, with an estimated intensity of MM V to MM VI. Church bells rang in St. Augustine, and severe shocks were felt along the east coast. Quake effects were felt in Tampa.
September 1–9, 1886	Jacksonville felt more aftershocks of intensity about MM IV from the Charleston quake.
November 5, 1886	Jacksonville felt another aftershock from the Charleston quake.
June 20, 1893	Jacksonville felt a tremor at 10:07 p.m. of estimated intensity MM IV.
October 31, 1900	U.S. Coast and Geodetic Survey recorded a local shock of MM V at Jacksonville.
January 23, 1903	Shock of intensity MM VI felt at Savannah, Georgia, and effects also felt in Florida.
June 12, 1912	Strong shock of unknown intensity felt at Savannah, Georgia; also felt in Florida.
June 20, 1912	Shock of intensity MM V felt at Savannah, Georgia; probably associated with the above quake of June 12. It was also felt in Florida.
1930, exact date unknown	An earth tremor was felt over a wide area in central Florida near LaBelle, Fort Myers, and Marco Island. Thought to be from an earthquake, but some persons believed it was tremendous explosions, though no explosions were known to have been detonated. Estimated intensity at Marco Island was MM V.
November 13, 1935	Two short tremors were felt at Palatka in the early morning. The second shock was felt at St. Augustine and on nearby Anastasia Island. Estimated intensity at Palatka was MM IV or MM V.
January 19, 1942	Several shocks felt on south coast of Florida, with some shocks felt near Lake Okeechobee and in the Fort Myers area. Estimated intensity was about MM IV.
January 5, 1945	About 10 a.m. windows shook violently in the DeLand courthouse, Volusia County.
December 22, 1945	Shock felt in the Miami Beach-Hollywood area at 11:25 a.m. Intensity was MM I to MM III.
November 8, 1948	A sudden jar, accompanied by sounds like distant explosions, rattled doors and windows on Captiva Island, west of Fort Myers.
November 18, 1952	Windows and doors were rattled by a slight tremor at Quincy, about 20 miles northwest of Tallahassee.
March 26, 1953	Two shocks estimated as MM IV were felt in the Orlando area.
October 27, 1973	Shock felt in central-east coastal area of Seminole, Volusia, Orange, and Brevard counties, at 1:21 a.m., maximum intensity MM V.
December 4, 1975	Shock felt in Daytona and Orlando areas at 6:57 a.m., maximum intensity MM IV.
January 13, 1978	Two shocks reported by residents in eastern part of Polk County, south of Haines City. Tremors were about one minute apart and each lasted about 15 seconds, shaking doors and rattling windows. The tremors occurred between 4:10 and 4:20 p.m. No injuries or damage were reported.
November 13, 1978	Tremor felt in parts of northwest Florida, near Lake City. Seismic station at Americus, Georgia, estimated it originated in the Atlantic Ocean.
December 1978 – January 1991	No tremors reported by Gainesville seismographic station.
February 10, 2006	Magnitude 5.2 quake occurred, centered about 260 miles southwest of Tampa.
September 11, 2006	Magnitude 6.0 quake reported in the same location as the February 10, 2006, quake. The earthquake occurred at 8:56 a.m. and was reported by more than 2,800 residents. It was felt on the Gulf coast and in central Florida, southern Georgia, Alabama, Mississippi, and Louisiana. Reported to be the largest earthquake to strike the eastern GOM in the past 30 years.

Sources: Lane 1994 and USGS 2007

3.4.3 Proposed Site and Route Geology

The major offshore components include the following:

- Two offloading buoys, commonly known as STL Buoys, which would be separated by a distance of approximately 5 km (3 mi) connected to two flowlines, each approximately 3.2 km (2 mi) long
- The 67.6 km (42 mi) offshore gas transmission line.

Survey Method and Equipment. A geophysical survey was conducted by T. Baker Smith in September 2007 (T. Baker Smith 2007). Data were collected from 82 track lines spaced at intervals of 100 m (328 feet) in the buoy mooring area; 19 parallel lines spaced at 50 m (164 foot) intervals, and 30 primary lines spaced at 25 m (82 foot) intervals in the pipeline area; and 13 track lines around nearshore features such as the Sunshine Skyway Bridge and the fishing pier. The following instruments were used to collect the geophysical data:

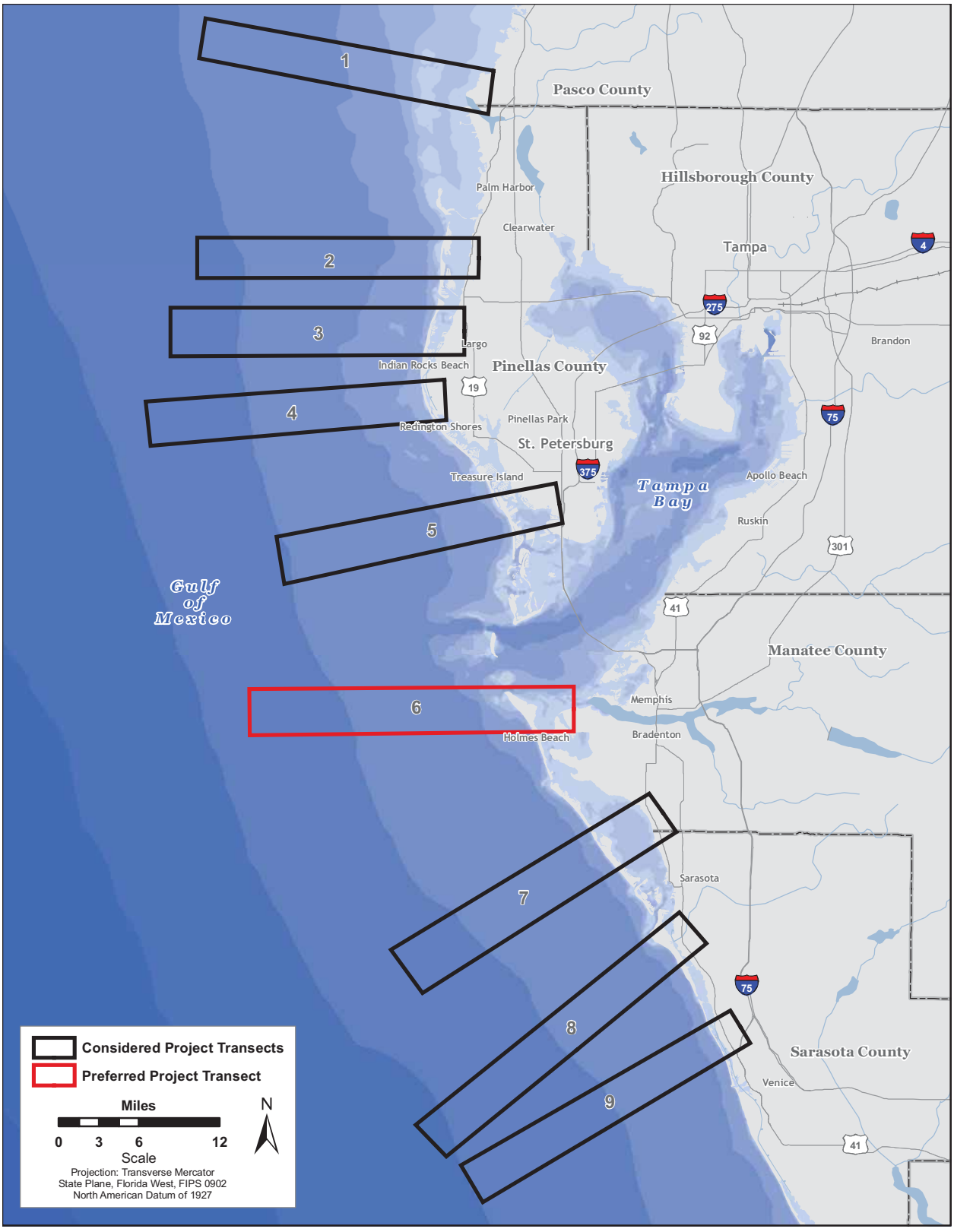
- Klein 300 (Side-scan sonar system)
- SeaSPY (Marine magnetometer)
- EdgeTech Model 3100-P (Subbottom profiler)
- EdgeTech Model 3200-XS (Subbottom profiler)
- Odom Echotrac Mark III (Echo sounder)
- Odom Digibar Pro Model DB1200 (Velocimeter)
- VT TSS Model HS-50 (Heave sensor)
- HyPack (Navigation and data acquisition software)
- Trimble Model DSM-232 (Global positioning system)
- Trimble Model MS-860 (Global positioning system).

An additional sand resource survey which included bathymetry, hard bottom, sand resources, and habitat classification surveys were conducted between Sta 1260+00 and Sta 1640+00 on the proposed pipeline alignment as part of the Port Dolphin Pipeline Offshore Geotechnical Investigation-Sand Source Re-Route Survey in 2008. The purpose of the survey was to determine a route that would reduce or avoid impacts to an permitted sand borrow area, a high volume sand shoal and other potential sand resources, and hard-bottom habitat along that section of the pipeline route.

In addition to the geophysical and sand source surveys, a former bathymetric study in the Project area was conducted by USGS entitled West-Central Florida Coastal Studies Project. The most relevant part of the study area involved investigative studies conducted along a transect located north of the proposed pipeline route (Transect #6). **Figure 3.4-2** depicts transects surveyed in the USGS study. Prior to this study, very little was known about the inner shelf, with the exception of the fact that limestone covered the area and sediment was noncontiguous along the floor of the shelf. A Summary of Findings of the West-Central Florida Coastal Studies Project is provided in USGS Open File Report 01-303 (USGS 2003).

Marine Sediments. Side-scan sonar indicated the primary sediment along the seafloor consists of sand and silty sand. In the mooring area and in the pipeline route, the seafloor showed a variety of features and bottom types. Hard-bottom areas were characteristic of bedded calcareous limestone scattered with coral colonies and deposits of shell hash. Sandy seafloor conditions were widespread in the survey area, with sand sheets covering some areas of hard bottom.

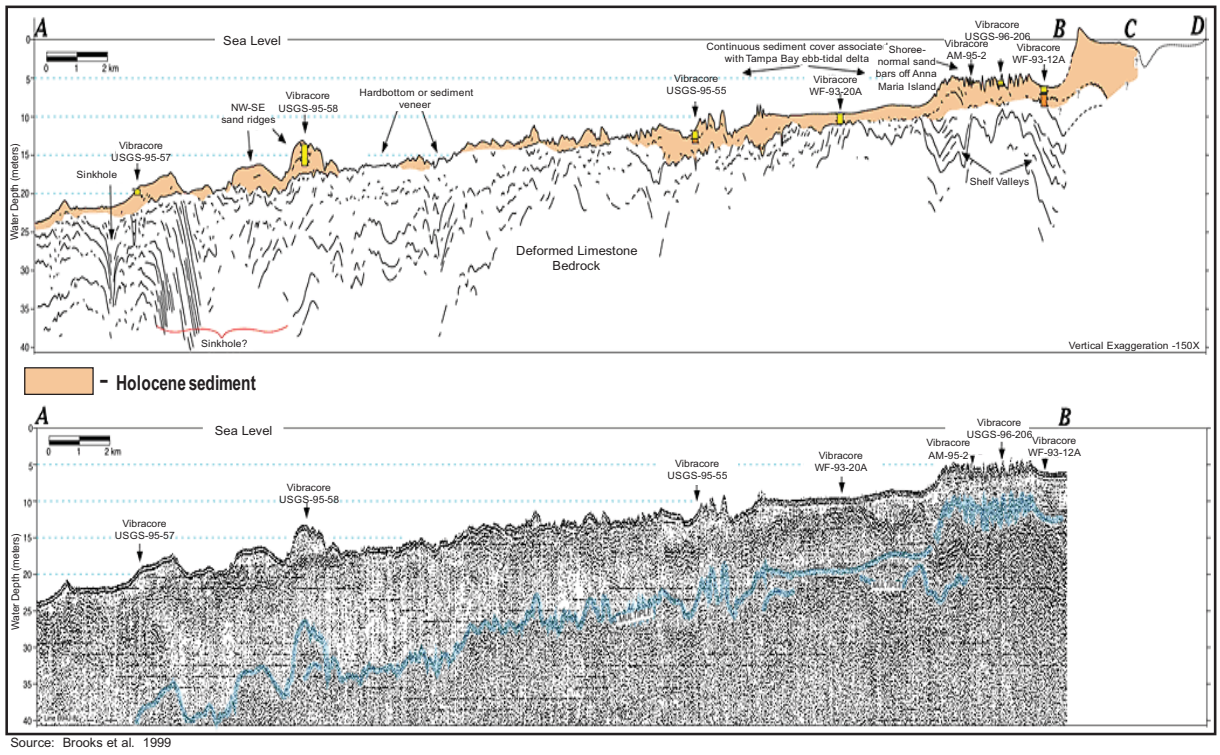
Modern sediment cover within the proposed pipeline can be more than 4 m (13 feet) thick offshore, corresponding with higher topographic relief of sand waves or ridges (USGS 2001). A cross-sectional



Source of Project Transects: USGS 2001

Figure 3.4-2. West-Central Florida Coastal Studies Project

view of Transect #6 (see **Figure 3.4-3)** of the West-Central Florida Coastal Studies Project depicts the offshore set of ridges, as well as shore-normal sand bars off Anna Maria Island. Seaward of the sand bars offshore Anna Maria Island is a wide apron of unconsolidated Holocene sediment associated with the Tampa Bay ebb-tide delta. The Tampa Bay ebb-tide delta is the primary modern source of sediments in the Inner Continental Shelf in this region. Sediment cover from this system extends approximately 10 km (6 mi) offshore (USGS 2001). The geophysical survey found that once inside the bay proper, the seafloor was observed to be primarily smooth sand with areas of sand waves that, from peak to peak, were approximately 4 to 20 m (13 to 65 feet) apart (T. Baker Smith 2007).



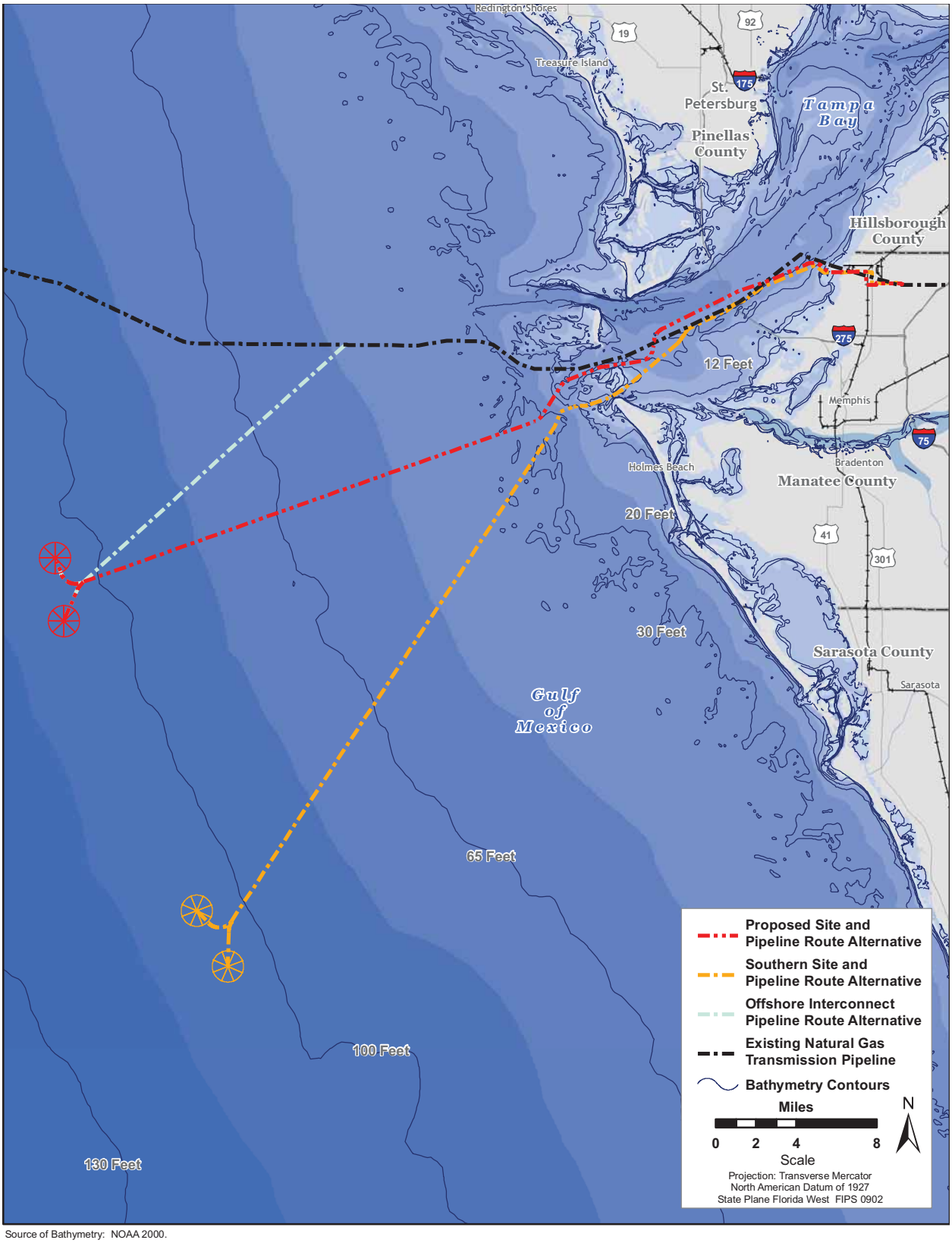
Source: Brooks et al. 1999

Figure 3.4-3. USGS Survey Area Transects

Sediment Veneers. In deeper areas of the shelf shown in the structural cross section (see **Figure 3.4-3**), Holocene sediment thins out and the substrate changes into extensive hard bottom or sediment veneers. These extensive hard-bottom features are present in the Proposed Site and Route Alternative (see **Appendix F2, Maps 4-6)**.

Bathymetry. The majority of the seafloor topography (in the proposed site and pipeline route) is relatively flat with minor undulations associated with migrating bodies of sand and other granular soils such as shell hash. **Figure 3.4-4** depicts the general bathymetry of the Project area. A relatively thin layer of probable sandy sediment covers the seafloor over the northwestern portion of the anchor mooring survey grid covering the mooring area. This layer varies in thickness between 0.3 to 6.0 m (1 to 20 feet) and appears to cover a relict seafloor that is characterized by its high amplitude, suggesting a well-compacted and hard surface in the mooring area. The remainder of the survey grid not covered by this thin veneer of sandy sediments exhibited very limited data penetration and resolution (T. Baker Smith 2007).

The geophysical survey showed the seafloor along the proposed pipeline route gently sloped to the west at a rate of between 0.6 and 1.8 m (2 and 6 feet) per mile (Port Dolphin 2007c). An area of irregular



Source of Bathymetry: NOAA 2000.

Figure 3.4-4. Bathymetry of Proposed Site and Route Alternative

seafloor surface contours was noted in the 18-m (60-foot) water depth range. Here, undulations in the bottom showing relief of 0.6 to 0.9 m (2 to 3 feet) are spread over hundreds and sometimes thousands of meters. Due to the presence of this concentrated area of hard bottom observed during the benthic characterization survey and confirmed during the geophysical survey in the area of the 18-m (60-foot) water depth range (approximately the league line), north-south transects were performed 3 NM north and 3 NM south of the survey corridor during the geophysical survey to determine if a gap was present in the hard-bottom area. Initially it appeared as if a gap did exist, but once additional east-west transects were run over the apparent gap, additional hard-bottom signatures were observed. The results of this additional survey indicated that no "gap" was present in this hard-bottom feature (Port Dolphin 2007c).

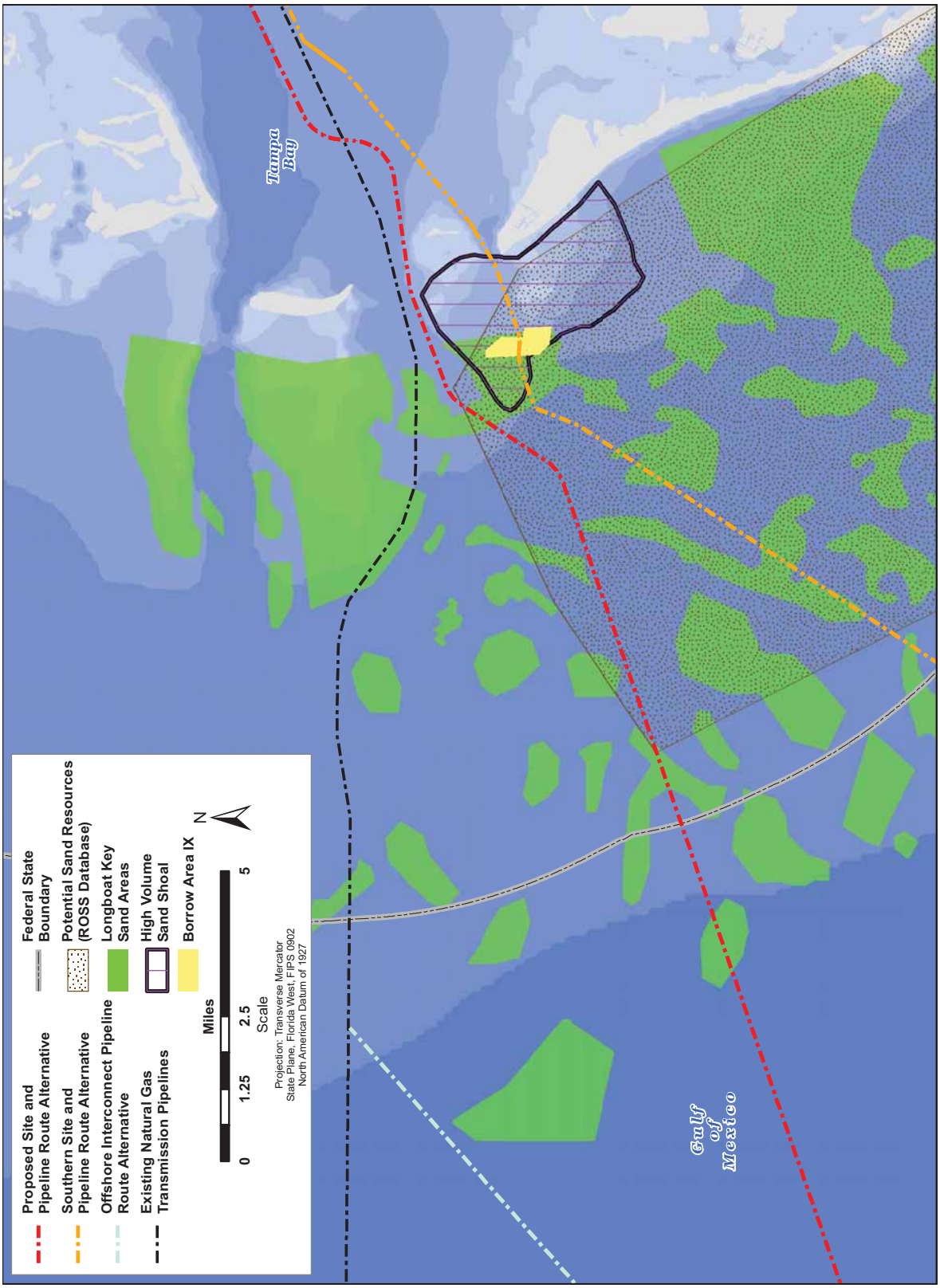
No discernable seafloor features were observed in the geophysical survey at the specific buoy or locations within the mooring area that would be an impediment to their placement. Along the specific pipeline route the seafloor appears free of any obstacles (T. Baker Smith 2007).

The following summary of findings is based on the high-resolution geophysical survey conducted on the proposed site and pipeline route, and is taken directly from the survey report.

- The water depths along the proposed pipeline range between 1.83 and 30.48 m (6 and 100 feet). The majority of the seafloor is relatively flat, with minor undulations associated with migrating sands and shell hash.
- The geophysical survey showed one man-made structure that would have to be avoided: the Gulfstream Natural Gas System 36-inch gas pipeline.

Sand Resources. The suitability of sand for beach renourishment or restoration is dependent on matching the quality of the existing sand to the source sand, and providing the proper mechanical properties to ensure that the beach is stable. Parameters considered for suitability include grain size, mineral content, and color and content of fine sediments. Beach renourishment borrow areas are permitted by the FDEP Bureau of Beaches and Coastal Systems. To receive a permit, the applicant must demonstrate that the area is suitable for beach renourishment both in sand quality and stability, and that the environmental consequences of dredging the borrow area would be acceptable. Currently Borrow Area IX is the only area permitted along the proposed pipeline route.

Potential and current sand resource areas along the proposed pipeline route were determined based on results of the Port Dolphin Pipeline Offshore Geotechnical Investigation-Sand Source Re-Route Survey and the ROSS project and associated database. Additional information on potential and current sand resources was provided in comments submitted by the Town of Longboat Key (Longboat Key 2008), and Manatee and Sarasota counties (Manatee County 2008, Sarasota County 2009). This information included a survey conducted for the Town of Longport Key by Coastal Planning & Engineering, Inc. Information was also provided by FDEP. This information included details on an active sand borrow area permitted by the Town of Longboat Key and identified as Borrow Area IX. This area is approximately 264 acres. An area referred to as the High Volume Sand Shoal, which includes Borrow Area IX, was also identified. This area covers approximately 4,500 acres. The survey information provided by the Town of Longboat Key identified approximately 25 additional areas with potential as future sand borrow areas. These areas have not been fully investigated, and therefore cannot be confirmed to contain beach quality sand resources. These areas include a total of approximately 125,000 acres. Finally, the ROSS-identified area totals approximately 538,000 acres, but this area has also not been fully investigated to determine how much of the area would be suitable for beach nourishment and restoration. **Figure 3.4-5** shows known and potential sand source areas along the proposed and southern pipeline routes.



Source of Proposed Piplines, Florida Gas Transmission Pipeline, and Existing Sand Resources: ConShelf 2007. Source of ROSS Potential Sand Source Area: ConShelf 2008. Source of Borrow Area IX and High Volume Sand Shoal: ConShelf 2009.

Figure 3.4-5. Known and Potential Sand Source Areas Crossed by the Proposed Pipeline Route and Alternatives

Subbottom data profiles collected along the currently proposed pipeline route through the ROSS database potential sand source area indicated that the thickness of the surficial sands vary between a maximum of 5.33 m (17.5 feet) and a minimum of 5 cm (2 in). The maximum thickness occurred only in one or two isolated sites and, similarly, there were areas where no sand cover was discernable on the data at all. The general average is between 1.14 m (3.75 feet) and approximately 2.9 m (9.5 feet). These numbers are estimates based on measuring amorphous pockets observed above the ambient seabed, while variations could exist within the survey area (Port Dolphin 2008a).

In January 2009, MMS published NTL 2009-G04 (MMS 2009a). The NTL refers to an online database that identified Significant OCS Sand Resources in the GOM. The database does not identify any sand resources in the Project area, including the proposed or alternative pipeline routes. (MMS 2009a).

Geologic Hazards. Primary geologic hazards to the pipeline could include the following:

- Buried or sediment-filled river channels
- Karst solution basins
- Sand waves
- Hard-bottom areas showing topographic relief (FERC 2001b).

Potential geologic hazards generally can include the following:

- Ground failure caused by unstable soils (liquefaction)
- Karst terrain/ground subsidence (unexpected formation of sinkholes)
- Seismicity (earthquakes)
- Volcanism
- Shallow gas (e.g., pockmarks and acoustic blanking)
- Competency of bedrock and sediments
- Human activities (mining and existing infrastructure).

Based on geologic and morphologic conditions in Tampa Bay, the potential hazards identified for the Port Dolphin pipeline include seismicity, karst basins, and human activities. These potential hazards are discussed below.

There is a low likelihood of soil/sediment liquefaction, volcanism, shallow gas, or landslides at the Project site. There are no faults beneath the Project site or abrupt topographic differences capable of creating landslides. There is a low likelihood for seismic activity at the Project site; the USGS Seismic Risk Map of Florida shows the proposed pipeline route is located in Zone 0, meaning there is no expected damage from an earthquake (USGS 2008).

Based on topographic maps, aerial imagery, and record reviews, human activities include inactive mining operations within the Project area.

The geophysical survey revealed a number of anomalies, some of which had a particular signature, such as a linear feature that is likely a utility corridor, or artificial reefs associated with the Sunshine Skyway Fishing Pier. In some cases, vague anomalies resembled filled channels, occurring at depths between 1.5 and 6 m (5 and 20 feet) below the seafloor. These features could be sinkholes; however, the features appeared stable, as though these systems had completed developmental processes. These channels could instead be a result of sea level rising and falling during the late Pleistocene and early Holocene (T. Baker Smith 2007).

The geophysical survey did not identify any faults or any other geologic hazard within the survey area.

3.4.3.1 Southern Site and Route Geology

A high-resolution geophysical survey of the Southern Port Site and Route Alternative was conducted in November 2007 by T. Baker Smith, Inc., under contract with Höegh LNG (Port Dolphin 2008a). One line down the centerline of the proposed Southern Route and two parallel lines 100 m to each side of the centerline were surveyed. In the buoy mooring area, 10 lines at a spacing of 300 m were surveyed to cover the entire area of anchoring for the buoy system. Survey equipment included side-scan sonar, an echo sounder to record water depths, a magnetometer to detect ferrous metal objects, and a subbottom profiler used to define shallow variations in sub-surface seabed sediments, shallow fault lines, and gas pockets (Port Dolphin 2008a).

Fathometer data collected during the survey reflect a slightly irregular seabed with minor depressions and slight topographic highs associated with sand accumulations. The seabed appears as an irregular surface interrupted by sandy accumulations and suspected hard-bottom areas and depressions. These irregularities could result from remnant shoals, which formed shortly after the last sea transgression of the area. Most of the features only affect the ambient seafloor by less than 2 to 3 feet. However, they extend laterally over several hundred feet. The majority of the seafloor topography as seen on the subbottom profiles is relatively flat with minor undulations associated with migrating bodies of sand and other granular sediments such as shell hash (Port Dolphin 2008a).

Along the specific pipeline route, the seabed slopes smoothly to the west at an average rate of between 2.1 and 2.5 feet per mile. The fathometer data did not show any evidence of topographic anomalies that could adversely influence the construction or lifetime operation of the proposed pipeline and mooring buoy structures (Port Dolphin 2008a).

Side-scan sonar data which was collected on each of the survey lines were utilized to map the seafloor reflectivity and any visible obstructions that could affect the construction or installation of the pipeline or buoys. In the mooring area and proposed pipeline route the sonar data displayed a seafloor of varied topographic features and bottom types. The sonar records displayed areas of sandy and suspected hard-bottom seafloor. The hard bottom is believed to consist of bedded calcareous limestone scattered with coral colonies and deposits of shell hash in varying degrees of concentration and extent. Based on the survey data the total percentage of hard bottom is greater for the Southern Route with 40.4 percent occurring along the Southern Route and 16.58 percent occurring along the Preferred Route. The exact classification of the hard-bottom features could not entirely be made based on the side-scan sonar alone. The sandy seafloor areas occurred as widespread deposits of sand with no discernable seafloor irregularities other than sand ridges in some locations (Port Dolphin 2008a).

Considering the known geologic conditions of the west Florida shelf, it is a reasonable assumption that seafloor conditions in the alternative routes are similar to the proposed route (USGS 2001).

The Southern Route would lie between the Egmont Channel waterway and Passage Key to the northern edge of the Terra Ceia AP. It would then turn north towards Manbirdtee Island and reach landfall on the southern side of Port Manatee. The major components of the southern pipeline route include the following:

- Two STL buoys, which would be separated by a distance of approximately 5 km (3 mi) and two flow lines that connect to the transmission line
- The 74 km (46 mi) offshore gas transmission line.

Once the pipeline makes landfall at Port Manatee, the pipeline would follow the proposed onshore route with one exception. The Southern Route Alternative would cross CSX railroad and U.S. Highway 41 before turning south along the eastern side of Highway 41 where it then follows the Proposed Route to the interconnection station.

Sediments. As with the proposed route, sediment cover can be more than 4 m (13 feet) thick offshore, corresponding with higher topographic relief of sand waves or ridges. The Tampa Bay ebb-tide delta can move sediment up to 10 km (6 mi) offshore. The cause of the ridges has not been determined. In deeper areas of the shelf, Holocene sediment thins out and the substrate changes into extensive hard bottom or sediment veneers. These hard-bottom features are present in the Southern Route Alternative (see **Appendix F2, Maps 1-7)**.

Sand Resources. Potential and current sand resource areas along the Southern Site and Route Alternative were determined from the same sources discussed in **Section 3.4.3**. **Figure 3.4-5** shows known and potential sand source areas along the Southern Route alternative. Sub-bottom data profiles collected along the currently proposed pipeline route through the ROSS database potential sand source area indicated that the thickness of the surficial sands vary between a maximum of 5.33 m (17.5 feet) and a minimum of 5 cm (2 in). The maximum thickness occurred only in one or two isolated sites and, similarly, there were areas where no sand cover was discernable on the data at all. The general average is between 1.14 m (3.75 feet) to approximately 2.9 m (9.5 feet). These numbers are estimates based on measuring amorphous pockets observed above the ambient seabed, while variations could exist within the survey area. The same average sand thicknesses were assumed for the Southern Route Alternative (Port Dolphin 2008a).

Geologic Hazards. For both the proposed and alternative route, in general, primary geologic hazards to the pipeline include the following:

- Buried or sediment-filled river channels
- Karst solution basins
- Sand waves
- Hard-bottom areas showing topographic relief (FERC 2001b).

There is a low likelihood of sediment liquefaction, volcanism, shallow gas, or landslides at the Project Site. There are no faults beneath the Project Site or abrupt topographic differences capable of creating landslides. There is a low likelihood for seismic activity at the Project site; the USGS Seismic Risk Map of Florida shows the proposed pipeline route is located in Zone 0, meaning there is no expected damage from an earthquake (USGS 2008).

Based on topographic maps, aerial imagery, and record reviews, human activities include active and inactive mining operations within the Project area. Areas along and in proximity to the southern pipeline route could be candidate sites for future mining of sandy sediments.

3.4.3.2 Offshore Gulfstream Pipeline Interconnect

Detailed information about seafloor conditions are only available for the proposed pipeline route (however, portions of the alternative routes do overlap with the path of the proposed route). Considering the known geologic conditions of the west Florida shelf, it is a reasonable assumption that seafloor conditions in the alternative routes are similar to the proposed route (Port Dolphin 2007c).

The Offshore Gulfstream Pipeline Interconnect would extend to the northeast from the location of the proposed buoy site for approximately 28.8 km (18 mi) were it would connect into the existing Gulfstream Pipeline. The major components of the Offshore Gulfstream Pipeline Interconnect include the following:

- Two STL buoys, which would be separated by a distance of approximately 5 km (3 mi) and two flow lines that connect to the transmission line
- The 28.8-km (18-mi) offshore gas transmission line.

No additional new onshore gas transmission line would be constructed in association with the Offshore Gulfstream Pipeline Interconnect.

Sediments. As with the proposed route, sediment cover can be more than 4 m (13 feet) thick offshore, corresponding with higher topographic relief of sand waves or ridges. The Tampa Bay ebb-tide delta can move sediment up to 10 km (6 mi) offshore. The cause of the ridges has not been determined.

In deeper areas of the shelf, Holocene sediment thins out and the substrate changes into extensive hard bottom or sediment veneers. The Offshore Gulfstream Pipeline Interconnect route does not pass through any permitted or proposed borrow sites.

Geologic Hazards. For both the proposed route and Offshore Gulfstream Pipeline Interconnect route, in general, primary geologic hazards to the pipeline include the following:

- Buried or sediment-filled river channels
- Karst solution basins
- Sand waves
- Hard-bottom areas showing topographic relief (Port Dolphin 2007c).

There is a low likelihood of soil liquefaction, volcanism, shallow gas, or landslides at the Project Site. There are no faults beneath the Project Site or abrupt topographic differences capable of creating landslides. There is a low likelihood for seismic activity at the Project site; the USGS Seismic Risk Map of Florida shows the proposed pipeline route is located in Zone 0, meaning there would be no expected damage from an earthquake (USGS 2008).

Based on record reviews, human activities include an ODMDS located approximately 1.2 km (0.75 m) southeast of the gas transmission line alignment.

3.4.3.3 FSRU Geology

The location of the FSRU and gas transmission line is the same as the STL Buoys and transmission line for the proposed Site. See the discussion of geologic and soil conditions described under the proposed Site in **Section 3.4.3** for a description of existing conditions under the FSRU alternative.

3.4.4 Terrestrial Geology

Geologic Setting. Soil and geological resources were analyzed along the proposed pipeline route between the mean high water mark at Port Manatee and its termination at the interconnection station. The onshore pipeline route is approximately 6.4 km (4 mi). Land surface elevations along the onshore route increase from Port Manatee at between 7 to 9 feet (2.1 to 2.7 m) to the interconnection station at between 7.6 to 9 m (25 to 30 feet) National Geodetic Vertical Datum (Port Dolphin 2007b).

The proposed pipeline lies entirely within the Southern Gulf Coastal Lowlands, a physiographic District of Miocene and Pliocene sediments with thin or nonexistent Quaternary deposits. Topography within this area is largely controlled by a series of marine terraces formed during the Pleistocene Era when the sea level was above its present level. In the vicinity of the proposed pipeline route these terraces are relatively flat and poorly drained (Brown 1983).

The regional geology of western Manatee County comprises a stratigraphy of a few tens of feet of surficial sands, shell, and clayey sands overlying several hundreds of feet of limestone and dolomite. Specifically, the geologic sequence in ascending order from Eocene to Recent Age consists of the Middle Eocene Age Avon Park Formation, Upper Eocene Ocala Limestone, Oligocene Age Suwannee Limestone, Miocene Age Hawthorn Group, and Plio-Pleistocene to Recent Age undifferentiated surficial soils (Scott 1990).

The oldest formation of interest in the study area is the Middle Eocene Avon Park Formation. The Avon Park Formation consists of interbedded limestone and dolomite. The limestones range from a white to brown, soft to hard, fine to granular, fossiliferous limestone. The dolomites are light to dark brown, hard, microcrystalline to crystalline dolomite. The formation is greater than 213 m (700 feet) thick and very permeable (Scott 1990).

The Upper Eocene Ocala Limestone unconformably overlies the Avon Park Formation. The upper zones of the formation consist of white to light gray, soft, friable, chalky, highly fossiliferous, silty to granular limestone. Lower zones are more granular, very porous and contain beds of brown and light brown, hard, crystalline dolomite. The formation is approximately 91 m (300 feet) thick and generally lies approximately 595 feet (181 m) below land surface, or approximately 174 m (570 feet) below sea level (Scott 1990).

Suwannee Limestone of Oligocene Age unconformably overlies the Ocala Limestone. The Suwannee Limestone consists of a white to light brown, soft to hard, granular, very fossiliferous, porous limestone with some beds of crystalline dolomite. The top of the formation generally occurs 61 m (200 feet) below land surface or 113 m (370 feet) below sea level. Numerous interconnected solution cavities exist within the Suwannee Limestone (Scott 1990).

The Hawthorn Group unconformably overlies the Suwannee Limestone and is composed of the Arcadia Formation and overlying Peace River Formation. The lower part of the Arcadia Formation consists of the Tampa Member. The Nocatee Member of the Hawthorn Formation is eroded away in the vicinity of the proposed Pipeline route. The Tampa Member (locally referred to as the “Tampa Limestone”) consists of white, gray, and brown, hard, dense, sandy, locally phosphatic, fossiliferous limestone displaying relatively high permeabilities due to interconnected solution features. The Tampa Member is the major producing zone of the intermediate aquifer system. The top of this member is approximately 82 m (270 feet) below land surface or 75 m (245 feet) below sea level (Scott 1990).

The Arcadia Formation (undifferentiated) of the Hawthorn Group consists of light gray and brown, sandy, phosphatic, calcareous hard clay and claystone overlying light gray and brown, sandy, phosphatic, dolomitic limestone with minor layers of sand, clay, and phosphate. The top of the Arcadia Formation is a dissected, irregular, erosional surface. Impervious deposits within the Arcadia formation act as confining beds for the underlying major producing zone of the intermediate aquifer system. The top of the Arcadia Formation is approximately 12 m (40 feet) below land surface, and it has an approximate thickness of 82 m (230 feet). The Peace River Formation of the Hawthorn Group, composing the lower part of the surficial aquifer system, unconformably overlies the Arcadia Formation, and consists of phosphatic clayey sand and sandy clay, which are typically mined for their phosphate. Although the

formation is clayey, it is relatively pervious. The top of the formation occurs at 3 to 6 m (10 to 20 feet) below land surface and is up to 9 m (30 feet) thick (Scott 1990).

Aboveground Facilities. Soil and geological resources were analyzed along the onshore pipeline route between the mean high water mark at Port Manatee and its termination at the interconnection station. The onshore portion of the pipeline would be approximately 6.4 km (4 mi).

The surficial geology in the vicinity of the proposed Interconnection Station, which would have a footprint of approximately 1.2 hectares (3 acres), consists of undifferentiated surficial soils, classified as Cassia series fine sand. These sands form in thick deposits of marine sands consisting of somewhat poorly drained to moderately well-drained soils, and grade into the Plio-Pleistocene Peace River Formation, consisting of sand, clay, and clayey sand (Hyde and Huckle 1983).

Blasting. No blasting is expected to be necessary along the proposed pipeline route. The Bradenton fine sand/limestone substratum might contain unweathered limestone from 111 to 195 cm (44 to 77 inches) below land surface. The unweathered limestone is expected to be discontinuous and is not likely to require blasting (Port Dolphin 2007l).

Mineral Resources. Based upon recent aerial imagery, and the Cockroach Bay 7.5-minute series USGS topographic quadrangle, there are three inactive sand pits along the proposed pipeline route. The first inactive mining area is approximately 219 m (279 feet) from the construction ROW, the second is approximately 441 m (1,450 feet) from the construction ROW, and the third inactive mining area is approximately 12 m) from the construction ROW (Port Dolphin 2007l).

The Manatee County Environmental Management Department records show that active mining permits have been issued for the land south of the proposed pipeline, between FM 233,278 and FM 236,793, 37 m (120 feet) south of the construction ROW. Another mining permit has been issued for property on the west side of Grass Farm Road approximately 90 m (3,250 feet) north of Buckeye Road and the proposed pipeline route. In addition, vacant land south of the proposed pipeline route has potential for the mining of sandy soils (Port Dolphin 2007l).

Soils. Existing onshore sediments are composed of carbonate-rich Canaveral sands of marine origin which grade into the Wulfert-Kesson association of poorly drained rapidly permeable soils, associated with mangrove swamps. NRCS soil maps show the first several hundred feet of proposed pipeline as water. Based on the review aerial of photography, these areas have been reworked and are now referred to as Altered Land in this report.

Soils occurring along the onshore portion of the proposed pipeline route are shown in **Figures 3.4-6** and **3.4-7,** and listed in **Table 3.4-3**. The majority of soils encountered along both the proposed pipeline routings belong to the B/D or D hydrologic soil group. Hydrologic soil group B/D indicates the classification with improved drainage. Approximately 50 percent of the Project area is composed of EauGallie series soils. EauGallie soils are poorly drained soils formed with thick beds of sandy and loamy marine sediments (Hyde and Huckle 1983).

Aboveground Facility Soils. Soils mapped in the area of the Port Manatee valve station include the Wulfert and Kesson series. The Wulfert series is very deep and very poorly drained with rapid permeability. The Kesson series is deep and very poorly drained with a rapid to moderately rapid permeability. The Wulfert and Kesson series under natural conditions are flooded during normal daily high tides. The soils at this site were probably altered when the Port was developed (Hyde and Huckle 1983). The Port Manatee valve station would encompass 0.028 hectares (0.07 acres).

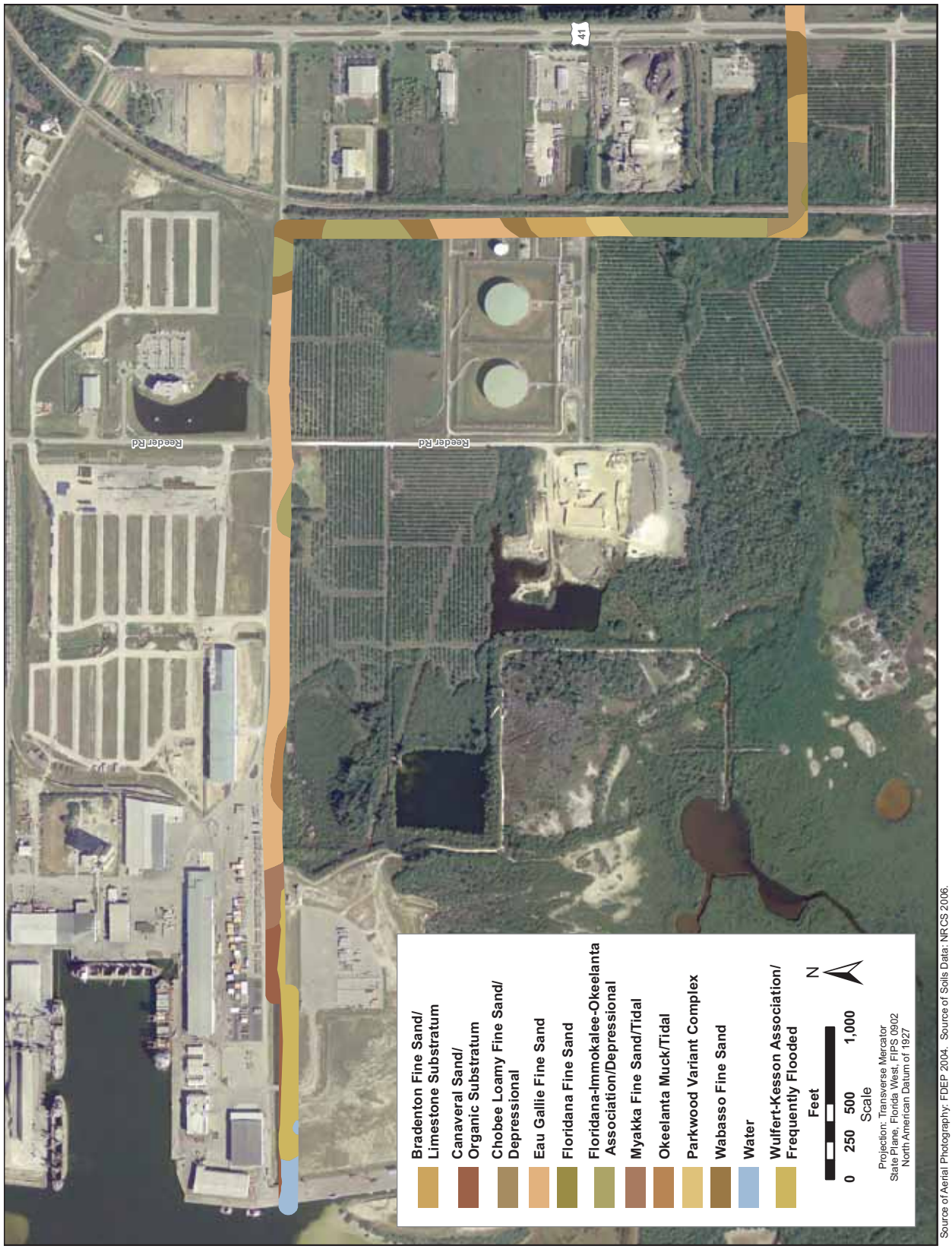


Figure 3.4-6. Soils Along the Proposed Route at Landfall



Figure 3.4-7. Soils Along the Proposed Onshore Route

Table 3.4-3. Soil Classifications

Soil Mapping Unit	Drainage Class	Hydrologic Group
Altered Land	-	-
Bradenton fine sand/limestone substratum	Poorly drained	B/D
Canova, Anclote, and Okeelanta soils	Very poorly drained	B/D
Cassia fine sand	Moderately well-drained	C
Chobee Loamy fine sand	Very poorly drained	D
EauGallie fine sand	Poorly drained	B/D
Floridana-Immokalee-Okeelanta association	Very poorly drained	D
Myakka fine sand, tidal	Very poorly drained	D
Okeelanta muck, tidal	Very poorly drained	D
Palmetto sand	Poor or somewhat poorly drained	B/D
Parkwood Variant complex	Poor or somewhat poorly drained	B/D
Wabasso fine sand	Poor or somewhat poorly drained	B/D
Wulfert-Kesson association	Very poorly drained	D

Source: Hyde and Huckle 1983

Notes:

B. The soils have a moderate infiltration rate when thoroughly wetted. They chiefly are moderately deep to deep, moderately well-drained to well-drained soils that have moderately fine to moderately coarse textures. They have a moderate rate of water transmission.

C. The soils have a slow infiltration rate when thoroughly wetted. They chiefly have a layer that impedes downward movement of water or have moderately fine to fine texture. They have a slow rate of water transmission.

D. The soils have a very slow infiltration rate when thoroughly wetted. They chiefly consist of clay soils that have a high swelling potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. They have a very slow rate of water transmission.

Note: Dual hydrologic groups, B/D, and C/D, are given for certain wet soils that can be adequately drained. The first letter applies to the drained condition, the second to the undrained. Only soils that are rated D in their natural condition are assigned to dual classes. Soils can be assigned to dual groups if drainage is feasible and practical.

The Cassia fine sand is mapped in the area of the proposed Interconnection Station. The Cassia fine sand forms in thick deposits of marine sands and consists of somewhat poorly drained to moderately well-drained soils with moderate to moderately rapid permeability. Without drainage improvement, the seasonal high water table is 38 to 101 cm (15 to 40 inches) below land surface. The Gulfstream Interconnection Station would encompass approximately 1.2 hectares (3 acres) (Port Dolphin 2007b).

Geologic and Soil Hazards. As with the proposed route and each alternative route, in general, primary potential geologic hazards to the terrestrial pipeline could include the following:

- Siesmic hazards
- Active faults
- Soil liquifaction
- Landslides
- Karst terrain/land subsidence.

There is a low likelihood for seismic activity in the Project area; the USGS Seismic Risk Map of Florida shows the pipeline routes are located in Zone 0, meaning there is no expected damage from an earthquake. The USGS Earthquake Probability Mapping tool identifies the pipeline routes as having between a 0.006 and 0.007 probability of a magnitude 4.75 occurring in the next 50 years. No known active faults exist within the State of Florida (USGS 2008).

Soil liquefaction typically occurs in saturated sediments due to earthquake activity. Because of the low probability of earthquakes occurring in the region of the pipeline routes, the likelihood of earthquake-induced liquefaction is not a concern. Due to the flat nature of the topography around the proposed pipeline routes, landslides are also not anticipated (Port Dolphin 2007c).

The USGS classifies all of Manatee County as an area where sinkholes are few, but large diameter and deep sinkholes can occur. Based on the Florida Geological Survey Sinkhole Database there are four known recent sinkholes in Manatee County; two have been documented within 16 km (10 miles) of the pipeline routes (Port Dolphin 2007c).

3.5 Marine Areas and Land Use

3.5.1 Definition of the Resource

The terms marine areas and land use refer to real property classifications that indicate either natural conditions or the types of human activities occurring or permitted within a defined area in the water, or within or adjacent to a parcel of land.

The OCSLA, as amended, defined the OCS, and authorized regulations to conserve OCS resources, including the exploration, development, and production of mineral resources, and other activities on the OCS. Within Federal waters of the GOM, functional land use is regulated through MMS with lease blocks and ROW permits for defined OCSLA activities. Other functional uses for the GOM include military warning areas, shipping lanes and anchorages, alternate energy uses on the OCS, and dredge disposal areas. Congress enacted the CZMA in 1972 to encourage states to preserve, protect, develop, and, where possible, restore or enhance valuable natural coastal resources such as wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs; and fish and wildlife that use those habitats. As such, the State of Florida would require that the Proposed Action meet their CZMA consistency certification (15 CFR 930.57) for Federal permitting.

Onshore, land use planning is done by Federal, state, and local planning and zoning entities. Functional uses for land in Florida include wetlands and waterbodies, agriculture, roads and utility ROWs, commercial and industrial lands, and residential areas. The main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent parcels or areas. Compatibility among land uses fosters the societal interest of obtaining the highest and best uses of real property. Tools supporting land use planning include written master plans, management plans, and zoning regulations.

The Proposed Route and Southern Route alternatives are evaluated for their potential to affect the Project sites and adjacent marine and land uses both. The foremost factor affecting the use of the area is compliance with existing functional uses, regulations, and zoning plans. Other relevant factors include matters such as existing land uses on adjacent sites, the duration of a proposed activity, and its permanence as a change in marine activities or land use.

3.5.2 Marine Areas

Activities in the GOM define the way areas are designated. Shipping activities, commercial and recreational fishing, USACE and other Department of Defense (DOD) activities, and MMS mineral leasing activities are prominent in the OCS of the GOM. There are also man-made and naturally occurring land uses in the GOM that include artificial reefs created by man-made structures, biologically sensitive areas, and topographic features. As such, areas of the OCS have been designated to accommodate all these major activities and resources. Port Dolphin and its offshore pipelines would traverse through or near the following land uses and area designations in Federal and state waters:

- Inactive Lease Blocks (managed by MMS for oil, natural gas, alternate energy uses on the OCS, and mineral production)
- Transportation Waterways (for maritime shipping and traveling)
- Dredged Material Disposal Areas (managed collectively by the USACE and Port Authorities)
- Coastal Zone Management Areas (for the protection and enhancement of state coastal areas).

3.5.2.1 Lease Blocks

MMS does not currently lease any blocks in the Tampa Bay area or northeastern GOM for the exploration of oil and gas resources. It is possible that MMS could lease the blocks traversed by the Project should a license be granted and the lease blocks receive a bid (see **Figure 2.3-4**). Due to the GOM Energy Security Act of 2006, these blocks would not become available for an OCS Lease Sale until after June 30, 2022. A lease sale is the process where the rights to explore for oil and gas resources are conveyed to qualified bidders. The process begins with a NEPA review for each oil and gas Lease Sale and ends with a public reading of sealed bids.

3.5.2.2 Transportation Safety Fairways

The purpose of shipping safety fairways and anchorage areas is to control the erection of structures along designated pathways in order to provide safe approaches for vessels traversing the GOM to entrances of major ports along the Gulf Coast. A shipping safety fairway is a lane or corridor in which no artificial island or fixed structure, temporary or permanent, will be permitted. The main shipping channel, Egmont waterway, and Port Manatee waterway shipping fairways are in the vicinity of the Project, as shown in **Figures 2.3-1** and **2.3-2**.

3.5.2.3 Ocean Dredged Material Disposal Areas

In 1972, Congress enacted the MPRSA, also known as the Ocean Dumping Act, to prohibit the dumping of material into the ocean that would unreasonably degrade or endanger human health or the marine environment. Virtually all material that is ocean-dumped today is dredged material (sediments) removed from the bottom of waterbodies to maintain navigation channels and berthing areas. Other materials that are currently ocean-disposed include fish wastes, human remains, and vessels (USEPA 2006).

Ocean dumping cannot occur unless a permit is issued under the MPRSA. In the case of dredged material, the decision to issue a permit is made by the USACE, using USEPA's environmental criteria and subject to USEPA's concurrence. For all other materials, USEPA is the permitting agency. USEPA is also responsible for designating recommended ocean-dumping sites for all types of materials (USEPA 2006). Currently, there is one ODMDS in the Project vicinity, and several spoil sites for waterway maintenance. These sites are depicted on **Figure 2.3-1**.

3.5.3 Coastal Zone Management Areas

The national Coastal Zone Management Program (CZMP) is authorized by the CZMA of 1972 and administered at the Federal level by the Coastal Programs Division (CPD) within the NOAA Office of Ocean and Coastal Resource Management. The State of Florida has a federally approved coastal management program, and the FDEP is responsible for directing the implementation of the statewide coastal management program (FDEP 2006a).

The Coastal Use Permit Program, managed by the FDEP, seeks to protect and sustain Florida's natural, cultural, historical, and economic coastal resources and communities. The Florida Coastal Management Program (FCMP) activities are implemented in partnership with FCMP network agencies through program support projects, and coordinated reviews of Federal activities for consistency with the statutory authorities in the FCMP. FDEP is responsible for directing the implementation of the FCMP.

The Applicant has completed a Federal consistency certification to describe how the Port Dolphin project complies with the policies of the CZMP. It is expected that the State of Florida would provide a concurrence, objection, or request for an extension relative to the Proposed Action after the publication of the Final EIS. The State of Florida would either concur or object to the certification and analysis.

3.5.4 Land Use

There is no nationally recognized uniform terminology for describing land use categories, but the State of Florida has developed the FLUCCS (FDOT 1999). The following general land use categories are located in the Project area: agricultural lands, wetlands, urban land, and residential lands.

ROW Collocation. The Port Dolphin routes have been designed to use existing utility corridors to the best extent possible. Port Dolphin Energy LLC intends to use a construction ROW of 100 feet, and an operation ROW of 30 feet. By collocating with other utilities, land use easements can be overlapped, thus reducing the overall footprint of the linear project. Where collocated with another utility, the ROW would be reduced by 15 feet. The Applicant would follow the FERC Plans and Procedures (see **Section 2.3.9**) during construction and operation of the onshore portion of the pipeline. This would include BMPs for erosion control.

Acquiring Land. Port Dolphin Energy LLC would obtain easements from landowners to construct its pipeline. The easement would allow Port Dolphin Energy LLC to construct, operate, and maintain the pipeline ROW. The easement between the landowner and Port Dolphin Energy LLC typically specifies compensation for the loss of use during construction. The acquisition of an easement is a negotiable process that would be carried out between Port Dolphin Energy LLC and individual landowners. However, if the onshore portion of the Project is approved by the FERC Commission, that approval conveys with it the right of eminent domain. Therefore, if easement negotiations fail to produce an agreement, Port Dolphin Energy LLC could initiate condemnation proceedings in accordance with Florida state law.

3.6 Recreation and Aesthetics

3.6.1 Definition of the Resource

Recreational resources include areas and infrastructure designated by local, state, and Federal planning entities to offer visitors and residents diverse opportunities to enjoy leisure activities. Recreational resources are those places or amenities set aside as parklands, beaches, trails (e.g., hiking, skiing,

bicycling, equestrian), recreation fields, sport and recreational venues, open spaces, and a number of other locales. National, state, and local jurisdictions typically have designated land areas with defined boundaries for recreation. Other less-structured activities, for example, hunting or cross-country skiing, are performed in broad, less-defined locales. A recreational setting might consist of natural or human-made landscapes and range in size from a roadside monument to a multimillion-acre wilderness area.

Visual resources are defined as the natural and man-made features that give a particular setting or area its aesthetic qualities. These features define the landscape character of an area and form the overall impression that an observer receives of that area. Evaluating the aesthetic qualities of an area is a subjective process because the value that an observer places on a specific feature varies depending on his/her perspective. For example, an engineer might appreciate the span of a bridge or a causeway, while a geologist might appreciate the exposure of a particular sequence of strata in a road cut. In general, a feature observed within a landscape can be considered as "characteristic" (or character-defining) if it is inherent to the composition and function of the landscape. Landscapes do change over time, so the assessment of the environmental impacts of a proposed action on a given landscape area must be made relative to the "characteristic" features currently composing the landscape or area.

Visual resources within the coastal waterway environment can include both man-made and natural features. In urban settings, man-made features dominate the landscape; while in rural settings, natural features dominate. Examples of natural visual resources that might occur along coastal areas would include landforms such as beaches, marshes, estuaries, wetlands, and coastal riffs. Within more urban settings, natural features might include parks and other green spaces, or waterfalls and ponds associated with milling operations. Examples of man-made features with dominantly natural landscapes might include farmsteads (houses and outbuildings), bridges, causeways, jetties, ports, wharves, piers, lighthouses, canals, docks, and historic forts or fortifications (intact or ruins).

3.6.2 Existing Conditions

Coastal Recreation and Viewing Areas. Florida recreation is centered on boating, beaches, and natural areas. Popular coastal recreation and viewing areas include the Terra Ceia AP in Manatee County, and the Cockroach Bay AP in Hillsborough County. The Terra Ceia AP was established in 1984 and covers approximately 25,786 acres of submerged lands that protect seagrass beds, oyster reefs, and mangroves. Cockroach Bay AP was established in 1976 and was designated as an OFW in 1979. Cockroach Bay AP encompasses approximately 8,583 acres and includes part of the Little Manatee River. Hillsborough Community College Environmental Studies Center is an 18-acre educational facility adjacent to the Cockroach Bay AP.

Boating activities are also very popular along the western coast of Florida. Hillsborough and Pinellas counties have public boat ramps. There are also 15 public marinas throughout the western side of Florida, three of which are in the Tampa Bay area. In addition to the public ramps, there are also several private boat ramps in residential areas. Commercial and recreational boating activities include touring and fishing. There are several boats registered in the vicinity of the Project for private and commercial uses. As outlined in **Table 3.6-1,** there are more than 128,000 private and commercial boats registered in the counties that surround the Project area. **Table 3.6-2** shows the annual landings statistics for the Tampa Bay area in 2006. **Section 3.9**, Socioeconomic Resources and Environmental Justice, will discuss the economics of these activities in the area.

Table 3.6-1. Registered Vessels in Hillsborough, Manatee, and Pinellas Counties, Florida

County	Total Vessels Registered	Commercial Vessels Registered
Hillsborough	48,526	824
Manatee	20,712	610
Pinellas	56,432	1,313
Totals	**125,670**	**2,747**

Source: FWC 2007f, NMFS 2006b, NMFS 2007a

Table 3.6-2. Annual Landings Statistics for Hillsborough, Manatee and Pinellas Counties, Florida in 2006

County	Total Finfish Landed (lbs)	Total Number of Finfish Trips	Total Invertebrates Landed (lbs)	Total Number of Invertebrate Trips
Hillsborough	755,188	1,772	283,703	1,218
Manatee	2,875,807	1,690	229,339	1,590
Pinellas	7,648,903	8,712	906,953	4,764

Source: FWC 2007f , NMFS 2006b, NMFS 2007a

Recreation on Local Islands. The Pinellas County Park system includes both island and aquatic preserves. Honeymoon Island Park is approximately 385 acres in land area with approximately 2,400 submerged acres and 4 miles of beach. Activities include bird watching, picnicking, hiking, fishing, and various other beach activities. Caladesi Island State Park, also within the Pinellas County AR, is composed of six islands with a total of approximately 668 upland acres and more than 2,500 acres of surrounding mangroves, tidal flats, and seagrass beds. Fort De Soto Park is the largest park within the Pinellas County Park System. This park consists of approximately 1,136 acres made up of five interconnected islands. Activities include bird watching, picnicking, hiking, fishing, and various other beach activities. Annual park attendance averages more than 2.7 million visitors. The Egmont State Park is at the mouth of Tampa Bay, and is cooperatively managed by the FDEP, USFWS, and USCG. Primarily a wildlife refuge, it is accessible only by private boat. Recreational activities include swimming, fishing, wildlife viewing, and picnicking.

Onshore Recreational and Viewing Areas. Onshore recreation and viewing areas include the Upper Tampa Bay Park and the Hillsborough River State Park, and the Little Manatee River State Recreation Area. The Upper Tampa Bay Park is in Western Hillsborough County, includes approximately 2,144 acres, and features a 600-acre peninsula on Old Tampa Bay Hillsborough River State Park. The Hillsborough River State Park opened in 1938 as one of Florida's first state parks. This park is divided by the swiftly flowing Hillsborough River. Fort Foster, a replica of an 1837 fort from the Second Seminole War, is located on the park grounds, adjacent to the river. The river provides opportunities for fishing, canoeing, and kayaking; a canoe/kayak launch is available on the river. Other activities include hiking, cycling, camping, and picnicking. Little Manatee River State Recreation Area begins in a swampy area near Fort Lonesome and flows almost 40 miles before emptying into Tampa Bay. The river has been designated an OFW and is part of the Cockroach Bay AP. Activities include fishing, boating, hiking, horseback riding, camping, and picnicking.

3.7 Air Quality

3.7.1 Definition of the Resource

In accordance with Federal CAA requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these "criteria pollutants" in ambient air are expressed in units of ppm, micrograms per cubic meter ($\mu g/m^3$), or milligrams per cubic meter (mg/m^3). The air quality in a region is a result not only of the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological "air basin," and the prevailing meteorological conditions.

The CAA directed USEPA to develop, implement, and enforce environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to affect human health and the environment. USEPA established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: ozone (O_3), CO, nitrogen dioxide (NO_2), SO_2, respirable particulate matter (including particulates equal to or less than 10 microns in diameter [PM_{10}] and particulates equal to or less than 2.5 microns in diameter [$PM_{2.5}$]), and lead (Pb). The primary NAAQS are ambient air quality standards of which maintenance is required to protect the public health, with an adequate margin of safety. Secondary NAAQS specify levels of air quality of which maintenance is required to protect the public welfare. This maintenance includes effects of pollution on vegetation, crops, wildlife, economic values, and visibility.

The CAA requires states to designate any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for a criteria pollutant as a nonattainment area. There are currently no areas in the State of Florida designated as nonattainment for any air pollutant. However, on March 7, 2009, FDEP recommended to the USEPA that counties in the Tampa Bay Area, including Pinellas, Hillsborough, Sarasota, and Manatee, be designated as nonattainment for the 8-hour ozone NAAQS, based on 2006–2008 ozone air quality monitoring data for these counties. USEPA is scheduled to make final nonattainment designations for the 2008 8-hour ozone NAAQS in March 2010.

Under the Federal Prevention of Significant Deterioration (PSD) program, Class I areas are assigned to protect Federal wilderness areas such as national parks, where the least amount of air quality deterioration is allowed (see **Section 3.7.3**). The Port would be within 300 km (186 mi) of two Class I areas, the Chassahowitzka NWR, at a distance of 150 km and Everglades National Park at 244 km. USEPA and state agencies generally require PSD sources within a 100-km (62-mi) to 200-km (124-mi) radius of a Class I area to consult with the relevant Federal Land Manager (FLM). Sources farther away could also be required to consult with the FLM, if the source's emissions could potentially impact a Class I area (see **Section 4.7.1**). Factors to be considered include distance to the Class I area, magnitude of emissions, current conditions of air-sensitive resources in the Class I area, potential for source growth in an area or region, prevailing meteorological conditions, and cumulative effects of multiple sources on air-sensitive resources.

A Class I increment analysis must be conducted if air quality modeling predicts ambient air concentrations above the USEPA Class I significance impact levels. In addition, the Applicant must also show that the Port would not have an adverse impact on Air-Quality Related Values (AQRV) in the Class I area. AQRV are scenic, cultural, physical, biological, ecological, or recreational resources that might be affected by a change in air quality, as defined by the FLM.

The USFWS is the FLM for the Chasshowitzka NWR, while the National Park Service (NPS) is the FLM for Everglades National Park. Impacts on air quality and AQRV will be addressed for areas potentially affected by construction activities and the operation of the Port. The location of the Class I areas in relation to the Port is illustrated in **Figure 3.7-1**.

3.7.2 Regulation of Air Quality in Florida

Under the CAA, areas within state boundaries are classified as either attainment, nonattainment, or unclassifiable. An attainment area is an air basin or region that meets or is better than the NAAQS. Nonattainment areas are areas that have air pollutant concentrations that exceed the NAAQS. The air emissions from the construction and operation of the Port would be under USEPA jurisdiction (USEPA Region 4). The criteria pollutants and their impact on health and environmental welfare are discussed in more detail below.

O_3. Emitted pollutants or "O_3 precursors" consist primarily of NO_X and VOCs that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies attempt to limit atmospheric O_3 concentrations by limiting VOC pollutants (also identified as reactive organic gases) and NO_X.

NO_X. NO_X emissions are primarily generated from the combustion of fuels. NO_X includes nitric oxide and NO_2. Because nitric oxide converts to NO_2 in the atmosphere over time and NO_2 is the more reactive of the two, NO_2 is the listed criteria pollutant. It can penetrate deep into the lungs where tissue damage occurs. NO_X is also regulated as a precursor to O_3.

CO. CO is the product of fuel combustion, principally from automobiles and other mobile sources of pollution. The major immediate health effect of CO is that it competes with oxygen in the blood stream and can cause death by asphyxiation. Concentrations of CO in urban environments are usually only a fraction of those levels that cause asphyxiation. Peak CO levels typically occur during winter months due to a combination of higher emissions rates and stagnant weather conditions.

SO_2. SO_2 is produced when any sulfur-containing fuel is burned. It is also emitted by chemical plants that treat or refine sulfur or sulfur-containing chemicals. Health and welfare effects attributed to SO_2 are due to high irritant effects of sulfate aerosols, such as sulfuric acid, which are produced from SO_2.

Particulate Matter. Particulates in the air are caused by a combination of wind-blown fugitive dust; particles emitted from combustion sources (usually carbon particles); and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides, and NO_x. Particulate matter might contribute to the development of chronic bronchitis and might be a predisposing factor to acute bacterial and viral bronchitis. In 1987, USEPA adopted standards for PM_{10} and phased out the total suspended particulate standards that had been in effect until then. In 1997, USEPA adopted emissions standards for $PM_{2.5}$ pollutants, which, due to their size, have been determined by USEPA to lodge deep in lung tissue and cause chronic health impacts.

Pb. Lead exposure can occur through multiple pathways, including inhaling air and ingesting lead in food from water, soil, or dust contamination. Excessive exposure to lead can affect the central nervous system. Lead gasoline additives were a significant contributor to atmospheric lead emissions. Legislation in the early 1970s required gradual reduction of the lead content of gasoline over a period of time, which has dramatically reduced lead emissions from mobile and other combustion sources. In addition, unleaded gasoline was introduced in 1975, and together these controls have essentially eliminated violations of the lead standard for ambient air in urban areas.

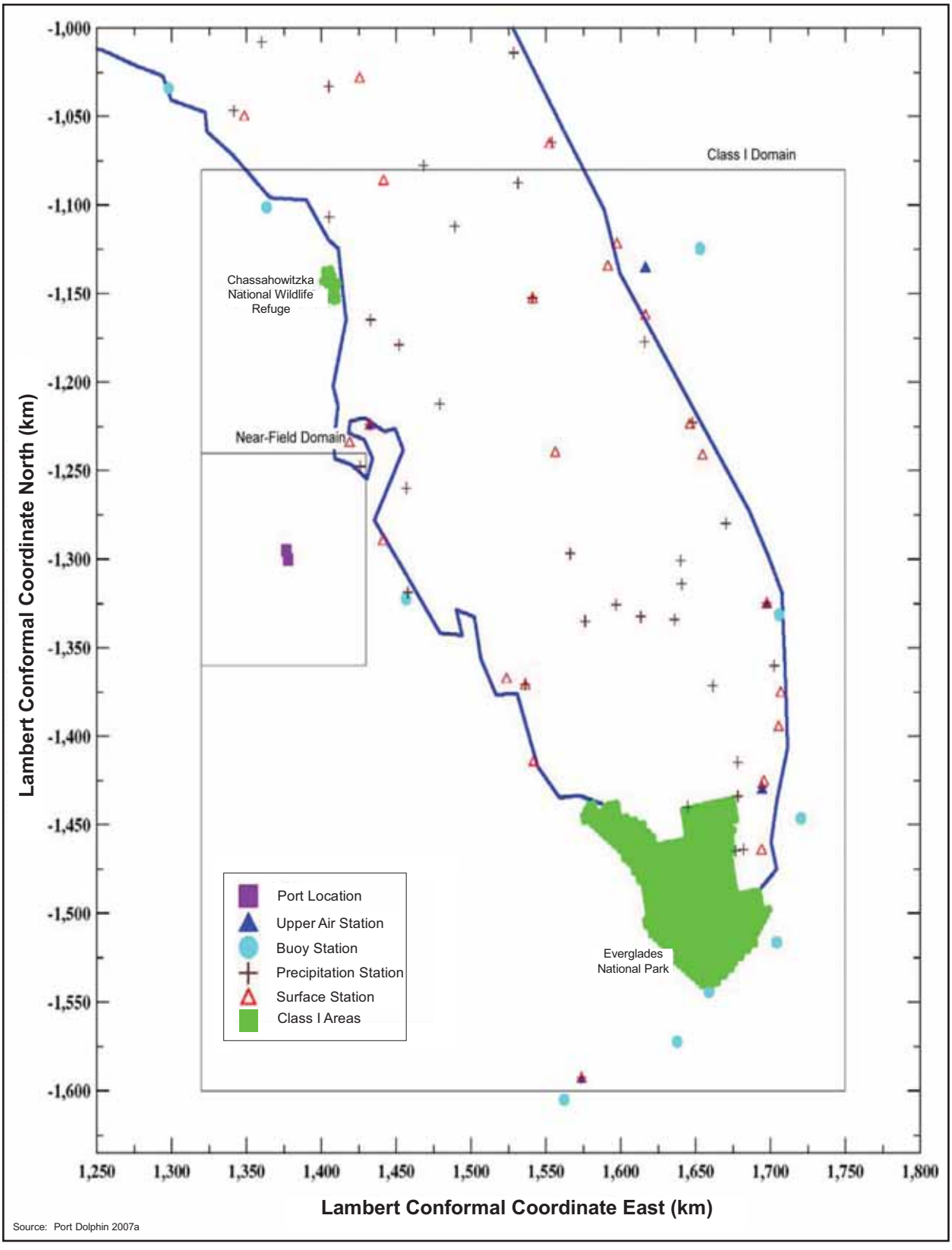


Figure 3.7-1. Location of Class I Areas in Relation to Port Dolphin

The FDEP has adopted most of the Federal limits in developing the Florida Ambient Air Quality Standards (FAAQS) promulgated under Chapter 62-204.240 of the F.A.C. For SO_2, the FAAQS for 24-hour and annual averaging times are lower than the NAAQS. **Table 3.7-1** presents the primary and secondary NAAQS and FAAQS.

Table 3.7-1. National and Florida Ambient Air Quality Standards

Pollutant	NAAQS	Florida AAQS	Averaging Time	Primary or Secondary?
Carbon Monoxide	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	8-hour [a]	Primary
	35 ppm (40 mg/m^3)	35 ppm (40 mg/m^3)	1-hour [a]	Primary
Lead	0.15 µg/m^3	N/A	Rolling 3-Month Average	Same as Primary
	1.5 µg/m^3	1.5 µg/m^3	Quarterly Average	Both
Nitrogen Dioxide	0.053 ppm (100 µg/m^3)	0.053 ppm (100 µg/m^3)	Annual (Arithmetic Mean)	Both
Particulate Matter (PM_{10})	150 µg/m^3	150 µg/m^3	24-hour [b]	Primary
Particulate Matter ($PM_{2.5}$)	15.0 µg/m^3	15.0 µg/m^3	Annual (Arithmetic Mean) [c]	Both
	35 µg/m^3	35 µg/m^3	24-hour [d]	Primary
Ozone	0.075 ppm (2008 std)	N/A	8-hour	Same as Primary
	0.08 ppm	0.075 ppm	8-hour [e]	Both
	0.12 ppm	N/A	1-hour (Applies only in limited areas)	Both
Sulfur Oxides	0.03 ppm (80 µg/m^3)	0.0225 ppm (60 µg/m^3)	Annual (Arithmetic Mean)	Primary
	0.14 ppm (365 µg/m^3)	0.10 ppm (260 µg/m^3)	24-hour [a]	Primary
	0.5 ppm (1300 µg/m^3)	0.5 ppm (1300 µg/m^3)	3-hour [a]	Secondary

Notes: FAC 1996

a. Not to be exceeded more than once per year.

b. Not to be exceeded more than once per year on average over 3 years.

c. Based on the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors.

d. Based on the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor.

e. Based on the 3-year average of the fourth-highest daily maximum 8-hour average concentrations.

3.7.3 Applicable Regulatory Requirements

The following CAA requirements could apply to construction and operational emissions from the Project:

- New Source Performance Standards (NSPS)
- National Emissions Standards for Hazardous Air Pollutants (NESHAP)
- New Source Review (including PSD and Non-attainment New Source Review [NNSR])
- Title V Operating Permits (Title V)
- Compliance Assurance Monitoring (CAM)
- General Conformity
- Florida Air Quality Regulations.

USEPA Region 4 will evaluate the Project's expected air emissions estimated in the CAA permit application submitted to USEPA by the Applicant, and develop a CAA preconstruction permit identifying all applicable requirements. The draft permit will be available for public review and comment prior to issuance of the final permit. The Project would conform to the Florida State Implementation Plan (SIP).

NSPS. Four NSPSs potentially apply to emissions sources associated with the Project. The Project has equipment that could be subject to the NSPS Standards for Fossil-Fuel-Fired Steam Generating Units (40 CFR 60, Subpart D) and the Standards for Large Industrial-Commercial-Institutional (ICI) Steam-Generating Units (40 CFR 60, Subpart Db), NSPS Standard of Performance for Stationary Compression Ignition Internal Combustion Engines (40 CFR 60 Subpart IIII), and NSPS Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (40 CFR 60, Subpart JJJJ).

The SRV vaporization boilers could be subject to the NSPS Standards for Fossil-Fuel-Fired Steam Generating Units (40 CFR 60, Subpart D) and the Standards for Large ICI Steam-Generating Units (40 CFR 60, Subpart Db). According to 40 CFR 60.41b(j), any affected facility meeting the applicability requirements under 40 CFR 60, Subpart Db is not subject to the standards under 40 CFR 60, Subpart D. The NSPS for Large ICI Steam-Generating units apply to new boilers that have a maximum heat input equal to or greater than 107 gigajoules per hour (100 MMBtu/hr) and that commenced construction after 1984 [40 CFR 60.44b(a)]. For boilers firing natural gas, the applicable NSPS emissions standard for NO_X is 0.09 kilograms (kg) NO_X /gigajoule (0.20 lb NO_X/MMBtu). Compliance with the standard is determined on a 30-day rolling average basis, in accordance with 40 CFR 60.44b(a)(1)(ii). Compliance with the NSPS Subpart Db NO_X emissions standard would be determined thorough performance testing. Performance testing would be conducted according to provisions of 40 CFR 60.46b. The installation, maintenance, and operation of a continuous emissions monitoring system (CEMS) for NO_X would also be required. Each boiler would be subject to the NSPS monitoring, recordkeeping, and reporting requirements. The particulate matter emissions standard, applicable to any fossil fuel, is 0.045 kg NO_X/gigajoule (0.10 lb/MMBtu). The particulate matter NSPS includes an emissions standard for opacity of no greater than 20 percent opacity except for one 6-minute period per hour of no greater than 27 percent opacity.

NSPS Standard of Performance for Stationary Compression Ignition Internal Combustion Engines is established under 40 CFR 60 Subpart IIII. Since the dual fuel engines are proposed for each to burn 99 percent natural gas and 1 percent marine diesel as pilot fuel, by definition the engines are considered spark ignition engines (40 CFR 60.4219). As a result, the provisions of NSPS Subpart IIII do not apply to the proposed Project.

NSPS Standards of Performance for Stationary Spark Ignition Internal Combustion Engines have been adopted under 40 CFR 60, Subpart JJJJ. This regulation was adopted by USEPA on January 18, 2008. This regulation is potentially applicable to the dual-fuel engines.

NESHAP. 40 CFR 60, Subparts 61 and 63 regulate emissions of hazardous air pollutants (HAPs) from new and existing sources. The Clean Air Act Amendments (CAAA) of 1990, under revisions to Section 112, requires USEPA to list and promulgate NESHAP to reduce HAP emissions (such as formaldehyde, benzene, xylene, and toluene) from categories of major and area sources. As these standards are promulgated, they are published in 40 CFR 63. The major source threshold for NESHAP is 9 metric tons per year (tpy) (10 tpy) of any single HAP or 23 metric tpy (25 tpy) for all combined HAP emissions.

The Project design and equipment specifications indicate that the Project would not operate any process source type or emissions source type regulated under Part 61. Therefore, the Project is not subject to the NESHAP regulations established under 40 CFR Part 61. The Project design and equipment specifications also indicate that HAP emissions would be less than 4.5 metric tpy (5 tpy) of benzene and less than 14 metric tpy (15 tpy) of total HAPs, which are well below the major source thresholds of 9 metric tpy (10 tpy) of any individual HAP and 23 metric tpy (25 tpy) of total HAPs.

USEPA promulgated NESHAP standards for natural gas transmission and storage (40 CFR 63 Subpart H) and oil and natural gas production (40 CFR 63 Subpart H) in 1999. In 2004, USEPA promulgated NESHAP standards for ICI boilers and process heaters (40 CFR 63 Subpart D), and standards for internal combustion reciprocating engines (40 CFR 63, Subpart Z). The Project design and equipment specifications indicate that HAP emissions from the Project would be less than the major source thresholds of 9 metric tpy (10 tpy) of any individual HAP and 23 metric tpy (25 tpy) of total HAPs.

New Source Review. Proposed new or modified air pollutant emissions sources must undergo a New Source Review (NSR) permitting process prior to construction or operation. Through the NSR permitting process, Federal regulatory agencies use local and state laws as the standard to review and approve Project construction plans, regulate pollutant increases or changes, emissions controls, and various other details. While Florida has a USEPA-approved SIP, this Project is under Federal jurisdiction with respect to air quality permitting. However, the DWPA directs the USEPA to apply the laws of Florida when permitting the source. The state NSR program must be at least as stringent as the Federal NSR program. The agencies then issue construction permits that include specific requirements for emissions control equipment and operating limits. Once construction is complete, the sources are issued operating permits that specify detailed operating conditions, emissions limits, fees, reporting and recordkeeping requirements, and various other operating parameters that must be met throughout the life of the permit. The three basic categories of NSR permitting are PSD, NNSR, and Minor NSR. The applicability of each NSR permitting process depends on the attainment status of the Project location, and whether the Project sources exceed specific emissions thresholds established in local, state, and Federal regulations. The basic elements of PSD and NNSR are described below.

PSD. Regulations for PSD are intended to preserve the existing air quality in attainment areas where pollutant levels are below (or better than) the NAAQS. New major sources of air emissions in attainment areas are subject to regulations in order to prevent the significant deterioration of air quality. The Tampa Bay area has PSD regulations in place in accordance with 40 CFR 52.21, and the Applicant would be required to obtain a PSD air quality permit. In addition to requiring an extensive review of environmental impacts, visible emissions, control technologies, and related impacts, PSD regulations impose specific limits on the amount of pollutants that major new or modified stationary sources might contribute to existing air quality levels. Ambient air quality impact analysis demonstrating compliance with ambient air quality standards and PSD increments is required. PSD major sources of attainment pollutants (SO_2, NO_2, PM, CO, and Pb) are subject to Federal PSD requirements (40 CFR 52.21).

For 28 specific source categories, the PSD major source threshold is 91 metric tpy (100 tpy). Because fossil fuel boilers with a heat input capacity greater than 250 MMBtu/hr are one of the 28 listed source categories, the Project is subject to the 100-tpy emissions threshold. Emissions estimates for the large-capacity boilers operated within the exclusion zone indicate that the Project exceeds PSD major source threshold of 100 tpy and is therefore subject to PSD review.

Under the PSD program, Class I areas are assigned to protect Federal wilderness areas such as national parks, where the least amount of air quality deterioration is allowed. Class I areas are designated as pristine natural areas or areas of natural significance. The Class II designation is used for all other areas, except heavily industrialized zones which are Class III designations (40 CFR 51.166). Each classification differs in terms of the amount of growth allowed before significant deterioration of air quality occurs. The Project is subject to PSD permit requirements, and Class I or II increment analysis could be required if project modeled impacts are above the Class I or II Significant Impact Levels (SILs).

NNSR. New major sources in nonattainment areas are subject to NNSR regulations in accordance with 40 CFR 52.24. NNSR is not applicable to the Project, since none of the areas adjacent to the Project are designated nonattainment for any pollutant. In March 2009, FDEP requested that most of the Tampa Bay area be designated as nonattainment for ozone, so it is possible that the area could be designated as non-attainment for the 2008 ozone standard before the Project is implemented. If this should occur, then NNSR requirements would become applicable.

Title V. CAA Title V operating permits are vehicles for ensuring that existing air quality control requirements are appropriately applied to facility emissions units in a single document, thereby enhancing compliance with the requirements of the CAA. The Title V operating permit program does not generally impose new substantive air quality control requirements, but does require permits to contain monitoring, recordkeeping, reporting, and other requirements to ensure compliance by sources with existing applicable requirements, 40 CFR §70.1(b). The Title V program applies, at a minimum, to any source defined as "major" under the CAA, any source subject to an NSPS or NESHAP (unless the source is part of a category USEPA has exempted), any "affected" source under Title IV of the CAA, any source required to have a PSD or NNSR permit, and any source in any category designated by USEPA.

While Florida has an approved Title V program, the proposed offshore facility is located beyond state jurisdiction with respect to air quality permitting, while the onshore portion of the proposed Project is below the emissions threshold at which a Title V permit is required. The Applicant must submit an operating permit application to the USEPA, which will review and issue any required air quality operating permits.

The public can view the PSD, NSR, and Title V permit applications online at the following Web site: http://www.epa.gov/Region4/air/permits/.

Compliance Assurance Monitoring. CAM requirements apply to stationary sources that (1) are equipped with post-process pollutant control devices, (2) have pre-control device emissions equal to or greater than 100 percent of the major source threshold for a pollutant, and (3) are subject to the Title V permit program. In accordance with regulations promulgated in 40 CFR Part 64, a CAM plan must be developed, as part of the Title V Operating Permit application, for each affected pollutant emitted from each affected source. The focus of the CAM Plan will be to ensure and document proper operation of the control device, thereby ensuring compliance with the applicable emissions limit.

General Conformity Determination. Section 176(c)(1) of the CAA mandates the general conformity rule[11]. This legislation prohibits the Federal government from conducting, supporting, or approving any actions that do not conform to an USEPA-approved SIP, a state's self-prepared plan for achieving and maintaining compliance with the goals of the CAA and the NAAQS. A SIP is a compilation of a state's air quality control plans/rules, approved by USEPA.

The 1990 CAAA revised Section 176(c) to expand and clarify Congressional intent for the conformity rule, and added a mandate for USEPA to establish a Federal conformity program[12]. The general conformity rule covers all Federal actions not addressed by the Transportation Conformity rule. USEPA promulgated the general conformity rule on November 30, 1993[13]; the rule and all subsequent amendments are found at 40 CFR 93 Subpart B. Federal agencies are required to demonstrate that their actions "conform" to the approved SIP for the geographic area in question, by performing a conformity review. The conformity review is the process used to evaluate and document project-related air pollutant emissions, local air quality impacts, and the potential need for emissions mitigation.

The General Conformity Rule applies only to Federal actions in locations designated as nonattainment or maintenance areas for any criteria pollutant under 40 CFR Part 81, "Designation of Areas for Air Quality Planning Purposes." The Project is adjacent to Manatee, Hillsborough and Pinellas counties. Hillsborough and Pinellas counties are 1-hour ozone maintenance areas. In March 2009, FDEP requested that most of the Tampa Bay area be designated as nonattainment for ozone, so it is possible that the area could be designated as nonattainment for the 2008 ozone standard before the Project is implemented. If this should occur, then general conformity requirements would become applicable.

Based on information provided from the Applicant in completing the general conformity determination for this Project, it was noted that the D.C. Circuit Court of Appeals recently vacated certain aspects of USEPA's phase I rule implementing the 8-hour ozone NAAQS (South Coast Air Quality Management District vs. USEPA, 472 F. 3d 882 [D.C. Cir. 2006]). USEPA is seeking a rehearing from the court on several aspects of the decision including conformity. The final position adopted by the Court might have implications for actions taken with respect to conformity programs in areas that were nonattainment or maintenance areas for the 1-hour standard. This decision is relevant to the Project in that both Hillsborough and Pinellas counties are maintenance areas for the 1-hour standard at this time. Therefore, the Project is not subject to general conformity at this time, pending a final decision by the Court.

Florida Air Quality Regulations. Although the Port would be outside the jurisdictional boundary for Florida, under the DWPA the facility would be subject to Florida regulations pertaining to individual pollutants and sources. Florida air quality and permitting requirements are codified in Title 62. These regulations include the following:

- FAAQS
- Permit Approval Requirements
- NNSR
- Operating Permit Program
- Florida Permitting Exemptions
- Emissions Limitations
- Visible Emissions Limitations.

[11] 42 U.S.C. 7506(c), Activities not conforming to approved or promulgated plans.
[12] PL 101-549, CAAA-90, Title I, Section 101(f), Conformity Requirements.
[13] 58 FR 63214, Final Rule, Determining Conformity of General Federal Actions to State or Federal Implementation Plans.

The Florida regulations incorporate the Federal program requirements listed in 40 CFR Parts 50–99, and establish plan approval procedures for all facilities that can emit pollutants to the ambient air. All new facilities are required to obtain plan approval prior to initiating construction. Facilities can trigger additional review if emissions exceed the major source thresholds listed in 40 CFR §52.21(b)(1)(i), or Title 62 Chapter 4 Permits.

Florida Ambient Air Quality Standards. The FAAQS are identical to the NAAQS per 40 CFR Part 50, except for the more stringent SO_2 requirement.

Florida New Source Review. Pursuant to the DWPA, USEPA is the permitting authority for deepwater ports. Therefore, USEPA is the permitting authority for all applicable state requirements. Florida NSR applies to new emissions sources that would be located in designated attainment areas and would emit a regulated pollutant. Four counties are in the vicinity of the Port Dolphin project, Pinellas, Hillsborough, Manatee, and Sarasota, and are in attainment for all criteria pollutants (i.e., NO_X, CO, SO_2, O_3, PM, and Pb). Since emissions of NO_X and VOCs are precursors to ozone, major sources of NO_X or VOC emissions are also considered major for ozone. New major sources located in a maintenance area are subject to Florida NSR. Therefore, a new major source in Hillsborough County is subject to Florida NSR.

Florida Operating Permit Program. The Federal Title V program (40 CFR 70) requires major sources of air emissions to obtain Federal operating permits. While Florida has an approved Title V program, this facility is located beyond state jurisdiction with respect to air quality permitting. The Applicant must submit an operating permit application to the USEPA, which will review and issue any required air quality operating permits. Potential emissions from the proposed Project exceed the 100-tpy applicable threshold of any criteria pollutant. Submission of the Title V permit application is not required until the plant becomes operational and within 12 months of that date.

Florida Permitting Exemptions. The Applicant surveyed the onshore facilities for permitting separately. The onshore pipeline facilities would include Port Manatee valve station at the landing point, the Gulfstream interconnection station, and the TECO interconnection station. The onshore facilities associated with the deepwater port operations are subject to the FDEP air quality rules and regulations. The aggregated potential emissions from these facilities are lower than the Title V major source thresholds. In addition, each of the three onshore facilities has a potential to emit less than 10 tpy. These facilities are therefore exempt from obtaining an air permit pursuant to Florida Chapter 62.210.300 (3).

Stationary Source Emissions Standards Florida Pollutant Emissions Limiting Standards. This regulation identified in Florida Chapter 62.296.320 contains general pollutant emissions limiting standards, including particulate standards, opacity limits, and visible emissions. The Project is subject to the applicable stationary source emissions standards.

Stationary Source Emissions Standards Florida NO_X Reasonable Available Control Technology (RACT). The nearest counties to the Project that are 1-hour ozone maintenance are Hillsborough and Pinellas counties. Since NO_X is a precursor to ozone and the facility is a major source of NO_X, the facility is subject to the applicable NO_X RACT requirements identified in Florida Chapters 62.296.500 and 62.296.570.

Stationary Source Emissions Standards Florida Petroleum Liquid Storage. The Project is subject to the applicable stationary source emissions standards for petroleum liquid storage identified in Florida Chapter 62.296.508.

3.7.4 Regional Climatology

This section describes the climate and meteorological conditions for the west-central coast of Florida near Tampa/St. Petersburg. The Florida climate is affected by the ocean, its close proximity to the equator, and its low elevation. The Tampa/St. Petersburg area climate is dominated by the waters of the GOM to the west, Tampa Bay, and the Atlantic Ocean across Florida to the east. The southern areas of Florida have a more tropical climate, being closer to the equator, while central and northern Florida is subtropical. Tampa lies near the west-central Florida coast, situated between northern and southern Florida regimes, so it experiences a mix of weather conditions.

Summers along the west-central Florida coast are hot and humid, with July and August being the warmest months. Florida's high humidity in the summer makes temperatures seem hotter than the average 90 °F (32.2 °C), but temperatures as high as 100 °F (37.8 °C) rarely occur. Moist, unstable air frequently flows through the region, particularly in the summer months, and summer thunderstorms are frequent. Summer is the rainy season in Florida with a good chance of afternoon thunderstorms at least every other day. The GOM provides a continuous source of moisture and influences temperatures in the region. Rainfall is heaviest July through September, with occasional heavy rains accompanying tropical disturbances. Peak hurricane season in Florida is in the mid to late summer months.

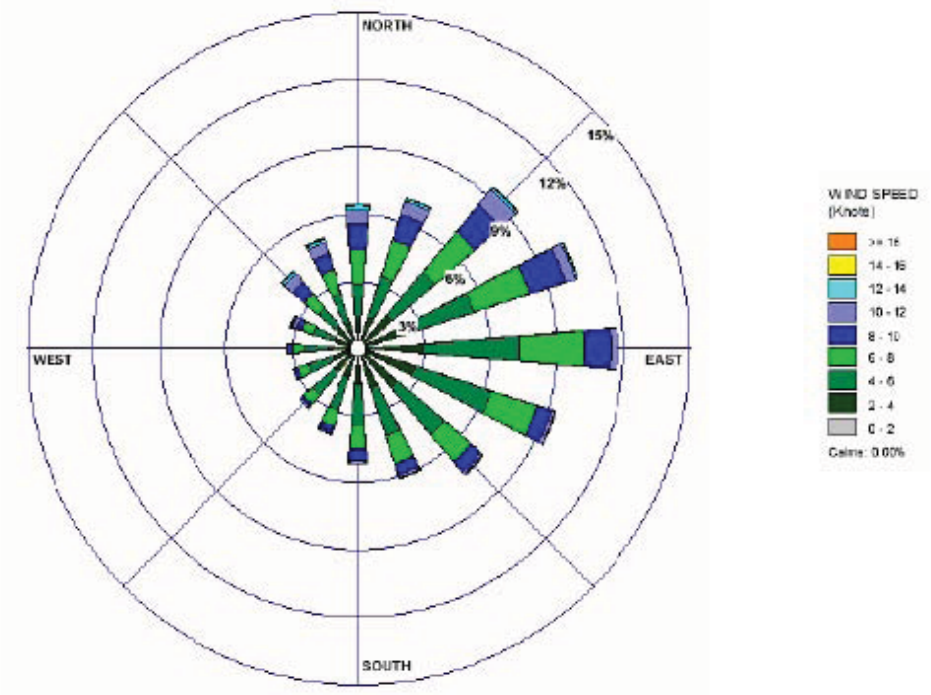
Florida's wet or rainy season extends from May through October. In central and northern Florida, humidity and temperatures decrease toward the end of October. Winter and spring are Florida's dry season from around November through March and April. A mix of cold and warm days occurs during the winter months, with several days of freezing temperatures occurring each year. April and November are the driest months of the year. In general, offshore climate and weather conditions are similar to onshore conditions, except that there is less daily temperature variation offshore.

Wind speed and direction near the Port Dolphin project location are variable depending on geographic location. **Table 3.7-2** presents monthly average wind speed (in knots) at Tampa International Airport based on a 59-year record. Offshore, in the vicinity of Port Dolphin, winds from the east dominate. **Figure 3.7-2** is a wind rose diagram depicting predominate wind patterns based on 13 years of wave measurements from offshore Coastal Ocean Monitoring and Prediction System (COMPS) C10 buoy, located at 27.375°N, 83.125°W. Wind speed and direction were inferred from wave measurements (APL 2006). By contrast, **Figure 3.7-3** illustrates the wind frequency at Sarasota-Bradenton International Airport, on the Gulf Coast about 14 miles south of Port Manatee. This onshore meteorological station shows a maximum wind occurrence from the east, but has a secondary wind direction maximum from the west.

Table 3.7-2. Tampa International Airport Monthly Average Wind Speed (knots)

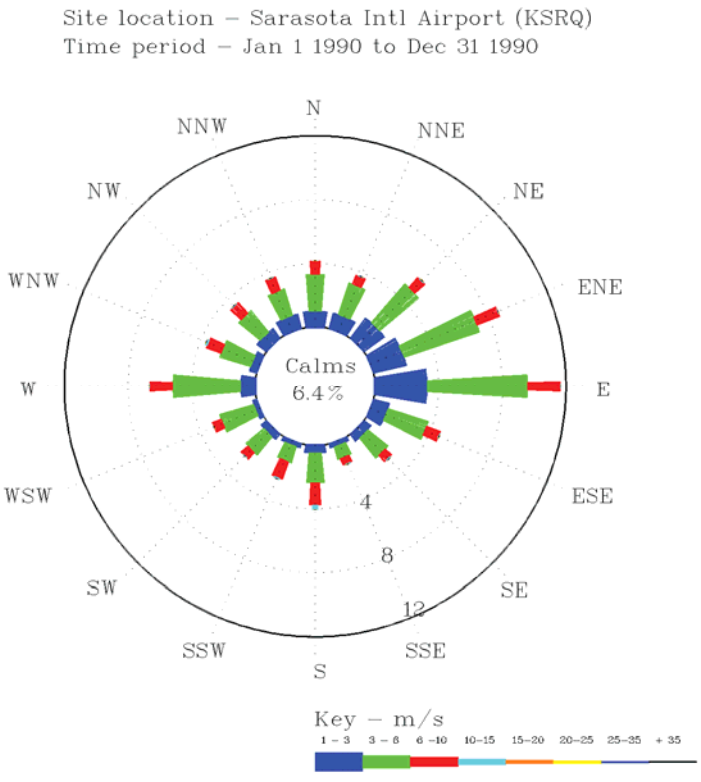
	Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Tampa, Florida	59	8.6	9.1	9.4	9.2	8.6	7.9	7.1	6.9	7.6	8.3	8.2	8.3	8.3

Monthly average air temperatures and extremes are listed for the Tampa Bay area from the Tampa International Airport weather station for the years 1900 to 2005 (see **Table 3.7-3**). Averages indicate that July and August are the warmest months, and December and January the coolest. To compare land air temperatures with offshore air temperatures, data were plotted from the COMPS C10 buoy located at 27°58N, 82°32W in a water depth of 25 m (82 feet) (see **Figure 3.7-4**). This buoy is a few miles



Source: APL 2006

Figure 3.7-2. Wind Rose Derived from 13 Years of Data at 27.375°N, 83.125°W



Source: EarthTech 2007

Figure 3.7-3. Wind Rose at Sarasota Airport (1990)

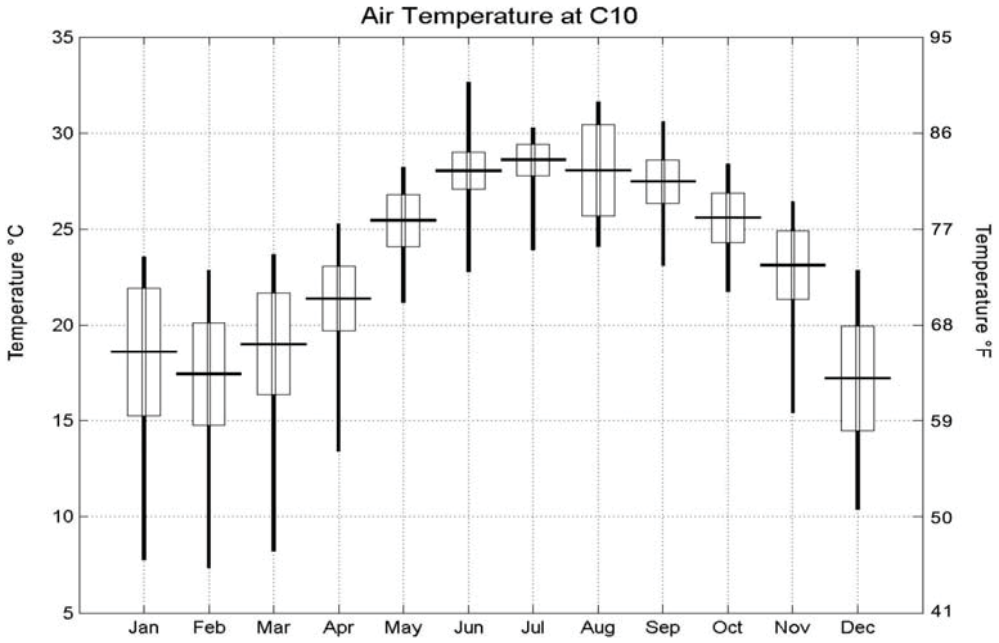
Table 3.7-3. Summary of Average and Extreme Air Temperature From Tampa International Airport at 27°58N, 82°32W

Units	Monthly Averages			Daily Extremes
	Max.	Min.	Mean	High
	°F	°F	°F	°F
January	70.5	50.9	60.7	86
February	72.1	52.5	62.3	88
March	76.5	57.1	66.8	91
April	81.6	61.8	71.7	93
May	87.2	68.0	77.6	98
June	89.6	73.0	81.3	99
July	90.1	74.5	82.3	98
August	90.3	74.6	82.5	98
September	88.9	73.2	81.0	96
October	84.0	66.2	75.1	95
November	77.4	58.1	67.8	90
December	71.9	52.3	62.1	86
Annual	81.7	63.5	72.6	99

Source: SERCC 2009

Note: From Year 1900 to Year 2005

Station: (088788) TAMPA WSCMO Tampa, Florida



Source: APL 2006

Note: The horizontal bars show the mean monthly temperature. Box limits indicate plus or minus one standard deviation and the vertical bars are monthly extremes.

Figure 3.7-4. Air Temperature at the COMPS C10 Buoy (27°10.152N, 82°55.552W)

southeast of the Port Dolphin location. Offshore buoy data show that July temperatures are warmest, averaging around 82.4 °F (28 °C) and temperatures are coolest in December, near 62.6 °F (17 °C). Temperatures are most variable during the winter months due to excess cold fronts and also during August because of increased summer storm activity.

3.7.5 Existing Ambient Air Quality

Background air quality data in the area surrounding the Project are available from numerous monitoring stations in the three counties east of the proposed deepwater Port. The measured pollutant concentrations for PM_{10} and $PM_{2.5}$, SO_2, NO_2, CO, and O_3 are presented in **Tables 3.7-4** through **3.7-8**, respectively. These data were acquired from the FDEP Web site (FDEP 2007). Many of the monitoring stations are in urban areas; air quality measurements from those locations might not be representative of concentrations at the Class II areas where receptors for dispersion modeling are located. Estimated worst-case background concentrations are in bold in **Tables 3.7-4** through **3.7-8**.

3.8 Noise

3.8.1 Definition of the Resource

Airborne Noise. The terms noise and sound are often used interchangeably. Physically there is no difference between these concepts, although it is an important distinction for the human listener. Noise is a class of sounds that are considered unwanted and in some situations noise can adversely affect the health and well-being of individuals. Consequently, noise is not typically defined solely on the basis of physical sound parameters. Rather it is defined as audible acoustic energy that adversely affects, or can affect, the physiological and psychological well-being of people (Berglund and Lindvall 1995).

Noise can be generated by natural sources such as wind, rain, and birds and by a wide variety of human sources such as automobiles, farm machinery, and industrial facilities. It is produced by any vibrating body and is transmitted in air as a longitudinal wave motion. The amplitude of the noise varies depending on the changing weather conditions and the surrounding terrain and vegetation.

As presented in **Figure 3.8-1**, sound travels in waves and the basic components of sound waves are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in Hz or cycles per second. Wavelength is the distance between two peaks of a sound wave. The wavelength of a sound equals the speed of sound (velocity) divided by the frequency of the wave. Lower frequency sounds have longer wavelengths than higher frequency sounds. Amplitude (see **Figure 3.8-1**) is the height of the sound pressure wave or the "loudness" of a sound and is typically measured using the decibel (dB) scale (NOAA 2003). A dB is the ratio between a measured pressure (with sound) and a reference pressure (sound at a constant pressure, established by scientific standards). It is a logarithmic unit that accounts for large variations in amplitude; therefore, relatively small changes in dB ratings correspond to large changes in sound pressure.

The ambient sound level of a region is defined by the total noise generated, including sounds from both natural and artificial sources. The magnitudes and frequencies of ambient sound experienced by an individual can vary considerably over the course of the day and throughout the week, due in part to changing weather conditions and the acoustical environment surrounding the individual. The term "A-weighted," is often used to describe the sound levels encountered. It denotes the adjustment of the frequency and amplitude content of an ambient noise event to reflect the way in which the average human ear responds to that event.

Table 3.7-4. Measured PM_{10} and $PM_{2.5}$ Ambient Air Quality

PM_{10} ($\mu g/m^3$)								
Location	County	Site ID	Averaging Time					
			24-hour			Annual		
			2004	2005	2006	2004	2005	2006
Ruskin	Hillsborough	12-057-0066	43	63	67	24.8	27.5	**32.9**
Tampa	Hillsborough	12-057-0083	61	78	65	26.9	26.6	27.2
Tampa	Hillsborough	12-057-0085	30	34	37	19.1	18.5	21.7
Tampa	Hillsborough	12-057-0095	63	39	80	26.7	26.5	28.5
Tampa	Hillsborough	12-057-1002	38	60	47	24.7	26.0	28.7
Tampa	Hillsborough	12-057-1035	54	65	73	24.5	24.4	25.5
Tampa	Hillsborough	12-057-1069	42	36	50	22.2	22.1	27.9
Tampa	Hillsborough	12-057-1070	62	71	96	27.6	29.1	32.3
Brandon	Hillsborough	12-057-2002	40	36	40	20.3	19.6	23.0
not in a city	Manatee	12-081-0008	37	**99**	49	22.1	27.2	24.3
St Petersburg	Pinellas	12-103-0012	80	54	43	29.4	23.3	24.4
St Petersburg	Pinellas	12-103-0018	30	27	36	18.5	16.2	18.4
Largo	Pinellas	12-103-3004	33	40	35	21.5	21.2	22.3
Tarpon Springs	Pinellas	12-103-5002	25	25	35	16.3	15.5	18.3

$PM_{2.5}$ ($\mu g/m^3$)						
Location	County	Site ID	24-hour Average (2nd highest)			
			2004	2005	2006	3-year average (2nd highest)
Tampa	Hillsborough	12-057-0030	25.8	26.2	19.7	23.9
Tampa	Hillsborough	12-057-0030	27.3	29.5	21.9	26.2
Tampa	Hillsborough	12-057-1065	27.9	25.7	22.3	25.3
Plant City	Hillsborough	12-057-3002	22.9	25.8	19.2	22.6
Plant City	Hillsborough	12-057-3002	39.7	30.6	22.3	**30.9**
Plant City	Hillsborough	12-057-4004	22.8	30.4	22.1	25.1
Bradenton	Manatee	12-081-4012	20.6	20.6	19.6	20.3
St Petersburg	Pinellas	12-103-0018	19.9	24.9	20.6	21.8
St Petersburg	Pinellas	12-103-0018	26.2	26.8	23.8	25.6
Clearwater	Pinellas	12-103-1009	21.7	21.2	18.6	20.5
Tampa	Hillsborough	12-057-0030	11.34	11.09	9.94	10.8
Tampa	Hillsborough	12-057-0030	12.66	yyy	11.54	12.1
Tampa	Hillsborough	12-057-1065	11.54	12.19	11.66	11.8
Plant City	Hillsborough	12-057-3002	11.46	10.87	9.95	10.8
Plant City	Hillsborough	12-057-3002	13.33	12.38	11.62	12.4
Plant City	Hillsborough	12-057-4004	12.03	12.45	11.65	12.0
Bradenton	Manatee	12-081-4012	9.11	8.91	8.74	8.9
St Petersburg	Pinellas	12-103-0018	9.64	10.40	9.53	9.9
St Petersburg	Pinellas	12-103-0018	11.74	12.14	11.20	11.7
Clearwater	Pinellas	12-103-1009	10.27	9.48	9.35	9.7

Source: FDEP 2008

Table 3.7-5. Measured SO_2 Ambient Air Quality (ppm)

Location	County	Site ID	Averaging Time								
			3-hour (2nd highest)			24-hour (2nd highest)			Annual		
			2004	2005	2006	2004	2005	2006	2004	2005	2006
Tampa	Hillsborough	12-057-0053	0.038	0.037	0.031	0.008	0.007	0.008	0.0026	0.0025	0.0021
Tampa	Hillsborough	12-057-0081	0.029	0.032	0.035	0.010	0.008	0.011	0.0028	0.0023	0.0022
Tampa	Hillsborough	12-057-0095	0.017	0.065	0.019	0.004	0.012	0.005	0.0016	0.0017	0.0014
Tampa	Hillsborough	12-057-0109	0.092	0.097	0.077	0.029	0.033	**0.038**	0.0034	0.0031	0.0032
Tampa	Hillsborough	12-057-1035	0.059	0.055	0.093	0.016	0.015	0.025	0.0042	0.0039	0.0043
Plant City	Hillsborough	12-057-4004	0.023	0.013	0.015	0.005	0.005	0.006	0.0016	0.0017	0.0017
Palmetto	Manatee	12-081-3002	0.023	0.017	0.017	0.008	0.007	0.005	0.0017	0.0017	0.0015
St Petersburg	Pinellas	12-103-0023	**0.102**	0.059	0.070	0.033	0.024	0.019	**0.0045**	0.0031	0.0027
Pinellas Park	Pinellas	12-103-3002	0.034	0.038	0.038	0.010	0.013	0.008	0.0019	0.0020	0.0015
Tarpon Springs	Pinellas	12-103-5002	0.043	0.048	0.050	0.012	0.009	0.011	0.0019	0.0018	0.0017
Tarpon Springs	Pinellas	12-103-5003	0.051	0.054	0.063	0.013	0.011	0.012	0.0020	0.0019	0.0020

Source: FDEP 2008

Table 3.7-6. Measured NO_2 Ambient Air Quality (ppm)

Location	County	Site ID	Averaging Time		
			Annual		
			2004	2005	2006
Tampa	Hillsborough	12-057-0081	0.006	0.006	0.005
Tampa	Hillsborough	12-057-1065	0.009	0.008	0.007
Plant City	Hillsborough	12-057-3002	0.007	0.007	0.007
Bradenton	Manatee	12-081-4012	0.003	0.005	0.004
St Petersburg	Pinellas	12-103-0018	**0.009**	0.008	0.008

Source: FDEP 2008

Table 3.7-7. Measured CO Ambient Air Quality (ppm)

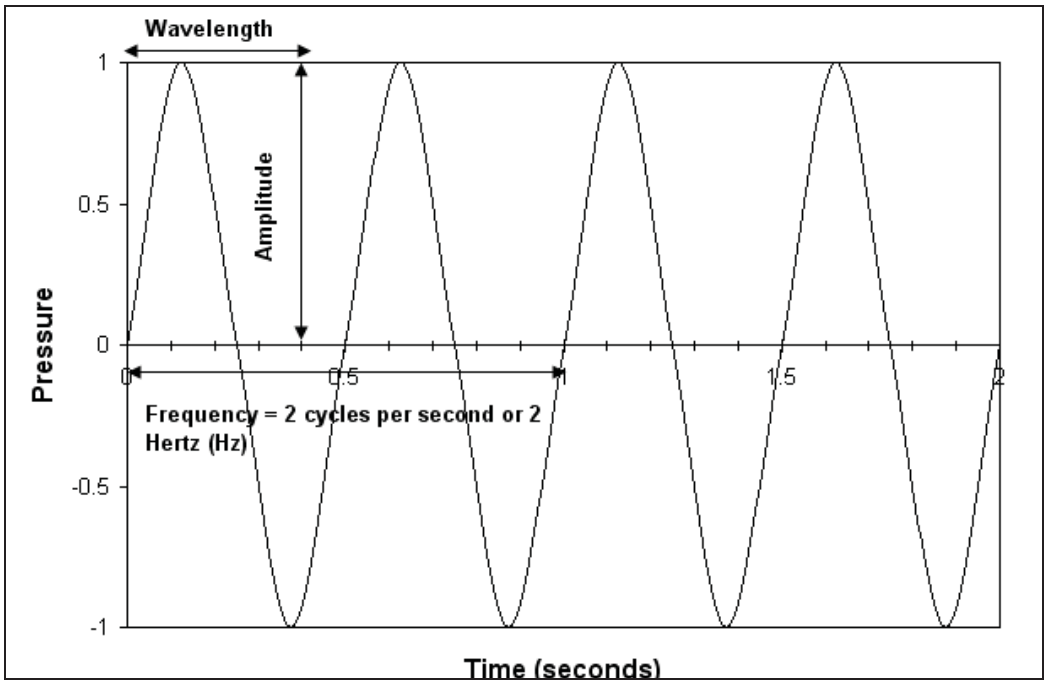
Location	County	Site ID	Averaging Time					
			1-hour (2nd highest)			8-hour (2nd highest)		
			2004	2005	2006	2004	2005	2006
Tampa	Hillsborough	12-057-1070	**4.4**	4.0	4.0	2.5	**3.0**	2.9
Plant City	Hillsborough	12-057-4004	1.8	1.9	2.6	1.3	1.5	1.9
St Petersburg	Pinellas	12-103-0018	2.4	2.3	2.2	1.2	1.3	1.4
St Petersburg	Pinellas	12-103-0024	2.8	2.2	2.3	1.7	1.6	1.7
Clearwater	Pinellas	12-103-2006	2.4	2.5	1.9	1.2	1.3	1.1
Clearwater	Pinellas	12-103-2008	2.6	2.5	2.3	1.6	1.5	1.2

Source: FDEP 2008

Table 3.7-8. Measured O_3 Ambient Air Quality (ppm)

Location	County	Site ID	Averaging Time			
			8-hour (4th highest)			
			2004	2005	2006	3-year average
Tampa	Hillsborough	12-057-0081	0.083	0.080	0.082	0.082
not in a city	Hillsborough	12-057-0110	0.073	0.079	0.083	0.078
Tampa	Hillsborough	12-057-1035	0.075	0.077	0.086	0.079
Tampa	Hillsborough	12-057-1065	0.083	0.089	0.090	**0.087**
Plant City	Hillsborough	12-057-3002	0.080	0.079	0.083	0.080
Plant City	Hillsborough	12-057-4004	0.071	0.080	0.085	0.079
Palmetto	Manatee	12-081-3002	0.088	0.082	0.080	0.083
Bradenton	Manatee	12-081-4012	0.082	0.082	0.084	0.083
Bradenton	Manatee	12-081-4013	0.079	0.078	0.078	0.078
Clearwater	Pinellas	12-103-0004	0.077	0.074	0.083	0.078
St Petersburg	Pinellas	12-103-0018	0.077	0.071	0.073	0.074
Tarpon Springs	Pinellas	12-103-5002	0.072	0.076	0.084	0.077

Source: FDEP 2008



Source: NOAA 2003

Figure 3.8-1. The Basic Components of a Sound Wave

Underwater Noise. This section explains the sound level standards and describes the existing ambient sound levels in the area of the Project and the methodology used to discuss a change in sound levels. When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in all directions away from the source (similar to ripples on the surface of a pond). The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life (including human ears) and man-made sound receptors such as hydrophones (NOAA 2003).

Sound Pressure Level (SPL) is the sound force per unit area, and is measured in micro Pascals (μPa), where 1 Pa is the pressure resulting from a force of one Newton (a unit of force) exerted over an area of 1 m^2. The intensity of sound is related to the square of the pressure divided by a term called the acoustic impedance. The acoustic impedance is equal to the product of the sound speed and the density of the medium (sea water for this circumstance) (NOAA 2003).

As stated above, the pressure of a sound wave is expressed in dB (a dB is the ratio between a measured pressure [of sound] and a reference pressure [a constant pressure established by the scientific standards community]). In water, the standard reference of SPL is 1 μPa; while in air, a standard sound reference pressure of 20 μPa is used. The source level represents the sound level at a distance of 1 m from the source, referenced to 1 μPa (re 1 μPa at 1 m). The received level is the sound level at the listener's position.

The underwater acoustic environment consists of ambient sounds, defined as environmental background sound levels lacking a single source or point (Richardson et al. 1995). As with airborne noise, the ambient underwater sound level of a region is defined by the total acoustical energy being generated by known and unknown sources, including sounds from both natural and man-made sources. The magnitudes and frequencies of environmental sound levels can vary considerably over the course of the

day and throughout the week, due in part to changing local activity in the Bay and nearby ocean and variation of the local weather conditions.

3.8.2 Regulatory Requirements

There are no local or Federal noise control regulations with specific dB limits that apply to the Project. There are also no local or Federal noise regulations established for underwater acoustical activities associated with the Project. Several state and Federal regulations or guidance have been developed for protecting public health and safety by establishing certain acceptable ambient noise thresholds. These thresholds can be used to evaluate potential noise effects from the Project.

There are no State of Florida regulations pertaining to construction noise. The Manatee County Code of Ordinances does not have any regulations specifically relating to construction noise. However, Manatee County describes the definition of noise pollution in Section 2-21-31 of the municipal code as "the presence of noise in excessive or unnecessary amount or of such duration, wave frequency or intensity as to be injurious to human or animal life or property, or which unreasonably interferes with the comfortable enjoyment or normal activities of life or property, or other conduct of business" (Manatee County 2007). Noise from the operation of construction equipment is allowed during the hours of 7:00 a.m. to 9:00 p.m.

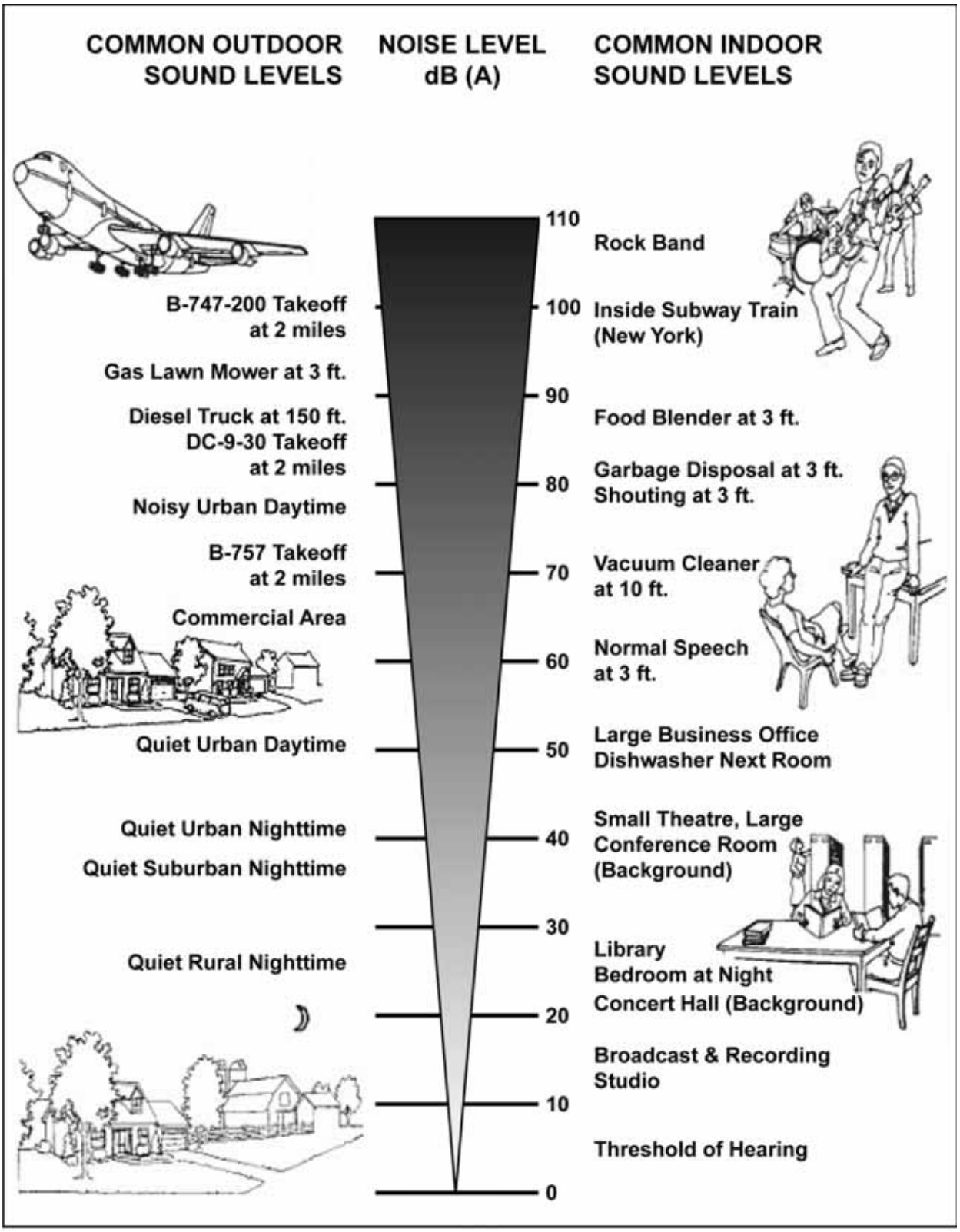
Much of the concerns and research about noise impacts on marine mammals has resulted from the MMPA of 1972. Although there are no specific noise limits that have been officially established from the MMPA, NMFS has developed guidance criteria for assessing acoustic impacts on marine mammals. These criteria are discussed in **Section 3.2.6.**

3.8.3 Existing Ambient Noise Conditions

Anticipated existing ambient noise conditions near the Project Site consist of airborne noise and underwater noise.

Airborne Noise. Current airborne noise levels in the vicinity of Port Manatee are expected to be similar to an urban environment. The ambient sound level increases in Port Manatee when vessel traffic is utilizing the port. Additional industrial facilities are east of Port Manatee. Areas to the north and south of Port Manatee consist of open space and ambient noise levels in these areas would be lower than the levels at the port. Land to the southeast of Port Manatee and on Buckeye Road likely have ambient noise levels equivalent to that of a rural area (see **Figure 3.8-2** for a comparison of relative noise levels).

Underwater Noise. Existing underwater ambient sound levels result from a combination of natural and anthropogenic (man-made) sources. The largest and interrelated natural source of sound is wind and wave action. Wind generated wave action and the resultant sound levels occur over a broad range of frequencies and the sound levels are related to the wind speed and consequent sea conditions (Richardson et al. 1995). Other natural sources of sound that could occur in the study area include sounds caused by precipitation (e.g., raindrops impacting the water surface) and sounds created by marine organisms such as fish, marine mammals, and shrimp. Phillips et al. (2006) presented measurements from manatee habitats in boating channels and rivers along the Florida coast, consisting of fairly flat or slightly sloping seafloors shallower than 5 m (16.4 feet). Ambient noise measurements in these habitats ranged from 69 dB in Crystal River (away from the mouth of the river) to 105 dB near the mouths of the Crystal and Indian rivers.



Source: Landrum and Brown 2002

Figure 3.8-2. Common Noise Sources

The largest and most important source of anthropogenic sound is shipping. In enclosed bays, the primary persistent noise sources tend to be commercial shipping and wind wave action (NRC 2003). Other anthropogenic sound sources in the study areas include recreational boating, dredging, shoreline construction (e.g., bulkheads, revetments, docks, and pile-driving), urban and industrial development, aircraft, and SONARs. Sound levels from some of these activities are generated in air, but can be coupled to the sea by transmission through building foundations, or in the case of aircraft, by transmission through the air-sea interface and might be stationary or transient. The intensity and frequency of the sound level emissions are highly variable, both between and among industry sources. In general, the frequencies of anthropogenic sounds are below 1 kHz and if higher frequency sound levels are created, they will attenuate (decrease) rapidly (Richardson et al. 1995).

Shipping is a major contribution to underwater SPLs, and its impact is strongest in frequencies from 0.005 to 0.5 kHz (NRC 2003). SPLs for various types of ships are presented in **Table 3.8-1**. The sound levels emitted from recreational boating are not quantified. Commercially available fish finders and depth sounders used during recreational boating activities have frequencies within the range of 50 to 200 kHz and SPLs in the range of 201 dB (NRC 2003). Fish finders have a short pulse-width (length in time of the signal) are and are typically designed to focus sound in a downward direction. Aircraft generate below-water sounds with frequencies generally below 0.5 kHz (MMS 2002a). Aircraft sounds are transient.

Table 3.8-1. Underwater Sound Pressure Levels for Various Vessels

Vessel Length and Description	Frequency (Hz)	Source Level (dB re 1µPa at 1 m)
Outboard drive – 23 feet (2 engines, 80 horsepower each)	630	156
Twin Diesel – 112 feet	630	159
Small Supply Ships – 180 to 279 feet	1,000	125–135 (at 50 m)
Freighter – 443 feet	41	172

Source: Richardson et al. 1995

There are no specific data on ambient underwater sound levels for the area of the proposed Port and pipeline route. As stated above, the most important sources of sound are wind waves action and shipping. Ambient underwater sound levels cover the frequency range from 0.001 kHz to 100 kHz with higher decibel levels at the lower frequencies. However, intensity level depends on factors such as wind speed and distance from the sources (e.g., shipping).

Because Tampa Bay is a busy port area, it is assumed that existing ambient underwater sound levels would be dependent upon the levels of shipping and boating. Other sources of man-made sound in the study areas include maintenance dredging and construction and maintenance of port infrastructures.

3.9 Socioeconomic Resources and Environmental Justice

3.9.1 Definition of the Resource

NEPA requires an analysis of socioeconomic issues if socioeconomic effects are interrelated with environmental effects. Socioeconomics are defined as the basic attributes and resources associated with the human environment, particularly population and economic activity. Socioeconomic data at local, county, and state levels permit characterization of baseline conditions in the context of regional and state trends.

Two fundamental socioeconomic indicators, population and economic activity, are the major focus of this analysis. Demographics identify the population levels and changes to population levels of a region. Demographics data might also identify, as appropriate to the evaluation of a project, a region's characteristics in terms of race, ethnicity, poverty status, and other broad indicators. Economic activity typically encompasses employment, personal income, and industrial or commercial growth. Data on employment might identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on personal income in a region can be used to compare the "before" and "after" effects of any jobs created or lost as a result of a project. Data on industrial or commercial growth or growth in other sectors provide baseline and trend line information about the economic health of a region. Socioeconomic data were collected and evaluated for areas near Tampa, Florida, where onshore activities would be performed as part of the Project and where persons employed by the onshore and offshore industries that might be affected by the Project reside. Commercial fishing, marine recreation, and tourism are highlighted in this document as the industries most likely to be affected by the Project.

President Clinton issued EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. This EO requires that Federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The provisions of EO 12898 require that no groups of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the adverse environmental consequences resulting from industrial, municipal, and commercial operations; or the execution of Federal, state, tribal, and local programs and policies. Consideration of environmental justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity where a Project would occur.

The demographic data presented in **Section 3.9.2.2** were used to evaluate consistency with the intent of EO 12898. USCG guidance on environmental justice is contained in COMDTINST 5810.3, *Coast Guard Environmental Justice Strategy*. That guidance directs the USCG to "conduct its programs, policies and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under, such programs, policies, and activities, because of their race, color or national origin."

3.9.2 Existing Conditions

Fishery Management. As discussed in **Section 3.2.9**, FMPs are in force for several fisheries and regulate both commercial and recreational fishing. The objectives of the plans vary, but are generally geared towards ensuring the long-term sustainability of the subject fish species and meeting specific management goals. FMPs generally use geographic and seasonal fishery closures, catch limits and quotas, size and age limits, gear restrictions, and access controls to manage the fishery resources.

The GMFMC has developed seven FMPs to promote the long-term health and stability of the managed fisheries. These FMPs are implemented by NMFS and are as follows:

- Shrimp Fishery of the GOM, U.S. waters
- Red Drum Fishery of the GOM
- Reef Fish of the GOM
- Coastal Migratory Pelagic Resources (Mackerels) in the GOM
- Stone Crab Fishery of the GOM and South Atlantic

- Spiny Lobster in the GOM and South Atlantic
- Coral and Coral Reefs of the GOM.

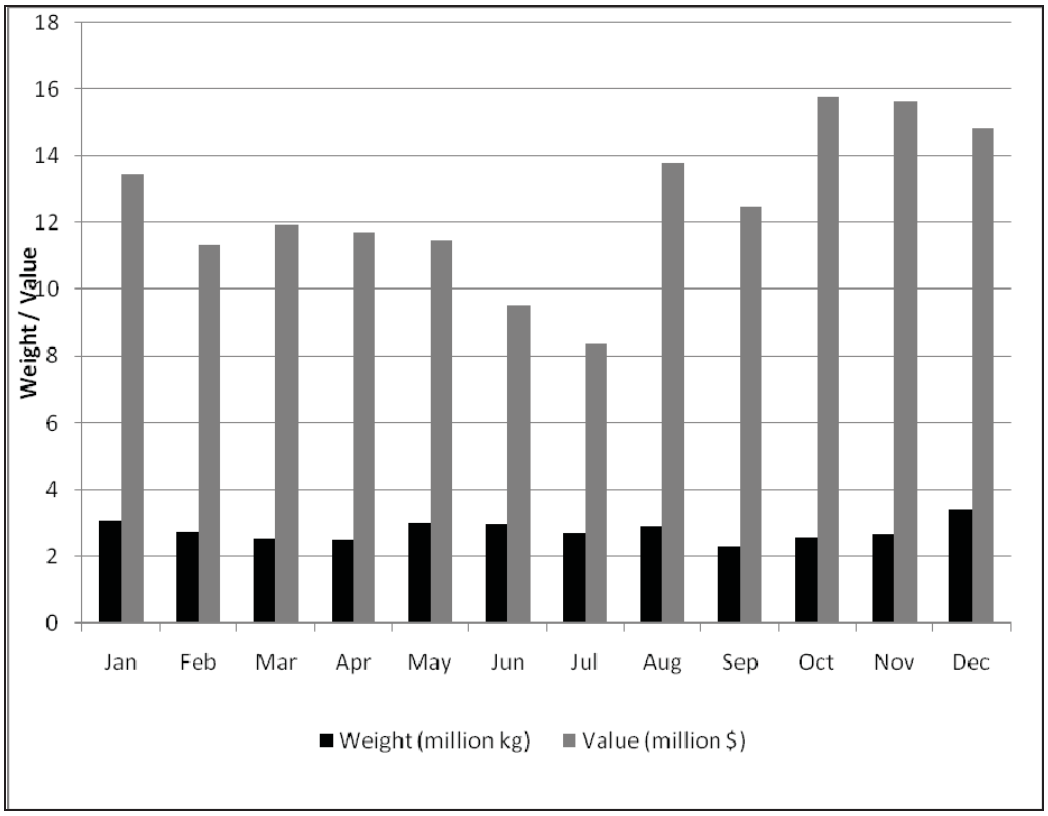
Secretarial FMPs have been developed by NMFS for highly migratory species and include Amendment 1 to the Atlantic Billfish Fishery Management Plan; *Final Fishery Management Plan for Atlantic Tuna, Swordfish, and Sharks;* and the Final Consolidated Atlantic Highly Migratory Species Fishery Management Plan (NMFS 1999a, NMFS 2006a, NMFS 1999b).

Commercial Landings. The 2006 commercial landings for Florida's west coast were approximately 69 million pounds (valued at more than $194 million, a slight decrease from the 70 million pounds (valued at more than $133 million) in 2005 (NMFS 2007a). Landings on the west coast of Florida exceeded 100 million pounds from 1952 to 1994, with the exception of 1954 (landings were approximately 98 million pounds). In 1993, landings dropped to 92 million pounds from almost 117 million pounds in 1994. The peak landing between 1950 and 2006 was in 1989 when landings reached 145 million pounds (valued at almost $158 million in 1989 U.S. dollars). The most valuable catch between 1950 and 2006 was in 1998 when landings were valued at almost $168 million (1998 U.S. dollars) (with a weight of 99 million pounds). On average, landings on the west coast of Florida composed 62 percent of the state's landings in terms of pounds and almost 75 percent in terms of value. Landings from the west coast of Florida accounted for an average 1.87 percent of the nation's landings in terms of pounds and 5.04 percent of the nation's landings in terms of total value from 1950 through 2005. In 2005, Florida's west coast landings accounted for the smallest percentage of the national landings in terms of pounds since 1950 (0.73 percent) and the smallest percentage of value of national landings since 1951 (3.373 percent). The only year that the percentage of the national value was lower was in 1950, when Florida's west coast landings only accounted for 2.97 percent of the value of the national landings (NMFS 2007b).

The five largest catches from 2001 through 2006 on the west coast of Florida were pink shrimp, blue crab, red grouper, striped mullet, and Florida stone crab claws (not necessarily in that order in all 5 years). The five catches with the highest total value from 2001 through 2006 were pink shrimp, Florida stone crab claws, Caribbean spiny lobster, red grouper, and gag (not necessarily in that order). The two most valuable catches in terms of price per pound from 2001 through 2005 were quahog clams and soft and peeler blue crabs (in that order in all years). The value of quahog clams peaked in 2001 at $9.31 per pound (in 2001 U.S. dollars). The third, fourth, and fifth most valuable catches in terms of price per pound varied between pinfish, Caribbean spiny lobster, shellfish (unspecified), slipper lobster, and Florida stone crab (NMFS 2007b).

Figure 3.9-1 presents the 2006 commercial landings in Florida by month. In 2006, approximately 26 percent of the landings, measured by weight, were recorded in the fall (October through December) and approximately 24 percent of the landings were recorded in the summer (July through September), the season with the lowest landings. The value of landings peaked in the winter (January through March), with more than 31 percent of the total annual value for landings. The season with the lowest landings by value was spring (April through June), with approximately 22 percent of the value for landings.

In terms of commercial landings by weight, the striped mullet was the dominant finfish species, composing approximately 8.6 percent of the total landings in Florida in 2006 (NMFS 2007a). The red grouper was the second most dominant finfish species in terms of landings by weight and the dominant species in terms of value, composing approximately 6 percent of the total landings by weight and approximately 7.5 percent by total commercial landing value.



Source: NMFS 2007a

Figure 3.9-1. Commercial Landings by Month, 2006

The pink shrimp was the dominant shellfish species by weight and second most dominant by value, composing almost 13 percent of the total landings by weight, and almost 13.5 percent by value. The blue crab was the second most dominant species of shellfish composing approximately 11.6 percent of the state's commercial landings by weight and the third most dominant by value, composing approximately 12.7 percent by total commercial landing value. The Caribbean spiny lobster was the most valuable overall, composing approximately 14.2 percent of the total commercial landing value while consisting of only approximately 4.8 percent of the total landings.

In 1995, NMFS began collecting and reporting data so that catches made in state waters—usually 0 to 6 km (0 to 3 NM) from shore—could be differentiated from those made in the EEZ and in the high seas, greater than 370 km (200 NM) from shore. While the landings reported are preliminary and still subject to change (NMFS 2006b), they provide an indication of how the catch is distributed between these zones.

As shown by **Table 3.9-1**, the data indicate that, in terms of weight and value, landings from state and Federal waters were relatively level, ranging between 48 and 52 percent (NMFS 2006b).

In terms of landings by weight, finfish dominate the commercial catch, comprising approximately 59 percent of the catch by weight in the EEZ. The relative economic value of landings from the state waters was reversed because shellfish accounted for approximately 86 percent and finfish represented almost 14 percent of the value. In the EEZ, shellfish accounted for approximately 52 percent of the area landings by value and finfish represented almost 48 percent. In state and Federal waters combined, the relative value of finfish to shellfish was more markedly reduced, and shellfish represented almost 70 percent of the value of the landings (NMFS 2006b).

Table 3.9-1. Commercial Landings by Distance from Shore, 2006

	Landings by Weight				Landings by Value		
	Thousands of kilograms	Thousands of Pounds	Percent of Area Landings	Percent of Total Landings	Thousands of Dollars	Percent of Area Landings	Percent of Total Landings
State Waters							
Finfish	9,661	21,299	43.4	22.4	16,968	13.9	7.2
Shellfish	12,574	27,721	56.6	29.1	105,349	86.1	44.4
Subtotal	*22,235*	*49,020*	*100.0*	*51.5*	*122,317*	*100.0*	*51.6*
Exclusive Economic Zone							
Finfish	12,359	27,248	59.0	28.6	54,768	47.7	23.1
Shellfish	8,613	18,989	41.0	19.9	60,045	52.3	25.3
Subtotal	*20,972*	*46,236*	*100.0*	*48.5*	*114,813*	*100.0*	*48.4*
Totals	**43,207**	**95,256**	**-**	**100.0**	**237,130**	**-**	**100.0**

Source: NMFS 2006b

Notes: Numbers might not total exactly due to rounding. No landings from the high seas were reported.

U.S. commercial fisheries landings data are collected by the state and NMFS. The cooperative State-Federal fishery data collection systems obtain landings data from state-mandated fishery or mollusk trip-tickets, landing weighout reports provided by seafood dealers, Federal logbooks of fishery catch and effort, and shipboard and portside interview and biological sampling of catches. State fishery agencies are usually the primary collectors of landings data, but in some states NMFS and state personnel cooperatively collect the data. Survey methodology differs by state, but NMFS makes supplemental surveys to ensure that the data from different states and years are comparable (NMFS 2007b).

Statistics for each state represent a census of the volume and value of finfish and shellfish landed and sold at the dock rather than an expanded estimate of landings based on sampling data. These data do not indicate where the fish were caught. Principal landing statistics that are collected consist of the pounds and ex-vessel dollar value of landings identified by species, year, month, state, county, port, water, and fishing gear (NMFS 2007b).

Table 3.9-2 presents the total commercial landings in Florida from 1996 through 2006. Over the decade ending in 2006, the commercial landings of food and baitfish, measured by weight, averaged about 55 million kg (121 million lb) per year. Commercial landings ranged between more than 65 million kg (145 million lb) in 1996 to a low of almost 42 million kg (93 million lb), 10 years later, in 2005 (NMFS 2007a).

Harvests were moderately stable from 1996 to 2004, with annual landings typically deviating from the average by approximately 15 percent. The landings data show a 26 percent decrease from 2004 to 2005, which is most likely a result of hurricanes Katrina and Rita. The data show an overall decline of approximately 3 percent over the decade. Landings values averaged almost $200 million from 1996 to 2005. There was a 26 percent decrease in the weight of commercial landings from 2004 to 2005 and a 14 percent decrease in the value of those landings.

Table 3.9-2. Commercial Landings in Florida, 1996 to 2006

Year	Weight (million kg)	Weight (million lb)	Value (million $)
1996	65.6	144.6	224.9
1997	58.1	128.2	204.2
1998	59.0	129.9	213.4
1999	54.9	121.0	212.6
2000	54.0	119.2	219.3
2001	54.3	119.6	197.1
2002	52.3	115.4	184.4
2003	51.7	114.1	178.0
2004	57.5	126.8	194.9
2005	42.3	93.4	168.4
2006	45.7	100.5	192.3

Source: NMFS 2007a

The Tampa Bay-St. Petersburg ports are the principal Florida ports where commercial fisheries activities are recorded by NMFS. In 2005, Tampa Bay-St. Petersburg, Florida, was ranked 43rd among the top 100 U.S. commercial fishing ports in terms of dollar value of the landings (NMFS 2007c). In terms of weight of the landings, Tampa Bay-St. Petersburg, Florida, was ranked 53rd (NMFS 2007d). The Tampa Bay-St. Petersburg area was ranked second in the State of Florida behind Key West, which was ranked 21st in terms of dollar value and 48th in terms of weight of landings (NMFS 2007c, 2007d).

Table 3.9-3 presents the total commercial landings from 1996 through 2006 for Tampa Bay-St. Petersburg, Florida. Over the decade ending in 2005, commercial landings, measured by weight, for Tampa Bay-St. Petersburg averaged about 5.4 million kg (11.8 million lb) per year. Commercial landings ranged between a low of about 4.3 million kg (9.4 million lb) in 1997 and a high of 6.5 million kg (14.4 million lb) in 1998. The landings data show a marked overall increase of about 23 percent over the 10 years. Landings by value increase even more rapidly, at a rate of approximately 143 percent. Landings in 2006 increased by 19 percent to 5.4 million kg (11.9 million lb) valued at $27.6 million (NMFS 2007e).

Marine Recreation and Tourism. Recreational activities in Tampa Bay primarily comprise game and sport fishing, charter boat fishing, sport diving, sailing, power cruising, and other recreational boating activities. Recreational fishing and other recreational boats range throughout the Florida coastal waters, depending on season and weather conditions. Travel between the most popular cruising destinations along the Florida coast does not require traversing the Project site. Larger recreational vessels travel considerable distances offshore and, depending on local wave and weather conditions, could traverse the vicinity of the Project site.

Marine recreational fishing in Florida is a substantial industry with a high level of activity. The Marine Recreational Fishery Statistics Survey (MRFSS) conducted by NMFS provides estimates of fishing effort, catch, and participation by recreational anglers in the marine waters of the United States. The following discussion of recreational fishing off of Florida is based on the findings of the MRFSS.

Table 3.9-3. Commercial Fishery Landings at Tampa Bay-St. Petersburg, 1996 to 2006

Year	Weight (million kg)	Weight (million lb)	Value (million $)
1996	5.4	11.8	20.0
1997	4.3	9.4	17.6
1998	6.5	14.4	28.7
1999	5.0	11.1	19.2
2000	5.3	11.7	20.4
2001	5.8	12.7	20.2
2002	5.6	12.4	19.2
2003	5.7	12.5	20.9
2004	5.6	12.3	21.6
2005	4.5	10.0	17.8
2006	5.4	11.9	27.6

Source: NMFS 2007e

During the decade from 1996 through 2006, recreational fishing efforts, measured as the number of fishing trips in state inland marine waters and in state and Federal waters off the coast of Florida, averaged approximately 25 million trips per year (NMFS 2006c). As shown by **Table 3.9-4**, recreational fishing efforts ranged from a low of less than 19.5 million trips in 1999 to a high of more than 29.3 million trips in 2006. The lowest level of recreational fishing participation, measured as the number of anglers, occurred in 1996 (4.2 million anglers); however, participation peaked in 2001 (7 million anglers). Recreational fishing participation averaged almost 6.7 million anglers per year, over the decade. Both effort and participation increased during the decade; effort at an overall rate of about 1.2 percent and participation at an overall rate of about 3.8 percent.

Tables 3.9-5 and **3.9-6** present recreational fishing effort and participation data for 2-month sampling periods during 2006. Recreational fishing efforts and participation were concentrated in the period from May through August. About 41 percent of the annual trips and anglers were recorded during this 4-month period. The number of trips to Federal waters peaked during May and June, when 820,659 trips (approximately 29 percent of the annual trips) were taken (NMFS 2007f).

As shown by **Table 3.9-6**, marine recreational fishing brings a considerable number of tourists to the coast and to the state. NMFS defines coastal anglers as those whose residence is within 40 or 80 km (25 or 50 mi) of the coast (depending on the time of year) and out-of-state anglers are not state residents or are from another country. Although the majority of the anglers that fish in Florida marine waters reside within the state's coastal region, nearly 30 percent of the anglers reside outside the state (NMFS 2007b).

3.9.2.1 Onshore Socioeconomic Conditions

As discussed in **Section 3.9.2**, the Tampa Bay-St. Petersburg ports are the two principal Florida fishing ports. The ports also support active marine recreation and tourism industries. If the Project were to result in changes to commercial and recreational fishing and marine tourism, the cities of Tampa, Port Manatee, and St. Petersburg, and the counties in which they reside, are more likely than other Florida communities

Table 3.9-4. Recreational Fishing Effort and Participation, 1996 to 2006

Year	Effort [a]	Participation [b]
	Trips	Anglers
1996	22,857,729	4,232,118
1997	24,683,393	4,563,792
1998	22,324,388	4,782,453
1999	19,491,018	4,435,918
2000	26,565,518	6,358,283
2001	28,852,722	7,095,998
2002	24,721,667	5,781,262
2003	27,452,758	6,488,857
2004	27,091,380	6,533,905
2005	27,538,053	6,581,999
2006	29,345,260	6,666,808

Sources: a. NMFS 2006c, b. NMFS 2007b

Note: Recorded effort and participation are marine recreational fishing trips and anglers visiting any marine fishing area comprising inland waters, the state territorial sea, and the EEZ.

Table 3.9-5. Recreational Fishing Effort, 2006

	Inland Trips	State Territorial Sea Trips	EEZ Trips	Total Trips
Jan–Feb	2,062,758	1,374,599	249,639	3,686,996
Mar–Apr	2,674,577	1,940,931	536,944	5,152,452
May–Jun	2,468,223	2,778,407	820,659	6,067,289
Jul–Aug	2,739,371	2,499,278	594,195	5,832,844
Sep–Oct	2,371,441	1,628,341	352,285	4,352,067
Nov–Dec	2,246,117	1,706,212	301,282	4,253,611
Total	**14,562,487**	**11,927,768**	**2,855,004**	**29,345,259**

Source: NMFS 2007f

Table 3.9-6. Recreational Fishing Participation, 2006

	Coastal Anglers	Out-of-State Anglers	Total Anglers
Jan–Feb	1,056,089	524,560	1,580,649
Mar–Apr	1,628,637	674,118	2,302,755
May–Jun	1,812,886	744,989	2,557,875
Jul–Aug	1,593,960	780,785	2,374,745
Sep–Oct	1,231,794	433,910	1,665,704
Nov–Dec	1,129,852	450,213	1,580,065
Total	**8,453,218**	**3,608,575**	**12,061,793**

Source: NMFS 2007f

Note: Recorded participation is marine recreational fishing anglers visiting any marine fishing area comprising inland waters, the state territorial sea, and the EEZ. Numbers might not total exactly due to rounding.

to experience the effect. As such, socioeconomic data for Hillsborough, Manatee, and Pinellas counties compose the region of influence (ROI), are the principal focus of the following discussion, and are used as baseline conditions for the socioeconomic analysis.

Table 3.9-7 presents the total population, recent trends, and year 2010 population projections for Hillsborough, Manatee, and Pinellas counties and the state. The ROI will be measured using the totals for Hillsborough, Manatee, and Pinellas counties. All four geographical areas experienced population growth during the decade ending in 2000. The ROI had a 15 percent increase in population from 1990 to 2000 and is projected to increase more than 18 percent from 2000 to 2010. The rate of growth for the ROI was lower than the rate of growth for Florida, but continued to increase from 1990 to 2000. The rate of growth is projected to increase through 2010. The population of Manatee County grew at a faster rate than did the population of Florida during the decade ending in 2000; the population of Pinellas and Hillsborough counties grew at a slower rate. Population projections for the decade starting in 2000 indicate growth rates in Hillsborough and Manatee counties exceeding the projected rate of population growth for the state. The population of Pinellas County is projected to increase from 2000 to 2010, but at a lesser rate than from 1990 to 2000.

Table 3.9-7. Population, 1990 to 2010

	Hillsborough County	Manatee County	Pinellas County	ROI [a]	Florida
1990 [b]	834,054	211,707	851,659	1,897,420	12,937,926
2000 [c]	998,948	264,002	921,482	2,184,432	15,982,378
1990–2000 Change (%)	16.5 %	19.8 %	7.6 %	15.1 %	19.0 %
2010 Projected [d]	1,262,709	343,773	978,460	2,584,942	19,920,348
2000–2010 Change (%)	20.9 %	23.2 %	5.8 %	18.3 %	19.8 %

Sources: b. Census Bureau 1990, c. Census Bureau 2000, d. EDR 2007

Note: a. The ROI is composed of Hillsborough, Manatee, and Pinellas counties.

As shown by **Table 3.9-8**, the unemployment rates for Hillsborough, Manatee, and Pinellas counties; and the ROI declined between 1995 and 2000 with slight increases in unemployment between 2000 and 2005. Florida's unemployment decreased considerably between 1995 and 2000 and stabilized from 2000 to 2005. Unemployment rates for the three counties and the ROI were lower than Florida from 1995 to 2005, with the differences ranging from 0.2 percentage points to 2.5 percentage points. Hillsborough, Manatee, and Pinellas counties; the ROI; and Florida encountered significant increases in unemployment rates between 2005 and 2008.

Residents living in the ROI are more likely to be employed in the educational, health, and social services; and retail trade industries (see **Table 3.9-9**). A smaller percentage of residents in the ROI are employed in the professional, scientific, management, administrative, and waste management services and manufacturing industries. The same trends are true for state employment. Only 1 percent of the ROI residents are employed in the agriculture, forestry, fishing and hunting, and mining industries. The county with the highest percentage of residents in this industry is Manatee County, where the onshore pipeline would be constructed. **Table 3.9-10** lists the economic and business characteristics for the ROI, the State of Florida, and the United States.

Table 3.9-8. Unemployment Rates, in Percent for 1995 to 2006

Year	Hillsborough County	Manatee County	Pinellas County	ROI *	Florida
1995	4.5	4.4	4.1	4.3	6.1
2000	3.5	3.4	3.4	3.4	4.1
2005	3.8	3.6	3.6	3.8	4.0
2008	6.5	6.9	6.9	6.5	6.6

Source: BLS 2009

Notes:* The ROI is composed of Hillsborough, Manatee, and Pinellas counties.

Rates are for July of the indicated year. Rates are neither seasonally adjusted nor benchmarked.

Table 3.9-9. Employment by Industry

Economic and Social Indicators	Hillsborough County	Manatee County	Pinellas County	ROI *	Florida
Agriculture, forestry, fishing and hunting, and mining	1.1%	1.6%	0.2%	1.0%	1.3%
Construction	6.7%	9.2%	6.1%	7.3%	8.0%
Manufacturing	7.3%	11.7%	10.1%	9.7%	7.3%
Wholesale trade	5.3%	3.6%	3.7%	4.2%	4.0%
Retail trade	13.2%	14.3%	13.9%	13.8%	13.5%
Transportation and warehousing, and utilities	5.3%	3.8%	4.1%	4.4%	5.3%
Information	4.5%	2.0%	3.3%	3.3%	3.1%
Finance, insurance, real estate, and rental and leasing	10.1%	7.0%	9.3%	8.8%	8.1%
Professional, scientific, management, administrative, and waste management services	12.0%	9.6%	12.0%	11.2%	10.6%
Educational, health, and social services	17.3%	18.6%	18.9%	18.3%	18.1%
Arts, entertainment, recreation, accommodation, and food services	8.7%	9.0%	9.1%	8.9%	10.5%
Other services (except public administration)	4.5%	5.0%	5.3%	4.9%	5.1%
Public administration	4.0%	4.6%	4.0%	4.2%	5.2%

Source: Census Bureau 2000

Note: * The ROI is composed of Hillsborough, Manatee, and Pinellas counties.

Table 3.9-10. Economic and Business Characteristics of the ROI, the State of Florida, and the United States

	ROI *	Florida	United States
Private nonfarm establishments, 2004	65,395	484,938	7,387,724
Private nonfarm employment, 2004	980,589	6,864,987	115,074,924
Nonemployer establishments, 2004	162,399	1,369,002	19,523,741
Manufacturers shipments, 2002 ($1,000)	16,249,704	78,474,770	3,916,136,712
Retail Sales, 2002	$28,652,584	$191,805,685	$3,056,421,997
Retail Sales per capita, 2002	$35,899	$11,498	$10,615
Minority-owned firms, percent of total, 2002	41.1%	27.3%	17.8%
Women-owned firms, percent of total, 2002	82.0%	28.4%	28.2%
Housing units authorized by building permits, 2005	25,433	287,250	2,155,316
Federal funds and grants, 2004 ($1,000)	$15,885,915	$121,933,502	$2,143,781,727

Source: Census Bureau 2007

Note: * The ROI is composed of Hillsborough, Manatee, and Pinellas counties.

Table 3.9-11 presents selected housing statistics. In 2000, occupied housing accounted for 918,785 units of the 1,045,663 total units in the ROI. In the ROI, rental units accounted for more than 68 percent of the occupied units, slightly lower than the state proportion (70 percent). The median monthly rent in the ROI, at $625, was slightly lower than the median rent for the state ($641).

Table 3.9-11. Housing Data for 2000

	Hillsborough County	Manatee County	Pinellas County	ROI [a]	Florida
Total Units	425,962	138,128	481,573	1,045,663	7,302,947
Occupied Units	391,357	112,460	414,968	918,785	6,337,929
Owner-Occupied	250,995	82,947	293,866	627,808	4,441,799
Renter-Occupied	140,362	29,513	121,102	290,977	1,896,130
Vacant Units	34,605	25,668	66,605	126,878	965,018
Seasonally Vacant Units [b]	6,068	16,845	34,111	57,024	482,944
Vacancy Rate – Homeowner	1.9	2.5	2.3		2.2
Vacancy Rate – Rental	8.9	10.1	10.2		9.3
Median Value ($)	91,800	96,000	85,600	91,133	93,200
Median Monthly Rent ($)	623	637	616	625	641

Source: Census Bureau 2000

Notes:

a. The ROI is composed of Hillsborough, Manatee, and Pinellas counties.

b. Vacant for seasonal, recreational, or occasional use.

The 2000 census recorded 1,045,663 total housing units in the ROI, of which 918,785 units were occupied. The proportion of occupied rental units to total occupied units was approximately 12 percent, which is comparable to that of the state, at approximately 13 percent. In 2000, the median monthly rent in Hillsborough County was $623, approximately 3 percent lower than the median monthly rent in Florida at $641.

Sand Resources. Tourism is an important industry in the ROI, especially on Anna Maria Island which includes the cities of Anna Maria, Holmes Beach, and Bradenton Beach and also the Town of Longboat Key. Anna Maria Island and Long Boat Key are located upon a barrier island just west of the Bradenton-Sarasota Metropolitan area. The white sandy beaches of this area are part of the draw for tourists. Both Anna Maria Island and Long Boat Key have beach management plans in place to ensure that a proper beach width is maintained to protect beach front property from destruction and nearby evacuation routes from flooding, and also to preserve the beaches that attract tourists to the region (Robinson et al. 2001).

Sand for beach renourishment projects is acquired from offshore sand deposits, ongoing dredging operations, and onshore sources. Sand provided by ongoing dredging options is the most economically viable option. The sand used for beach renourishment is a byproduct of the dredging operation and can be used to complete the Project. Resources acquired via this method are contingent upon ongoing dredging operations and the quantity of material being dredged. Acquiring sand from onshore sources and delivering to the beach by truckload tends to be extremely expensive, but if offshore sand resources do not exist this may be the only option. Sand, dredged for the purpose of renourishment, from offshore sources and then deposited onto nearby beaches is the most common method of beach renourishment.

Anna Maria Island and Longboat Key have been replenishing their beaches at various intervals and levels since 1993. Numerous major beach renourishments have occurred on Anna Maria Island and Longboat Key, the volumes and costs are listed in **Table 3-9.12** (Murley et al. 2003).

Table 3-9.12. Anna Maria Island and Long Boat Key Beach Renourishment Projects, 1993-2006

Year	Volume Renourished (cubic yards)	Length of Beach Renourished (miles)	Total Cost (dollars)
Anna Maria Island			
1993	2,300,000	4.6	9,300,000
2002	1,900,000	5.2	9,900,000
2006	213,000	4.6	3,400,000
Longboat Key			
1993	3,360,000	9.3	N/A
1997	891,000	3.1	N/A
2006	1,790,000	9.8	N/A

Source: Murley et al. 2003

These projects are large capital investments and in the interest of preserving upland property and reducing major disasters the Federal government helps offset the costs. The Federal government pays around 50 percent of the cost of the Project and the remaining 50 percent is split between the local municipality, the county, and the state. The beach renourishment projects on Anna Maria Island have accepted Federal funds where as Longboat Key has not pursued Federal funds for their restoration projects, citing additional requirements posed by the government as the inhibiting factor (Port Dolphin 2008a).

3.9.2.2 Environmental Justice

This section presents the demographic data to identify potential environmental justice impacts associated with the Project. An area is considered to have a disproportionately high percentage of low-income or minority residents under either of two conditions: (1) if the percentage of low-income or minority populations within that area is substantially greater than the county or state minority percentage or low-income percentage, or (2) the percentage of persons in low-income or minority populations within the area is greater than 50 percent.

Census data on 2000 racial and ethnic make-up for Hillsborough, Manatee, and Pinellas counties and the state are presented in **Tables 3.9-13** and **3.9-14** summarizes income and poverty characteristics. The ROI does not have disproportionately higher proportions of minority and low-income residents compared to Florida. Although, the percentage of Black and Hispanic or Latino residents in Hillsborough County is slightly higher than the percentage for the ROI and state, Hillsborough County also has the highest median household income, and the percentages of individuals living in poverty is the same as the State and only slightly higher compared to the other counties in the ROI, the ROI, and the state. The poverty level for the United States in 1999 was 12.4, slightly lower than the Hillsborough County and state level but higher than the level for Manatee and Pinellas counties (Census Bureau 2000).

Table 3.9-13. Race and Ethnicity, by Percent in 2000

	Hillsborough County	Manatee County	Pinellas County	ROI [a]	Florida
White	75.2	86.4	85.9	82.5	78.0
Black [b]	15.0	8.2	9.0	10.7	14.6
American Indian and Alaska Native	0.4	0.3	0.3	0.3	0.3
Asian	2.2	0.9	2.1	1.7	1.7
Other Race	4.7	2.8	1.1	2.9	3.0
Two or More Races	2.6	1.4	1.6	1.9	2.4
Hispanic or Latino [c]	18.0	9.3	4.6	10.6	16.8

Source: Census Bureau 2000

Notes:

a. The ROI is composed of Hillsborough, Manatee, and Pinellas counties.

b. Having origins in any of the black racial groups of Africa.

c. Hispanic origin, could be of any race.

Table 3.9-14. Income and Poverty, in 1999

	Hillsborough County	Manatee County	Pinellas County	ROI *	Florida
Median Household Income	$40,663	$38,673	$37,111	$38,816	$38,819
Per Capital Income	$21,812	$22,388	$23,497	$22,566	$21,557
Individuals Living in Poverty (%)	12.5	10.1	10.0	10.9	12.5

Source: Census Bureau 2000

Note: * The ROI is composed of Hillsborough, Manatee, and Pinellas counties.

3.10 Navigation and Transportation

3.10.1 Definition of the Resource

Marine transportation includes all vessels that use the channels and navigable waterways within the area adjacent to and in the vicinity of the Port. This includes marine traffic to and from the onshore staging area during construction and between the Port and onshore ports for supplies during operation. Within this region of Tampa Bay, marine transportation includes a variety of vessels engaged in commercial, recreational, Federal, and state functions.

Onshore transportation refers to the movement of ground-based motor vehicles and supporting infrastructure. This category is dominated by privately owned cars; commercial trucks, busses, and trains; and the supporting road, parking, and railroad track networks. The areas required for the onshore portions of the Project and its alternatives are limited to the temporary staging areas necessary to construct the offshore facility, the selected port with merchants capable of providing supplies to restock the moored vessels, and the roadway system serving those staging areas and supply locations.

For this Project, the affected environment for transportation and navigation includes those onshore, near-shore, and offshore components that could be directly or indirectly impacted. These areas include vessel traffic in Tampa Bay and nearby shipping lanes in the GOM, ports in the Tampa Bay area, and roadways and railways that could be used to deliver construction materials or personnel.

3.10.2 Vessel Traffic

Tampa Bay is approximately 6 to 7 miles wide and 20 miles long, and provides access to two major ports, the Port of Tampa and Port Manatee, and one small port, the Port of St. Petersburg. Water depths in Tampa Bay vary significantly from one location to another, but are generally shallow with depths less than 15 feet except where dredging has occurred for vessel transit (NRL 2005). A large variety of vessel traffic occurs in Tampa Bay, including commercial shipping; commercial fishing; recreational fishing; and the operation of charter vessels engaged in fishing, diving, and dolphin watching. In addition, several cruise lines operate out of Port of Tampa (TPA 2008).

As shown in **Figure 2.3-2**, the main shipping fairway, Egmont Channel, enters the offshore area of Tampa Bay from the eastern GOM. It is dredged and maintained to 6 miles west off the coast of Florida to a water depth of 13 m (43 feet), ending just west of Egmont Key (TPA 2008). Egmont Channel extends between Mullet Key and Egmont Key and dredged cuts leading up the bay through Tampa Bay, Hillsborough Bay, and Old Tampa Bay to Port Manatee, Big Bend, Alafia River, Port Sutton, Tampa, Port Tampa, and Weedon Island. Egmont Channel is used by all deep-draft vessels entering Tampa Bay (NOAA 2008). **Table 3.10-1** shows the number of vessel trips along Egmont Channel to their respective port of call (Port Manatee, Port of Tampa, or Port of St. Petersburg) for Fiscal Year (FY) 2005 through FY 2008. A vessel entering Tampa Bay and proceeding to its respective port of call, conducting its port business, and then leaving the Port and exiting Tampa Bay, would be two vessel trips.

The following types of vessels conducted the trips along Egmont Channel to Port Manatee and the Port of Tampa shown in **Table 3.10-1** (Davis 2009 and Higgins 2009):

- Liquid bulk vessels such as product and crude tankers, which carry petroleum, sulfur, or other liquid bulk
- Dry bulk vessels such as bulk vessels, bulk containerships, cement carriers, ore carriers, and wood-chip carriers

Table 3.10-1. Vessel Trips along Egmont Channel to Port Manatee, Port of Tampa, and Port of St. Petersburg from FY 2005 to FY 2008

Year	Port Manatee	Port of Tampa [a]	Port of St. Petersburg [b]	Total Trips Along Egmont Channel
FY 2005	1,032[c]	7,376	60	**8,468**
FY 2006	786[c]	7,398	60	**8,244**
FY 2007	740[c]	7,162	60	**7,962**
FY 2008	1,064[a]	6,832	60	**7,956**

Sources: a. TPA 2009, b. McGowan 2008 (Port of St. Petersburg vessel trips are approximate), c. Higgins 2009

- Barges that carry liquid or dry bulk such as petroleum, dry bulk goods, or scrap materials
- Tugs used to tow the liquid or dry bulk barges
- Cruise ships
- Crew boats
- General cargo vessels such as general cargo carriers, partial containerships, refrigerated ships, barge carriers, and livestock carriers
- Other types of vessels such as roll-on/roll off vessels that are designed to carry wheeled cargo such as automobiles, trailers, or railroad cars; container vessels such as container carriers and refrigerated container carriers; and combination vessels such as ore/bulk/oil carriers.

The largest percentage of vessels trips along Egmont Channel to Port Manatee in FY 2008 were by general cargo vessels (30 percent) followed by tugs (28 percent). The largest percentage of vessels along Egmont Channel to the Port of Tampa in FY 2008 was by the types of vessels listed under other vessels above (35 percent) followed by tugs (30 percent). The Port of St. Petersburg does not accept the types of vessels listed above due to the small size of the port (see **Section 3.10.2.3**). The Port of St. Petersburg maintains permanent berthing for vessels such as large (approximately 280 feet) personal yachts, small cargo vessels, USCG vessels, and research vessels (McGowan 2008).

Table 3.10-2 shows the number of vessels registered in 2008 in the counties of Manatee, Hillsborough, and Pinellas, which surround Tampa Bay. Most vessels are Class 1 (i.e., between 16 and 25 feet 11 inches long). As shown in **Table 3.10-2**, most vessels registered in the counties surrounding Tampa Bay are for recreational use (approximately 98 percent).

Most recreational boating involves fishing, cruising, and nature viewing. Vessel types include various sized power boats, sailboats, kayaks, and fishing boats. Frequent destinations within the Tampa Bay region are Terra Ceia Bay, Egmont Key, and the Sunshine Skyway Bridge. See **Section 3.6** for more information on recreational areas. Boaters use routes within the bay and offshore areas that center on their intended activity. Divers tend to travel farther into the GOM to reach their destination whereas nature viewers remain closer to islands and the coastal area. The highest density of departures for southern Tampa Bay is from Anna Maria Island and the most densely used transit routes are within southern Tampa Bay (Sidman et al. 2004).

A large tourism-based economy supports a charter boat industry for visitors who want to experience ocean-based activities. Within the Tampa Bay region, numerous charter companies and private captains offer individual or group experiences in fishing, diving and snorkeling, cruising, gambling,

Table 3.10-2. Number of Vessels Registered by Class in Hillsborough, Manatee, and Pinellas Counties in 2008

Vessel Class (and Size)	Hillsborough County	Manatee County	Pinellas County	Three-County Total
Recreational Vessels				
Class A-1 (< 12 feet)	8,568	3,241	10,955	22,764
Class A-2 (12–15 feet 11 inches)	10,679	4,039	8,727	23,445
Class 1 (16–25 feet 11 inches)	23,038	9,948	26,737	59,723
Class 2 (26–39 feet 11 inches)	3,149	1,872	6,303	11,324
Class 3 (40–64 feet 11 inches)	601	337	982	1,920
Class 4 (65–109 feet 11 inches)	33	7	29	69
Class 5 (> 110 feet)	5	0	3	8
Canoes	615	199	730	1,544
Subtotal	*46,688*	*19,643*	*54,466*	*120,797*
Commercial Vessels				
Class A-1 (< 12 feet)	59	50	74	183
Class A-2 (12–15 feet 11 inches)	138	86	145	369
Class 1 (16–25 feet 11 inches)	457	321	610	1,388
Class 2 (26–39 feet 11 inches)	134	105	358	597
Class 3 (40–64 feet 11 inches)	79	45	133	257
Class 4 (65–109 feet 11 inches)	37	10	23	70
Class 5 (> 110 feet)	1	0	0	1
Canoes	2	1	2	5
Subtotal	*907*	*618*	*1,345*	*2,870*
Total of Recreational and Commercial Vessels	**47,595**	**20,261**	**55,811**	**123,667**

Source: FHSMV 2008

dolphin-watching, harbor touring, kayaking, nature-viewing, and bird watching. As illustrated in **Table 3.10-2**, of the 123,667 registered vessels in Hillsborough, Manatee, and Pinellas counties, 2,870 are considered commercial and include charter vessels and commercial fishing vessels (FHSMV 2008). Impacts on the navigation and traveling routes used by recreational and commercial vessels from pipeline operations are discussed in **Section 4.10**.

3.10.2.1 Port Manatee

Port Manatee is on the southeastern shoreline of Tampa Bay in Manatee County in a predominantly commercial and industrial area and is not situated near recreational or tourist attractions (MCPA 2009a). Port Manatee serves the counties of Lee, Charlotte, DeSoto, Sarasota, Hardee, Polk, Hillsborough, Pasco, Hernando, Pinellas, and Manatee (FSTEDC 2008). Port Manatee is accessed through the shipping channel for Port Manatee, which is a 4.8-km- (2.9-mi-) long, 12-m- (40-foot-) deep mean low water harbor channel which branches off Egmont Channel to the southeast.

Port Manatee is presently a deepwater cargo port, although it has supported cruise operations in the past. Port Manatee services a variety of break-bulk cargo commodities, which is led by the import of perishables, forest products, steel, and nonferrous metals. Bulk commodities include finished phosphate products, cement and cement clinkers, refined petroleum, and a growing range of construction-grade aggregates. Phase One of Port Manatee's $125 million expansion project was completed in 2007. Key components of the entire expansion project include one-half mile of new deepwater berthing and modern docks and new navigational safety features including a 1,300-foot-diameter turning basin and improved turning configuration where the port's channel intersects the main Tampa Bay Shipping Channel (MCPA 2009b). In FY 2008 Port Manatee handled 8.3 million short tons of cargo which was managed by 62 full-time employees and an estimated 1,100 on-Port employees (MCPA 2009c). **Table 3.10-3** presents the types of vessels that called on Port Manatee in FY 2008. As shown in **Table 3.10-3**, Port Manatee is busiest from August to October.

Table 3.10-3. Port Manatee Vessel Calls by Vessel Type for FY 2008

Month	Liquid Bulk	Dry Bulk	General Cargo	Barges	Tugs	Crew Boats	Total
January	0	8	10	3	4	0	**25**
February	1	9	14	3	6	0	**33**
March	1	7	21	2	3	0	**34**
April	1	3	16	6	5	1	**32**
May	4	4	12	6	6	2	**34**
June	1	4	11	5	5	0	**26**
July	3	8	9	13	13	0	**46**
August	0	2	14	26	27	0	**69**
September	0	4	19	28	28	0	**79**
October	1	4	12	24	24	0	**65**
November	2	1	11	10	13	3	**40**
December	3	4	13	14	15	0	**49**
Total Calls	**17**	**58**	**162**	**140**	**149**	**6**	**532**

Source: Higgins 2009

Note: Liquid Bulk includes liquid bulk barges and liquid bulk tankers. Dry bulk includes dry bulk barges and dry bulk tankers.

3.10.2.2 Port of Tampa

The Port of Tampa is the largest port in Florida as measured by tonnage and area, and handles a variety of cargo and cruise operations (FSTEDC 2008). The Port of Tampa serves Hillsborough, Hernando, Pasco, Pinellas, and Polk counties. The Port of Tampa is a major port of entry for the fuel and building materials used in the region and is also a popular cruise port, serving the expanding Western Caribbean market. The Port of Tampa has a current annual economic impact of $7.8 billion, which includes 96,000 jobs. Approximately 782,000 revenue-generating cruise passengers used the Port of Tampa in FY 2006 and 2007, and 1.0 million are projected for FY 2011/2012 (FSTEDC 2008). **Table 3.10-4** presents the types of vessels that called on the Port of Tampa in FY 2008. The Port of Tampa is surrounded by a residential population and a variety of tourist attractions (TPA 2008).

Table 3.10-4. Port of Tampa Vessel Calls by Vessel Type for FY 2008

Vessel Type	Number of Calls
Barge	1,003
Cruise*	179
Tugs	1,022
Other Vessels	1,212
Total Calls	**3,416**

Source: TPA 2009

Note: * Includes cruise vessels that dry-docked for repairs

3.10.2.3 Port of St. Petersburg

The Port of St. Petersburg is off the west coast of Tampa Bay. It is not considered a true deepwater port and does not provide berths for standard-sized cargo vessels, such as the cargo vessels that dock at Port Manatee and Port of Tampa (McGowan 2008), due to a controlling water depth of approximately 7.0 m (23 feet) within the port basin and lesser depths along the eastern edge of the port basin (NOAA 2008). The port maintains permanent berthing for vessels such as large (approximately 280 feet) personal yachts, small cargo vessels, USCG vessels, and research vessels from the University of Southern Florida (McGowan 2008). Approximately 30 vessels use the Port of St. Petersburg annually (McGowan 2008).

3.10.3 Roadways

I-75 is the major north-south interstate highway through the Tampa area. I-4, which ends in Tampa, and I-10 are the major east-west highways. I-275 connects Tampa across Old Tampa Bay to St. Petersburg, and St. Petersburg across Tampa Bay to the Terra Ceia area, just south of Port Manatee. U.S. Highway 41 provides access to Port Manatee and is directly accessible by I-275 and indirectly accessible by I-75 and I-4.

Semi-trucks are the solitary mode of transportation for 6 million of the total 7 million tons of cargo that move through Port Manatee annually; therefore the existing conditions of Port Manatee include significant truck traffic (FDOT 2005). U.S. Highway 41 provides access to Port Manatee from 1-275. I-275 is south of Port Manatee, and provides access to the western side of Tampa Bay via the Sunshine Bridge. Vehicles access Port Manatee from U.S. Highway 41 via Piney Point Road.

The portion of U.S. 41 which provides access to Port Manatee from I-275 has average daily vehicle traffic of 10,300 vehicles or 3.8 million vehicles annually. Semi-truck traffic accounts for approximately 15 percent (1,545 vehicles) of the daily traffic along this stretch of U.S. Highway 41. Piney Point Road, which provides access to Port Manatee from U.S. Highway 41, has an average of 2,900 vehicles daily or 1.1 million vehicles annually. Approximately 13 percent of this daily traffic (377 vehicles) is semi-truck traffic. I-75 has an average traffic count of 10,001 to 15,000 semi-trucks daily. Between 501 and 1,500 semi-trucks use U.S. Highway 41 north of Piney Point Road daily, and 1,501 to 3,500 semi-trucks cross the Sunshine Bridge daily on I-275 and proceed north on U.S. Highway 41 to Piney Point Road (FDOT 2008a). The flow of automobile traffic heading into Port Manatee has recently been modernized due to the opening of Port Manatee's Access Control Center. It is located at the port's north entrance and features multiple drive-through lanes, as well as a main building that streamlines surveillance, identification badge authorization, and visitor screenings. The Access Control Center has simplified access to the Port and allows a smoother flow of traffic from U.S. Highway 41, which is just outside the main entrance (MCPA 2009b).

3.10.4 Railways

The CSX Railroad handles more than 1.4 million carloads of freight annually in all of Florida (CSX 2008). The major products shipped via railcar include coal, orange juice, sugar, fertilizer, feed, phosphate, limestone, new and used cars, and aggregates. The CSX Railroad also provides railway access to the Port of Tampa and Port Manatee (CSX 2008, MCPA 2009b). Port of Tampa is an intermodal terminal, meaning that the facility is designed for loading and unloading containers and trailers to and from the railroad and street or highway (CSX 2008). Port Manatee owns approximately 8 miles of railroad track that also service an intermodal center (MCPA 2009b).

4. Environmental Consequences

This section presents an analysis of the potential direct and indirect impacts each alternative would have on the affected environment, as characterized in **Section 3**. Alternatives considered include the No Action Alternative, deepwater port concepts, alternative vaporization technologies, alternative pipeline routes, alternative anchoring methods, and pipeline construction methods (see **Table 2.1-1** in **Section 2.1**). Each alternative carried forward for detailed analysis in this EIS was evaluated for its potential to produce environmental impacts.

Direct impacts are caused by the action and occur at the same time and place. Indirect impacts are caused by the action and are later in the time or are farther removed in distance, but are still associated with the action. Impact characteristics (i.e., minor, moderate, or major) as described in **Section 1.4**, have several impact attributes including (1) duration (i.e., short-term, long-term), (2) mechanism (i.e., direct, indirect), (3) magnitude (classifications ranging from minor to major), and (4) whether an impact is adverse or beneficial. The evaluation criteria upon which impact determinations are made are presented in **Table 4.0-1.** Determination of the significance of impacts also considers two critical NEPA-based factors as given below.

Context – where an impact can be determined to be localized or more widespread (e.g., regional). While the definition of the term "local" (or localized) can vary by resource, it can be broadly defined as one that occurs within an established regulatory limit (e.g., 100-m (328-foot) mixing boundary or within approximately 10 km (6 mi) of the source). "Regional" impacts are broadly defined as those that occur on the order of 100 km (62 mi) or more from the source.

Intensity – where an impact is determined through consideration of several factors, including whether a proposed action might have an adverse impact on the unique characteristics of an area (e.g., historical resources, ecologically critical areas), public health or safety, threatened or endangered species, or designated critical habitat. Impacts are also considered in terms of their potential for violation of Federal, state, or local environmental law; their controversial nature; the degree of uncertainty or unknown impacts, or unique or unknown risks; if there are precedent-setting impacts; and their cumulative impacts (see **Section 6**).

The evaluation criteria summarized in **Table 4.0-1** provide a framework for establishing context and intensity. These evaluation criteria were developed by environmental professionals in the respective fields in coordination and consultation with stakeholder agencies. Although some evaluation criteria have been designated based on legal or regulatory limits or requirements, others are based on best professional judgment and best management practices. The evaluation criteria include both quantitative and qualitative analyses, as appropriate to each resource.

Section 4.11 outlines potential minimization and mitigation techniques. Various Federal and state agencies have requested specific measures including monitoring in order to minimize or offset potential impacts on natural resources. The Applicant has also committed to several BMPs and minimization practices during construction and operations to reduce potential impacts, which are also presented in **Section 4.11**.

4.1 Water Resources

The following discussion of water quality impacts includes an analysis of impacts and a determination of impact duration and severity. Included in the discussion are elements of the project description that

Table 4.0-1. Evaluation Criteria for Determining Environmental Consequences by Resource Area

Resource	Evaluation Criteria
Water Resources	• Violate a Federal, state, local, or federally recognized international water quality criterion or waste discharge requirement (major) • Cause irreparable harm to human health, aquatic life, or beneficial uses of aquatic ecosystems (major) • Degrade marine, coastal, or terrestrial (lakes, rivers, wetlands, tidal environments) water quality (minor to major depending on extent of degradation)
Biological Resources	• Violate a legal standard for protection of a species or its critical habitat (major) • Degrade the commercial, recreational, ecological, or scientific importance of a biological resource or its critical habitat (minor to major depending on extent of degradation) • Measurably change the population size (density) or change the distribution of an important species in the region (minor to major depending on extent of change)
Cultural Resources	• Potential to impact submerged cultural resources in or adjacent to Tampa Bay (minor to moderate depending on extent of adverse impact) • Irretrievable or irreversible damage to a prehistoric or historic property that is listed or eligible for listing on the NRHP (major) • Adversely impact a prehistoric or historic property that is listed or eligible for listing on the NRHP (minor to moderate depending on extent of adverse impact)
Geological Resources	• Destruction of unique geological features (major) • Increased erosion potential (minor to moderate depending on extent of increase) • Siting facilities to prevent recovery of mineral resources (minor to moderate) • Increased potential for geologic hazards, such as seismicity (minor to major depending on extent of increase) • Alteration of the soil composition, structure, or function within the environment (minor to moderate depending on extent of alteration)
Marine Areas and Land Use	• Alter the functional use of an area already used (minor to major depending on the current use) • Impacts on prime farmland (moderate) • Impacts on existing residences or businesses (moderate to major)

Resource	Evaluation Criteria
Recreation and Aesthetics	• Interference with access to coastal recreational shorelines or waterways (minor to moderate depending on extent of alteration) • Loss or displacement of an important recreational resource, such as impairment of recreational fishing activities and other water-dependent uses (minor to major depending on extent of alteration) • Degradation of recreational value (moderate) • Alter or impair a viewshed, scenic quality, or aesthetic value not consistent with applicable laws or regulations (minor to major depending on extent of alteration)
Air Quality	• Cause or contribute to a violation of any NAAQS (major) • Cause or contribute to a violation of a Class I or Class II increment (major) • Cause an adverse impact on AQRV in a Class I area (moderate to major) • Expose sensitive receptors to substantially increased pollutant concentrations (minor to major) • Increase emissions of criteria pollutants beyond limits allowed under CAA regulations (major) • Substantially increase the emissions of greenhouse gases (minor to moderate)
Noise	• Substantial change in existing ambient noise levels on land (which could impact humans) or underwater (which could impact biological resources) (minor to moderate depending on change) • Violation of state or local noise ordinances, limits, or standards, or applicable land use compatibility guidelines (minor to moderate depending on violation)
Socioeconomics and Environmental Justice	• Substantial change to the local or regional economy, population, housing, infrastructure (schools, police, and fire services), social conditions, or employment (major) • Disproportionate environmental health or safety risk to children (minor to major depending on risk and scope of impact) • Disproportionate environmental, economic, social, or health impacts on minority or low-income populations (minor to major depending on risk and scope of impact)
Navigation and Transportation	• Long-term interference with access to transportation routes (minor to major) • Permanent decrease in Level of Service of key transportation arteries (minor to major) • Substantial increased risks of collisions or other mishaps (e.g., grounding) (minor to major depending on risk)

Note: Impact characteristics (i.e., minor, moderate, or major) as discussed in the table above provide a framework for establishing context and intensity. The evaluation criteria include both quantitative and qualitative analyses, as appropriate to each resource.

would produce impacts and are proposed to minimize potential impacts. Applicant-proposed measures for minimizing potential environmental impacts are those that have been committed to by the Applicant and incorporated into the project design, and are listed in **Section 4.11**. Additional measures that are recommended by lead or cooperating agencies to mitigate potential adverse impacts, are also stated in **Section 4.11**.

This section addresses potential impacts on water resources associated with the Project, alternatives considered, and the No Action Alternative. As discussed in **Section 3.1**, the Project area encompasses areas within the GOM, Tampa Bay, and a 6.2-km (4-mi) onshore pipeline corridor. Because the Project area encompasses three distinct geographic areas, resources that might be impacted include water quality in marine, estuarine, and terrestrial (including wetland and groundwater) environments.

The potential impacts on water quality would be from the temporary resuspension of sediments and increases in turbidity in the water column during offshore Port and pipeline installation; erosion and generation of sediments in surface waterbodies during construction of the onshore portion of the pipeline; the discharges of water from hydrostatic testing of the pipelines; and the discharges from construction and support vessel engine-cooling water, barge and carrier deck drains, discharge of cooling water at elevated temperatures during operations, and other miscellaneous drains during Port construction and operations.

The offshore portion of the project would not degrade marine water quality or cause irreparable harm to human health, aquatic life, or beneficial uses of the aquatic ecosystem. Similarly, the onshore portion of the project would not degrade groundwater, surface water, or wetland water quality or cause irreparable harm to human health, aquatic life, or beneficial uses of the aquatic ecosystem. No Federal or state water quality criteria or water discharge criteria would be violated.

4.1.1 Impacts of the Proposed Action

4.1.1.1 Construction

SRV Construction. The SRVs would not be constructed within the Project area, thus adverse impacts on the sediment and water column of the Gulf during construction of the SRVs would not occur.

Proposed Port Construction. The Port would require construction of an STL subsea system that consists of a permanently installed anchoring system for the two off-loading buoys and eight mooring lines for each of the two SRVs. Each buoy would be connected to a flexible riser that would act as a gas transmission line between the SRV and the PLEM. Each PLEM would connect to a flowline that leads to a piggable-Y, at which point both STL systems would be connected to the single gas transmission pipeline that would lead onshore.

Fabrication of the Port components would occur offsite at manufacturing facilities, and the components would be transported to Port Manatee for storage prior to construction. All Port components would be transported to the offshore installation site by deck cargo barge, and offloaded by crane vessel. Onsite installation of the Port would take approximately 6 months. Construction activities would involve the use of derricks, barges, and pipelaying vessels to install the two STL buoy systems, riser pipelines, gas flowlines, and associated anchoring and mooring lines. These actions would result in increases in turbidity from sediment disturbance during placement of the anchors and laying of equipment on the seafloor. Modeling of the turbidity and sediment suspension associated with offshore pipeline construction (discussed below) determined that the distance, duration, and thickness of sedimentation associated with seafloor trenching activities would be small and temporary. Due to the short-term nature and more limited seafloor disturbance associated with the Port construction activities, minor, short-term direct adverse impacts on water quality during installation of the Port would be expected. Installation of

the mooring anchors as well as placement of the mats for manifolds and risers at the buoy sites would result in a localized and temporary disturbance to the sediment, causing short-term sediment resuspension in the water column. FDEP standards regarding turbidity due to suspension of sediment at the Port location would not be applicable to the construction of the Port. This is because the maximum distance of sediment deposition associated with seafloor trenching is estimated to be less than 2 km (1.2 mi), while the Port is located more than 28 km (17.8 mi) outside of state waters.

Construction of Proposed Offshore Pipeline Route. Installation of the gas transmission pipeline, two riser manifolds, and the gas flowlines would be performed predominantly by using a plow to dig a trench within seafloor sediments. This process would adversely impact water quality by increasing turbidity and suspending sediments within the water column along the proposed pipeline route.

The entire length of the offshore portion of the pipeline would be 67.6 km (42 mi), and would include portions in both Federal and state waters, including portions of Tampa Bay designated as OFW (as discussed in **Section 3.1.3.3**, and shown in **Figure 2.3-2**). The construction of the offshore portion of the pipeline would be accomplished using a variety of techniques, depending on the nature of the seafloor at various locations. Options for pipeline burial include various methods of digging a trench in the seafloor, such as plowing and dredging. In locations where sediment thickness does not allow for full burial, the pipeline would be covered by concrete mattresses. At three locations (the approach to the onshore connection, and the two crossings of the Gulfstream pipeline) the pipeline would be installed using HDD technology. All of these activities would result in disturbance of the sediment present at the work location.

The adverse impacts resulting from the pipeline installation would vary depending on the type of sediment disturbed, and the potential for disturbance of contaminated sediments. For the location of the STL buoys and the offshore portions of the pipeline, the sediments consist of fine quartz sand, coarse sand, and gravel-sized carbonates. Due to the large grain size of these sediments, individual particles would resettle to the bottom rapidly. This would result in the adverse impact having a very short duration, and would also result in the sediments not traveling very far from the site of disturbance. For the pipeline sections closer to Lower Tampa Bay, the sediments contain a larger percentage of silts and clays which would remain in suspension longer, and travel farther, than the offshore sediments. Therefore, the duration, horizontal extent, and contamination levels associated with pipeline installation in this area would be greater than that offshore.

The impacts of sediment suspension were modeled by the Applicant using the SSFATE model (ASA 2008). This modeling was performed to estimate the suspended sediment concentration, and the transport and deposition of sediment, resulting from pipeline construction and operation. A workplan for the modeling effort was developed by the Applicant to define the objectives, procedures, and input parameters to be used. The workplan was technically reviewed, and comments were provided before approval to verify that the proposed modeling was consistent with other similar studies. The results were provided in a narrative report (ASA 2008), were reviewed and evaluated, and were judged to be accurate and representative.

The adverse impacts from three separate construction activities were evaluated in the model: the releases of HDD drilling fluid, the use of a clam shell dredge to excavate the exit hole for the HDD locations, and the use of a mechanical plow or hydraulic jet to install pipeline sections. The model was used to estimate the area in which sediment concentrations would continue to exceed 100 mg/L after 30 minutes. The total areal extent of the turbidity plumes created during pipeline installation would be approximately 1,894 hectares (4,679 acres) (ASA 2008). The turbidity plumes would be short-lived and remain fairly close to their source. However, the duration of the exceedance was predicted to be limited to less than 2 hours for the worst-case condition. In addition, although sediment deposition of up to 15 mm (0.6 in)

was predicted locally, the majority of the affected area would receive less than 2 to 3 mm of sediment (ASA 2008). The magnitude and duration of these adverse impacts is small and temporary.

Modeling performed for the installation of the Gulfstream pipeline through this same area of Tampa Bay was also reviewed. For the Gulfstream project, the Final EIS (FERC 2001b) developed by the FERC concluded that disturbance of sediment would result in exceedances of the Florida state water quality standard of 29 nephelometric turbidity unit (NTU) for turbidity over a relatively small area, and for a short period of time. The model predicted that the area exceeding the turbidity standard at any given time would cover an area of 0.9 acres. Also, the model predicted that the longest length of time any given location would be exposed to an exceedance of the turbidity standard would be 10 hours. Therefore, the FERC concluded that the overall impact from pipeline construction would be minimal (FERC 2001b).

Extending this conclusion to the current Port Dolphin Project would require that the location, construction method, and construction duration for both Projects is approximately the same. Based on a review of the Gulfstream EIS, it appears likely that the Port Dolphin pipeline route would have smaller adverse impacts than those evaluated for the Gulfstream pipeline. This is because the Gulfstream pipeline was constructed directly through a 5.9-km (4-mi) portion of the Terra Ceia AP Tampa Bay, while the Proposed Route Alternative for the Port Dolphin pipeline does not enter the preserve (Port Dolphin 2007c).

Based upon this analysis, direct adverse impacts on water quality would be expected during the construction of the offshore portion of the pipeline. The impacts would result from the disturbance of seafloor sediment during construction. Due to the short-term duration of the construction activities, and the minimal amount of sediment resuspension anticipated, minor, adverse short-term impacts on water quality during installation of the pipelines would be expected. Contraventions of the FDEP requirements for OFW or toxic pollutants, and other water quality parameters are not anticipated during construction of the pipelines.

Adverse impacts on water resources would be further reduced by the use of BMPs proposed by the applicant and presented in **Section 4.11** and adherence to all applicable laws, regulations, industry standards, and recommended mitigation measures.

Offshore Hydrostatic Testing. Gauging and hydrostatic testing of the offshore portion of the pipeline could result in adverse water quality impacts due to the discharge of water that contains hazardous chemicals or reduced oxygen levels, or has otherwise been affected by its use in the testing process.

Gauging and hydrostatic testing would be required following the installation of the gas transmission line and all associated components. There would be two flushing events for the pipeline. The pipeline would first be filled with filtered seawater; then a pig would be passed through the pipe by flushing with water from behind the pig. Each flushing would constitute a volume of approximately 12.3 million gallons of filtered seawater, for a total of 24.6 million gallons. To assist in leak detection during testing, a fluorescent dye (Champion Fluorescent Dye or similar) would be added to the filtered seawater at an average concentration of 450 ppm. Also, a corrosion inhibitor (HydroHib P) would be added to the water. The water would be discharged at the location of the PLEM offshore.

The adverse impacts could potentially occur if the water quality of the hydrostatic test water were to be affected by added chemicals, or were to be modified (deprived of oxygen or charged with hydrogen sulfide) during the test period. Should these changes occur, the discharged water would mix with ambient water, reducing water quality within the mixing zone. To reduce the potential for adverse impacts, the Applicant has proposed to use dye and corrosion inhibitor that are nontoxic. In addition, the discharge would be performed in compliance with the NPDES permit for the Port Dolphin facility. Should water with impacted quality still be discharged, even with these precautions, the 12.3 million gallons of

discharge would be a relatively small volume of discharge in an offshore area, and would rapidly become diluted.

Direct adverse impacts on water quality would be expected during the hydrostatic testing of the pipeline. The impacts would result from the introduction of chemicals into the test water, modifications in the chemistry of the test water during the test (such as reduction in oxygen content), and then discharge of the water to open water. Due to the relatively small volume of discharge compared to site of the discharge, adverse impacts are expected to be minor, short-term, and of limited extent.

Construction Vessel Discharge. The operation of construction vessels during offshore pipeline and Port construction could result in adverse water quality impacts due to the discharges of water from construction vessels (e.g., deck drain runoff, engine cooling water, bilge water, treated sanitary wastewater, and potential oil spills).

Construction activities are expected to be of limited duration (11 months for Project construction, compared to the anticipated operating life of the Port of approximately 25 years), and discharges would be similar to those from other ships, boats, and barges in the Gulf and Tampa Bay. Construction vessels would not discharge sanitary waste (sewage) in state waters, where such discharge is prohibited. Sanitary waste could be discharged when vessels are in transit in international waters, in compliance with MARPOL.

Construction operations are likely to include the use of petroleum fuels, lubricating oils and greases, and cleaning solvents. These materials would be stored within small containers onboard the construction vessels and equipment. All construction operations that require the use of hazardous materials (e.g., heavy oil, diesel) would need to be in compliance with MARPOL Annex I and Annex IV and other applicable regulations set forth to minimize the risk of accidental discharge. All deck machinery would operate in compliance with an approved Spill Prevention, Control, and Countermeasures (SPCC) Plan. Decks on all vessels would be fitted with 4-inch-high welded steel barriers surrounding areas containing diesel-operated equipment. Although rainwater contaminated with petroleum products could potentially wash over the side of the ship deck, the potential for this to occur is expected to be low. Should such discharges occur, they would be expected to compose a relatively small volume and be readily dispersed in a short timeframe.

There is a potential for fuels or hazardous materials to be released, but any discharges are expected to be of very low volume and limited duration. Therefore, adverse impacts from construction vessel discharge would be expected to be minor and short-term.

With the use of BMPs proposed by the Applicant as presented in **Section 4.11**, adherence to all applicable laws, regulations, industry standards, and recommended mitigation measures, adverse impacts from construction vessel discharge would be minimized.

Onshore Groundwater. Onshore pipeline and interconnect station construction activities could result in adverse groundwater quality impacts due to the modification of the existing groundwater flow system, release of hazardous substances, or disturbance of existing contaminated groundwater.

Most segments of the pipeline would be installed by trenching and burial to a maximum depth of 4.7 m (15 feet). The onshore approach would be installed using HDD technology to a maximum depth of 37.5 m (120 feet) below water level, and one onshore segment through the FPL Tank Farm would be installed using HDD technology to a maximum depth of 12.5 m (40 feet). Because groundwater depth within the Surficial Aquifer System ranges from 0 to 3.1 m (0 to 10 feet) deep, the pipeline trench and the drilled borehole could be located below the water table, within the groundwater. For the trenched areas,

groundwater seeping into the trench would be pumped out, resulting in a short-term modification of the groundwater flow regime. Approximately 4 to 5 months are scheduled to install the entire 6.2-km (4-mi) pipeline. It is likely that any given trench location would only be open from a few hours to a few days, at the longest. Because the Surficial Aquifer is composed of loose soil and sand material, groundwater would flow back into open trenches within hours or days of pumping, and would have a minor adverse impact on the overall groundwater flow system.

The only aspect of the construction process that has the potential for adding contaminants to the groundwater is the potential release of fuels or lubricants from the operation of construction equipment. The Applicant has committed to following the FERC Procedures (see **Section 2.3.9**), which would ensure compliance with state and Federal permit conditions, including conditions related to the operation, and maintenance of equipment. The FERC Procedures require the Applicant develop an SPCC Plan, which would minimize the potential for, and adverse impacts of, any inadvertent releases of petroleum products or other hazardous materials into the environment during project construction. The SPCC Plan would specify preventive measures and clean-up and disposal procedures related to inadvertent fluid releases and would describe the preventative measures to be implemented to avoid spills. The SPCC Plan would also specify the spill response, clean-up, mitigation, reporting, and remediation measures to be implemented in the event of a spill. It would also specify spill response materials that must be available at the worksite, as well as required spill response training for the construction crew. Implementation of the SPCC Plan would minimize the project's potential short-term and long-term impact on groundwater resources.

Trenching and pumping of groundwater during construction of the onshore portion of the pipeline could potentially disturb areas with currently known groundwater contamination. The onshore pipeline route crosses within a few hundred feet to the south of the former Piney Point Phosphate gypsum stack system property, which is known to have been the location of a groundwater release and subsequent remediation effort. Groundwater flow in that area is reported to be to the north, away, from the pipeline route, so contamination is not likely to be present. To avoid disturbance of contaminated groundwater, the Applicant proposes to investigate groundwater in this area before performing trenching.

The pipeline route would include the use of HDD installation technology to install the pipeline at a depth of 13 m (43 feet) for a distance of 403 m (1,322 feet) below FPL tank farm. A review of FDEP environmental records did not identify any existing groundwater contamination issues or remediation efforts at this location. However, groundwater contamination is very common at petroleum product storage sites, and would not be unexpected at this location. Adverse impacts on groundwater or surface water quality could potentially occur if the HDD pathway intersected an area of contaminated groundwater.

Construction of the Gulfstream Interconnect Station and Port Manatee Valve Station would be performed by surface grading and placement of slab foundations. Slab foundations would not require substantial excavation, and there are no reports of contaminated groundwater in the area. Therefore, the construction of the stations is unlikely to adversely impact groundwater quality.

Minor, short-term adverse impacts on groundwater quality would potentially occur during construction of the onshore portion of the pipeline. Modification of the groundwater flow system by trenching and pumping groundwater from the top few feet of the existing aquifer system is not expected to result in adverse impacts. Although there is a potential for fuels or hazardous materials to be released to groundwater, any discharges are expected to be of very low volume and limited duration. However, the potential for construction operations to encounter contaminated groundwater does exist. Excavation is expected to occur within a few hundred feet of the known groundwater contamination at the former Piney Point property. In addition, although a literature search has not identified any groundwater impacts at the

FPL tank farm, they would not be unexpected in this industrialized area. Should pipeline construction activities encounter contaminated groundwater, the impacts are expected to be minor and of limited duration. However, disturbance of a contaminated groundwater plume that is currently under control could result in its release to a larger area. If pipeline construction does encounter contaminated groundwater, the potential adverse impacts on onshore groundwater could be moderate or major and long-term.

The implementation of spill response and emergency response plans would limit the duration and severity of a release event, should it occur. With adherence to all BMPs proposed by the Applicant and stated in **Section 4.11**, and applicable laws and regulations, minor adverse impacts on onshore groundwater would be minimized, and the potential for greater adverse impacts would be reduced.

Onshore Surface Water. Onshore pipeline and interconnect station construction activities could result in adverse surface water quality impacts due to the release of HDD drilling materials into surface waterbodies, and the discharge of hydrostatic test water.

At the onshore approach, the pipeline corridor would cross nearshore waters of Tampa Bay, sensitive habitats (such as seagrasses), tidally influenced mangrove habitat, and a water management ditch. This segment is classified as a 303d Listed Water Segment ("direct runoff to bay") by FDEP. To avoid disturbance of this area, the pipeline would be installed in the subsurface using HDD drilling technology. Surface-based construction activities associated with this technology would occur at either end of the 1,153-m- (3,783-ft-) long boring, but no activities would take place on the surface within the nearshore waters, sensitive habitats, or mangrove habitats that are being crossed. The surface-based activities occurring at either end of the boring would involve the use of construction vessels and vehicles for the duration of the construction, presenting a small potential for releases of fuels during a limited construction period. However, the Applicant's construction plan states that the activity itself would only involve the use of bentonite-based drilling mud with nontoxic additives. It is possible that an inadvertent release of drilling fluid, called a frac-out, could occur during HDD activities. If a frac-out were to occur, short-term sediment transport and bottom disturbance would likely adversely impact water quality. The FERC Procedures (see **Section 2.3.9**) require the Applicant to develop an HDD Plan that includes a description of how a frac-out would be contained and cleaned up. The Applicant would file all HDD plans with the FERC staff prior to construction. The non-Federal agencies with jurisdiction over HDD in Tampa Bay include FDEP (habitat and submerged lands), FWC (habitat and species), Tampa Port Authority (habitat and submerged lands in Tampa Bay), and Tampa Bay Regional Planning Council. Although Tampa Bay Regional Planning Council does not have a permitting process, they are a commenting agency for all proposed land alterations within the Tampa Bay Region.

Former wetland W-4, the borrow pond, is now considered to be a waterbody and would be crossed as such according to the FERC Procedures.

The final phase of construction would include gauging and hydrostatic testing of the onshore portion of the pipeline using 1.2 million gallons of water obtained from local fire hydrants. The Manatee County Utilities Department provides up to 45 million gallons of water per day, so the removal of 1.2 million gallons is not expected to result in adverse impacts on the water supply system. The timing and permits associated with access to the water would be coordinated with the Manatee County Utilities Department. The water would have biocides and oxygen scavengers added. Following testing, the test water would be discharged at a rate of 415 gpm at the Interconnection Station. The water discharge would be performed under appropriate state permits that would be obtained prior to construction. The discharged water would be treated (if required) and discharged through hay bales or other similar means to comply with water quality requirements of the discharge permit.

Major long-term adverse impacts on surface water quality could potentially occur during construction of the onshore portion of the pipeline. The HDD drilling and discharge of hydrostatic test water could potentially release a relatively large volume of poor quality water into small surface waterbodies. Should such releases occur, the adverse impacts could be substantial and of long duration. However, the potential for such adverse impacts to occur is expected to be low. Therefore, although the potential for major long-term adverse impacts exists, the likely actual impacts on onshore surface waters during construction activities is expected to be minor and short-term.

Use of the HDD Plan, as well as a spill response plan, would limit the duration and severity of a release event, should it occur. Adherence to all BMPs proposed by the Applicant and stated in **Section 4.11**, and applicable laws and regulations, adverse impacts on onshore surface waters would further reduce the potential for adverse impacts during construction.

Wetlands. Onshore pipeline and interconnect station construction activities could result in adverse water quality impacts due to the disturbance of designated wetlands during the installation of the onshore portion of the pipeline.

The onshore portion of the pipeline corridor would cross 9 individual sections of wetlands, including open water, scrub-shrub, emergent, and forested wetlands totaling approximately 10.71 acres, see **Section 4.2.2.1** for acreage details. Wetlands could be directly and adversely impacted by the removal of vegetation, disturbance of surface water flow paths, or the release of contamination into wetland areas. Port Dolphin's permanent operation of the pipeline would prevent trees and some larger shrubs from reestablishing directly over or adjacent to the pipeline. This would not result in a net loss of wetlands, but rather a conversion of the 1.19 acres of forested wetlands to emergent or smaller shrub type.

Because the proposed pipeline corridor crosses known wetlands, the potential for such impacts is certain, and not theoretical. The impact would be direct, adverse, minor, and long-term within the 10.71 acres of the construction area.

BMPs for wetland impacts are standard practice in the construction industry, and regulated by state, local, and Federal agencies. With proper adherence to industry standard BMPs proposed by the Applicant and stated in **Section 4.11**, and applicable laws and regulations, the adverse impact of construction of the onshore pipeline on wetlands would be reduced. Construction within wetlands would be conducted in accordance with the FERC Procedures and Port Dolphin's project-specific Wetlands and Waterbody Construction and Mitigation Procedures Plan, which contain wetland mitigation measures that are designed to minimize the overall area of wetland disturbance, minimize the duration of wetland disturbance, reduce the amount of wetland soil disturbance, and enhance wetland restoration following construction. The following are examples of some of the wetland impact minimization measures that Port Dolphin would adhere to:

- Limiting the operation of construction equipment within wetlands to only that equipment essential for clearing, excavation, pipe installation, backfilling, and restoration
- Using proper sediment and spoil controls
- Minimizing the time the trench is open in wetlands
- Installing trench breakers at the boundaries of wetlands as needed to prevent draining of a wetland and to maintain original wetland hydrology
- Prohibiting storage of hazardous materials, chemicals, fuels, and lubricating oils within a wetland or within 100 feet of a wetland boundary

- Restricting annual maintenance of vegetation to a 10-foot-wide strip of grasses centered over the pipeline and trees less than 15 feet in height within 15 feet of the pipeline centerline, and complying with state and Federal permit conditions.

The FERC Procedures requires that most wetlands be crossed using a right-of-way width of no greater than 75 feet. Port Dolphin has proposed to use a 100-foot-wide right-of-way in several wetlands. This issue is discussed in **Section 4.2.2.1.1**. With proper adherance to the FERC Procedures and other industry standard BMPs, as shown in **Section 4.11**, and applicable laws and regulations, the adverse impact of the onshore pipeline on wetlands would be reduced.

4.1.1.2 Operations

SRV Discharges. The SRV operations at the Port location could result in adverse water quality impacts due to the precipitation/deck runoff, discharge of engine and condensate cooling water, and discharge of firewater. **Table 4.1-1** presents the discharges associated with the operation of the SRVs as documented in the Applicant's NPDES permit application.

Table 4.1-1. Discharges Associated with the Pipeline Construction and Operation of the SRVs

Outfall Number	Operations Contributing Flow	Average Flow	Treatment
001	SRV 1 – Engine Room Cooling Water	6,604 gpm	Ocean discharge through outfall
002	SRV 1 – Firewater	5,238 gpm	Discharge to surface
001A	SRV 2 – Engine Room Cooling Water	6,604 gpm	Ocean discharge through outfall
002A	SRV-2–Firewater	5,238 gpm	Discharge to surface

Source: Port Dolphin 2007a

Notes: gpm – gallons per minute; MGD – million gallons per day

Uncontaminated precipitation/deck runoff would be discharged to the receiving waters through outlets on each side of the SRV. All deck areas where diesel or oil spills might occur would be confined by a 4-inch-high welded steel containment barrier. Potentially contaminated rainwater from these areas would be collected in a bilge holding tank, which would be equipped with an oil sensor. If oil concentrations greater than 15 ppm are detected, the bilge would be transferred to the engine room bilge system for treatment so that there would be no discharge that causes sheen on the water surface. The discharge would contain small amounts of petroleum product, but at low concentrations. Rainwater contaminated with petroleum products would not be expected to wash over the side of the SRV deck. Although the discharges of petroleum products could potentially occur, they are expected to be infrequent and small in volume.

Firewater discharge would be intermittent, occurring four times per year during USCG-required tests. During the tests, no chemicals are added to the water system. The discharge would be conducted in compliance with the NPDES requirements for outfalls 002 and 002A, and no detectable adverse impacts on water quality are expected.

The SRVs would require an intake of 9.5 MGD for engine and condensate cooling water, and up to 9.5 MGD of engine cooling water and firewater could be discharged. The SRVs would have systems onboard that generate wastewater, including sewage/domestic wastewater, brine from freshwater generators, and sodium hypochlorite from an electrochemical chlorination biofouling system. In addition, each SRV would take on up to 2.3 MGD of water for ballast to offset the weight of the offloaded LNG.

While SRVs are moored at the Port, there would be no discharge of sewage, domestic waste (gray water), bilge water, or ballast water. For the domestic waste systems, the SRVs would have sufficient onboard storage capacity for all wastewater generated while the vessel is moored at the Port. In compliance with MARPOL requirements, the wastewater would be stored, treated, and discharged while in transit in international waters. For the freshwater generator and biofouling systems, the systems would not need to be operated during the short time period that the vessel is moored at the Port, so no discharges would be generated at the Port location.

The purpose of the cooling water intake would be to reduce the temperature of engine systems and the LNG vaporization system. Therefore, the cooling water discharged would have an elevated temperature relative to the ambient temperature of the seawater. To evaluate any potential adverse impacts from the discharge of this heated water, Cornell Mixing Zone Expert System (CORMIX) modeling was conducted to predict the extent of elevated temperatures resulting from the discharge. CORMIX was selected because it is a USEPA-approved modeling software package for predicting the dispersion and mixing of effluent into surface waters. These include applications involving thermal gradients between the receiving water body and the discharge. The water quality criteria for the temperature increase is the USEPA 1986 standard allowing a maximum increase in the weekly average temperature of 1 °C. As shown in **Figure 4.1-1**, the water temperature drops rapidly as a function of distance from the discharge location. The modeling indicated that the discharge would produce exceedances of the standard over a maximum radius of 11 m (36 feet), and would produce detectable temperature increases over a maximum radius of 106 m (348 m). This impact would be minor due to the limited distance of impact, but would be adverse, direct, and long-term.

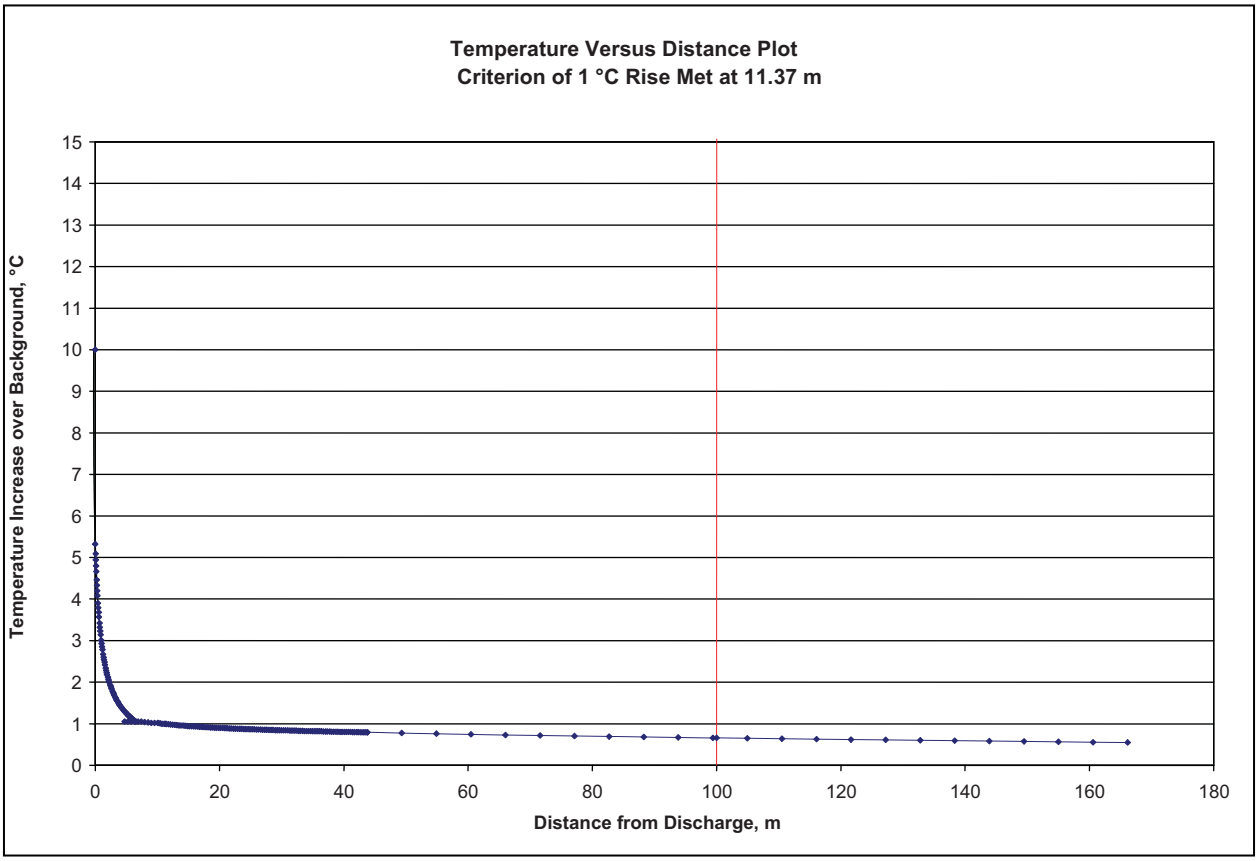


Figure 4.1-1. Temperature Distribution for Worst-Case (winter) Discharge Scenario

Also, there would be a potential for spillage of LNG during operations of the Port. However, LNG is not toxic and evaporates quickly; thus, impacts on water quality due to a release of LNG would be short-term, minor, direct, and adverse.

The result of the analysis is that minor direct adverse impacts on water quality could occur during the operation of SRVs at the Port. The potential for adverse impacts due to the release of rainwater, fuels, or hazardous materials is expected to be low, and any discharges are expected to be of very low volume and limited duration. However, the discharge of cooling water would be certain, as it is a necessary function of the SRVs. The impact of the cooling water discharge would be minor, adverse, direct, and long-term, but would occur over a limited distance from the Port.

SRV Mooring. The mooring of SRVs at the Port location could result in adverse water quality impacts due to sediment displacement when the flexible riser is pulled off the bottom as the buoy is raised to mate with the SRV. While the SRVs are moored at the Port, raising and lowering of the buoy and weathervaning of the SRVs would cause dragging of the mooring chains and risers on the seafloor. This would result in localized and temporary disturbances to the sediment, potentially causing short-term sediment resuspension and increases in turbidity near the bottom of the water column. These disturbances would occur periodically during the entire duration of the project (25 years).

The Applicant performed sediment suspension modeling for mooring line sweep, which would occur routinely during operations. The model was used to estimate the duration of elevated sediment concentrations resulting from the disturbance of the seafloor by the mooring lines. The model concluded that, under worst-case conditions, the sediment concentration would drop below 20 mg/L after 5 minutes of a sweep event. The suspended sediment would only rise to a height of 5 m (16 feet) above the seafloor, and result in deposition less than 2 mm (0.08 in) thick (ASA 2008). The magnitude and duration of these adverse impacts is small and temporary.

The result of the analysis is that minor, direct, adverse impacts on water quality would be expected during the mooring of SRVs. The amount of sediment resuspension anticipated during each event is small and short-term, but the event would be repeated every time an SRV arrives or leaves the Port throughout the 25-year duration of the project.

Offshore Pipeline Operation. Normal flow of gas through the offshore pipeline would not have any potential to cause adverse water quality impacts. Pipeline operations would only result in adverse water quality impacts due to pipeline rupture, and subsequent repair efforts.

According to the Applicant, operation of the offshore portion of the pipeline would consist only of the transmission of natural gas from the Port to Port Manatee. Therefore, it is not anticipated that contaminants would be released to the water column or sediment during operation of the pipelines. Should a leak or break occur in the pipeline or flowline, safety devices would shut down gas flow and isolate the problem. The natural gas would bubble to the surface and disperse. There would be a repair and response effort involving construction vessels and disturbance of sediment that could cause localized, short-term adverse impacts similar to those resulting from the initial construction activity.

Adverse water quality impacts could only occur in the event of a pipeline rupture. Should this occur, adverse impacts associated with pipeline repair would be similar to those associated with pipeline construction, but in a limited area and for a much shorter duration. The implementation of spill response and emergency response plans would limit the duration and severity of a release event, should it occur.

Onshore Pipeline and Interconnect Station Operation. Normal flow of gas through the onshore pipeline would not have any potential to cause adverse water quality impacts. Pipeline operations could result in

adverse water quality impacts due to pipeline rupture, and subsequent repair efforts. In addition, the position of the pipeline in the subsurface could potentially affect current surface water or groundwater flow paths.

No adverse impacts on groundwater quality, surface water quality, or wetlands would be expected during operation of the pipeline. Operation of the onshore portion of the pipeline would consist only of the transmission of natural gas from Port Manatee to the Gulfstream Interconnection Station. It is not anticipated that contaminants would be released to groundwater, surface water, or wetlands during operation of the pipeline. Should a leak or break occur in the pipeline, safety devices would shut down gas flow and isolate the problem. The natural gas would rise and disperse in the atmosphere. Repair activities are typically localized and short-term.

The location and size of the pipeline in the subsurface is not such that groundwater flow paths would be disturbed. The thickness of the Surficial Aquifer System is reported to be up to 6.3 m (21 feet) deep. The position of the 1-m- (3-foot-) diameter pipeline within the 6.3-m- (21-foot-) thick aquifer is not expected to impede groundwater flow.

The number of wetlands along the proposed pipeline route has been reduced from 11 to 9 due to development in the area, unrelated to this Project, and a refined definition of jurisdictional wetlands. It is important to note that Wetland W-5 was recently disturbed and filled (as of May 13, 2008). No portion of this wetland remains in the Project area. Additionally, the FPL borrow pond was originally delineated as Wetland W-4, but according to both the state and Federal rules, a borrow pond constructed in upland habitat is not jurisdictional. Pipeline corridor maintenance activities such as mowing and weed control could potentially impact wetlands and surface waterbodies if performed in a manner that caused runoff or damaged wetland biota.

Potential adverse water quality impacts could only occur in the event of a pipeline rupture and repair. Potential impacts would include soil disturbance and construction-related factors from replacing the pipe. In the event of a pipeline rupture on land, the impacts associated with pipeline repair would be similar to those associated with pipeline construction, but in a limited area and for a much shorter duration.

4.1.1.3 Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Offshore Decommissioning: The decommissioning of the offshore portion of the pipeline and the Port could result in adverse water quality impacts due to the operation of construction vessels.

The SRVs would be decommissioned by transporting them to suitable facilities for removal of LNG equipment. The buoys, risers, umbilicals, landing pad, and mooring lines would be removed. The pile anchors would be cut, with the top portion removed and the lower portion remaining in place. The pipelines would be decommissioned in place by filling them with seawater and capping the ends. Because there would be no disturbance of the seafloor through pipeline trenching or anchoring of construction vessels, adverse water quality impacts associated with sediment suspension would be expected to be much less than adverse impacts on water quality during construction and installation activities.

The result of the analysis is that short-term, minor, direct, adverse impacts on water quality could be expected during decommissioning of the Project. These adverse impacts would only occur through the operation of construction vessels during the decommissioning process. Therefore, the adverse impacts would be similar to those that would occur during construction, but would be of more limited duration.

The implementation of spill response and emergency response plans would limit the duration and severity of a release event, should it occur.

Onshore Decommissioning: The decommissioning of the onshore portion of the pipeline could result in adverse groundwater or surface water quality impacts due to excavation and disturbance within surface water, wetlands, and groundwater, or through the release of fuels or hazardous materials associated with construction equipment.

Short-term, minor, direct, and adverse impacts on surface water and groundwater quality would be expected during decommissioning of the onshore portion of the pipeline. Decommissioning would occur at the end of the Project duration (25 years), would be a one-time event, and would be subject to specific FERC review and approval for pipeline abandonment. The portions of the pipeline that were buried in trenches shallower than 2 m (6.4 feet) would be excavated, cut into sections, and removed, and the trenches would be backfilled and revegetated. The pipeline sections that were installed at depths between 2 m (6.4 feet) and 4.7 m (15.4 feet) using HDD technology would be abandoned in place by filling them with cement and capping the ends. The adverse water quality impacts associated with pipeline excavation and removal would be expected to be similar to the impacts associated with construction and installation of those sections. However, the sections that were installed by HDD would be left in place, so the decommissioning process for these sections would have a lower potential for adverse impacts than during construction and installation activities. Decommissioning would also involve excavation and use of construction vehicles in the same wetland areas that were affected during the initial construction. Adverse impacts associated with these efforts would be no larger than those associated with the initial construction.

The only aspect of the construction process that has the potential for adding contaminants to the surface water or groundwater is the potential release of fuels or lubricants from the operation of construction equipment. The Applicant has committed to following the FERC Procedures (see **Section 2.3.9**), which would ensure compliance with state and Federal permit conditions, including conditions related to the operation, and maintenance of equipment. The FERC Procedures require the Applicant develop an SPCC Plan, which would minimize the potential for, and adverse impacts of, any inadvertent releases of petroleum products or other hazardous materials into the environment during project construction.

The result of the analysis is that short-term, minor, direct, adverse impacts on water quality could be expected during decommissioning of the onshore portion of the pipeline. These adverse impacts would

include temporary disturbance of groundwater and wetlands during pipeline excavation. Adverse impacts could also occur through the operation of construction equipment during the decommissioning process. Therefore, the adverse impacts would be similar to those that would occur during construction, but would be of more limited duration.

4.1.2 Alternatives

Table 4.1-2 compares impacts from the Proposed Action to each of the alternatives with respect to water quality.

4.1.2.1 Southern Site and Route Alternative

The location of the Southern Site and Route Alternative is presented in **Figure 2.3-1**. The nearshore portions of the alternative routes are the same, so they would have the same construction, operation, and decommissioning impacts over this portion of the pipeline route. The alternative and proposed Port location and pipeline route are different only for the offshore portion. At 80.4 km (50 mi), the alternative pipeline route is approximately the same length as the Proposed Route, and therefore the total area impacted would be the same. The construction time and methods, and the associated potential for discharges associated with construction, operations, and decommissioning would be the same for the alternative and proposed locations and routes.

The only potential difference in adverse water quality impacts between the alternative and proposed locations and routes would be a different sediment characteristic, which could result in greater or lesser degrees of sediment suspension for the alternative route and location. No site-specific grain size study or sediment suspension modeling has been performed for this alternative route. However, regional grain size and sediment composition information for the two locations and routes was obtained from a review of several sediment sampling transects published by the USGS (Locker et al. 1999a, Locker et al. 1999b). These transects show that the general trend in sediment grain size and composition from the shoreline to locations offshore of both the alternative and proposed Port locations is very similar. Therefore, the magnitude and duration of water quality impacts resulting from sediment suspension is expected to be similar for both the proposed and alternative locations.

4.1.2.2 Offshore Interconnection with Gulfstream Pipeline Alternative

The location of the Offshore Interconnect Alternative is presented in **Figure 2.3-1**. The Port location, construction, and operation, and the associated water quality impacts, would be the same as those associated with the proposed Project. There would be three major differences that would affect the water quality analysis discussed for the proposed Project in **Section 4.1.1**. These are the shorter offshore pipeline route associated with the offshore Interconnect Alternative, the construction of the Interconnect Station at an offshore location, and the elimination of the entire onshore portion of the pipeline.

The shorter pipeline route (28.8 km for this alternative versus 67.6 km for the proposed Project) would result in a lower amount of construction-related impacts due to sediment disturbance and potential releases from construction vessels. The magnitude of the impacts would be the same as those for the proposed Project, but they would occur over a shorter distance and shorter time duration. The impacts would be in a different location, as the 28.8-km section of the pipeline route is not the same as any portion of the proposed Project. However, based on a review of the sediment sampling transects published by the USGS (Locker et al. 1999a, Locker et al. 1999b), there are not likely to be any substantial differences in sediment grain size or composition through this different area. The mitigation measures discussed for the proposed Project would also be used for this alternative.

The construction of the Offshore Interconnect would likely result in adverse water quality impacts due to sediment disturbance during offshore construction. Information on the construction of the Offshore Interconnect is currently unavailable. However, it is expected that these impacts would be of short duration.

This alternative would eliminate any need for the onshore portion of the pipeline. Therefore, none of the actual or potential adverse water quality impacts associated with the onshore portion of the proposed Project would occur should this alternative be selected.

4.1.2.3 FSRU Port Design Alternative

The FSRU unit itself would require one set of anchors, as opposed to two sets of anchors for the SRVs included in the proposed Project. Also, use of the FSRU would not require a flexible riser to be pulled off the bottom as the buoy is raised to mate with the SRV. These features would result in lower water quality impacts associated with sediment disturbance from mooring line sweep and raising and lowering of the buoy.

4.1.2.4 AAV Vaporization Technology Alternative

The FSRU design alternative would allow for the use of AAV technology to vaporize the LNG. By using air as the heating mechanism, this alternative would not generate cooling water to reduce the temperature of the LNG vaporization system, as would occur for the proposed Project. The AAV system would generate fresh water through condensation, and this fresh water would be discharged to the surrounding Gulf at a reduced temperature compared to ambient temperature conditions.

To evaluate any potential adverse impacts from the discharge of this water, CORMIX modeling was conducted to predict the extent of reduced temperatures resulting from the discharge. There are no common established water quality criteria for cooled discharges. The Draft NPDES Permit Application (Port Dolphin 2007a) used a combination of the USEPA marine aquatic life water quality criteria of maximum acceptable temperature increase of 1 °C (USEPA 1986) and the mixing zone size of 100 m (328 feet) based on the World Bank's definition for the thermal power plant discharges away from sensitive aquatic ecosystems. These same values are used in this analysis for comparison purposes. The parameters assumed in this analysis were a discharge volume of 1.2 MGD, at a temperature of 0 °C, and released directly on the surface. The ambient conditions used in the analysis included the most conservative, worst-case assumptions for ambient water temperature (30 °C during the month of August), wind speed (2.26 m/s), and water current speed (25.36 cm/s).

The results of the calculation are presented in **Figures 4.1-2** and **4.1-3.** Because the discharge water is fresh water, it does not mix readily with the more dense GOM water, and instead forms a thin layer on the surface. The modeling indicated that the temperature of this discharge would exceed the 1 °C temperature differential over a maximum distance of approximately 500 m (1,640 feet) from the FSRU. This distance is likely to be an overestimate, because the CORMIX model does not account for warming of the water by the overlying atmosphere. Therefore, the actual distance of reduced temperature would be less than 500 m (1,640 feet). Also, the temperature differential would be confined to a thin surface layer. This impact would be minor due to the limited thickness of impact, but would be adverse, direct, and long-term.

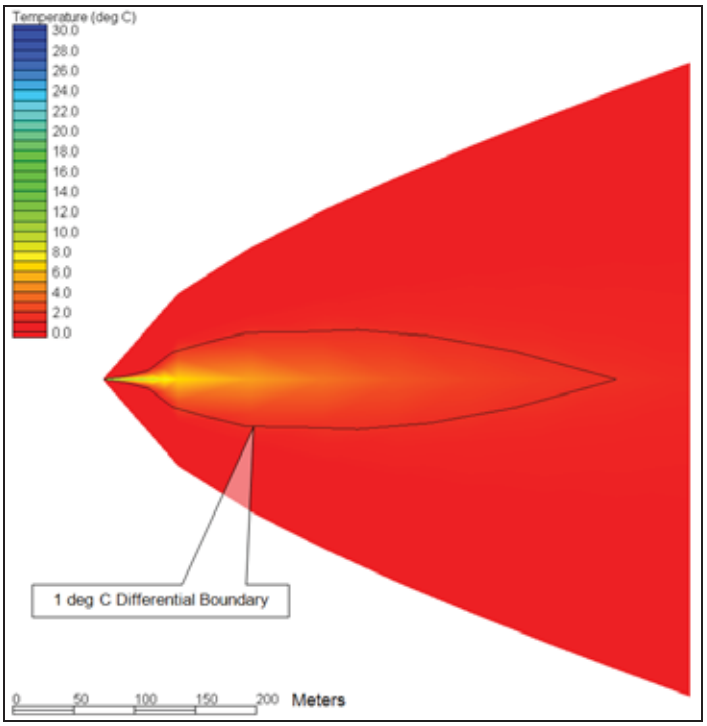


Figure 4.1-2. Plan View of the CORMIX Model Results

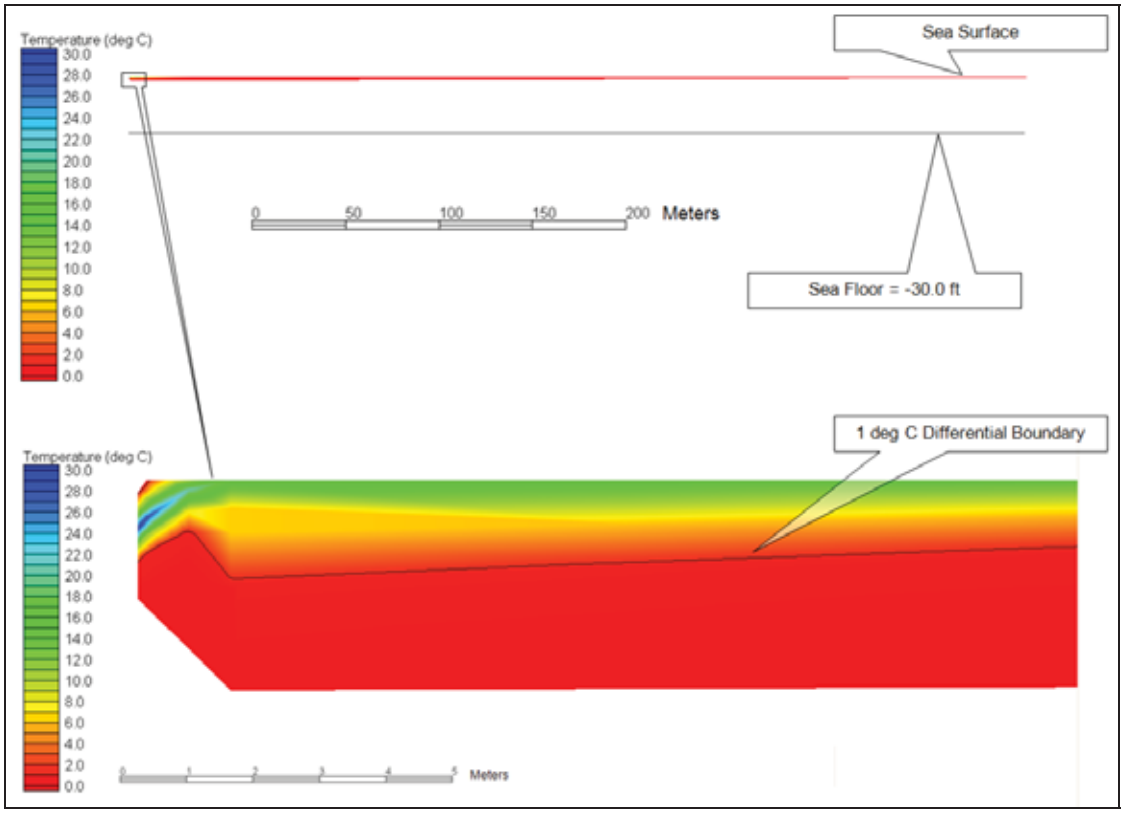


Figure 4.1-3. Cross-sectional View of the CORMIX Model Results

4.1.2.5 Suction Piles Anchoring Alternative

Construction, operation, and decommissioning impacts on water quality would be similar to those under the Proposed Action.

4.1.2.6 No Action Alternative

The No Action Alternative refers to the continuation of existing conditions of the affected environment, without implementation of the Project. Under this alternative, the additional infrastructure proposed by the Applicant would not be built and there would be no potential for adverse water quality impacts associated with Project construction and operation. Adverse impacts that could occur as part of the Project, and that would not occur as part of the No Action Alternative, include the following:

- Suspension of sediment at the Port location during construction, operations (mooring line sweep), and decommissioning
- Suspension of sediment along the offshore pipeline route during construction, and possibly as a result of repairs during operations
- Discharge of hydrostatic test water
- Potential releases of fuels and hazardous materials from construction, operation, and decommissioning vessels to offshore surface water
- Potential releases of fuels and hazardous materials from construction, operation, and decommissioning equipment and vehicles to onshore surface water or groundwater
- Disturbance of groundwater flow paths or state of contamination due to pipeline burial (construction), pipeline removal (decommissioning), or foundation excavation
- Disturbance of wetlands
- Modification of seawater temperature through SRV operations
- Current onshore and offshore water quality impacts associated with industrial operations, shipping, and the urban character of the Tampa Bay area would continue.

Table 4.1-2. Impact Summary for Water Quality for Each Alternative

Impacts	Proposed Project	Southern Site and Route Alternative	Offshore Interconnect Alternative	FSRU Port Design Alternative	AAV Vaporization Technology Alternative
Proposed Port Location	Construction impacts possible	Magnitude of impacts same as proposed Project, but in different location	Magnitude and location of impacts at Port location same as proposed Project; Additional impacts would occur at Interconnect location	Magnitude and location of impacts same as proposed Project	Magnitude and location of impacts same as proposed Project
Proposed Offshore Pipeline Route	Construction impacts possible along 67.6 km	Impacts possible along 80.4 km	Impacts possible along 28.8 km	Magnitude and location of impacts same as proposed Project	Magnitude and location of impacts same as proposed Project
Offshore Discharge of Hydrostatic Test Water	Discharge volume (and therefore impacts) related to pipeline length of 67.6 km	Increased volume (and therefore impacts) related to pipeline length of 80.4 km	Decreased volume (and therefore impacts) related to pipeline length of 28.8 km	Magnitude and location of impacts same as proposed Project	Magnitude and location of impacts same as proposed Project
Construction Vessel Discharge	Construction impacts possible along 67.6 km	Impacts possible along 80.4 km	Impacts possible along 28.8 km	Magnitude and location of impacts same as proposed Project	Magnitude and location of impacts same as proposed Project
Onshore Groundwater	Construction impacts possible	Magnitude and location of impacts same as proposed Project	No impacts	Magnitude and location of impacts same as proposed Project	Magnitude and location of impacts same as proposed Project
Onshore Surface Water	Construction impacts possible	Magnitude and location of impacts same as proposed Project	No impacts	Magnitude and location of impacts same as proposed Project	Magnitude and location of impacts same as proposed Project
Disturbance of wetlands	Construction impacts possible	Magnitude and location of impacts same as proposed Project	No impacts	Magnitude and location of impacts same as proposed Project	Magnitude and location of impacts same as proposed Project

Impacts	Proposed Project	Southern Site and Route Alternative	Offshore Interconnect Alternative	FSRU Port Design Alternative	AAV Vaporization Technology Alternative
Port Operations Water Discharges	Cooling water discharge impacts	Magnitude of impacts same as proposed Project, but in different location	Magnitude and location of impacts same as proposed Project	Magnitude and location of impacts higher due to LNGC discharges	Magnitude of cooling water discharge lower due to use of AAV condensation for engine cooling
Vessel Mooring	Sediment disturbance impacts	Magnitude of impacts same as proposed Project, but in different location	Magnitude and location of impacts same as proposed Project	Magnitude and location of impacts same as proposed Project	Magnitude of impacts lower because there would be only one mooring system instead of two
Offshore Pipeline Operation	Potential impacts associated with repairs along pipeline length of 67.6 km	Potential impacts associated with repairs along pipeline length of 80.4 km	Potential impacts associated with repairs along pipeline length of 28.8 km	Magnitude and location of potential impacts same as proposed Project	Magnitude and location of potential impacts same as proposed Project
Onshore Pipeline Operation	Potential impacts associated with repairs; Possible modification of groundwater flow	Magnitude and location of impacts same as proposed Project	No impacts	Magnitude and location of impacts same as proposed Project	Magnitude and location of potential impacts same as proposed Project
Offshore Decommissioning	Impacts similar to, but lesser than, construction	Magnitude of impacts same as proposed Project, but in different location	Magnitude and location of impacts at Port location same as proposed Project; Additional impacts would occur at Interconnect location	Magnitude and location of impacts same as proposed Project	Magnitude and location of potential impacts same as proposed Project
Onshore Decommissioning	Impacts similar to, but lesser than, construction	Magnitude and location of impacts same as proposed Project	No impacts	Magnitude and location of impacts same as proposed Project	Magnitude and location of potential impacts same as proposed Project

Notes:

There would be no impacts from the No Action Alternative.

The Suction Pile Anchoring Alternative was carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.2 Biological Resources

The following section on biological resources differs from other resource areas by providing an organizational structure intended to facilitate review of the broad range of marine and terrestrial resources that fall under the general category of biological resources. In this section, possible impacts are discussed by specific resource groups. These groups are marine protected areas, threatened and endangered species, marine mammals, sea turtles, coastal and marine birds, fish and invertebrates, benthic resources, EFH, and terrestrial resources. Each resource group then includes a discussion of construction, operations, and decommissioning impacts for the Proposed Site and Route Alternative. Finally, impacts of other alternatives are discussed.

Included in the discussion are elements of the project description that would both produce impacts and are proposed to minimize potential impacts. Applicant-proposed measures for minimizing potential environmental impacts are those that have been committed to by the Applicant and incorporated into the project design, and are listed in **Section 4.11**. If further measures are recommended by lead or cooperating agencies to mitigate potential adverse impacts, they are stated at the end of each analysis and in **Section 4.11**.

4.2.1 Coastal and Marine Resources

4.2.1.1 Marine Protected Areas

4.2.1.1.1 Proposed Action

Within the Tampa Bay estuary, there are four APs: Boca Ciega Bay, Cockroach Bay, Pinellas County, and Terra Ceia. The project is not near or expected to have any impact on Boca Ciega Bay, Cockroach Bay, or Pinellas County APs.

The pipeline route would be about 530 m (1,740 feet) from the northern edge of the Terra Ceia AP. Near the approach to Port Manatee along the northeastern edge of the AP, the minimum distance would be 37 m (121 feet). Impacts on the Terra Ceia AP would occur only during construction. There would be no activities in the Terra Ceia AP during routine operations or decommissioning.

Near the mouth of Tampa Bay, the pipeline would pass between two NWRs (see **Figure 3.2-1**). The Proposed Route is approximately 800 m (2,625 feet) from Passage Key NWR and 1,750 m (5,742 feet) from Egmont Key NWR.

Construction

Seafloor Disturbance and Turbidity. The Proposed Route would avoid disturbing sediments within the Terra Ceia AP. No plowing, dredging, or anchoring would occur within the AP. In the shore approach area near Port Manatee where the pipeline is closest to the AP, a jack-up barge would be used that has legs that rest directly on the seafloor, so there would be no anchors extending into the AP. Therefore, seafloor disturbance impacts would be negligible.

For most of its length the pipeline would be buried using a plowing technique. Both the trenching per se and anchoring of the lay barge would be sources of turbidity. The impacts of sediment suspension were modeled by the Applicant using the SSFATE model (ASA 2008). This modeling was performed to estimate the suspended sediment concentration, and the transport and deposition of sediment, resulting from pipeline construction and operation. The adverse impacts from three separate construction activities were evaluated in the model: the releases of HDD drilling fluid, the use of a clam shell dredge to excavate

the exit hole for the HDD locations, and the use of a mechanical plow or hydraulic jet to install pipeline sections. The model was used to estimate the area in which sediment concentrations would continue to exceed 100 mg/L after 30 minutes. The total areal extent of the turbidity plumes created during pipeline installation would be approximately 1,894 hectares (4,679 acres) (ASA 2008). The turbidity plumes would be short-lived and remain fairly close to their source. However, the duration of the exceedance was predicted to be limited to less than 2 hours for the worst-case condition. In addition, although sediment deposition of up to 15 mm (0.6 in) was predicted locally, the majority of the affected area would receive less than 2 to 3 mm of sediment (ASA 2008). The magnitude and duration of these adverse impacts is small and temporary.

Modeling performed for the installation of the Gulfstream pipeline through this same area of Tampa Bay was also reviewed. For the Gulfstream project, the Final EIS (FERC 2001b) developed by the FERC concluded that disturbance of sediment would result in exceedances of the Florida state water quality standard of 29 nephelometric turbidity units (NTUs) for turbidity over a relatively small area, and for a short period of time. The model predicted that the area exceeding the turbidity standard at any given time would cover an area of 0.9 acres. Also, the model predicted that the longest length of time any given location would be exposed to an exceedance of the turbidity standard would be 10 hours. Therefore, the FERC concluded that the overall impact from pipeline construction would be minimal (FERC 2001b).

Extending this conclusion to the current Port Dolphin Project would require that the location, construction method, and construction duration for both projects is approximately the same. Based on a review of the Gulfstream EIS, it appears likely that the Port Dolphin pipeline route would have smaller adverse impacts than those evaluated for the Gulfstream pipeline. This is because the Gulfstream pipeline was constructed directly through a 5.9-km (4-mi) portion of the Terra Ceia AP Tampa Bay, while the Proposed Route Alternative for the Port Dolphin pipeline does not enter the preserve (Port Dolphin 2007c).

Based upon this analysis, direct adverse impacts on water quality would be expected during the construction of the offshore portion of the pipeline. The impacts would result from the disturbance of seafloor sediment during construction. Contraventions of the FDEP requirements for OFW or toxic pollutants, and other water quality parameters are not anticipated during construction of the pipelines.

Plumes from construction activities are not expected to result in turbidity or sedimentation in areas of manatee critical habitat. The nearest designated critical habitat areas for manatees are (1) the Manatee River, which is approximately 5 km (3.1 mi) from the nearest point on the pipeline route; and (2) the Little Manatee River, which is approximately 13 km (8.1 mi) away. Based on the turbidity modeling (ASA 2008), the plume would not be expected to reach these areas (Port Dolphin 2008a).

Due to the short-term duration of the construction activities, and the minimal amount of sediment resuspension anticipated, short-term, minor, adverse impacts on water quality within MPAs during installation of the pipelines would be expected.

Vessel Traffic. Adverse impacts on water quality within MPAs would be expected from discharges of water from construction vessels (e.g., deck drain runoff, engine cooling water, bilge water, treated sanitary wastewater). These discharges would be of limited duration (less than 6 months for Project construction), and would be similar to those from other ships, boats, and barges in the Gulf and Tampa Bay. Construction vessels would not discharge sanitary waste (sewage) in locations where such discharge is prohibited.

The main potential impact as the result of vessel traffic in coastal waters during construction would be disturbance to two NWRs, which are important bird areas. Vessel traffic transiting near Egmont Key could result in disturbance of foraging and reproductive activity of wintering piping plovers. Availability

of quality foraging and roosting habitat in the wintering grounds is necessary to ensure that an adequate number of adults survive to migrate back to breeding sites and successfully nest. Interrupted feedings can stress juvenile birds during critical periods in their development (USFWS 2007b).

Short-term, minor, direct and indirect, adverse impacts on MPAs would be expected from discharges of water from construction vessels and vessel traffic disturbance near MPAs.

Hydrostatic Test Water Intake and Discharges. During the construction phase, seawater would be used for hydrostatic testing of the pipeline and flowlines. To assist in leak detection during testing, a fluorescent dye (Champion Fluorescent Dye or similar) would be added to the filtered seawater at an average concentration of 450 ppm. Also, a benign corrosion inhibitor (HydroHib P) would be added to the water. The discharges would comply with NPDES permit requirements and would occur outside the Terra Ceia AP. Impacts on the Terra Ceia AP or any other AP would be considered short-term and minor.

Operations

No adverse impacts on MPAs are anticipated as a result of water quality degradation from normal Port operations. The project would not degrade marine water quality or cause irreparable harm to aquatic life or beneficial uses of the aquatic ecosystem. No Federal or state water quality criteria or water discharge criteria would be violated. All operational discharges would be conducted in compliance with the NPDES requirements, and no detectable impacts on water quality are expected.

There would be a potential for spillage of hydrocarbons and LNG during operations of the Port. All SRVs are designed with features to minimize the potential for oil spills, the impact is expected to be minor and short-term (see **Section 2.3.3**). LNG is not toxic and evaporates quickly and the closest MPA to the Port is approximately 40 km (25 mi), which exceeds the potential reach of an LNG spill; thus, no impacts on MPAs due to a release of LNG are expected.

Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Therefore, impacts on MPAs are expected to be reduced, although a specific timeline would be developed at the time of decommissioning and abandonment.

Impacts on MPAs associated with the decommissioning of the project are expected to be similar, but of less magnitude, than impacts on water quality during construction and installation activities. Short-term, minor, direct, and adverse impacts on MPAs would be expected during decommissioning of the project.

4.2.1.1.2 Alternatives

Table 4.2-1 compares impacts from the Proposed Action to each of the alternatives with respect to MPAs.

Southern Site and Route Alternative. Under this alternative, impacts on MPAs would be substantially greater than the Proposed Action. The pipeline would run adjacent to and within the boundaries of the Terra Ceia AP. Impacts on the Terra Ceia AP would occur only during construction, as there would be no activities in Terra Ceia during routine operations or decommissioning. As proposed, the Southern alternative route enters the Terra Ceia AP from the northwest and traverse primarily soft-bottom and some hard- and live-bottom communities for 4.8 (3.0 mi). The pipeline exits the preserve, and traverses another 5.8 km (3.6 mi) along the northern boundary before re-entering the preserve at the northeastern corner for 1 km (0.6 mi). Short-term, moderate, direct, and adverse impacts on MPAs would be expected under this alternative.

Offshore Interconnection with Gulfstream Pipeline Alternative. Impacts on MPAs would be less than the Proposed Action under this alternative. Under this alternative the pipeline would not come onshore because of the connection to the Gulfstream pipeline. Therefore, no direct or indirect impacts on the Terra Ceia AP or critical habitat for wintering piping plovers would be expected. Seafloor disturbance associated with pipeline disturbance under this alternative would be less in shallow coastal waters and would not occur in Tampa Bay. A more detailed description of seafloor disturbance under this alternative is described in detail under Benthic Resources. There would also be less of an impact of turbidity in shallow coastal waters associated with pipeline installation under this alternative. There would be no turbidity increases associated with pipeline installation in Tampa Bay under this alternative.

FSRU Port Design Alternatives. Construction, operation, and decommissioning impacts on MPAs under the FSRU Port Design Alternative would be similar to but to a lesser degree than those under the Proposed Action. The FSRU unit itself would require one set of anchors, as opposed to two sets of anchors for the SRVs included in the proposed Project. Also, use of the FSRU would not require a flexible riser to be pulled off the bottom as the buoy is raised to mate with the SRV. These features would result in decreased turbidity associated mooring line sweep and raising and lowering of the buoy.

AAV Vaporization Alternative. Construction, operation, and decommissioning impacts on MPAs under the AAV Vaporization Alternative would be similar to those under the Proposed Action.

Suction Piles Anchoring Alternative. Construction, operation, and decommissioning impacts on MPAs under the Suction Piles Anchoring Alternative would be similar to those under the Proposed Action.

No Action Alternative. The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, no direct or indirect impacts on MPAs would be expected.

Table 4.2-1. Marine Protected Area Impacts Summary

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnect Alternative	FSRU Design Alternative
Pipeline construction	Minor, short-term, adverse impacts along pipeline route as a result of seafloor disturbance, turbidity, vessel traffic, and hydrostatic testing, and discharge.	Moderate, short-term, adverse impacts along the pipeline corridor as the result of seafloor disturbance, turbidity, vessel traffic, and noise (route within Terra Ceia AP and near 2 NWRs); long-term impacts as the result of seafloor disturbance.	No impacts. No MPAs offshore.	No difference from Proposed Action.
Port construction	Minor, short-term, adverse impacts in vicinity of the Port as a result of seafloor disturbance, turbidity, and vessel traffic.	No difference from Proposed Action.	No impacts. No MPAs offshore.	No difference from Proposed Action.
Operation of Port	Minor, long-term, adverse impacts due to potential LNG/hydrocarbon spills.	No difference from Proposed Action.	No impacts. No MPAs offshore.	No difference from Proposed Action.
Decommission of Port	Minor, short-term and long-term, adverse impacts in vicinity of the Port are similar to but lower than port construction impacts.	No difference from Proposed Action.	No impacts. No MPAs offshore.	No difference from Proposed Action.

Notes:

1. Under the No Action Alternative none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur. No direct or indirect impacts on biological resources would be anticipated.
2. The AAV and Suction Pile Anchoring Alternatives were carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.2.1.2 Threatened and Endangered Marine Mammals

4.2.1.2.1 Proposed Action

As discussed in **Section 3.2.4**, the Maritime Administration has the responsibility under the ESA to determine whether or not the Project would adversely affect threatened or endangered marine mammals and their critical habitat. In accordance with Section 7 of the ESA, the Maritime Administration and the USCG initiated informal consultation with the USFWS and NMFS on August 24, 2007. Minimization measures to reduce potentially adverse impacts on protected marine mammals are described in **Section 4.11**. ESA-listed marine mammals with documented occurrence in the northern GOM are listed in **Table 4.2-2**. Of these species, only the West Indian manatee regularly occurs in the Port Dolphin Action Area. The sperm whale, while common in the GOM, only occurs seaward of the shelf break (200 m [656 foot] isobath) (Jochens et al. 2008); this species is not expected to be impacted by the Proposed Action. The humpback whale and North Atlantic right whale (herein referred to as right whale) are sporadically sighted in the northern GOM, including along the west coast of Florida; the sei whale, blue whale, and fin whale could be considered extralimital (beyond their normal range) (Würsig et al. 2000). The West Indian manatee is the only marine mammal species with designated critical habitat in the northern GOM (see **Section 3.2.3.4** for more details).

Table 4.2-2. ESA-Listed Marine Mammal Species with Documented Occurrence in the Northern GOM

Common Name	Scientific Name	ESA status
West Indian manatee	*Trichechus manatus*	Endangered, critical habitat (in GOM)
North Atlantic right whale	*Eubalaena glacialis*	Endangered, critical habitat (not in GOM)
Humpback whale	*Megaptera novaeangliae*	Endangered
Fin whale	*Balaenoptera physalus*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
Blue whale	*Balaenoptera musculus*	Endangered
Sperm whale	*Physeter macrocephalus*	Endangered

Construction

Seafloor Disturbance. Installation of Port components and pipelines would temporarily disrupt benthic habitat in the immediate vicinity of the construction areas. ESA-listed marine mammals could be indirectly impacted if prey species (including aquatic vegetation) were displaced or destroyed by construction activities. The pipeline route would not pass through any manatee protection areas including critical habitat or manatee protection zones. The proposed pipeline's route would be constructed within a half of a mile of the Terra Ceia AP, about 7 km (4.5 mi) from manatee critical habitat and about 11.5 NM from a manatee protection area In the nearshore areas, seagrass was observed predominantly near Manbirtee Key, the spoil island near Port Manatee, and in water with a bottom depth shallower than 2 m (7 feet) (Port Dolphin 2007b). The nearest seagrasses are 23 m (75 feet) to the southwest and distances greater than 59 m (194 feet) to the northeast of the HDD exit point; therefore seagrasses would be avoided. Neither manatees nor their feeding areas would be directly impacted by seafloor disturbance due to mitigation measures. Threatened and endangered baleen whales are only sporadically sighted in the GOM and have not been observed to feed here (feeding grounds for both the humpback whale and right whale are off the northeastern United States); therefore, no impacts on these species are anticipated.

Short-term, minor, indirect, adverse impacts on threatened and endangered marine mammals could occur as a result of seafloor disturbance caused during construction.

Turbidity. The main source of water quality impacts would be pipeline trenching, which would produce turbidity along the pipeline route. Sources of turbidity include pipeline burial, as well as anchoring of the lay barge, placement of the pipeline and mattresses, and HDD of the shore approach. The clamshell dredge method to be used during the Proposed Action is expected to produce much less turbidity than jetting (ASA 2008). As indicated in **Section 4.1.1**, turbidity modeling (SSFATE) conducted by the Applicant was used to estimate the area in which sediment concentrations would continue to exceed 100 mg/L after 30 minutes. Under worst-case conditions, it is estimated that sediment concentration would exceed 100 mg/L for less than 2 hours (ASA 2008). Turbidity modeling indicates that both turbidity plumes would be short-lived and remain fairly close to their source (ASA 2008). The total areal extent of the turbidity plumes created during pipeline installation is estimated to be approximately 1,894 hectares (4,679 acres) (ASA 2008). However, the actual distance from the source would depend on the source (e.g., HDD, dredge) and prevailing conditions (e.g., weather and tide). Water turbidity appears to have little or no direct impact on manatees or threatened and endangered whales, as they are sighted in both clear and muddy waters (Hartman 1979). However, suspended sediments in the water column reduce light availability and, therefore, seagrass production (SCDNR 1995); seagrass beds serve as feeding areas for manatees. Manatees and threatened and endangered whales could be indirectly impacted as a result of any hazardous substances in sediment being resuspended and bioaccumulated in food items from contaminated suspended sediments. Due to the temporary nature of water quality changes following construction activities, short-term, minor, indirect, adverse impacts on manatees or threatened or endangered whales could occur.

Hydrostatic Test Water Intake and Discharges. During the construction phase, seawater would be used for hydrostatic testing of the offshore pipeline and flowlines. The seawater would be taken onboard a marine vessel at five locations along the route. Hydrostatic testing is a one-time temporary event that would require filling the pipeline twice. To assist in leak detection during testing, an environmentally benign dye, Hydro Tag Green Fluorescent Dye, would be added to the flooding and test water. HydroHib P would be added as a corrosion inhibitor; it is widely used in the offshore pipeline industry and has been approved by the USEPA and certified by USEPA-approved laboratories. HydroHib P requires no neutralization and the treated water can be discharged into the sea (subsea) through specially designed diffusers. This is intended to release the treated seawater into a larger volume of water than if diffusers were not used. As the test water is released to the sea, the concentration would be immediately diluted well below the toxicity limit via the diffusers, thereby further rendering the test water as uninhibited or "Non-Toxic." The hydrostatic test water discharge would occur offshore from a marine vessel at one of the STL buoy locations rather than at Port Manatee. No water quality impacts are expected from the water additives.

Manatees feed primarily on aquatic vegetation, so no indirect impacts are expected to this species. There is no evidence of feeding by humpback or right whales during their rare occurrences in the GOM; feeding grounds are off the northeastern United States for these two species, so no impacts would be expected on these species either.

Vessel Traffic. Construction activities, associated with the Proposed Action, would result in increased vessel traffic in the Tampa Bay region. As specified by the Applicant, approximately 1,800 total vessel trips would be required during construction, as shown in **Table 4.10-1** (Port Dolphin 2008a). **Section 4.10.1** provides more information on construction vessel traffic. Twelve types of vessels might be used during construction (weather contingent); the supply vessel (360 to 600 total trips) and material barges (720 to 900 total trips) represent the most frequent vessel movements. Frequency of vessel movements ranges from 2 trips per year for jack-up and dragline barges to approximately 900 trips per

year for material barges. Expected vessel traffic during construction would consist of approximately 1,796 trips over the 11-month construction period. Approximately 125,000 boats were registered in Manatee, Hillsborough, and Pinellas counties in 2006, of which approximately 2,800 are considered commercial and include charter vessels and commercial fishing vessels (HSMV 2005). From a broader perspective, upwards of 1,000 commercial vessels pass through the Straits of Florida daily, and there are tens of thousands of vessel transits annually in the GOM. The worldwide commercial fleet was estimated to include at least 81,867 vessels in 1999 and is reportedly increasing at about 12 percent per year (NRC 2003). Vessel traffic can affect marine mammals by direct collisions with vessels, wave action from boat wakes impacting seagrasses, noise (which might cause behavioral disturbance), and accidental hydrocarbon spills. Potential impacts of noise from vessel traffic are discussed in the following section addressing *noise*. Increased vessel traffic is likely to increase inadvertent discharge of petroleum hydrocarbons into the water; those possible impacts are discussed in the marine mammal sections regarding *hydrocarbon spills*.

The largest problem presently faced by manatees in Florida is death or injury from boat strikes (USFWS 2001). Vessel collisions (particularly from small watercraft) are identified as a major source of mortality for Florida manatees (*Trichechus manatus latirostris*), where more than 30 percent of all documented deaths have been attributed to vessel strikes (Nowacek et al. 2004). Deaths from boat strikes involve all age classes and occur year-round over much of the manatee's range in the GOM (Nowacek et al. 2004). A large percentage of adult manatee carcasses bear scars from previous boat strikes and the healed, skeletal fractures of some indicate that they had survived previous traumatic impacts.

Many living manatees have been scarred by boat collisions, especially on the tail and back. Nonlethal injuries can reduce the breeding success of wounded females and could permanently remove some animals from the breeding population. Vessel traffic that disturbs manatees can cause them to leave preferred habitats and could alter biologically important behaviors such as feeding, nursing, or resting (FWC 2006).

To help reduce the chance of vessel strikes, the State of Florida has established manatee protection zones, including those in the Tampa Bay area. Two types of manatee protection areas also have been developed by USFWS: manatee sanctuaries and manatee refuges. Manatee sanctuaries are areas in which all waterborne activities are prohibited, and manatee refuges are areas where certain waterborne activities are restricted or prohibited (designation of refuges or sanctuaries, however, would not eliminate waterway property owner access rights). To date, USFWS has established seven winter sanctuaries to protect manatees in association with the Crystal River NWR. The most recent was a 0.25-acre sanctuary established in 1997 at Three Sisters Spring run (FWC 2006). The pipeline route where construction activities would occur does not pass through any manatee protection zones (approximate closest distance from pipeline route to manatee protection areas is 11.5 NM).

Injuries and deaths resulting from ship collisions also represent a significant threat to several large whale populations (Laist et al. 2001, Jensen and Silber 2003). In general, whales engaged in feeding and other activities tend to be less responsive to approaching ships. All types and sizes of vessels hit whales, but most lethal and serious injuries are caused by larger vessels. Laist et al. (2001) report that of 15 whales considered severely injured by ship strikes, 3 were struck by vessels less than 20 m (65.6 feet) long, 3 were struck by vessels 20 to 80 m (65.6 to 262.5 feet) long, and 9 were struck by vessels longer than 80 m (262.5 feet). Of the 23 whales killed by vessel collisions, at least 20 whales (87 percent) were struck by vessels more than 80 m (262.5 feet) long (Laist et al. 2001).

Vessel speed is a principal factor in the severity of injury or likelihood of mortality among whales struck by ships (Jensen and Silber 2003). Vessel speed at the time of strike was reported for 58 of the 292 strikes recorded in NOAA's Large Whale Ship Strike Database (Jensen and Silber 2003). The range of

speeds at which vessels were operating when a whale was hit was 2 to 51 knots, with a mean speed of 18.1 knots. This category for the Proposed Action would include SRVs, which typically travel at speeds up to 19.5 knots in the open ocean. However, once approaching the vicinity of the terminal, SRVs would slow to about half-speed. The mean vessel speed which resulted in injury or mortality to the whale was 18.6 knots. The majority (79 percent) of these strikes occurred at speeds of 13 knots or greater. Of the 58 cases, 19 (32.8 percent) resulted in serious injury to the whale and 20 (34.5 percent) resulted in death. In total, 39 (67.2 percent) ship strikes in which ship speed was known resulted in serious injury or death (Jensen and Silber 2003). In a more recent study by Pace and Silber (2005) which evaluated 64 ship strike records in which vessel speed was known, there was strong evidence that the probability of death or serious injury increased rapidly with increasing speed. The predicted probability of death or serious injury increased from 45 percent to 75 percent as vessel speed increased from 10 to 14 knots, and exceeded 90 percent at 17 knots. Speeds of 25 knots and greater resulted in a 100 percent probability of death or serious injury. A reduction in speed from 18 knots to 12 knots would give whales an additional 2.6 seconds (at a distance of 50 m (164 feet)) to avoid a vessel.

Increases in vessel traffic (with no mitigation or monitoring) could potentially increase the likelihood for collisions with ESA-listed marine mammals, thereby increasing the occurrence of serious injuries or mortality. While it is known that an increase in vessel traffic increases the risk of collision, the probability of that risk cannot be quantified. Short-term, minor, direct, and adverse impacts on threatened and endangered marine mammals could occur as a result of increased vessel traffic during construction (without mitigation and monitoring). Any vessel strike of a threatened and endangered marine mammal would be considered a "take" under both the MMPA and ESA. Based on NMFS recommendations, the Applicant has proposed BMPs for all vessels used during installation routine operations, and decommissioning to reduce or avoid impacts of vessel traffic on marine mammals. With strict adherence to the proposed BMPs, adverse impacts on marine mammals would be reduced.

Additional indirect effects from increased vessel traffic include increased wave action due to vessel wakes and scarring of seagrass beds by propellers (EPC 2007). Seagrasses are important foraging areas for the manatee. Wakes affect seagrass beds by the increase of wave action which might play a role in the decline of longshore sandbars that help protect seagrasses (Lewis 2002), as well as increased turbidity that, as noted earlier, reduces light availability and, therefore, seagrass production. Turbidity modeling indicates that turbidity plumes would be short-lived (settle to close to background levels within 5 hours) and remain fairly close to their source (ASA 2008). It also indicates that sediment resuspended by plowing would not reach seagrass beds near the landfall. However, resuspended sediment from HDD pit excavation would reach seagrass beds south of the HDD pit. The seagrass beds would be exposed to suspended sediment levels of 0 to 5 mg/L and the total area of seagrasses affected would be 0.78 hectares (1.93 acres). However, no measurable sediment accumulation on seagrasses is predicted (Port Dolphin 2008). As stated above, seagrass beds are dynamic, and a thorough seagrass survey would be conducted prior to construction to determine the current status and location of seagrass in the area of HDD exit location (Port Dolphin 2007b). Seagrasses would be avoided and mitigated based on the BMPs and the Project-specific Wetland and Waterbody Construction and Mitigation Procedures Plan. The plan would be developed in coordination with appropriate regulatory agencies and implemented prior to and during construction activities. The specific recovery plan would address a preconstruction seagrass survey, consistent with NMFS recommendations and mitigating unavoidable impacts on wetlands and waters of the United States (inland, coastal, and seagrasses).

Due to the temporary nature of water quality changes during construction, short-term, minor, direct, adverse impacts on manatees, and indirect impacts on their feeding grounds (i.e., seagrasses and macroalgae) would not be expected when taking mitigation measures into consideration. No impact on right whales or humpback whales is expected since these two species are only sporadically sighted in the

GOM and have not been observed to feed here (feeding grounds for right whales and humpback whales are off the northeastern United States).

Noise. Marine mammals rely heavily on the use of underwater sounds to communicate and gain information about their environment. Even in the absence of man-made sounds, the sea is noisy and ambient background noise can interfere with the ability of marine mammals to detect sound signals even when they are above its absolute hearing threshold. Ambient background noise includes natural contributions from wind, waves, precipitation, and other animals, as well as sounds from distant human activities such as shipping or oil exploration and production (Richardson et al. 1995). Ambient noise is highly variable over continental shelves, and this inevitably results in a high degree of variability in the range at which marine mammals can detect man-made sounds.

Known effects of noise on marine mammals have been reviewed by various sources (Richardson et al. 1995, Hildebrand 2005, NRC 2005, Nowacek et al. 2007, Weilgart 2007a, Weilgart 2007b). Human-made sounds can affect the ability of marine mammals to communicate and to receive information about their environment. Such noise can interfere with or mask the sounds used and produced by these animals and thereby interfere with their natural behavior.

Observed effects of noise on marine mammals include changes in vocalizations; respiration, swim speed, diving, and foraging behavior; displacement; avoidance; shifts in migration path; stress; hearing damage; and strandings. The response threshold depends on whether habituation (gradual waning of behavioral responsiveness) or sensitization (increased behavioral responsiveness) occurs (Richardson et al. 1995); however, as noted by Wright et al. (2007) an interpretation of a reduction in behavioral responses to noise as acclimation might be a mistake in many situations, as alternative reasons for the observed results are much more likely. Sounds can cause reactions that might include disruption of marine mammals' normal activities (behavioral or social disruption) and, in some cases, short- or long-term displacement from areas important for feeding and reproduction (Richardson et al. 1995). Marine mammal responses to noise vary widely depending on the species, the context and duration of exposure, the properties of the stimuli (e.g., low-frequency versus high-frequency, continuous versus pulsive), the time of day or year, the reproductive state of the animal, the activity of the animal at the time of exposure, and the experience or prior exposure of the animal (NRC 2003, Richardson et al. 1995). Responses also vary widely among individuals of a species or group.

Disturbance is one of the main concerns of the potential impacts of man-made noise on marine mammals, but for many species and situations, there is no detailed information about reactions to noise. Behavioral reactions of marine mammals to sound are difficult to predict because they are dependent on a variety of factors. Preliminary research suggests that most small- and medium-sized toothed whales are unlikely to be displaced when exposed to prolonged or repeated underwater sound unless the overall received sound level exceeds 140 dB re 1µPa at 1m. Baleen whales are probably more sensitive to low-frequency sounds and have been shown to react to sound levels of 120 dB re 1µPa at 1m. Toothed whales also appear to exhibit a greater variety of reactions to man-made sound than baleen whales. While toothed whale reactions vary from approaching the vessel to strong avoidance, baleen whale reactions range from neutral to strong avoidance (Richardson et al. 1995).

The energetic consequences of one or more disturbance-induced periods of interrupted feeding or rapid swimming, or both, have not been evaluated quantitatively. Energetic consequences would depend on whether suitable food is readily available. Of the animals responding to noise, females in late pregnancy or lactating would probably be most affected. Human-made noise can cause temporary or permanent hearing impairment in marine mammals if the noise is strong enough. Such impairment would have the potential to diminish the individual's chance for survival.

Determining if short-term changes in behavior represent a biologically significant effect is difficult (Wright 2006). Immediate or short-term changes in behavior could represent short- or long-term effects on a population. Short-term changes in behavior can include many of the changes described in previous literature including increases in dive duration and changes in direction of travel. However, long-term impacts or effects include changes such as reduced health and viability of a population. For example, short-term changes in activity budgets that reduce amount of time feeding could represent long-term challenges by reducing energy acquisition. These short-term changes could also have a greater impact on a population depending on resource availability.

Nonauditory physical effects can also occur in marine mammals exposed to very strong underwater sound. Possible types of nonauditory physiological effects or injuries that, in theory, might occur include stress, neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage.

The potential impacts of noise on marine mammals can be based on specific zones of influence (ZOIs): (1) the zone of audibility (within which the animal can hear the sound), (2) the zone of responsiveness (within which the animal reacts to the sound), (3) a zone of masking (within which the noise levels can interfere with other sounds and signals), and (4) the zone of hearing loss or discomfort (within which the animal's physical auditory structures are temporarily or permanently damaged). ZOI refers to the distances at which marine mammals are affected by man-made noise. Marine mammals usually do not respond overtly to audible but weak man-made sounds, so the zone of "responsiveness" is usually much smaller than the zone of audibility. Potential effects of noise on marine mammals include masking, behavioral disturbance, hearing impairment in the form of permanent or temporary threshold shifts (PTS and TTS, respectively), and nonauditory physiological effects (Richardson et al. 1995). Noise can also elicit behavioral responses such as cessation of feeding, resting, or social interaction; onset of alertness or avoidance; or attraction to the noise source. Behavioral responses vary widely both within and among species, and many marine mammals habituate easily to underwater noise (Watkins 1986). Alternatively, noise can be detectable but have no effect on an animal's behavior, hearing, or physiology.

Noise Criteria. Very high sound levels can rupture the eardrum or damage the small bones in the middle ear. Continuous sound exposure and loud sounds can temporarily or permanently affect the auditory sensitivity of animals by causing an upward shift in auditory threshold; such an effect is called a sound-induced threshold shift, or simply a threshold shift. A threshold shift can be either permanent, in which case it is termed a PTS, or it may be temporary, in which case it is termed a TTS. Still lower levels of sound can result in auditory masking, which could interfere with an animal's ability to hear other concurrent sounds.

Injury (Level A Harassment). Nonlethal injurious impact is defined as eardrum rupture (i.e., tympanic-membrane [TM] rupture). This is considered indicative of the onset of injury. This recognizes that TM rupture is not necessarily a life-threatening injury, but is a useful index of possible injury that is well correlated with measures of permanent hearing impairment. This is often referred to as PTS.

The primary factors thought to cause a PTS are sound impulse duration, peak amplitude, and rise time. However, no data are available on noise levels that might induce PTS in marine mammals. Damage to a marine mammal's hearing apparatus could theoretically occur if an animal is exposed to sound impulses that have very high peak pressures, especially if they have very short rise times. Also, very prolonged exposure to a noise strong enough to elicit a TTS, or shorter-term exposure to noise levels well above the TTS level, could cause hearing impairment in marine mammals. For sound exposure at or somewhat above the TTS level, hearing sensitivity presumably recovers rapidly after exposure to the noise ends, and the received sound level from a single noise exposure must be far above the TTS level for there to be any risk of PTS. It has been suggested that PTSs caused by prolonged exposure to continuous man-made

noise is not likely to occur in marine mammals for sounds with source levels less than 200 dB re 1µPa at 1m (Richardson et al. 1995).

Level A harassment has an exposure criterion of 180 dB re 1 μPa^2-s.

TTS and Sub-TTS (Level B Harassment). There are two thresholds for noninjurious harassment, also known as Level B harassment. The first is TTS, which is a temporary, recoverable, loss of hearing sensitivity that is considered to result from the temporary, noninjurious distortion of hearing-related tissues. The duration of the TTS varies depending on the nature of the stimulus, but by definition, there is generally recovery of full hearing over time (Hastings and Popper 2005). A TTS is the mildest form of hearing impairment and occurs when exposure to a strong sound results in a nonpermanent elevation in hearing threshold making it harder for an animal to hear sounds. TTS can last from minutes or hours to days and the magnitude of the TTS depends upon other factors, including the level and duration of noise exposure. For sound exposures at or somewhat above the TTS level, hearing sensitivity usually recovers rapidly after exposure to the noise ends (Richardson et al. 1995). Only a few data on sound levels and durations necessary to elicit mild TTSs have been obtained for marine mammals. Although TTS studies on humans and terrestrial mammals provide insight on understanding the principles of TTS, it is unclear to what extent these data can be extrapolated to marine mammals (LGL and JASCO 2005).

The second threshold is termed "sub-TTS" and is used to account for behavioral disturbance large enough to be judged as harassment, but occurring at lower sound energy levels than those that might cause TTS.

Behavioral modification has been defined to address a noise level or other activities that might potentially cause marine mammals to alter normal biological behavior. NMFS defines these behavior responses as modifications resulting from repeated noise exposures (below TTS) to the same animals (i.e., resident) over a relatively short period of time (Southall et al. 2007).

Behavioral disturbance criteria for impulse/intermittent sounds is set at a sound pressure level (SPL) value of 160 dB re 1 µPa at 1m and 120 dB re 1 µPa at 1m for continuous noise (70 FR 18871–1875).

The exposure zone for Level B harassment includes both behavioral effects and physiological effects and includes the region in which TTS is predicted to occur.

Noise Types. NMFS recognizes three general kinds of sounds: continuous (e.g., shipping sounds), intermittent (e.g., vibratory pile-driving sounds), and impulsive (e.g., conventional pile driving) (NMFS 2008a). Noise sources associated with construction activities of the Proposed Action include pipe laying, pipe burial, vessel traffic, and anchor installation. It should be noted that sounds from moving sources might be continuous, but for an animal at a given location, these sounds would be a transient impact on the animal, as the vessel passes by. Hearing capabilities of threatened and endangered marine mammals are described in **Section 3.2.4.1**. Baleen whales and the West Indian manatee are considered to be most sensitive to low-frequency sounds (about 7 Hz to 22 kHz), while odontocetes have relatively good hearing across a broader range of mid- to high-frequency sounds (150 Hz to 160 kHz to 100 kHz) (Southall et al. 2007). Manatees are considered to hear predominantly low-frequency sounds (Gerstein et al. 1999). Therefore, all ESA-listed marine mammal species assessed for the Proposed Action are low-frequency hearing specialists (e.g., manatee, right whale, and humpback whale).

The hammer to be used for pile driving would be similar to the Menck MHU 3000 hydraulic hammer (JASCO 2008). Impact hammering noise source levels that were used for noise modeling were based on the LGL Limited and JASCO Research Limited (2005) underwater noise modeling report developed for the Neptune Deepwater Port EIS and are based on measurements and computations based on Greene and Davis (1999) and Malme et al. (1998) (Port Dolphin 2009a). There are only rare occurrences of the

manatee, humpback whale, and right whale in the offshore component of the Project (STL buoy locations); therefore, potential impacts on listed marine mammal species from pile driving would be expected to be short-term minor adverse.

The noise from HDD operations, both onshore and offshore, is primarily from the diesel engines that power the drilling and pull-in winches. The HDD could take between 3 to 4 weeks each to accomplish, during which the equipment would be running most of the time. However, the in-air noise near the HDD drilling equipment is normally within 88 dB, which is a decibel level where ear protection is not required as defined by Occupational Safety and Health Administration (OSHA) rules and regulations. It is anticipated that the noise generated by both onshore and offshore HDD operations would be less than that caused by ongoing large bulk carrier ships that traverse the shipping lanes in the same area of the planned HDD. With strict adherence to the proposed BMPs, there would be a full-time manatee watch during construction of the pipeline and all operations would cease when a manatee is sighted in the vicinity of the HDD. It should also be noted that most of the noise generated by the HDD operations is above the surface of the water (either on land or on a fixed jack-up vessel) and therefore noise generated by HDD operations would have to travel down the legs of the jack-up into the water, which would quickly dissipate and would have a minimal effect on manatees.

Vessels contribute noise primarily through propeller cavitation, propeller singing, and propulsion or other machinery (Richardson et al. 1995). Characteristic ship noise is a combination of narrowband, tonal sounds, and broadband sounds with energy continuously over a wide range of frequencies (Richardson et al. 1995). Levels and frequencies of both tonal and broadband sounds tend to be related to vessel size; for example, large vessels create stronger and lower-frequency sounds (Richardson et al. 1995). For medium to large vessels, tones dominate up to about 50 Hz (Richardson et al. 1995). Broadband components can extend up to 100 kHz, peaking at 50 to 150 Hz (Richardson et al. 1995). Vessel noise (particularly from large ships) is a major contributor to low-frequency ambient noise in the ocean and is a major environmental concern (NRC 2003, 2005). During 2004, NOAA and a number of other government, industry, and academic partners convened the first formal meeting ("Shipping Noise and Marine Mammals: A Forum for Science, Management, and Technology") to consider the effects of sounds from large vessels on marine life. During 2007, NOAA convened a symposium to assess quieting applications for large commercial vessels.

Vessel traffic is considered to be continuous noise, and, as noted earlier in the discussion of acoustic criteria, subject to level A and B thresholds for continuous noise (180 dB and 120 dB, respectively). Continuous noise from vessels is a main sound source during construction. Listed species that could be exposed to construction vessel noise include the manatee (for the inshore portion of pipeline construction) and any rare occurrences of the humpback whale and right whale (at the STL buoy locations and anywhere along the pipeline route). However, the latter two species are expected to be rare in the Project area. Although sounds created by construction equipment and vessels would be continuous during pipeline installation, activities would progress slowly along the route as the pipeline is laid, buried, and the trench backfilled. Thus, any one area would be subject to the maximum sound levels for only a day or two each time as the construction activities pass that area. The following types of vessels are likely to be involved during the two types of installation:

- Buoy installation. A large crane vessel and a cargo barge. Depending on the chosen installation method, one or several assisting installation vessels might be required for the installation.
- Pipeline installation. An inshore pipelaying barge and two smaller anchor-handling support vessels. Pipeline burial would most likely be done using an advanced burial plow and backfill plow system. Each crossing of the Gulfstream Pipeline would require two jack-up barges in the 200-Class range.

The noise associated with construction would be broadband noise (over a wide range of frequencies, as described above) and most marine mammals present would be capable of hearing it. Third-octave bands (10 to 2,000 Hz) and source levels for construction scenarios for noise modeling are presented in **Section 4.8**. Underwater noise would travel in all directions from the source. **Tables 4.2-3** and **4.2-4** present results of the noise modeling in terms of radii to threshold values of 120 dB to 190 dB root mean square (RMS). Additional detail regarding the noise modeling is presented in **Section 4.8**. **Table 4.2-3** presents modeling results which show the distance from noise sources that Level A and Level B harassment of threatened and endangered marine mammals and other listed species could occur. **Table 4.2-4** presents the distance from noise sources that Level A and Level B harassment of threatened and endangered marine mammals and other listed species, could occur for inshore construction activities.

In order to take into account the differential hearing capabilities of various groups of marine mammals, the M-weighting frequency weighting approach described by Miller et al. (2005) was applied. The M-weighting filtering process is similar to the C-weighting method that is used for assessing impacts of loud impulsive sounds on humans. It accounts for sound frequencies extending above and below the most sensitive hearing range of marine mammals within each of five functional groups: low-frequency cetaceans, mid-frequency cetaceans, high-frequency cetaceans, pinnipeds in water, and pinnipeds in air (Southall 2007). The right whale and the humpback whale are low-frequency cetaceans, and, as noted earlier, are expected to rarely occur in the area of the Proposed Action. Measurements on captive manatees (Gerstein et al. 1999) indicate a functional hearing range of 400 Hz to 46 kHz, which is within the bounds listed for pinnipeds. As such, M-weightings for pinnipeds are used as a precautionary approximation of impact for manatees in **Table 4.2-4**. The Applicant has initiated preapplication consultations with the NMFS regarding incidental harassment authority (IHA) and Letter of Authorization (LOA) requirements. NMFS would determine whether an operational permit is required.

Based on the types of noise and the distances affected, monitoring measures would be taken to avoid both Level A and Level B harassment of marine mammals. Avoidance and monitoring measures are presented in **Section 4.11.** Overall, the amount of noise created during buoy installation, pipelaying, and pipe burial would be consistent with other man-made underwater noise sources in the area (e.g., commercial shipping or dredging,). Few data are available for the ambient noise levels in the areas associated with the Proposed Action. **Section 3.8.3** provides a discussion of the ambient noise levels associated with types of activities similar to the Proposed Action. Most noise would be short-term in duration and moderate in intensity, and few, if any, threatened and endangered marine mammal species are expected near the Port site where the strongest noise source during construction would occur. Therefore, it is anticipated that short-term, direct, adverse effects on marine mammals would be minor.

Continuous noise created by construction vessels could potentially mask sounds produced and received by marine mammals. Masking occurs when underwater noise interferes with an animal's ability to hear other concurrent sounds such as conspecifics, or predators. This could, in turn, affect an animal's ability to feed, mate, or travel efficiently and safely through an environment. While no data exist for the specific area associated with the Proposed Action, Phillips et al. (2006) found that ambient noise measurements near the mouth of the Crystal River, approximately 130 km (81 mi) north of the Proposed Action area, were 105 dB. While one cannot quantifiably analyze the noise levels specifically in the Proposed Action area, one can assume that the ambient noise levels would increase. However, based on acoustic analyses performed off the northeastern United States using similar equipment and construction techniques, the transient nature and short-term duration of construction vessel noise would reduce the potential for masking to occur (LGL and JASCO 2005). In general, marine mammal exposure to construction vessel noise would only occur for a finite period of time and would not be expected to have long-term population-level impacts on marine mammals.

Table 4.2-3. Distance from Broadband Noise Sources that Level A and Level B Harassment of Threatened and Endangered Marine Mammals[1] and other Listed Species Could Occur for Offshore Construction Activities

	Buoy Installation (distance from source)	Pile Driving (distance from source)	Pipe Laying (distance from source)	Pipe Burial (distance from source)
Low-Frequency Hearing Cetaceans[2]				
Level A	1 to 20 m	3 to 18 m	< 20 m	< 20 m
Level B	20 m to 3.8 km	18 m to 4.5 km	20 m to 7.4 km	20 m to 8.3 km

Source: JASCO 2008

Notes:

1. The manatee is not expected in the offshore area.
2. The North Atlantic right whale and humpback whale are the only low-frequency hearing cetaceans anticipated in the area of the Proposed Action; these occurrences would be rare.

Level A harassment: intensities above 180 dB re 1 µPa at 1 m RMS

Level B harassment (impulse noises): intensities above 160 dB re 1 µPa at 1 m RMS

Level B harassment (continuous noises): intensities above 120 dB re 1 µPa at 1 m RMS

Table 4.2-4. Distance from Broadband Noise Sources that Level A and Level B Harassment of Threatened and Endangered Marine Mammals and other Listed Species Could Occur for Inshore Construction Activities.

	Pile Driving (distance from source)	Pipe Laying: Passage Key (distance from source)	Pipe Laying: Tampa Bay (distance from source)	Pipe Burial: Tampa Bay (distance from source)
Low-Frequency Hearing Cetaceans[1]				
Level A	7 to 30 m	< 20 m	< 20 m	< 20 m
Level B	30 m to 1.9 km	20 m to 1.6 km	20 to 6 km	20 to 6.7 km
Manatee				
Level A	6 m to 26 m	< 20 m	< 20 m	< 20 m
Level B	26 m to 1.8 km	20 m to 1.5 km	20 m to 6.0 km	20 m to 6.7 km

Source: JASCO 2008

Notes:

1. The North Atlantic right whale and humpback whale are the only low-frequency hearing cetaceans anticipated in the area of the Proposed Action; these occurrences would be rare.

Level A harassment: intensities above 180 dB re 1 µPa at 1 m RMS

Level B harassment (impulse noises): intensities above 160 dB re 1 µPa at 1 m RMS

Level B harassment (continuous noises): intensities above 120 dB re 1 µPa at 1 m RMS

Selected documented reactions of threatened and endangered marine mammals to continuous underwater noise created by industrial activities, such as drilling, are presented in **Table 4.2-5**. Mitigation measures to reduce the impacts of pile driving are described in **Section 4.11**.

Table 4.2-5. Selected Threatened and Endangered Marine Mammal Responses to Continuous Underwater Sound Sources Created by Various Industrial Activities

Mysticetes (Baleen Whales)	
Humpback whale	• Showed no obvious avoidance response to drill ship sounds with broadband received source levels of 116 dB re 1 µPa. • Exhibited startle responses to received sound level of 150 to 169 dB re 1 µPa, even at distances up to 3.2 km (2 mi) away. • Whale songs were not interrupted by dynamite blasts. • Commonly found within 10 km (6 mi) of blast sites and showed no obvious reactions to received sound levels of about 150 dB re 1 µPa.

Source: Unless otherwise stated, all information was adapted from Richardson et al. 1995.

The pipeline route does not pass through any manatee protection zones. Pile driving would occur approximately 7.6 km (4.8 mi) from the nearest manatee critical habitat and approximately 21.7 km (13.6 mi) from the nearest manatee protection zone. In addition, the project includes mitigation that would help reduce exposure of manatees to construction activities (see **Section 4.11**). Therefore, adverse impacts on manatees would be expected to be minor.

Vessel noise would be continuous, yet transient. Reactions of various marine mammals to transient underwater sound sources are summarized in **Table 4.2-6**. In general, baleen whale reactions to transient vessel noise include changes in swimming direction and speed, blow rate, and the frequency and kinds of vocalizations (Richardson et al. 1995). Baleen whales occasionally approach stationary or slow-moving boats, but they more commonly avoid them. Avoidance is strongest when boats approach directly or when vessel noise changes abruptly. Long-term reactions of baleen whales to vessel noise vary, but some species seem to show habitation to frequent boat traffic (Richardson et al. 1995). Short-term, minor, direct, adverse impacts on ESA-listed marine mammals could occur as a result of noise generated by construction vessels and machinery. With the application of BMPs and minimization measures, adverse impacts could be minimized.

Entanglement. It is possible that marine mammals might become entangled by anchors, anchor lines, or buoy lines deployed during construction. For example, as noted by NMFS (2007), entanglement in fishing vessel anchor lines has been documented historically; however, NMFS also notes that no information is available on the prevalence of such events. Short-term, minor, direct, adverse impacts on ESA-listed marine mammals could occur as a result of entanglement during construction. With strict adherence to proposed BMPs for detection of marine mammals in the area, the potential for entanglement associated with construction activities of the Proposed Action would be minimized.

Lighting. Construction activities would take place 24 hours per day, 7 days per week, during the installation period. For identification and safety purposes, construction and support vessels would be required to display lights when operating at night. The use of vessel lights during construction would be short-term, temporary, and transient. All lights would be installed and used in accordance with NMFS and USFWS guidelines designed to reduce impacts on marine mammals. Additionally, during installation an environmental coordinator would be on-site to ensure no violations would occur. This would decrease attraction by fish and invertebrates to the area, as well as marine mammals that might be attracted by their presence, thereby reducing the vulnerability of ESA-listed marine mammals to possible disorientation, vessel strikes, noise, predation, and entanglement. Long-term, minor, direct, adverse impacts on marine mammals would be expected to occur as a result of lighting used during routine Port operations. As a

Table 4.2-6. Selected Threatened and Endangered Marine Mammal Responses to Transient Underwater Sound Sources

Mysticetes (Baleen Whales)	
Humpback whale	• Responded negatively to boats at distances of at least 0.3 to 0.5 NM (Bauer 1986, Bauer and Herman 1986). • Showed little or no reaction to boats (Watkins 1986).
North Atlantic right whale	• Showed no response to actual vessels or to playbacks of the sound of a large (120-m [394-foot]) container ship approaching (Nowacek et al. 2003). • Slow-moving vessels can approach, but abrupt changes in course or engine noise elicit a negative reaction (Goodyear 1989, Mayo and Marx 1990, Gaskin 1991). • Mothers interposed themselves between calves and directly approaching vessels.
Sirenians	
West Indian manatee	• Oriented towards deeper channel waters and increased their swimming speed when boats were within approximately 25 to 50 m (82 feet to 164 feet) (Nowacek et al. 2004). • Show some avoidance of approaching boats, but the response is often too late and too slow to avoid collision.

Source: Unless state otherwise, all information adapted from Richardson et al. 1995.

result, direct and indirect, adverse impacts on ESA-listed marine mammals would be short-term and minor.

Marine Debris. Both entanglement in and ingestion of debris have caused the death of or serious injury to marine mammals (Laist 1997). The discharge and disposal of garbage and other solid debris from vessels by lessees is prohibited by the MMS (30 CFR 250.300) and the USCG (MARPOL Annex V, Public Law 100-220 [Statute 1458]) (33 CFR Part 151). The discharge of plastics, including ashes from burned plastics, is strictly prohibited and is therefore never authorized. All plastics must be returned to shore, and are tracked. These prohibitions on the discharge and disposal of garbage and other solid debris from vessels would be incorporated as enforceable conditions into the DWPA license. The USCG enforces MARPOL and the Deepwater Port License and fines or penalties could be assessed where laws and regulations are violated. Short-term, minor, direct, adverse impacts on marine mammals could occur if marine debris were accidentally released during the Proposed Action. Based on the measures that would be implemented to reduce the discharge of marine debris, it is unlikely that ESA-listed marine mammals would be adversely impacted by marine debris associated with the Proposed Action.

Operations

Seafloor Disturbance and Turbidity. Operations activities would cause long-term disturbances in both soft- and hard-bottom habitat. The placement of buoy system parts and concrete mattresses along the pipeline route, as well as anchor sweep would result in 16.32 acres of long-term disturbance on soft-bottom habitat and 19.42 acres of long-term disturbance on hard-bottom habitat. An additional 18.98 acres of soft substrate/sand habitat would be disturbed due to anchor sweep. It is anticipated that long-term STL buoy anchor chain sweep would cause the resuspension of fine sediments and would result in a sediment drape and turbidity increases within immediately adjacent areas. Turbidity associated with

long-term chain scour is expected to be localized and in the lower portion of the water column. This area would not be expected to recolonize because of long-term chain scour. Turbidity could spread from the immediate area of the proposed Port and affect different areas depending on the currents.

Removal of bottom habitat, along with resident benthic organisms within the area, affects not only the benthic communities, but also the fish assemblages that rely on the benthos for food, which in turn are preyed upon by marine mammals. Once the disturbance ceases, the substrate would be available for recruitment of benthic organisms. Reestablishment of a benthic community similar to that in adjacent areas would be expected to take a period of weeks to several years. Threatened and endangered baleen whales are only sporadically sighted in the GOM and have not been observed to feed here (feeding grounds for both the humpback whale and right whale are off the northeastern United States), so no impacts on these species would be anticipated. Additionally, manatees are expected to be rare in the offshore project area. Therefore, seafloor disturbance associated with Port operation is not expected to result in impacts associated on these species.

Water turbidity appears to have little or no direct impact on manatees or threatened and endangered whales, as they are sighted in both clear and muddy waters (Hartman 1979). Threatened and endangered baleen whales are only sporadically sighted in the GOM and have not been observed to feed here (feeding grounds for both the right whale and the humpback whale are off the northeastern United States). Additionally, manatees are expected to be rare in the offshore project area. Therefore, turbidity associated with Port operation is not expected to result in impacts on these species.

Vessel Traffic. A maximum of 90 SRVs could call on Port Dolphin per year. In the open ocean, SRVs typically travel at speeds of up to 19.5 knots. However, once approaching the vicinity of the terminal, SRVs would slow to about half-speed. Manatees, which occur inshore, would not be affected by SRV traffic. Supply and crew vessels are expected to call on the SRVs while at Port Dolphin. Based on the estimated 90 calls a year, 938 supply vessel trips from 22 onshore locations in Tampa Bay are anticipated.

Increases in vessel traffic (with no mitigation or monitoring) could potentially increase the likelihood for collisions with ESA-listed marine mammals, thereby increasing the occurrence of serious injuries or mortality. Additional indirect effects from increased vessel traffic include increased wave action due to vessel wakes and scarring of seagrass beds by propellers, noise from vessel traffic (potential impacts and analyses discussed in detail under *noise*), and accidental hydrocarbon spills (potential impacts and analyses discussed in detail under *hydrocarbon spills*).

While it is known that an increase in vessel traffic increases the risk of collision, the probability of that risk cannot be quantified. Short-term, minor, direct, and adverse impacts on threatened and endangered marine mammals could occur as a result of increased vessel traffic during operation (without mitigation and monitoring). Any vessel strike of a threatened and endangered marine mammal would be considered a "take" under both the MMPA and ESA. Based on NOAA and USFWS recommendations, the Applicant has proposed BMPs for all vessels used during installation routine operations, and decommissioning to reduce or avoid impacts of vessel traffic on marine mammals (see **Section 4.11**). Additionally, threatened and endangered baleen whales are only sporadically sighted in the GOM. Minor, long-term adverse impacts on manatees or threatened or endangered whales would be expected during operation. The use of proposed BMPs, minimization measures, and mitigation measures (see **Section 4.11**) would further reduce potential adverse impacts.

Noise. Long-term, minor, direct, adverse impacts on federally listed marine mammals could occur as a result of noise generated by SRVs and support vessels during routine Port operations. Background information on noise impacts on marine mammals and acoustic criteria can be found in **Section 4.2.1.2.1**, discussed in detail under *noise* in *construction impacts*.

Long-term underwater noise impacts would be created by the operation of various equipment and powering systems on the SRVs and other support vessels, as well as from the vaporization of the LNG at the mooring buoy. An overlap is anticipated between arriving and departing SRVs; consequently, an SRV would be present most of the time. Under the Proposed Action, the Port would operate 24 hours a day, 365 days per year to provide a continuous supply of natural gas.

The source levels associated with the regasification process are expected to be nearly 110 dB in the water, near the vessel. There are no situations where the noise level exceeds 120 dB even a few meters from the vessel (LGL 2008). Therefore, no effects on marine animals are expected from noise associated with regasification.

Noise levels in the offshore area would be elevated when two SRVs are on buoys at the same time (separated by a distance of approximately 5 km (3 mi)) (JASCO 2008). While SRVs are moored at the Port, main engines would not be operational, but shipboard machinery used to regasify or offload LNG, generate power, and maintain facilities, would produce continuous sources of noise. An additional noise source could include the sound produced by the flow of gas through the proposed flowline, although very little noise in the underwater environment would be expected (JASCO 2008).

The SRV traffic associated with the project would contribute incrementally to the underwater noise environment of the world's oceans. **Section 6.3.8** provides an analysis of the cumulative impacts of the Proposed Action relative to noise in the ocean. The main sources of vessel noise are propeller cavitation, propeller singing, and propulsion; other sources include auxiliaries, flow noise from water dragging along the hull, and bubbles breaking in the wake (Richardson et al. 1995). Vessel traffic is a major contributor to noise in the world's oceans, especially at low frequencies between 5 and 500 Hz (NRC 2003). During 2004, NOAA and a number of other government, industry, and academic partners convened the first formal meeting ("Shipping Noise and Marine Mammals: A Forum for Science, Management, and Technology") to consider the effects of sounds from large vessels on marine life. During 2007, NOAA convened a symposium to assess quieting applications for large commercial vessels.

Although each vessel has a unique acoustic signature, individual vessels are indistinguishable at a distance. Above 300 Hz, the level of weather-related noise might exceed shipping noise. Wind, wave, and precipitation noise originating close to the point of measurement dominate frequencies from 500 to 50,000 Hz. The ambient noise frequency spectrum and level can be predicted fairly accurately for most shallow-water areas based primarily on known shipping traffic density and weather or sea conditions (wind speed, Beaufort wind force, or sea state) (Urick 1983). Other anthropogenic sources of underwater noise include oil and gas drilling and production activities, seismic air guns, and SONARs. While the level of noise from ships is not of a magnitude likely to cause death, injury, or auditory trauma, the noise can affect the ability of marine mammals to communicate and receive information about their environment (Richardson et al. 1995). These sounds might frighten, annoy, or distract marine mammals and lead to physiological and behavioral disturbances. However, the incremental contribution of the planned SRV traffic to the level of vessel traffic in the GOM and the world oceans is minor. Moreover, compared to the world fleet, the SRVs would be newer ships, which tend to have several noise-mitigating characteristics such as quieter propulsion systems and deeper propellers that are less prone to cavitation (NRC 2003).

The acoustic transponder would emit a 30-kHz signal at 188 to 192 dB re µPa at 1m when signaled by an incoming SRV. This signal is within the functional hearing range of the manatee, but not in its range of best hearing (6 to 20 kHz). Noise modeling indicates that this signal would drop to below 180 dB re µPa at approximately 3 m (10 feet) and to 160 dB re µPa at approximately 32 m (106 feet) (see **Section 4.8** for additional detail regarding noise modeling.) Manatees are not expected to occur in the offshore component of the study area, and, as such, would not be impacted by the acoustic transponder. While rare

occurrences of the right whale and humpback whale are anticipated, the transponder's frequency is higher than that of the hearing range for both the humpback whale and right whale.

Entanglement. It is possible that ESA-listed marine mammals might become entangled in anchors, anchor lines, or buoy lines associated with operations of the Port in offshore waters. For example, as noted by NMFS (2007), whale entanglement in fishing vessel anchor lines has been documented historically; however, NMFS also notes that no information is available on the prevalence of such events. Because right whales and humpback whales are expected to be rare in the Project area and manatees are expected to be rare in the offshore Project area, the potential for such an event would be very low. Therefore, long-term, minor, direct and indirect, adverse impacts on ESA-listed marine mammals could occur due to the increased risk of entanglement during routine Port operations. With strict adherence to proposed BMPs, the potential for entanglement associated with construction activities of the Proposed Action would be minimized.

Lighting. SRVs would be guided to the submerged unloading buoys by two lighted buoys floating on the sea surface. The lighted buoys would include flashing yellow lights, with an average lighting level of 900 to 1,000 Candelas. Once SRVs are securely moored, lighted buoys would be taken on board and turned off. Moored SRVs would be required to exhibit light signals appropriate for vessels at anchor. Deck lights would also be used to illuminate working decks during LNG regasification activities. This would decrease any possible attraction by ESA-listed marine mammals to the area, thereby reducing their possible disorientation, vessel strikes, noise, predation, and entanglement. Additionally, right whales and humpback whales are expected to be rare in the Project area and manatees are expected to be rare in the offshore Project area, where Port operations occur. Long-term, minor, direct, adverse impacts on ESA-listed marine mammals would be expected to occur as a result of lighting used during routine Port operations.

Seawater Intake and Cooling Water Discharge. Seawater would be taken in through one of two sea chests covered with a lattice screen and used to cool the ship's engines. Marine mammals would not be directly impacted because they would be able to swim faster than the seawater intake velocity, which would not exceed 0.15 m/s (0.5 feet/s). Average swimming speeds for ESA-listed marine mammal species in the area of the Proposed Action include 2.2 to 4.0 m/s (7.2 to 13.1 feet/s) for humpback whales and 4.5 m/s (14.8 feet/s) for right whales (Noren 2004). Manatees are rarely observed in offshore waters and therefore would not likely be affected. Hartman et al. (1979) estimated a top swim speed of 6.25 m/s (20.5 feet/s) for manatees, though it should be noted that since manatees are rarely observed in offshore waters, they would likely not be affected by seawater intake. Seawater uptake might indirectly impact threatened and endangered marine mammals, since plankton species could be entrained and subsequently killed by the seawater intake system. Plankton mortality could indirectly impact invertebrate and fish populations that feed on plankton. There is no evidence, however, of feeding by humpback or North Atlantic right whales during their rare occurrences in the GOM; feeding grounds are off the northeastern United States for these two species, so no impacts are expected to these species either. No impacts on ESA-listed marine mammals would be expected to occur as a result of seawater intake associated with the Project.

Cooling water would be discharged at 10 °C (18 °°F) above ambient seawater temperature. Modeling indicates that cooling water temperature would be 1 °C (1.8 °F) above ambient temperature within 100 m (328 feet) of the discharge (see **Section 4.1.2.1**). The cooling water discharge is not expected to reach the seafloor. An increase in temperature could result in short-term behavioral and physiological impacts. Because the cooling water plumes compose a relatively small area, impacts are expected to be minor. Because the cooling water plumes compose a relatively small area and because right whales and humpback whales are expected to be rare throughout the Project area and manatees are expected to be rare in the offshore Project area, adverse affects are unlikely.

Other Routine Discharges. While SRVs are present at the Port, they would not discharge domestic waste, bilge water, or ballast water. In addition, on the SRVs, gutter bars would be replaced around equipment where oil leaks could occur (e.g., mooring winches, cranes). Rain water from these areas would be drained to a bilge holding tank. No rain water would be discharged overboard, from areas around equipment where oil leaks would occur, while at the buoy. The firewater system discharges consist of uncontaminated seawater from testing the firefighting system on the SRVs. Based on the infrequent nature of the discharge, its short duration, and the lack of contaminants, short-term, minor, direct and indirect impacts on ESA-listed marine mammals are expected to occur.

Marine Debris. Both entanglement in and ingestion of debris have caused the death of or serious injury to marine mammals (Laist 1997). The discharge and disposal of garbage and other solid debris from vessels by lessees is prohibited by the MMS (30 CFR 250.300) and the USCG (MARPOL Annex V, Public Law 100-220 [Statute 1458]) (33 CFR Part 151). The discharge of plastics, including ashes from burned plastics, is strictly prohibited and is therefore never authorized. All plastics must be returned to shore, and are tracked. These prohibitions on the discharge and disposal of garbage and other solid debris from vessels would be incorporated as enforceable conditions into the DWPA license. The USCG enforces MARPOL and the Deepwater Port License and fines or penalties could be assessed where laws and regulations are violated. Based on the measures that would be implemented to reduce the discharge of marine debris and the fact that right whales and humpback whales are expected to be rare throughout the Project area and manatees are expected to be rare in the offshore Project area, it is unlikely that ESA-listed marine mammals would be adversely impacted by marine debris associated with the operation of the Port. Short-term, minor, direct, adverse impacts on ESA-listed marine mammals could occur if marine debris were accidentally released during the Proposed Action.

Hydrocarbon Spills. Based on the amounts of hydrocarbons stored on the SRVs (see **Section 2.3.3**) and the fact that all SRVs are designed with features to minimize the potential for oil spills (see **Section 2.3.10**), the impact is designated as minor, short-term, and long-term. There would be no ship-to-ship fuel oil transfer and the Port would operate under the provisions of an approved oil spill contingency plan.

An oil spill in coastal waters could affect the West Indian manatee, humpback whale, and right whale should they come into direct contact with the spill. Marine mammals could incidentally ingest floating or submerged oil or tar or consume oil-contaminated food (Geraci 1990, St. Aubin and Lounsbury 1990). Spilled oil can foul the baleen fibers of mysticete whales, temporarily impairing food-gathering efficiency or resulting in the ingestion of oil or oil-contaminated prey (Geraci 1990). Spilled oil might affect the quality or availability of aquatic vegetation (St. Aubin and Lounsbury 1990). Because the distribution of this species is largely limited to coastal waters along the Florida peninsula, the West Indian manatee would be most vulnerable to a spill reaching the preferred river system and canals where it congregates.

Oil-spill response activities can affect marine mammals, either through exposure to response chemicals (e.g., dispersants or coagulants) applied to control or break down spilled surface oil, or through disturbance by or collision with spill response vehicles. The chemicals used during a spill response are toxic, but are considered much less so than the constituents of spilled oil (NRC 1989); there is little information regarding their potential effects on marine mammals. The presence of, and noise generated by, oil-spill response equipment and support vessels could temporarily disturb marine mammals in the vicinity of the response action, with affected individuals likely leaving the area. Oil-spill response support vessels can also increase the risk of collisions between these vessels and marine mammals in the vicinity of the spill response. It is unlikely that hydrocarbon spills associated with Port operation would adversely affect right whales, humpback whales, and manatees as they are unlikely to be found in the area surrounding the Port located in the offshore area. In addition, the SRVs are designed with features to minimize the potential for oil spills (see **Section 2.3.10**).

LNG Spills. Short-term, minor, direct, adverse impacts on ESA-listed marine mammals could occur in the unlikely event of an LNG spill. All SRVs are designed with features to minimize the potential for LNG spills (refer to Chapter 2, *Maritime Safety and Related Matters*). However, if an LNG spill were to occur, potential impacts would include exposure to low-temperature LNG at the water surface, possibly resulting in frostbite or death, and asphyxiation by natural gas vapors above the surface of the water. These impacts would likely occur in the immediate vicinity of the spill location; the timeframe of the impact is limited (see **Section 5**). Since LNG does not dissolve in water, the timeframe for these potential impacts would be limited, and no adverse toxic impacts would be expected after the LNG boiled off and the vapors dispersed.

Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

The process would probably result in temporary turbidity increases in the immediate vicinity of the proposed decommissioning activities. These increases would indirectly affect threatened and endangered marine mammals by impacting their food (see previous sections on *Turbidity*). Additionally, the presence of additional vessels during decommissioning and typical debris-removal practices could potentially affect ESA-listed marine mammals (see previous sections on *Vessel Traffic*). The Applicant specified that three types of vessels would be used during decommissioning as shown in **Table 4.10-2**, which includes one 4-point direct support vehicle (DSV) barge with a 30-ton crane, two tugs to support the DSV barge, and one crew/supply vessel (Port Dolphin 2008a). The Applicant specified that approximately 156-vessel trips would be required for decommissioning over the course of approximately 2 months (Port Dolphin 2007a, 2008a). For more information on vessel traffic associated with decommissioning activities, see **Section 4.10.1**.

Decommissioning activities would occur mainly in the STL buoy area and would not involve any activities along the pipeline route or in nearshore waters. Decommissioning involves no use of explosives. Monitoring efforts during decommissioning would detect presence of marine mammal species and mitigate any impacts. Short-term, minor to moderate, direct and indirect, adverse impacts on ESA-listed marine mammals could occur during Project decommissioning.

4.2.1.2.2 Alternatives

Table 4.2-7 compares impacts from the Proposed Action to each of the alternatives with respect to threatened and endangered marine mammals.

Southern Site and Route Alternative. Construction, operation, and decommissioning impacts on threatened and endangered marine mammals under the Southern Site Route Alternative would be similar to those under the Proposed Action. Impacts associated with turbidity would be slightly greater because the pipeline route would be longer.

Offshore Interconnection with Gulfstream Pipeline Alternative. Impacts on threatened and endangered marine mammals would be less than the Proposed Action under this alternative. Under this alternative the pipeline would not come inshore because of the connection to the Gulfstream pipeline. The connection would occur approximately 15 km (10 mi) from the mouth of Tampa Bay, in water with a bottom depth of 6 m (20 feet). Seafloor disturbance associated with pipeline disturbance under this alternative would be less in shallow coastal waters and would not occur in Tampa Bay. A more detailed description of seafloor disturbance under this alternative is described in detail under *Benthic Resources*. There would also be less of an impact of turbidity in shallow coastal waters associated with pipeline installation under this alternative. There would be no turbidity increases associated with pipeline installation in Tampa Bay under this alternative. The right whale and the humpback whale are the only ESA-listed marine mammal species with documented occurrences on the continental shelf off Florida; however, as noted earlier, these are very rare instances. Manatees are not expected to occur as far offshore as the offshore interconnection, though rare occurrences could take place. The pipeline route also does not pass through any of the designated manatee protection zones. Therefore, no impacts on manatees as a result of construction, operation, and decommissioning under this alternative would be expected.

FSRU Port Design Alternatives. Construction, operation, and decommissioning impacts on threatened and endangered marine mammals under the FSRU Alternative would be similar to those under the Proposed Action. The FSRU unit itself would require one set of anchors, as opposed to two sets of anchors for the SRVs included in the proposed Project. Also, use of the FSRU would not require a flexible riser to be pulled off the bottom as the buoy is raised to mate with the SRV. These features would result in decreased seafloor disturbance and turbidity associated with mooring line sweep and raising and lowering of the buoy. The discharge associated with the FSRU alternative would be fresh water. This discharge would travel a longer distance as a thin layer; therefore, the impacts would be minor.

AAV Alternative. Construction, operation, and decommissioning impacts on threatened and endangered marine mammals under the AAV Alternative would be similar to those under the Proposed Action.

Suction Piles Anchoring Alternative. Potential noise impacts associated with pile driving on threatened and endangered marine mammals under the proposed anchoring method (driving piles) would not occur with the use of the Suction Piles Anchoring Alternative. However, it should be noted that threatened and endangered marine mammals are not likely to be in the area affected by pile driving. Therefore, although the use of the Suction Piles Anchoring Alternative would be substantially less noisy than the proposed driven piles, the potential impacts on threatened and endangered marine mammals are likely to be the same (minor and short-term) for both alternatives because Federally-listed marine mammals are not expected to be in the proposed port area.

No Action Alternative. The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed port and the associated

pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, there would be no direct or indirect impacts from the Port on threatened and endangered marine mammals.

Alternative sources of natural gas might include other Deepwater LNG Ports or onshore LNG terminals. Other Deepwater LNG Ports might have impacts on threatened and endangered marine mammals that are similar to the Port Dolphin system but in a different geographic location. Onshore LNG terminals would be located in coastal areas where there could be a higher chance of impacting these species; however, it would depend on the location.

Table 4.2-7. Threatened and Endangered Marine Mammal Impacts Summary

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnection Alternative	FSRU Design Alternative	Suction Pile Anchoring Alternative
Pipeline construction	Minor, short-term, adverse impacts along pipeline route as a result of seafloor disturbance, noise, entanglement, and marine debris. Long-term impacts due to hydrostatic testing and discharges and lighting.	Short-term impacts higher than Proposed Action (longer route).	Short-term impacts lower than Proposed Action (shorter route and no nearshore impacts).	No difference from Proposed Action.	No difference from Proposed Action.
Port construction	Minor, short-term and long-term, adverse impacts in vicinity of Port as a result of seafloor disturbance, noise, entanglement, and marine debris. Long-term impacts due to lighting.	No difference from Proposed Action.	No difference from Proposed Action.	Short-term impacts as a result of seafloor disturbance and turbidity lower than Proposed Action (less anchors and no flexible riser).	Short-term impacts lower than Proposed Action (lower noise levels).
Operation of Port	Minor, short-term, adverse impacts in vicinity of Port as the result of seawater intake and cooling water discharge, routine discharges, marine debris, and potential LNG/hydrocarbon spills; long-term impacts due to noise, entanglement, lighting, seawater intake and discharge and potential hydrocarbon spills.	No difference from Proposed Action.	No difference from Proposed Action.	Short-term impacts comparable to Proposed Action; higher long-term impacts (cool freshwater discharge).	No difference from Proposed Action.
Decommission of Port	No impacts.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.

Notes:

1. Under the No Action Alternative none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur. No direct or indirect impacts on biological resources would be anticipated.
2. The AAV Vaporization Alternative was carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.2.1.3 Threatened and Endangered Sea Turtles

4.2.1.3.1 Proposed Action

As discussed in **Section 3.2.3**, the Maritime Administration has the responsibility under the ESA to determine whether or not the Project would adversely affect federally listed threatened or endangered sea turtles and their critical habitat. In accordance with Section 7 of the ESA, the Maritime Administration informally initiated consultation with the USFWS and NMFS on August 24, 2007. Federally listed sea turtles occurring in the northern GOM are listed in **Table 4.2-8**. Impacts of installation, operations, and decommissioning on sea turtles are summarized in **Table 4.2-9** (see **Section 4.2.1.3.2**).

Table 4.2-8. Federally Listed Sea Turtles Occurring in the Northern GOM

Common Name	Scientific Name	ESA status
Green sea turtle	*Chelonia mydas*	Threatened, endangered *
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Loggerhead sea turtle	*Caretta caretta*	Threatened
Olive ridley sea turtle	*Lepidochelys olivacea*	Threatened, endangered *

Note: * Although the species as a whole is listed as threatened, the Florida and Mexican Pacific nesting stocks of the green turtle and the Mexican Pacific nesting stocks of the olive ridley turtle are listed as endangered. Since the nesting areas for green and olive ridley turtles encountered at sea often cannot be determined, a conservative approach to management requires the assumption that all greens and olive ridleys found in the study area are endangered.

Construction

Seafloor Disturbance. Installation of Port components and pipelines would temporarily disrupt benthic habitat in the immediate vicinity of the construction areas. Of the six turtle species, the loggerhead, Kemp's ridley, green, and hawksbill are known to inhabit Tampa Bay and use benthic habitats for foraging. Although sea turtles do not directly use such habitat, they might feed on benthic species that could be temporarily displaced or destroyed by construction activities. Construction would result in a short-term loss of soft-bottom foraging habitat and a long-term loss of hard- and live-bottom foraging habitat. Most soft-bottom areas disturbed during pipeline burial would be backfilled and remain usable as potential foraging habitat. The areal extent of seafloor disturbance is approximately 3,756 hectares (9,272 acres), of which about 33 percent or 1,224.39 hectares (3,025.54 acres) would be hard- or live-bottom habitats. Most of the damage would occur during pipeline installation, including plowing of the seafloor, placement of barge anchors, and anchor sweep. Damage to the hard-bottom substrate is considered irreversible. The recovery of benthic communities associated with damaged hard-bottom areas would be much slower than for soft-bottom areas due to the slow growth rate of corals and other hard-bottom epibiota.

Seagrass beds and macroalgae are also important foraging habitat for sea turtles. In offshore areas deepwater seagrass patches of paddlegrass and macroalgae would be impacted either directly by mechanical damage during plowing or indirectly by a reduction of photosynthesis due to sediment redeposition. Paddlegrass is an annual seagrass species that regrows each year; therefore, locations of paddlegrass areas are very dynamic in nature (Hammerstrom et al. 2006, Dawes and Lawrence 1990). Consequently, impacts would not be long-term or permanent. In the nearshore areas, seagrass was observed predominantly near Manbirtee Island, the spoil island near Port Manatee, and in water depths

shallower than 2 m (7 feet) (Port Dolphin 2007b). The nearest seagrasses are 23 m (75 feet) to the southwest and greater than 59 m (194 feet) to the northeast of the HDD exit point. Therefore, seagrasses would be avoided. Therefore, it is unlikely that sea turtles would be adversely affected.

It is possible that an inadvertent release of drilling fluid, called a frac-out, could occur during HDD activities. If a frac-out were to occur, short-term sediment transport, water quality impacts, and bottom disturbance would likely occur. The FERC Procedures require the Applicant to develop an HDD Plan that includes a description of how a frac-out would be contained and cleaned up. The Applicant would file all HDD plans with the FERC staff prior to construction. The non-Federal agencies with jurisdiction over HDD in Tampa Bay include FDEP (habitat and submerged lands), Florida Fish and Wildlife Conservation Commission (FWC) (habitat and species), Tampa Port Authority (habitat and submerged lands in Tampa Bay), and Tampa Bay Regional Planning Council (regional planning council). Although Tampa Bay Regional Planning Council does not have a permitting process, they are a commenting agency for all proposed land alterations within the Tampa Bay Region. Because of the required plan to contain and clean up a frac-out, it is unlikely sea turtles would be affected by a frac-out, should one occur.

Short-term and long-term, minor, direct and indirect, adverse impacts on sea turtles could occur as a result of seafloor disturbance caused by construction.

Turbidity. Turbidity increases could cause sea turtles to avoid commonly used feeding or resting habitats. Adverse impacts on the seagrass beds and macroalgae could result from increases in turbidity. The main source of water quality impacts is pipeline trenching, which would produce turbidity along the pipeline route. Turbidity modeling indicates that the total areal extent of the turbidity plumes created during pipeline installation would be approximately 1,894 hectares (4,679 acres) (ASA 2008). The turbidity plumes would be short-lived and remain fairly close to their source.

Suspended sediments in the water column reduce light availability and, therefore, seagrass production; seagrass beds serve as feeding areas for sea turtles. Due to the temporary nature of water quality changes following construction activities, adverse impacts are expected to be minor and short-term during construction. Therefore, adverse effects on sea turtles would be unlikely. Short-term, minor, direct and indirect, adverse impacts on sea turtles could occur as a result of temporary turbidity increases caused by construction.

Hydrostatic Test Water Intake and Discharges. The proposed use of approximately 24 million gallons of filtered, surface seawater during flushing and hydrostatic testing of the pipeline would result in the entrainment of phytoplankton. The intake velocity (through-screen) for hydrostatic testing would be maintained below 0.15 m/s (0.5 feet/s). Average swimming speeds for sea turtle hatchlings are 0.44 m/s (1.43 feet/s) for green turtles, 0.36 m/s (1.17 feet/s) for loggerhead turtles, and 0.25 m/s (0.83 feet/s) for leatherback turtles (Wyneken 2001). These speeds are faster than both the average and maximum intake velocities, so hatchlings would likely be able to outswim the seawater intake. Therefore, no measurable direct impacts on sea turtles would be expected to occur as a result of seawater intake associated with the Project.

As stated in **Section 4.1.1,** hydrostatic testing would have a short-term, minor, localized impact on water quality. Therefore, short-term, negligible, indirect, localized impacts on sea turtles would occur as a result of hydrostatic testing.

Vessel Traffic. Sea turtles can be injured or killed if struck by a vessel, particularly if struck by an engaged propeller. Increased vessel traffic could result in a higher number of collisions between ships and sea turtles, thereby increasing the occurrence of serious sea turtle injuries or fatalities.

Although adult turtles are visible at the surface during the day and in clear weather, they can be difficult to spot from a moving vessel when resting below the water surface or during nighttime or periods of inclement weather. Sea turtles spend most of their lives submerged and thus are not visible by vessel operators. The average percentage of time spent submerged is 89 percent for Kemp's ridleys and 91 percent for greens (Meylan et al. 2003). While the risk of a vessel striking a sea turtle cannot be quantified, it is known to exist because of data from turtle stranding networks. A total of 298 records of dead or injured turtles exist for the inshore waters of the Tampa Bay area for 1980 through 2001. Boat-related injuries (including propeller wounds and possible boat collision injuries), were the most frequently observed carcass anomaly for loggerheads; 16 Kemp's ridleys and 1 hawksbill also showed evidence of boat injuries (Meylan et al. 2003).

The ability of an animal to appropriately respond to an approaching source of danger is constrained by how soon the animal can detect the danger. Knowledge of the sensory biology of sea turtles indicates that sound and light offer the only potential cues for detecting an approaching vessel. In one study of green turtles, flight initiation distances did not exceed 12 m (39 feet), possibly indicating a dependence on visual cues rather than sound cues. The proportion of turtles that fled to avoid the vessel decreased significantly as vessel speed increased. Turtles fled frequently in encounters with slow vessels (4 km per hour [km/h] [2.5 miles per hour (mph)]), infrequently in encounters with moderate vessel (11 km/h [6.8 mph]), and rarely in encounters with a fast vessel (19 km/h [11.8 mph]) (Hazel et al. 2007).

High volumes of vessel traffic adjacent to shallow foraging habitat could be particularly dangerous for turtles because of the tendency to flee towards deeper water and to use deeper water to rest between foraging bouts. The collision risk for turtles in all areas is likely to be further exacerbated when water clarity is low and during the night (Hazel et al. 2007). Supply vessels and crew/survey vessels would make regular trips between Port Manatee and the construction site for approximately 11 months. It is possible for sea turtles to be present in nearshore areas where seagrass has been observed (i.e., Spoil Island near Port Manatee). Potential indirect impacts include disruption of sea turtles' activities (foraging and nesting) and, in some cases, short- or long-term displacement from areas important for feeding and reproduction. Short-term changes in activity budgets that reduce amount of time feeding could represent long-term challenges by reducing energy acquisition. These short-term changes could also have a greater impact on a population depending on resource availability. The energetic consequences of one or more disturbance-induced periods of interrupted feeding have not been evaluated quantitatively. Energetic consequences would depend on whether suitable food is readily available.

Increases in vessel traffic (with no mitigation or monitoring) could potentially increase the likelihood for collisions with sea turtles, thereby increasing the occurrence of serious injuries or mortality. While it is known that an increase in vessel traffic increases the risk of collision, the probability of that risk cannot be quantified. If a sea turtle were to be struck, it would be considered a "take" under the ESA. Therefore, mitigation measures would be taken to minimize the potential for vessel collisions during construction.

Vessel traffic associated with the Proposed Action would be expected to result in short-term, minor, direct, adverse impacts on sea turtles.

Noise. The main noise sources include pile driving (at the STL buoy locations) and vessel engines. Pile driving would occur in offshore waters; therefore noise would not affect sea turtles in foraging, breeding, or nesting areas, which occur in nearshore waters approximately 48 km (30 mi) from the STL buoy locations.

Noise modeling indicates that sea turtles in the Project area could hear the broadband noise (over a wide range of frequencies) associated with construction of the deepwater port and pipeline. **Table 4.2-3** presents the distance from noise sources that Level A and Level B harassment of listed species could

occur for offshore construction activities. **Table 4.2-4** presents the distance from noise sources that Level A and Level B harassment of listed species could occur for inshore construction activities. Based on the types of noise and the distances affected, measures should be taken to reduce or avoid both Level A and Level B harassment on sea turtles.

The possibility of TTS exists for sea turtles. Lenhardt (2002) found that at received levels from 151 to 161 dB re 1 μPa, adult loggerheads showed a marked response (i.e., increased swimming speeds) and avoided areas where low-frequency air guns were being used at up to 175 dB re 1 μPa. However, they eventually habituated to these received levels. During the same trials, one turtle exhibited a TTS of more than 15 dB for up to 2 weeks after exposure to these received levels (Lenhardt 2002). Juveniles also have been found to avoid low-frequency sound (less than 1,000 kHz) produced by airguns (O'Hara and Wilcox 1990). TTS can last from minutes or hours to days and the magnitude of the TTS depends, upon other factors, on the level and duration of noise exposure. For sound exposures at or somewhat above the TTS level, hearing sensitivity usually recovers rapidly after exposure to the noise ends (Richardson et al. 1995). Because sea turtles would be expected to leave the area in response to activities associated with pre-construction preparation, auditory trauma such as TTS or PTS is unlikely. In addition, the Applicant has identified and committed to "ramp-up" procedures to reduce the likelihood of a sea turtle being exposed to the highest sound levels during pile driving (see **Section 4.11**). "Ramp-up" procedures would be used to gradually increase the sound intensity during pile driving and allow time for sea turtles to leave the area before the sound reaches its full intensity. The intent of ramp-up is to either avoid or reduce the potential for instantaneous hearing damage to an animal (from the sudden initiation of an acoustic source at full power) that might be located in close proximity. Numerous sources including the Marine Mammal Commission, NMFS, and the MMS note that the effectiveness of "soft start," although theoretically sound, has yet to be verified empirically (David 2006, Ragen 2008).

Behavioral responses to underwater noise can occur during pile driving. Avoidance behavior could reasonably be expected to occur at distances ranging from a few meters to a few hundred meters from a pile driver. Exposure to pile-driving noise could interrupt feeding, resting, or other behaviors or could cause a turtle to change its course of travel. The interruptions might continue for as long as the pile driving continues, or until the sea turtle could swim outside of the ZOI. Short-term changes in activity budgets that reduce amount of time feeding could represent long-term challenges by reducing energy acquisition. Energetic consequences would depend on whether suitable food is readily available. The energetic consequences of one or more disturbance-induced periods of interrupted feeding have not been evaluated quantitatively. Because of the limited areal extent of impacts and the short duration of the pile-driving activity, minor, short-term impacts on sea turtles are expected.

All six species of sea turtles (possibly present at the STL buoy locations and anywhere along the pipeline route) could be exposed to construction vessel noise. Although sounds created by construction equipment and vessels would be continuous during pipeline installation, activities would progress slowly along the route as the pipeline is laid, buried, and the trench backfilled. Thus, any one area would be subject to the maximum sound levels for only a day or two each time as the construction activities pass that area. It is likely that sea turtles would be able to hear low-frequency underwater noise from construction vessels and possibly experience some disturbance. The most likely impacts would be short-term behavioral changes such as diving and evasive swimming, disruption of activities, or departure from the area.

Short-term, minor, direct, adverse impacts on sea turtles could occur as a result of noise generated by construction vessels and machinery.

Entanglement. Entanglement of sea turtles in discarded fishing gear and other marine debris is a serious and growing problem (USFWS and NMFS 1992, 1993, 2008). Once entangled, turtles can be injured by the line itself, become susceptible to predation because of reduced mobility, or drown if they are unable to

surface for air. The risk of a sea turtle becoming entangled in buoy anchor lines is very low because the anchor chains would be large, heavy, and taut. In addition, there would be no horizontal link between anchor lines, eliminating this potential for entanglement. The derrick/lay barge could use up to 10 anchor cables, including the anchor, anchor line, and mid-line buoy. The mid-line buoy would be a single buoy and line used to suspend the anchor line to avoid dragging and scouring the seafloor. All lines would be greater than 10 cm (4 inches) in diameter. Anchor lines on the derrick/lay barge would be set and raised once during the installation of each unloading buoy, but they would be set and raised repeatedly during pipeline installation. Other construction vessels could also employ anchors and anchor lines.

Short-term, minor, direct, adverse impacts on sea turtles could occur as a result of entanglement during construction.

Lighting. The lighting associated with this Project's construction can affect nesting and hatching sea turtles adjacent to the shoreline where the construction would occur. The main issue concerning lighting and sea turtles is disorientation of hatchlings by artificial lighting on or near nesting beaches (Witherington 1997). Under natural conditions, hatching sea turtles typically emerge from nests at night and move toward the brightest, most open horizon which is over the ocean. However, when bright light sources are visible on the beach, they become the brightest spot on the horizon and attract hatchlings in the wrong direction making them more vulnerable to predators, desiccation, entrapment in debris or vegetation, and exhaustion, and often lure them onto roadways and parking lots where they are run over. Artificial lights can also disorient hatchlings once they reach the water. Electroretinography (ERG) data show that green turtles are most sensitive to light in the violet to orange region of the visible spectrum, from 400 to 640 nanometers. Green turtles, hawksbills, and olive ridleys were most strongly attracted to light in the near-ultraviolet to yellow region of the spectrum and were weakly attracted or indifferent to orange and red light. Loggerheads were most strongly attracted to light in the near-ultraviolet to green region. A light source emitting both 525-nanometer (green) and 645-nanometer (red) light, a source highly attractive to hatchlings, appears to a human observer to emit yellow light comparable to a 588-nanometer monochromatic source, which would be only weakly attractive to hatchlings (Witherington and Martin 1996).

Nearly all ocean-facing (Gulf) sandy beaches in the Tampa Bay area are used as nesting habitat by sea turtles, primarily loggerheads. The NMFS notes that attraction to offshore locations is less problematic than attraction to landside locations, as the issue is to ensure that hatchlings head to sea rather than remaining onshore. NMFS concludes that while some adverse effects could occur from brightly lit platforms, "it is unlikely that they would appreciably reduce the reproduction, numbers, or distribution of sea turtles in the wild" (NMFS 2001, 2002).

Short-term, minor, direct, adverse impacts on sea turtles could occur as a result of lighting used during construction.

Operations

Seafloor Disturbance and Turbidity. Operations activities would cause long-term disturbances in both soft- and hard-bottom habitat in the offshore portion of the Project area. The placement of buoy system parts, direct placement of the pipelines, and concrete mattresses along the pipeline route, as well as anchor sweep, would result in 36.76 acres of long-term disturbance on soft-bottom habitat and 34.53 acres of long-term disturbance on hard-bottom habitat. Although sea turtles do not directly use such habitat, they might feed on benthic species that could be temporarily displaced or destroyed by operation activities and thus minor, indirect, adverse impacts on sea turtles from seafloor disturbance and turbidity would be expected.

Vessel Traffic. Sea turtles can be injured or killed if struck by a vessel, particularly if struck by an engaged propeller. Increases in vessel traffic (with no mitigation or monitoring) could potentially increase the likelihood for collisions with sea turtles, thereby increasing the occurrence of serious injuries or mortality. While it is known that an increase in vessel traffic increases the risk of collision, the probability of that risk cannot be quantified.

Long-term, minor, direct, adverse impacts on sea turtles could occur as a result of vessel traffic associated with the Project.

Noise. Continuous, yet transient noise would be created by SRVs, support vessels, and pilot vessels in transit. The acoustic transponder would emit a 30-kHz signal at 188 to 192 dB re μPa when signaled by an incoming SRV. Therefore, this signal would not be within the hearing range of sea turtles, which generally range from 0.08 to 2 kHz with the best dynamic hearing range between 0.1 and 1 kHz (Ridgway et al. 1969, Lenhardt 1994, Moein et al. 1994, Moein Bartol et al. 1999). Overall, the amount of noise created by vessel traffic during routine Port operations would be consistent with other man-made underwater noise sources in the area (e.g., commercial shipping). Ambient underwater noise conditions are expected to vary, depending on factors such as wind and waves, precipitation noise, biological noise in the area, and tidally generated noise (JASCO 2008).

Entanglement. The possibility exists that a sea turtle could become entangled in the messenger or recovery line. Although there is evidence that some sea turtles take up residence, at least briefly or seasonally, at platforms or other hard-bottom structures, a statistical study of such associations in the GOM produced mixed results, with positive associations in a few areas but little or no association in others (Lohoefener et al. 1990). The buoy locations are in an area where extensive low-relief hard-bottom habitat already exists, so the subsea buoys would not constitute a unique feature likely to attract large numbers of turtles from surrounding areas. There would be two buoy locations in a small area, and relatively few turtles would be expected to encounter them. The likelihood of entanglement is very low because the anchor chains securing the unloading buoys would be large, heavy, and taut. In addition, there would be no horizontal link between anchor lines.

Long-term, minor, direct, adverse impacts on sea turtles could occur as a result of entanglement during operations.

Lighting. Offshore structures such as drilling rigs or drill ships typically are visible from shore at distances of 5 to 16 km (3 to 10 NM), and on a clear night, lights on top of offshore structures could be visible to humans on shore to a distance of approximately 32 km (20 NM) (MMS 2002b). Due to the distance offshore, lighting at the STL buoy locations is expected to have no detectable impact (beneficial or adverse) on sea turtle hatchlings. The buoy locations are 45 km (28 NM) offshore and, therefore, the associated lighting would not be visible to humans or turtle hatchlings. Also, the distribution of hatchlings in offshore waters is likely to be much more diffuse than at the nesting beach, and the chance of numerous turtle hatchlings encountering a particular offshore structure (e.g., a ship moored at the STL buoy) is remote. The average level of lighting at the vessel side (at sea level) would be 50 to 55 Lux, and at the buoy markers would be 900 to 1,000 Candela (Alards method) and a peak of 400 to 500 Candela (Clear lens).

As of 2005, there were more than 4,000 bottom-founded structures (e.g., jacketed platforms, caissons, and well protectors) and 29,500 well-related structures in the northern GOM (MMS 2005). Many of these structures are well-lit, and the MMS (2002b) speculated that if hatchlings were attracted to brightly lit platforms, they could be susceptible to increased predation since large birds and predatory fish also congregate around these structures. The NMFS addressed this issue in biological opinions (BOs) for several oil and gas lease sales in the GOM (NMFS 2001, 2002). The NMFS analysis notes that attraction

to offshore locations is less problematic than attraction to landside locations, as the issue is to ensure that hatchlings head to sea rather than remain onshore. NMFS concludes that while some adverse effects might occur from brightly lit platforms, "it is unlikely that they would appreciably reduce the reproduction, numbers, or distribution of sea turtles in the wild" (NMFS 2001, 2002).

Long-term, minor, direct, adverse impacts on sea turtles would be expected to occur as a result of lighting used during routine Port operations. BMPs would decrease light attraction by sea turtles thereby reducing their vulnerability to disorientation, vessel strikes, noise, predation, and entanglement.

Seawater Intake and Cooling Water Discharge. Seawater would be taken in through one of two sea chests covered with a lattice screen. The two intakes would be located 4.5 m (14.8 feet) and 7.5 m (24.6 feet) below the water line of a fully loaded vessel. The water intake velocity (through-screen) would be maintained below 0.15 m/s (0.5 feet/s) independent of vessel size. The speeds of several measured sea turtle hatchling species are faster than both the average and maximum intake velocities, so hatchlings would be able to outswim the seawater intake. Average swimming speeds for sea turtle hatchlings are 0.44 m/s (1.43 feet/s) for green turtles, 0.36 m/s (1.17 feet/s) for loggerhead turtles, and 0.25 m/s (0.83 feet/s) for leatherback turtles (Wyneken 2001). In addition, only juvenile and adult sea turtles would be present in the Project area and they would also be capable of outswimming the seawater intake. No measurable direct impacts on sea turtles would be expected to occur as a result of seawater intake associated with the Project.

Indirect, adverse impacts of seawater intake on sea turtles would primarily be associated with the impingement or entrainment of marine organisms. Impingement would occur if organisms became trapped against the seawater intake screens; entrainment would occur if small marine organisms (e.g., ichthyoplankton) were drawn into the seawater intake system. The mortality rate of all entrained organisms is conservatively assumed to be 100 percent. The entrainment and subsequent mortality of eggs, larvae, phytoplankton, and zooplankton would potentially impact the juvenile and hatchling sea turtles that feed on them. However, considering the overall availability of food in this area, these impacts would likely be immeasurable, if they occurred. Therefore, adverse impacts on sea turtles would be unlikely.

Long-term, minor, direct, adverse impacts on sea turtles would be expected to occur as a result of seawater intake associated with the Project.

Cooling water would be discharged at 10 °C (18 °F) above ambient seawater temperature. Modeling indicates that cooling water temperature would be 1 °C (1.8 °F) above ambient temperature within 100 m (328 feet) of the discharge. In compliance with NPDES permits, the cooling water discharge plume is not expected to reach the seafloor. An increase in temperature could result in adverse behavioral and physiological impacts. The main difference in comparison between sea turtles and marine mammals is that sea turtles are ectothermic (cold-blooded) animals and, thus, could potentially be more adversely affected by warmed seawater discharges from engine cooling. However, due to the localized nature of the discharges and dilution in the open ocean (MMS 2007c), it is unlikely that a threatened or endangered sea turtle would be within the discharge plume long enough for more than a minor impact to occur.

Most sea turtles would be expected to avoid the cooling water discharge during the summer months and be attracted to the cooling water during the winter months. There would be a marine growth prevention system on the SRV for ballast water treatment, but this system would not be used while at the buoy site. The effects of cooling water discharges would decrease water quality in a localized area but would be expected to dilute rapidly.

Long-term, minor, direct, adverse impacts on sea turtles would be expected to occur as a result of cooling water discharge associated with the Project.

Other Routine Discharges. Testing of the firefighting system associated with operation of the Port would comply with NPDES permit conditions. While SRVs are present at the Port, they would not discharge domestic waste, bilge water, or ballast water. In addition, on the SRVs, gutter bars would be replaced around equipment where oil leaks could occur (e.g., mooring winches, cranes). Rain water from these areas would be drained to a bilge holding tank. No rain water would be discharged overboard, from areas around equipment where oil leaks would occur, while at the buoy. The firewater system discharges consist of uncontaminated seawater from testing the firefighting system on the SRVs.

Based on the infrequent nature of the discharge, its short duration, and the lack of contaminants, impacts on sea turtles are expected to be short-term and minor.

Marine Debris. Sea turtles could be seriously injured or killed if they became entangled in or ingested construction debris or other materials accidentally released by SRVs moored at the Port, should that occur. Marine debris could also affect a sea turtle's ability to successfully migrate, feed, mate, or nest. The discharge and disposal of garbage and other solid debris from vessels by lessees is prohibited by the MMS (30 CFR 250.300) and the USCG (MARPOL Annex V, Public Law 100-220 [Statute 1458]) (33 CFR Part 151). The discharge of plastics, including ashes from burned plastics, is strictly prohibited and is therefore never authorized. All plastics must be returned to shore, and are tracked. These prohibitions on the discharge and disposal of garbage and other solid debris from vessels would be incorporated as enforceable conditions into the DWPA license. The USCG enforces MARPOL and the Deepwater Port License and fines or penalties could be assessed where laws and regulations are violated.

No food or garbage would be discharged into the sea. All such materials would be placed in proper containers and disposed of in accordance with applicable regulations. No wildlife would be fed or intentionally attracted to the SRVs or support vessels, and no fishing by crewmembers would be allowed. Given the relatively small potential for marine debris associated with the Project, measurable increases in sea turtle ingestion of or entanglement in debris would not be expected. Therefore, short-term, minor, direct, adverse impacts on sea turtles would be expected as a result of increased marine debris associated with routine Port operations.

Hydrocarbon Spills. A hydrocarbon spill associated with fuel and lubricating oil on the vessels could adversely affect sea turtles. Approximately 3 percent of annual south Florida sea turtle strandings are associated with oil spills. Oil spills in shipping lanes result in surface contamination along ocean tanker lanes and coastal areas. Like any living resource at risk, turtles are susceptible to a number of potential indirect impacts, which would generally be less obvious than short-term direct impacts such as mortality, but might ultimately cause more harm to populations. Dietary differences can potentially increase or decrease risk from hydrocarbon ingestion. Kemp's ridley and loggerhead turtles, for example, feed primarily on crustaceans and mollusks, which bioaccumulate petroleum hydrocarbons because they cannot efficiently clear contaminants from their bodies. Thus Kemp's ridleys and loggerheads might be at greater risk of exposure by ingesting food than leatherback turtles, which feed primarily on coelenterates. Trapped oil in sediments of intertidal beds of turtle grass (*Thalassia testudinum*) kills the seagrass, a significant component of green turtle diets. Decreases in invertebrates and sponge populations also affect hawksbills, loggerheads, and Kemp's ridleys (NOAA 2003).

There would be no ship-to-ship fuel oil transfer and the Port would operate under the provisions of an approved oil spill contingency plan. Vessels would be operated in compliance with all applicable spill prevention requirements and would have spill response plans. Short-term and long-term, minor, direct

and indirect, adverse impacts on sea turtles could result from a hydrocarbon spill associated with fuel and lubricating oil on the vessels.

LNG spills. The diving behavior of sea turtles puts them at risk in the unlikely event of an LNG spill. They rapidly inhale a large volume of air before diving and continually resurface over time. Adults doing this would experience extended physical exposure to the spill and prolonged exposure to vapors. Compared to hatchlings, however, juveniles and adults spend less time at the sea surface, which potentially reduces their chances of exposure (NOAA 2003). A release of natural gas would rise to the surface and dissipate. The pipeline would be monitored and be capable of being shut down in the event of a release. Pursuant to the USCG's deepwater port regulations, the USCG has prepared an Independent Risk Assessment to assess the risk and consequences of accidental and intentional events that compromise cargo containment.

Short-term, minor, direct, adverse impacts on sea turtles could result in the event of an LNG spill.

Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Therefore, impacts on sea turtles are expected to be reduced, although a specific timeline would be developed at the time of decommissioning and abandonment.

Impacts on sea turtles associated with the decommissioning of the project are expected to be similar to, but of less magnitude than, impacts during construction and installation activities. Short-term and long-term, minor, direct, and adverse impacts on MPAs would be expected during decommissioning of the project.

4.2.1.3.2 Alternatives

Table 4.2-9 compares impacts from the Proposed Action to each of the alternatives with respect to sea turtles.

Southern Site and Route Alternative. Construction, operation, and decommissioning impacts on sea turtles under the Southern Site Route Alternative would be similar to those under the Proposed Action.

Offshore Interconnection with Gulfstream Pipeline Alternative. Impacts on sea turtles would be less than the Proposed Action under this alternative. Under this alternative the pipeline would not come inshore because of the connection to the Gulfstream pipeline. Sea turtles generally inhabit shallow coastal waters and use the nearshore habitats for foraging, resting, and nesting. Therefore, construction, operation, and decommissioning impacts on sea turtles are expected to be minor under this alternative. Seafloor disturbance associated with pipeline disturbance under this alternative would be less in shallow coastal waters and would not occur in Tampa Bay. A more detailed description of seafloor disturbance under this alternative is described in detail under Benthic Resources. There would also be less of an impact of turbidity in shallow coastal waters associated with pipeline installation under this alternative. There would be no turbidity increases associated with pipeline installation in Tampa Bay under this alternative.

FSRU Port Design Alternatives. Construction, operation, and decommissioning impacts on sea turtles under the Southern Site Route Alternative would be similar to those under the Proposed Action. The FSRU unit itself would require one set of anchors, as opposed to two sets of anchors for the SRVs included in the proposed Project. Also, use of the FSRU would not require a flexible riser to be pulled off the bottom as the buoy is raised to mate with the SRV. These features would result in decreased seafloor disturbance and turbidity associated with mooring line sweep and raising and lowering of the buoy. The discharge associated with the FSRU alternative would be fresh water. This discharge would travel a longer distance as a thin layer; therefore, the impacts would be minor.

AAV Alternative. Construction, operation, and decommissioning impacts on threatened and endangered sea turtles under the AAV Alternative would be similar to those under the Proposed Action.

Suction Piles Anchoring Alternative. Potential noise impacts associated with pile driving on threatened and endangered sea turtles under the proposed anchoring method (driving piles) would not occur with the use of the Suction Piles Anchoring Alternative. The Suction Piles Anchoring Alternative would result in short-term, minor impacts on threatened and endangered sea turtles, which is similar to the Proposed Action, but substantially less than the Proposed Action because the noise that would be produced by installation of the piles would be substantially lower.

No Action Alternative. The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In

addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, no direct or indirect adverse impacts on sea turtles would be expected.

Table 4.2-9. Sea Turtle Impacts Summary

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnection Alternative	FSRU Design Alternative	AAV Alternative	Suction Pile Anchoring Alternative
Pipeline construction	Minor, short-term, adverse impacts along pipeline route as a result of seafloor disturbance, turbidity, hydrostatic testing, vessel traffic, noise, entanglement, and lighting; long-term impacts due to loss of habitat from seafloor disturbance.	Short-term impacts comparable to Proposed Action; somewhat higher long-term impacts (longer route).	Short-term impacts comparable but lower than Proposed Action (no impacts nearshore); lower long-term impacts (shorter route).	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.
Port construction	Minor, short-term, adverse impacts in vicinity of Port as a result of seafloor disturbance, turbidity, vessel traffic, noise, lighting, and entanglement,; long-term impacts due to loss of habitat from seafloor disturbance.	No difference from Proposed Action.	No difference from Proposed Action.	Short-term impacts comparable to Proposed Action; lower long-term impacts (less anchors and no flexible riser).	No difference from Proposed Action.	Short-term impacts lower than Proposed Action (lower noise levels).
Operation of Port	Minor, short-term, adverse impacts in vicinity of Port as a result of routine discharges, marine debris, and potential LNG/hydrocarbon spills; long-term impacts due to seafloor disturbance, turbidity, vessel traffic, noise, entanglement, lighting, seawater intake and discharge, and potential LNG/hydrocarbon spills.	No difference from Proposed Action.	No difference from Proposed Action.	Short-term impacts comparable to Proposed Action; higher long-term impacts (cool freshwater discharge).	Short-term impacts comparable to Proposed Action; higher long-term impacts (higher seawater intake and discharge).	No difference from Proposed Action.
Decommission of Port	Minor, short-term and long-term, adverse impacts in vicinity of Port are similar to but lower than port construction impacts.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.

Note: Under the No Action Alternative none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur. No direct or indirect impacts on biological resources would be anticipated.

4.2.1.4 Threatened and Endangered Coastal and Marine Birds

4.2.1.4.1 Proposed Action

The Project area is inhabited by a diverse assemblage of resident and migratory birds, including seabirds, shorebirds, wetland birds, and waterfowl including six endangered or threatened bird species identified in **Table 4.2-10**. Of these species, only the piping plover (*Charadrius melodus*), listed as threatened, and wood stork (*Mycteria americana*), listed as endangered, are known to inhabit or frequent coastal areas and waters of the inner continental shelf where project activities would be located, and thus the other four species listed in **Table 4.2-10** would not be affected by project activities.

Table 4.2-10. Federally Listed Birds in Hillsborough, Manatee, Pinellas Counties, Florida

Common Name	Scientific Name	Federal Status
Audubon's Crested Caracara	*Polyborus plancu audubonii*	Threatened
Bald Eagle	*Haliaeetus leucocephalus*	Threatened
Florida Scrub-jay	*Aphelocoma coeruluscens*	Threatened
Piping Plover	*Charadrius melodus*	Threatened, critical habitat
Red-cockaded Woodpecker	*Picoides borealis*	Endangered
Wood Stork	*Mycteria americana*	Endangered

Source: USFWS 2007a

Only three piping plover individuals have been recorded within the St. Petersburg survey area last year; none within the Alafia Banks Sanctuary, the Tampa survey area, or the Bradenton survey area (Audubon Society 2007). Critical habitat for wintering piping plovers is designated on Egmont Key in Hillsborough County (66 FR 36038 36086). Although foraging wood storks were observed in the Project area during the October–November 2007 field surveys, rookeries are not known within or adjacent to the proposed construction area (Port Dolphin 2007b). Impacts of installation, operations, and decommissioning on threatened and endangered birds are summarized in **Table 4.2-11** (see **Section 4.2.1.4.2**).

Construction

Vessel Traffic. Traffic increases associated with construction would be short-term and temporary. Approximately 1,800 vessel trips are anticipated during the construction of Port Dolphin (within 11 months). Vessel traffic could result in degraded water quality and disturbance of foraging/reproductive activity. Disturbance often curtails breeding success; excessive disturbance can cause individuals to desert the nest, exposing eggs or chicks to the elements and predation. Interrupted feedings can stress juvenile birds during critical periods in their development (USFWS 2007c). The Project area is a busy Port with vessel traffic. Foraging wood storks in the Project area are currently exposed to vessel traffic. The Proposed Route is approximately 1,750 m (5,742 feet) south Egmont Key NWR, which is designated as critical habitat for wintering piping plovers.

Short-term, minor, direct and indirect, adverse impacts would be expected as a result of increased vessel traffic generated by construction.

Noise. Localized, short-term increases in noise associated with construction could potentially affect coastal birds. The level of impact would vary depending on the bird species, type of vessel or machinery, vessel speed, relative noise level, distance, frequency, and season (MMS 2002b). During Project

installation, increased noise levels could temporarily displace coastal and marine birds from commonly used feeding or resting areas, but displaced birds would be expected to return shortly after construction ceased. During construction, increased noise levels could temporarily displace foraging wood storks and piping plover, but displaced individuals would be expected to return shortly after construction ceased. The lay barge and support vessels move very slowly down the pipeline corridor during installation activities to decrease the level of disturbance from wakes. Any local noise ordinances would also dictate construction work hours in this area. Animals, in general, tend to become less sensitive to those types of noise and disturbance to which they are repeatedly exposed (Richardson et al. 1995). Because the Proposed Action occurs in a busy Port, wood storks and piping plovers would be expected to have adapted to the variety of noise levels associated with Port Manatee and local industry. Therefore, impacts on wood storks and piping plovers would be negligible.

Short-term, minor, direct and indirect, adverse impacts on wood storks could occur as a result of noise associated with construction.

Lighting. The use of lights on construction and support vessels would be short-term, temporary, and transient. The use of solid or pulsating red lights would be avoided, and all vessel lights would be downshielded to minimize visibility to birds above. Construction activities would be performed to avoid sensitive areas during bird nesting season, to the extent practicable. In North Florida these birds are more numerous in summer than in winter, indicating a fall migration to South Florida (FWC 2003).

Long-term, minor, direct, adverse impacts on threatened and endangered coastal and marine birds would be expected to occur as a result of lighting used during routine Port operations.

Operations

Vessel Traffic. Traffic increases associated with routine Port operations would be minor compared to the total vessel traffic in the Project area (see **Section 3.10.2**). Proposed vessel routes would avoid sensitive receptors (e.g., bird colonies) to the extent feasible and the Applicant has committed to limiting the number of vessel trips as much as possible. These restrictions would be mandated on all vessels, except when USCG regulations or safety precautions supersede them. Use of proposed vessel routes would reduce physical contact; therefore, impacts on threatened and endangered coastal and marine birds would be negligible. Therefore, SRVs and support vessels in transit to and from the Port could result in long-term, minor, direct, adverse impacts on threatened and endangered coastal and marine birds.

Noise. Noise created by SRVs and support vessels in transit to and from the Port would be continuous, yet transient, for short periods of time. Animals, in general, tend to become less sensitive to those types of noise and disturbance to which they are repeatedly exposed (Richardson et al. 1995). Because the construction activities, associated with the Proposed Action, occur in a busy Port and shipping channel, wood storks and piping plovers would be expected to have adapted to the variety of noise levels associated with Port Manatee and local industry.

Long-term, minor, direct, adverse impacts on threatened and endangered coastal and marine birds could occur as a result of the noise created during routine Port operations.

Lighting. Lighting aboard SRVs would be low, and all lights would be installed and utilized in accordance with USFWS guidelines designed to reduce migratory bird impacts (USFWS 2000). The use of solid or pulsating red lights would be avoided, and all vessel lights would be downshielded to minimize visibility to birds above.

Long-term minor, direct, adverse impacts on wood storks would be expected to occur as a result of lighting.

Seawater Intake and Cooling Water Discharge. Seawater intakes would be below the sea surface, which would preclude birds from being entrained or impinged. Cooling water would be discharged at 10 °C (18 °F) above ambient seawater temperature. Due to dilution in the open ocean and because the cooling water plumes compose a relatively small localized area, impacts are expected to be negligible.

Negligible impacts on wood storks would occur as a result of seawater intake and cooling water discharges associated with the Project.

Other Routine Discharges. Routine discharges from project-related vessels (i.e., grey water) would have an effect on water quality and therefore an indirect effect on birds. Due to dilution in the open ocean and because the discharges would be localized, impacts on threatened and endangered birds are expected to be negligible.

Marine Debris. Wood storks foraging in the Project area could be seriously injured or killed if they became entangled in or ingested construction debris or other materials accidentally released by SRVs moored at the Port. Marine debris could also affect a bird's ability to successfully migrate, feed, mate, or nest. The discharge and disposal of garbage and other solid debris from vessels by lessees is prohibited by the MMS (30 CFR 250.300) and the USCG (MARPOL Annex V, Public Law 100-220 [Statute 1458]) (33 CFR Part 151). The discharge of plastics, including ashes from burned plastics, is strictly prohibited and is therefore never authorized. All plastics must be returned to shore, and are tracked. These prohibitions on the discharge and disposal of garbage and other solid debris from vessels would be incorporated as enforceable conditions into the DWPA license. The USCG enforces MARPOL and the Deepwater Port License and fines or penalties could be assessed where laws and regulations are violated.

In addition, no food or garbage would be discharged into the sea. All such materials would be placed in proper containers and disposed of in accordance with applicable regulations. No wildlife would be fed or intentionally attracted to the SRVs or support vessels, and no fishing by crewmembers would be allowed. Given the relatively small amount of marine debris associated with the Project, major increases in coastal and marine bird ingestion of or entanglement in debris would not be expected. The relatively small amount of marine debris potentially generated at the Port, along with required avoidance measures would result in minor, adverse impacts on threatened and endangered coastal and marine birds.

Therefore, short-term, minor, direct, adverse impacts on wood storks and piping plovers would be expected as a result of marine debris associated with the Project.

Hydrocarbon Spills. The impacts of hydrocarbons on wood storks and piping plovers are caused by the physical and chemical nature of the spill, by clean-up operations, or indirectly through physical damage to the foraging habitats in the Project area. There would be no ship-to-ship fuel oil transfer and the Port would operate under the provisions of an approved oil spill contingency plan. Vessels would be operated in compliance with all applicable spill prevention requirements and would have spill response plans. Short-term to long-term, minor, direct and indirect, adverse impacts on wood storks and their habitat could result from the unlikely occurrence of a hydrocarbon spill.

LNG Spills. Potential impacts would include exposure to low-temperature LNG at the water surface, possibly resulting in frostbite or death, and asphyxiation by natural gas vapors above the surface of the water. These impacts would likely occur in the immediate vicinity of the spill location; the timeframe of the impact is limited. Since LNG does not dissolve in water, the timeframe for these potential impacts would be limited, and no adverse toxic impacts would be expected after the LNG boiled off and the

vapors dispersed. Because of the low temperatures in the vicinity of the spill, coastal and marine birds would be expected to avoid the area. Because wood storks and piping plovers would be located inshore, LNG spills would not be likely to adversely affect listed coastal and marine bird species.

Short-term to long-term, minor, direct, adverse impacts on threatened and endangered coastal and marine birds could occur in the unlikely event of an LNG spill.

Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Therefore, impacts on threatened and endangered coastal and marine birds are expected to be reduced, although a specific timeline would be developed at the time of decommissioning and abandonment.

Short-term, minor to moderate, direct and indirect, adverse impacts on threatened and endangered coastal and marine birds could occur during Project decommissioning.

4.2.1.4.2 Alternatives

Table 4.2-11 compares impacts from the Proposed Action to each of the alternatives with respect to threatened and endangered coastal and marine birds.

Southern Site and Route Alternative. Construction, operation, and decommissioning impacts on threatened and endangered coastal and marine birds under the Southern Site Route Alternative would be similar to those under the Proposed Action.

In comparison with the Proposed Route, the Southern Route Alternative is closer to Passage Key and farther from Egmont Key (see **Figure 3-1 of Appendix G, Biological Assessment**). This results in negligible impacts on the wintering piping plover population at Egmont Key NWR.

Offshore Interconnection with Gulfstream Pipeline Alternative. Impacts on threatened and endangered coastal and marine birds would be less than the Proposed Action under this alternative. Under this alternative the pipeline would not come inshore because of the connection to the Gulfstream pipeline. Wood storks and piping plovers are found in wetland and coastal habitats respectively and thus would not be impacted under this alternative. Seafloor disturbance associated with pipeline disturbance under this alternative would be less in shallow coastal waters and would not occur in Tampa Bay. A more detailed

description of seafloor disturbance under this alternative is described in detail under Benthic Resources. There would also be less of an impact of turbidity in shallow coastal waters associated with pipeline installation under this alternative. There would be no turbidity increases associated with pipeline installation in Tampa Bay under this alternative. Therefore, no construction, operation, and decommissioning impacts on threatened and endangered coastal and marine birds would be expected under this alternative.

FSRU Port Design Alternatives. Construction, operation, and decommissioning impacts on threatened and endangered coastal and marine birds under the FSRU Port Design Alternative would be similar to those under the Proposed Action. The discharge associated with the FSRU alternative would be fresh water. This discharge would travel a longer distance as a thin layer; therefore, the impacts would be minor.

AAV Alternative. Construction, operation, and decommissioning impacts on threatened and endangered coastal and marine birds under the AAV Alternative would be similar to those under the Proposed Action.

Suction Piles Anchoring Alternative. Construction, operation, and decommissioning impacts on threatened and endangered coastal and marine birds under the Suction Piles Anchoring Alternative would be similar to those under the Proposed Action.

No Action Alternative. The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, no direct or indirect impacts on threatened and endangered coastal and marine birds would be expected.

Table 4.2-11. Threatened and Endangered Coastal and Marine Birds Impacts Summary

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnect Alternative	FSRU Design Alternative
Pipeline construction	Minor, short-term, adverse impacts along pipeline route as a result of vessel traffic and noise.	Short-term impacts slightly lower than Proposed Action (route farther from Egmont Key wintering plovers).	Short-term impacts lower than Proposed Action (shorter route and no nearshore impacts).	No difference from Proposed Action.
Port construction	Minor, short-term, adverse impacts in the vicinity of the Port as a result of vessel traffic and noise.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.
Operation of Port	Minor, short-term, adverse impacts due to marine debris and potential LNG/hydrocarbon spills; long-term impacts due to vessel traffic, noise, lighting, and potential LNG/hydrocarbon spills.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.
Decommission of Port	Minor, short-term and long-term, adverse impacts in vicinity of Port are similar to but lower than port construction impacts.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.

Notes:

1. Under the No Action Alternative none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur. No direct or indirect impacts on biological resources would be anticipated.
2. The AAV and Suction Pile Anchoring Alternatives were carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.2.1.5 Threatened and Endangered Fish Species

4.2.1.5.1 Proposed Action

The threatened and endangered fish species that occur in the project area are presented in **Table 4.2-12.** Smalltooth sawfish are expected to be rare in the terminal area and offshore areas of the pipeline, but would have a greater likelihood for interaction in the shallower, nearshore areas of the pipeline. However, smalltooth sawfish occurrence in the nearshore pipeline installation area is expected to be sporadic (NMFS 2009) (see **Section 3.2.4.4**). Gulf sturgeon are expected to be rare in both the terminal and Pipeline areas (see **Section 3.2.4.4**). Additionally, critical habitat for smalltooth sawfish is greater than 40 NM from the Project area and critical habitat for Gulf sturgeon is greater than 90 NM from the Project area.

Table 4.2-12. Federally Listed Fish Species in the Vicinity of the Project

Common Name	Scientific Name	ESA status
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	Threatened
Smalltooth sawfish	*Pristis pectinata*	Endangered

Construction

Short-term, minor, direct, adverse impacts on smalltooth sawfish and Gulf sturgeon could occur as a result of seafloor disturbance, turbidity, hydrostatic test water intake and discharge, noise, entanglement, and lighting. Seafloor disturbance could degrade potential smalltooth sawfish habitat (primarily mud or soft-bottom sediments) during construction in the inshore pipeline area. However, smalltooth sawfish occurrence in the inshore pipeline installation area is expected to be sporadic (NMFS 2009). Proper design and implementation of BMPs and mitigation are expected to be effective in reducing the magnitude and extent of impacts resulting from construction activities and therefore, the impact on smalltooth sawfish and Gulf sturgeon. However, the performance of the measures should be monitored during construction to verify their effectiveness.

Operation

Smalltooth sawfish and Gulf sturgeon inhabit coastal and inshore waters (NMFS 2009, USFWS 2004). Additionally, because smalltooth sawfish (which only occurs in the Everglades with any regularity) and Gulf sturgeon (recent sightings are limited to Alabama, Mississippi, and the Florida panhandles) are expected to be uncommon in offshore areas (see **Section 3.2.4.4**). As such, smalltooth sawfish and Gulf sturgeon are expected to be rare in the STL buoy area. Therefore, no adverse impacts on smalltooth sawfish or Gulf sturgeon would occur as a result of the operation of the Port.

Decommissioning

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action. Decommissioning activities would result in restrictions similar to those described for the construction process. Due to the in-place abandonment procedures for the pipeline, decommissioning activities are anticipated to take less time than construction. Smalltooth sawfish and Gulf sturgeon inhabit coastal and inshore waters (NMFS 2009, USFWS 2004). Additionally, because smalltooth sawfish (which only occurs in the Everglades with any regularity) and Gulf sturgeon (recent sightings are limited to Alabama, Mississippi, and the Florida panhandles) are expected to be uncommon in the offshore areas (see **Section 3.2.4.4**). As such, smalltooth sawfish and Gulf sturgeon are expected to be rare in the STL buoy area. Impacts associated with decommissioning would occur mostly in the STL buoy area because various Port components (e.g., anchor chains, unloading buoys, and piles) would be removed and retrieved. No explosives would be used for the removal of these components.

Impacts along the pipeline route would not be expected. The ends of the pipeline would be capped, filled, and left in place (subject to the terms of negotiated land lease conditions). Therefore, no adverse impacts on smalltooth sawfish and Gulf sturgeon would occur as a result of decommissioning.

4.2.1.5.2 Alternatives

Table 4.2-13 compares impacts from the Proposed Action to each of the alternatives with respect to threatened and endangered fish species.

Southern Site and Route Alternative. Construction, operation, and decommissioning impacts on smalltooth sawfish and Gulf sturgeon under the Southern Site Route Alternative would be similar to those under the Proposed Action.

Offshore Interconnection with Gulfstream Pipeline Alternative. Impacts on smalltooth sawfish and Gulf sturgeon would be less than the Proposed Action under this alternative. Under this alternative, the pipeline would not come inshore because of the connection to the Gulfstream pipeline. The connection would occur approximately 16 km (10 mi) from the mouth of Tampa Bay, in water depth of 6 m (20 feet). Seafloor disturbance associated with pipeline disturbance under this alternative would be less in shallow coastal waters and would not occur in Tampa Bay. A more detailed description of seafloor disturbance under this alternative is described in detail under Benthic Resources. There would also be less of an impact of turbidity in shallow coastal waters associated with pipeline installation under this alternative. There would be no turbidity increases associated with pipeline installation in Tampa Bay under this alternative. Smalltooth sawfish and Gulf sturgeon inhabit coastal and inshore waters (NMFS 2009, USFWS 2004). Additionally, smalltooth sawfish (which only occurs in the Everglades with any regularity) and Gulf sturgeon (recent sightings are limited to Alabama, Mississippi, and the Florida panhandles) are expected to be uncommon in the Project area (see **Section 3.2.4.4**). Therefore, no construction, operation, and decommissioning impacts on smalltooth sawfish and Gulf sturgeon would be expected under this alternative.

FSRU Port Design Alternatives. Construction, operation, and decommissioning impacts on smalltooth sawfish and Gulf sturgeon under the FSRU Port Design Alternative would be similar to those under the Proposed Action.

AAV Alternative. Construction, operation, and decommissioning impacts on threatened and endangered fish species under the AAV Alternative would be similar to those under the Proposed Action.

Suction Piles Anchoring Alternative. Potential noise impacts associated with pile driving on threatened and endangered fish species under the proposed anchoring method (driving piles) would not occur with the use of the Suction Piles Anchoring Alternative. However, it should be noted that threatened and endangered fish species are found in nearshore areas, and thus are not likely to be in the area affected by pile driving. Therefore, although the use of the Suction Piles Anchoring Alternative would be substantially less noisy than the proposed driven piles, the potential impacts on threatened and endangered fish species are likely to be the same (minor and short-term) for both alternatives because Federally-listed fish species are not expected to be in the proposed port area.

No Action Alternative. The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated

pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, no direct or indirect impacts on smalltooth sawfish and Gulf sturgeon would be expected. Alternative sources of natural gas might include other Deepwater LNG Ports or onshore LNG terminals. Other Deepwater LNG Ports might have impacts on smalltooth sawfish and Gulf sturgeon that are similar to the Port Dolphin system but in a different geographic location. Onshore LNG terminals would be located in coastal areas where there could be a higher chance of impacting these species; however, it would depend on the location.

Table 4.2-13. Threatened and Endangered Fish Species Impacts Summary

Impact	Proposed Action	Offshore Interconnect Alternative
Pipeline construction*	Minor, short-term, adverse impacts along pipeline route as a result of seafloor disturbance, turbidity, hydrostatic testing, and noise.	Short-term impacts lower than Proposed Action (shorter route and no nearshore impacts).

Notes:

* Only impacts associated with pipeline construction are presented in the table because the T&E fish species are not expected to occur in the offshore Project area.

1. Under the No Action Alternative none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur. No direct or indirect impacts on biological resources would be anticipated.
2. The Southern Site and Route, AAV, FSRU Port Design, and Suction Piles Alternatives were carried forward but not presented in the table because there were no differences from the construction of the Proposed Action. Impacts of these alternatives are similar to the Proposed Action in the inshore waters of Tampa Bay, which is where the Gulf sturgeon and smalltooth sawfish have the potential to occur.

4.2.1.6 Benthic Resources

4.2.1.6.1 Proposed Action

Construction

Seafloor Disturbance. Approximately 9,972 acres of soft-bottom and hard-bottom benthic habitat would be directly impacted from pipeline installation, buoy anchor installation, and anchoring impacts of

construction vessels along the construction pathway. A detailed description of the direct impact of each activity that would disturb the seafloor is presented in **Table 4.2-14**.

Table 4.2-14. Estimate Extent of Direct Impacts on Benthic Habitats for the Proposed Location and Route

Activity	Habitat Type Affected (acre)*				
	Soft Bottom	Hard Bottom			Total
		Type A	Type B	Type D	
Construction					
STL Subsea System – barge anchoring	0.11	0.00	0.06	0.00	0.17
Pipeline installation – plowing	207.13	15.48	38.52	55.72	316.85
Pipeline installation – mattress placement	8.60	0.00	4.43	0.00	13.03
Clamshell/dragline	1.28	0.24	0	0	1.52
Anchoring	18.57	1.61	4.63	2.75	27.56
Anchor cable sweep	5,989.69	519.62	1,497.20	885.35	8,891.86
Total	**6,225.38**	**536.95**	**1544.84**	**943.82**	**9,250.99**
Operation					
STL Landing Pad	0.26	0.00	0.00	0.00	0.26
PLEM	0.04	0.00	0.00	0.00	0.04
Anchors/piles	0.10	0.00	0.04	0.00	0.14
Concrete mattresses along pipeline route	8.60	0.00	4.43	0.00	13.03
Anchor sweep (STL buoy)	15.71	0.00	6.39	0.00	22.1
Total	**24.71**	**0**	**10.86**	**0**	**35.57**
Decommissioning					
STL subsea system removal	0.26	0	0.00	0	0.26
Accidents or Upsets					
Accidental release of drilling muds could cover benthos	**	**	**	**	**

Source: Port Dolphin 2008a

Notes: Initial surveys were conducted between 17 August and 14 December 2006. After consultation with Florida Fish and Wildlife Conservation Commission, additional surveys for nearshore routes were resurveyed between 16 September and 19 October 2007.

* Note that this table includes direct impacts on benthic habitat only and does not include indirect impacts such as sediment drape associated with resuspended sediments.

** This impact is not quantifiable at this time. Type A = 20–100 percent cover by epibenthic biota or hard bottom with greater than or equal to 0.25 m (0.8 feet) in relief, inclusive of sand components integral to these habitats. EFH, Habitat Area of Particular Concern; Type B = 5–20 percent cover by attached epibenthic bio or hard bottom with less than .25 m (0.8 feet) in relief, inclusive of sand components integral to these habitats. EFH, Habitat Areas of Particular Concern; Type C = Breakwater spoil area; EFH, Habitat Area of Particular Concern; Type D = Sand (Soft Substrate/Sedimentary Habitat) in proximity to reef/hard-bottom resources, a sandy veneer over hard substrate with less than 5 percent epibenthic coverage, EFH.

Table 4.2-14 includes a conservative estimate of direct construction installation anchoring impacts (associated with pipelaying, plowing, and backfilling); therefore, impacts are expected to be less than calculated. Additionally, many aspects of the anchor sweep calculations are conservative. Consequently, impacts are likely to be less than calculated. Further reductions could be possible depending on prevailing field and operational conditions. For example:

- A relatively large ratio of anchor wire length to water depth (sometimes known as the anchor "scope") has been conservatively assumed in the ratio range of about 20 to 50. The "scope" could be reduced with judicious anchor placement, subject to detailed route engineering (see Applicant Proposed BMPs in **Section 4.11.1**).
- There is some degree of overlapping (redundancy) in the swept area calculations between anchor resetting positions, which has not been accounted for in the results. Specifically, as the barge moves along the route, some of the swept areas would be locations that have already have been swept and thus are "double-counted."
- There would most likely be a degree of overlapping (redundancy) of seafloor impact areas between the different passes (pipelaying, plowing, and backfilling), which has not been accounted for in the final results presentation. With judicious anchor placement on each pass this could represent a substantial impact area that is being "double-counted."

Plans for installation of the STL buoy and the pipeline have been developed to minimize impacts on hard and live bottom, as well as sand resources and the Terra Ceia AP (Port Dolphin 2008b). The estimated linear extent of each pipeline burial technique is presented in **Table 4.2-15**. Approximately 87 percent of the pipeline would be plowed. Some of the plowed areas might require additional rock armoring if the required installation depth cannot be achieved. These plans include the use of midline buoys to minimize anchor sweep during pipeline installation.

Table 4.2-15. Estimated Linear Extent of Pipeline Burial Techniques

Burial Technique	Proposed Pipeline Route
Plowing/trenching	62,787 m (205,997 feet)*
Concrete mattress/rock armoring	8,656 m (28,398 feet)
Clamshell dredging/dragline burial	336 m (1,104 feet)
Horizontal directional drilling (HDD)	2394 m (7,854 feet)
Total length	74,174 m (243,353 feet)
Total length excluding HDD segments	71,780 m (235,499 feet)
Plowing/trenching / total non-HDD length	87%

Source: Port Dolphin 2008d

Note:

* Includes an estimated 23,316 m (76,500 feet) that might not achieve the design depth and could require concrete mattresses or rock armoring.

Approximately 6,225 acres of soft-bottom/sand habitat and approximately 3,026 acres of hard- and live-bottom habitat would be directly affected by installation of the Proposed Port and Route Alternative. Current data indicate seagrass beds are not present at the HDD exit location, but do occur 23 m (75 feet) to the southwest. Because seagrass beds are dynamic, a thorough seagrass survey would be conducted prior to construction to determine the current status and location of seagrass in the area of HDD exit location (Port Dolphin 2007b).

About 96 percent of the total impact area would be due to anchor sweep. Of the total hard- and live-bottom habitats affected, about 18 percent would be Type A (20 to 100 percent cover by attached epibentic biota or hard bottom with greater than or equal to 0.3 m (0.8 feet) in relief, inclusive of sand components), 51 percent Type B (5 to 20 percent cover by attached epibentic biota or hard bottom with greater than or equal to 0.3 m (0.8 feet) in relief, inclusive of sand components), and 31 percent Type D

(sand [soft substrate/sedimentary habitat] in proximity to reef/hard-bottom resources, a sandy veneer over a less than 5 percent epibenthic coverage). In areas of Type A and B habitats, the substrate, as well as the organisms attached to it, could be damaged by anchor cable sweep. In Type D areas, there would be no anchor cable damage to emergent hard substrate, as the cables are assumed to sweep the top few inches of the seafloor. However, depending on the thickness of the sand veneer, some organisms might be attached to the underlying hard substrate and could be dislodged by the anchor cable. Overall, the damage to hard- and live-bottom communities due to anchor sweep in Type D areas is considered less severe than impacts on Type A and B habitats.

Indirect impacts associated with plowing would result in the resuspension of coarse-grained sediments and result in resettled sediments (also known as a sediment drape) within immediately adjacent areas. Resettled sediments are considered an indirect seafloor disturbance. Impacts of sediment drape on soft bottom would be short-term. Impacts of sediment drape on hard bottom would be long-term. Inside Tampa Bay, tidal currents and winds are the predominant forcing mechanisms for distribution of sediments while offshore currents, parallel to the coast, drive the transport of suspended sediments. Turbidity modeling (SSFATE) indicates that, as a result, fast settling rates are expected and the coarse sediments along the pipeline route would remain close to the source of disturbance (ASA 2008). The maximum deposit thickness associated with plowing, which would account for burial of 87 percent of the pipeline is expected to range from 1 mm at approximately 300 meters from the source to approximately 5 mm at the source. The deposit thickness associated with the clamshell dredge, which would account for burial of less than 1 percent of the pipeline is expected to range from 0 to 2 mm (0 to 0.08 inches) up to 120 m (394 feet) from the source. The deposit thickness associated with the HDD excavation, is expected to range from 0 to 5 mm (0 to 0.20 inches) up to 180 m (591 feet) from the source. If drilling muds are accidentally discharged during HDD, deposition thickness would be less than 1 mm. The extent of the maximum deposit would be limited to a narrow line along the pipeline route for pipeline burial or to a small area around the excavation of the HDD exit holes.

Soft-bottom substrates and the associated benthic community could recover in days to weeks. Santos and Simon (1980) observed that recolonization of soft sediments in Tampa Bay was initiated in a month following disturbance. Therefore, direct and indirect impacts on soft bottom would be minor and short-term.

Impacts such as pile driving into hard bottom or the laying of pipelines and concrete mattresses on limestone outcroppings and other hard-bottom relief features would be permanent. The substrates that replace the limestone outcropping would be recolonized. If soft substrates replace hard bottom the new habitat would be replaced with opportunistic organisms. If hard substrate replaces hard bottom, the new substrate would be quickly recolonized with epifauna such as corals and sponges. However, given the slow growth rates of these species it would take several years for species composition and density to rebound to pre-construction levels. Additionally, the structural component of the habitat would be reduced because the biota such as corals, sponges, and algae provide structure for juvenile and adult fish and shellfish species in this low relief habitat (Auster and Langton 1998). Typically, invaded habitats have low natural diversity, including area of anthropogenic disturbance (Ray 2005). The introduced Asian green mussel and possibly an introduced tunicate have been identified along the pipeline route in Tampa Bay (Port Dolphin 2007d). These could recolonize disturbed hard bottom and possibly outcompete other hard-bottom species in disturbed areas (Ray 2005). In the offshore areas, patches of paddlegrass would be affected by trenching of the pipeline. Although patches of paddlegrass would be completely disturbed or uprooted, these impacts would not be long-term, or permanent. Paddlegrass is an annual seagrass species which regrows each year; therefore locations of paddlegrass areas are very dynamic in nature (Hammerstrom et al. 2006, Dawes and Lawrence 1989). Paddlegrasses would be impacted in depths of 12 to 15 m (40 to 50 feet). No direct impacts on inshore seagrass beds would be expected because the pipeline would be installed using HDD in this area. All seagrass beds, including all

species of submerged aquatic vegetation, are protected under Section 404 of the CWA. Therefore, mitigation for all impacts on seagrass or macroalgae would be required.

Seafloor disturbance could also occur as a result of resettling of suspended sediments during installation and construction of the Proposed Port Site and Route Alternative. Redeposited sediments would potentially reduce viability of demersal fish eggs, growth and reproduction of benthic organisms, and survival rates of benthic organisms. In extreme cases, resettled sediments could smother benthic organisms, although many benthic invertebrates would be able to burrow vertically through resettled sediments (Berry et al. 2003). Redeposited sediments could also cover macroalgae and seagrass beds, causing a reduction in photosynthesis and possible mortality to these species as well. Effects of burial are dependent on sediment type, depth of sediment, and the size and behavior of infaunal or epifaunal organisms (including the species' ability to burrow and species' mobility) (SCDNR 1995). In laboratory experiments, most estuarine infaunal species were able to survive burial to depths of 20 cm (7.8 inches) or more. Epifaunal or sessile species (organisms attached to the substrate) suffer higher mortality rates after burial however (SCDNR 1995). Macrofaunal assemblages living deep 2 to 15 cm (0.79 to 5.9 inches) within the sediment were generally slower to recover than those found in the top 2 cm (0.79 inches) (Thrush et al. 2003). Mortality during sedimentation has been found to depend on a species' ability to burrow through redeposited sediments and the rate at which sediment is deposited (IMG 2004). High levels of sedimentation could also impact hard bottom by reducing colonization of hard-bottom organisms by covering potential substrate and burying newly settled juveniles (IMG 2004). Areas where hard bottom is replaced by soft sediments are expected to be recolonized by more opportunistic species, such as polychaetes. Santos and Simon (1980) indicate that in the Tampa Bay region, initial colonizers following natural and artificial defaunations include polychaetes such as *Streblospio benedicti*, *Mediomastus californiensis*, *Diopatrea cuprea*, *Nereis succinea*, *Gyptis vittata*, and *Parahesione vittata*; mollusks such as *Mulinia lateralis*; turbellaria (a class of flatworms) such as *Stylochus* sp.; various Harpactacoid copepods; various amphipods; and various cumaceans. Invasive species could also colonize areas where hard bottom has been replaced by soft bottom. Typically, invaded habitats, including areas of anthropogenic disturbance, have low natural diversity (Ray 2005). The introduced Asian green mussel and possibly an introduced tunicate have been identified along the pipeline route in Tampa Bay (Port Dolphin 2007d). These could recolonize disturbed hard bottom and possibly outcompete other hard-bottom species in disturbed areas (Ray 2005).

The maximum expected deposit thickness associated is 5 mm (depending on the pipeline burial method). Sediment thickness tapers off to less than 2 mm within about 50 to 200 m (164 to 656 feet) from the source for most of the seafloor deposits. While the total area receiving sediment deposits of 2-mm thickness could be several times greater than the area directly affected by trenching as noted above, the areas receiving the thickest accumulations would be close to the trench—essentially the same areas directly affected by the plowing or dredging per se. These are predominantly soft-bottom areas since such areas are amenable to plowing or dredging. No measurable sediment accumulation on seagrasses is predicted (Port Dolphin 2008a). As stated above, seagrass beds are dynamic and a thorough seagrass survey would be conducted prior to construction to determine the current status and location of seagrass both in deeper waters and in the area of HDD exit location (Port Dolphin 2007b). In areas that cannot be plowed, the pipeline would be covered with concrete mattresses (or similar armoring). The width of seafloor affected by mattresses is estimated to be 4 m (13 feet). Approximately 5.2 hectares (13 acres) would be affected by concrete mattresses. About 44 percent would be hard- and live-bottom habitats, and the remaining 56 percent would be soft bottom. In hard- and live-bottom areas, the result would be replacement of the natural hard substrate by a low-relief, relatively smooth concrete covering. The mattresses are expected to eventually be colonized by epibiota and fishes. The mattresses or other armoring would not mimic the complex physical structure of the original hard substrate. The climax community on the artificial substrate would not match the hard bottom it replaces. However, the material would be similar to artificial reefs that have been constructed in various areas including the west Florida

shelf (Dodrill 2007). The impacts from sediment deposition resulting from pipeline construction on hard-bottom communities would be minor, short-term, and adverse.

Concrete mattresses would also be placed in some soft-bottom areas (e.g., where plowing is not feasible due to curvature of the route). In these areas, the existing soft-bottom substrate would be replaced with an artificial hard substrate. The existing soft-bottom benthic community at those locations would be crushed or buried.

Predicting recovery times of benthic communities following disturbance is complex and depends on (1) the timing, severity, and frequency of the impact; (2) the complexity of the habitat and the organisms that are being disturbed; and (3) the energy of the environment (Auster and Langton 1998). In soft-bottom/sand habitat, displaced organisms would return shortly after construction ceased, and disrupted communities would easily recolonize from surrounding communities of similar organisms. Santos and Simon (1980) observed that recolonization of soft sediments in Tampa Bay was initiated in a month following disturbance. The recovery of hard- and live-bottom habitat is expected to take longer, because it is a more complex community (Auster and Langton 1998). Hard-bottom assemblages in the area are composed of algae, sponges, scleractinian corals, octocorals, hydrozoans, and other sessile organisms. Most epifaunal groups colonize disturbed or newly open hard-bottom areas by settlement of planktonic larvae. Thus, the assembly of organisms on newly exposed hard-bottom areas can be highly variable and depend on life history characteristics of individual species coupled with local circulation patterns.

While recolonization usually begins soon after dredging ends, the process can range in duration from a few months for shallow dredging to years or decades (the latter for deep pits created by dredging borrow areas, which would not be relevant here). Recovery of soft-bottom communities in and along the pipeline trench would likely be faster than indicated by most studies of dredging impacts. Unlike typical dredging sites, the trench itself would be only 20.4 m (66.9 feet) wide, backfilled after being dredged, and accessible for recolonization from adjacent soft-bottom areas to either side all along its length.

In cases where hard-bottom habitat is converted to soft-bottom habitat due to sediment redeposition, a long-term shift in community structure would occur. Epifaunal species associated with hard bottom would be buried and infaunal species would recruit the soft-bottom habitat. In areas where hard-bottom habitat is being replaced by less complex hard structure of the Port, pipeline, and concrete mattresses, mobile organisms would be temporarily displaced from existing shelter, thereby exposing them to increased predation. Sessile organisms such as corals and sponges would be crushed. Similar organisms would recolonize the new hard-bottom habitat; however, because of the slow growth rates of these species, it would take up to several years for species composition and density to recover to pre-construction numbers.

In summary, short-term and long-term, minor to moderate, direct and indirect, adverse impacts on benthic communities would occur as a result of seafloor disturbance associated with construction.

Proper design and implementation of BMPs and mitigation would minimize impacts on benthic resources from seafloor disturbance from the construction of the pipeline.

Turbidity. Turbidity increases would cause mobile benthic organisms to temporarily disperse from or avoid the construction areas. However, displaced benthic infaunal organisms would likely recolonize the disturbed area within days after construction ceased (MMS 2002b). Direct impacts on sessile organisms would include abrasion; clogging or obstruction of respiratory organs and filter-feeding appendages; and interference with feeding, growth, or respiration (Berry et al. 2003). In extreme cases, resettled sediments could smother benthic organisms, although many benthic invertebrates would be able to burrow vertically

through resettled sediments (Berry et al. 2003). Increases in turbidity could also reduce photosynthesis of macroalgae and seagrasses.

Indirect impacts on benthic organisms, seagrasses, and macroalgae would be associated primarily with light attenuation caused by suspended sediment particles. This, in turn, could affect the feeding efficiency and behavior (e.g., avoidance of predators) of benthic organisms, or alter habitat by changing substrate composition. Increases in turbidity could cause a decrease in photosynthesis in macroalgae and seagrasses. Either of these impacts could change the distribution of infaunal and epifaunal species (Berry et al. 2003). In addition, reduced water clarity could inhibit the feeding success of visual predators (Colby and Hoss 2004). Benthic invertebrates can tolerate elevated concentrations of suspended particulates for short periods of time (days) without suffering acute effects (USACE 2001). Chronic effects such as decreased growth, weight loss, and increased mortality can occur from low sediment levels during longer time periods. However, turbidity modeling indicates that turbidity plumes would be short-lived (settle to close to background levels within 5 hours) and remain fairly close to their source. Therefore, adverse impacts on benthic resources would be minor.

The extent of hard and live bottom exposed to turbidity from plowing and dredging can be roughly estimated by assuming that the plume typically would extend about 150 m (492 feet) to each side of the pipeline. Using a plume width of 300 m (984 feet) and a total length of 63,124 m (207,101 feet) for the plowable and dredgeable segments of the pipeline, the total plume area would be 18,937,200 square meters (203,838,324 square feet) or 1,894 hectares (4,679 acres). Habitats along the plowable portion of the route are 65 percent soft bottom, 5 percent Habitat Type A, 12 percent Habitat Type B, and 18 percent Habitat Type D. Multiplying the total plume area by the percentage of each habitat type yields an impact area of 1,240 hectares (3,064 acres) of soft bottom, 94 hectares (231 acres) of Habitat Type A, 229 hectares (566 acres) on Habitat Type B, and 331 hectares (819 acres) on Habitat Type D (see **Table 4.2-14** for the area of each habitat type along the plowable portions of the pipeline route) (Port Dolphin 2008d).

Turbidity modeling predicts that sediment resuspended by plowing would not reach seagrass beds near the landfall. However, resuspended sediment from HDD pit excavation would reach seagrass beds south of the HDD pit. The seagrass beds would be exposed to suspended sediment levels of 0 to 5 mg/L and the total area of seagrasses affected would be 0.78 hectares (1.93 acres). However, no measurable sediment accumulation on seagrasses is predicted (Port Dolphin 2008a). As stated above, seagrass beds are dynamic, and a thorough seagrass survey would be conducted prior to construction to determine the current status and location of seagrass in the area of HDD exit location (Port Dolphin 2007b).

In summary, short-term, moderate, direct and indirect, adverse impacts on benthic resources would be expected to occur as a result of turbidity increases associated with construction.

BMPs are expected to be effective in reducing the magnitude and extent of impacts resulting from sediment suspension during pipeline construction and therefore, the impact of turbidity on benthic resources. However, the performance of the measures should be monitored during construction to verify their effectiveness. The Applicant has stated the intention to apply for a variance from turbidity standards; if granted, this could result in an increase in adverse impacts on benthic resources.

Lighting. The Applicant has committed to using downshielding on lights used to identify construction vessels and illuminate working decks. Further, lighting on construction vessels would not illuminate surrounding waters. Additionally, during installation an environmental coordinator would be on site to ensure no violations would occur. Therefore, no impacts on benthic resources would be associated with lighting used during construction.

Operations

Seafloor Disturbance. Long-term seafloor disturbance would occur as a result of placement of fixed parts of the buoy system, concrete mattresses, or other protective cover where the pipeline cannot be buried, long-term chain and riser scour, and resettling of suspended sediments associated with the chain and riser sweep.

Table 4.2-14 presents an estimate of the area of each habitat type that would be impacted by the operation of the proposed Port. In areas where soft bottom/sand is replaced by hard components such as concrete mattresses, and anchors/piles associated with the buoy, a shift in associated benthic assemblages could occur. This impact would be beneficial for species that prefer hard-bottom structure and adverse for species that prefer soft sediment. In areas where anchors/piles are placed in Type B (see definition in **Table 4.2-14**) hard-bottom habitat, the anchors/piles are expected to be colonized by organisms from the surrounding habitat (Auster and Langton 1998). Long-term impacts on the natural hard-bottom relief would result during pile driving.

Additional long-term disturbance (approximately 22 acres) would be caused by the sweeping and scouring of benthic substrate by anchor chains and cables. In soft-bottom areas (approximately 16 acres), anchor and riser sweep could cut through the top few inches of the sediment layer, adversely impacting fauna such as tube-dwelling polychaetes, anemones, and other large infauna. In hard-bottom areas (approximately 6 acres), anchors and risers would scrape the surface of limestone outcropping, impacting various epifaunal species. Turbidity modeling indicates that in the immediate vicinity of the proposed Port, sediments would continually be resuspended and resettle. It is unlikely that this area would be successfully recolonized by motile or sessile benthic organisms. Considering the abundance of soft-bottom habitat available in the region, the intensity of potential impacts, impacts on soft-bottom/sand communities would be long-term, minor, direct, and adverse. Impacts on hard-bottom habitat in Type B hard- and live-bottom habitat would be long-term, moderate, direct, and adverse. The importance of this habitat to commercial and recreational fish and shellfish species is presented in **Section 3.2.9**. A characterization of the commercial and recreational fish and shellfish species, and commercial and recreational fisheries in the area is presented in **Section 3.2.9**.

In summary, long-term, minor to moderate, direct, adverse, beneficial impacts on benthic communities would occur as a result of seafloor disturbance associated with the operations of the proposed Port.

Turbidity. Turbidity associated with long-term chain scour is expected to be extremely localized. This area is not expected to recolonize because of long-term chain scour. Turbidity could spread from the immediate area of the proposed Port and affect different areas depending on the currents. The maximum distance a turbidity plume of 100 mg/L is expected to travel from a source is 150 m (492 feet) (ASA 2008). The chronic effects of turbidity on benthic resources in a larger area surrounding the proposed Port would be expected to be minor.

Long-term, moderate, direct and indirect, adverse impacts on benthic resources would be expected to occur as a result of turbidity increases associated with long-term chain-and-riser sweep.

Seawater Intake and Cooling Water Discharge. Modeling of the cooling water discharge plume indicates that the plume would surface and would not impinge the seafloor. No impacts on benthic resources would be expected to occur as a result of seawater intake or cooling water discharges associated with Port operations.

Other Routine Discharges. Cooling water discharges and testing of the firefighting system would comply with NPDES permit conditions. While SRVs are present at the Port, they would not discharge

domestic waste, bilge water, or ballast water. In addition, on the SRVs, gutter bars would be replaced around equipment where oil leaks could occur (e.g., mooring winches, cranes). Rain water from these areas would be drained to a bilge holding tank. No rain water would be discharged overboard, from areas around equipment where oil leaks would occur, while at the buoy. The firewater system discharges consist of uncontaminated seawater from testing the firefighting system on the SRVs. Based on the infrequent nature of the discharge, its short duration, and the lack of contaminants, impacts on benthic resources would be expected to be long-term, minor, direct, and adverse. Proposed BMPs (see **Section 4.11**) would help reduce the impact of routine vessel discharges on benthic resources.

Marine Debris. The discharge and disposal of garbage and other solid debris from vessels by lessees is prohibited by the MMS (30 CFR 250.300) and the USCG (MARPOL Annex V, Public Law 100-220 [Statute 1458]) (33 CFR Part 151). The discharge of plastics, including ashes from burned plastics, is strictly prohibited and is therefore never authorized. All plastics must be returned to shore, and are tracked. These prohibitions on the discharge and disposal of garbage and other solid debris from vessels would be incorporated as enforceable conditions into the DWPA license. The USCG enforces MARPOL and the Deepwater Port License and fines or penalties could be assessed where laws and regulations are violated. Therefore, long-term, minor, direct and indirect, adverse impacts on benthic resources would be expected to occur as a result of the discharge of marine debris, should this occur.

Although the intentional discharge of marine debris is prohibited by law, discharges associated with offshore structures do occur and sinking marine debris could also have long-term direct impacts on benthic resources, by altering substrate composition, interfering with dissolved gas exchange between sediment pore waters, and releasing heavy metals and other toxic substances. Long-term, minor, direct, adverse impacts on benthic resources would be expected to occur as a result of marine debris.

Hydrocarbon Spills. The impacts of hydrocarbons on benthic resources would be caused by either the physical nature of the oil (physical contamination and smothering) or by its chemical components (toxic effects and bioaccumulation). The impacts would depend on the depth of the oil spill and the type of oil spilled. It is likely that oil spills at the surface would tend not to sink below depths of 20 m (35 feet) (MMS 2002a, 2002b). When oil sinks to depths around 20 m (35 feet), it is at concentrations several orders of magnitude lower than those demonstrated to have an effect on marine organisms (MMS 2002b). Because the Project area is approximately 30 m (100 feet) above the seafloor, a hydrocarbon spill from an SRV would not impact the benthos. However, benthic communities could be indirectly affected by clean-up operations or through physical damage to the habitats in which plants and animals live. Indirect, adverse, minor, and short-term and long-term impacts on benthic resources are expected to result from hydrocarbon spills. Applicant proposed BMPs (see **Section 4.11**) would both help to avoid and reduce the impacts of hydrocarbon spills, which would reduce potential impacts on federally managed fish and shellfish.

Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and

abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

These activities would cause localized removal, turnover, and disruption of sediments, which could potentially displace, bury, or crush benthic organisms primarily in the offshore areas of the Project and at each end of the pipeline. No explosives would be used for decommissioning. Habitat structures could also be temporarily disturbed. The total area of each type of benthic habitat affected by decommissioning is presented in **Table 4.2-14**.

Displaced organisms would likely return to the area shortly after decommissioning activities ceased. Due to the ubiquitous nature of the region's benthic communities, affected benthic assemblages would be expected to recover by recruitment from surrounding communities of similar organisms. As a result, short-term, minor, direct, adverse impacts on benthic communities would occur during Project decommissioning.

4.2.1.6.2 Alternatives

Table 4.2-16 compares impacts from the Proposed Action to each of the alternatives with respect to benthic resources. There are limited quantitative benthic data available for the alternative pipeline routes. Comparisons in **Table 4.2-16** were made based on publicly available resource maps.

Southern Site and Route Alternative. The impacts on benthic resources associated with construction, operation, and decommissioning under the Southern Site Route Alternative would be similar to those under the Proposed Action based on limited available data. However, impacts on offshore seagrasses and macroalgae would be greater under this alternative. Impacts associated with turbidity would be slightly greater because the pipeline route would be longer.

Offshore Interconnection with Gulfstream Pipeline Alternative. Impacts on benthic resources would be less than the Proposed Action under this alternative. Under this alternative the pipeline would not come inshore because of the connection to the Gulfstream pipeline. The connection would occur approximately 16 km (10 mi) from the mouth of Tampa Bay, in water depth of 20 feet. Turbidity associated with pipeline installation would be less under this alternative.

FSRU Port Design Alternatives. Construction, operation, and decommissioning impacts on benthic resources under the FSRU Port Design Alternative would be similar, but slightly less than those under the Proposed Action. Under this alternative there would be fewer anchors and, therefore, less seafloor disturbance and turbidity.

AAV Alternative. Construction, operation, and decommissioning impacts on benthic resources under the AAV Alternative would be similar to those under the Proposed Action.

Suction Piles Anchoring Alternative. Construction, operation, and decommissioning impacts on benthic resources under the Suction Piles Anchoring Alternative would be similar to those under the Proposed Action.

No Action Alternative. The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No

Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, no direct or indirect impacts on benthic resources would be expected. Alternative sources of natural gas might include other Deepwater LNG Ports or onshore LNG terminals. Other Deepwater LNG Ports might have impacts on benthic resources that are similar to the Port Dolphin system but in a different geographic location and therefore on different species and habitat types.

Table 4.2-16. Benthic Resources Impact Summary

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnect Alternative	FSRU Design Alternative
Pipeline construction	Minor to moderate, short-term, adverse impacts along pipeline route as a result of seafloor disturbance and turbidity. Long-term impacts due to loss of habitat as a result of seafloor disturbance.	Short-term impacts higher than Proposed Action (longer route).	Short-term impacts lower than Proposed Action (shorter route).	No difference from Proposed Action.
Port construction	Moderate, short-term and long-term, adverse impacts in the vicinity of the Port as a result of seafloor disturbance and turbidity.	No difference from Proposed Action.	No difference from Proposed Action.	Short-term impacts would be similar to the Proposed Action, with a slightly less impact, there would be fewer anchors and less turbidity.
Operation of Port	Minor to moderate, long-term, adverse impacts due to chain sweep, routine discharges, marine debris, and potential LNG/hydrocarbon spills.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.
Decommission of Port	Minor, short-term adverse impact would be similar to construction of the pipeline and port. Impacts of decommissioning would be lower than construction.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.

Notes:

1. Under the No Action Alternative none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur. No direct or indirect impacts on biological resources would be anticipated.
2. The AAV and Suction Pile Anchoring Alternatives were carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.2.1.7 Nonthreatened and Nonendangered Marine Mammals

4.2.1.7.1 Proposed Action

As noted in **Section 3.2.6**, based on available survey data, only the bottlenose dolphin, Atlantic spotted dolphin, and rough-toothed dolphin occur on the continental shelf in the eastern GOM (Fulling et al. 2003). Analyses of potential impacts of the Proposed Action are directed to those species.

Construction

Seafloor Disturbance. Installation of Port components and pipelines would temporarily disrupt benthic habitat in the immediate vicinity of the construction areas. Removal of bottom habitat, along with resident benthic organisms within the area, affects not only the benthic communities, but also the fish assemblages that rely on the benthos and seagrasses for food, which in turn are preyed upon by marine mammals. Once the disturbance ceases, the substrate would be available for recruitment of benthic organisms. Reestablishment of a benthic community similar to that in adjacent areas is expected to take a period of weeks to several years. This is based on studies of fishing gear impacts on the seafloor and associated habitat changes (Auster and Langton 1998). Nonendangered and nonthreatened marine mammals could be indirectly impacted if benthic prey species were displaced or destroyed by construction activities. Affected species would be expected to recover soon after construction ceased, and would represent only a small portion of food available to marine mammals in the area. Short-term, minor, indirect, adverse impacts on nonendangered and nonthreatened marine mammals could occur as a result of seafloor disturbance caused during construction. The potential for adverse impacts on seagrasses would be reduced with use of the BMPs and the Project-specific Wetland and Waterbody Construction and Mitigation Procedures Plan (see **Section 4.11**).

Turbidity. The main source of water quality impacts would be pipeline trenching, which would produce turbidity along the pipeline route. Sources of turbidity include pipeline burial, as well as anchoring of the lay barge, placement of the pipeline and mattresses, and HDD of the shore approach. The clamshell dredge method to be used during the Proposed Action is expected to produce much less turbidity than jetting (ASA 2008). As indicated in **Section 4.1.1**, turbidity modeling (SSFATE) conducted by the Applicant was used to estimate the area in which sediment concentrations would continue to exceed 100 mg/L after 30 minutes. Under worst-case conditions, is estimated that sediment concentration would exceed 100 mg/L for less than 2 hours (ASA 2008). Turbidity modeling indicates that both turbidity plumes would be short-lived and remain fairly close to their source (ASA 2008). The total areal extent of the turbidity plumes created during pipeline installation is estimated to be approximately 1,894 hectares (4,679 acres) (ASA 2008). However, the actual distance from the source would depend on the source (e.g., HDD, dredge) and prevailing conditions (e.g., weather and tide).

Impacts on nonendangered and nonthreatened marine mammals would be indirect, due to any impacts on finfish and invertebrates that are prey for dolphins. Resuspended sediments can obstruct gills of fish, as well as cause behavioral responses by the fish to the turbidity (Anchor Environmental 2003). Water turbidity appears to have little or no direct impact on dolphins, in particular, bottlenose dolphins that occur within Tampa Bay as well as coastal waters, as they are sighted in both clear and muddy waters. Suspended sediments in the water column reduce light availability and, therefore, seagrass production. Seagrass beds serve as habitat for fish species important to dolphins. Dolphins could be indirectly impacted as a result of any hazardous substances in sediment being resuspended and bioaccumulated in food items from contaminated suspended sediments. Short-term, minor, indirect, adverse impacts on nonendangered and nonthreatened marine mammals could occur as a result of temporary turbidity increases caused by construction.

Hydrostatic Test Water Intake and Discharges. During the construction phase, seawater would be used for hydrostatic testing of the offshore pipeline and flowlines. Hydrostatic testing is a one-time temporary event that would require filling the pipeline twice. The seawater would be taken onboard a marine vessel at five locations along the route. To assist in leak detection during testing, an environmentally benign dye, Hydro Tag Green Fluorescent Dye, would be added to the flooding and test water. HydroHib P would be added as a corrosion inhibitor; it is widely used in the offshore pipeline industry and has been approved by the USEPA and certified by USEPA-approved laboratories. HydroHib P requires no neutralization and the treated water can be discharged into the sea (subsea) through specially designed diffusers. This is intended to release the treated seawater into a larger volume of water than if diffusers were not used. As the test water is released to the sea, the concentration would be immediately diluted well below the toxicity limit via the diffusers, thereby further rendering the test water as uninhibited or "Non-Toxic." The hydrostatic test water discharge would occur offshore from a marine vessel at one of the STL buoy locations rather than at Port Manatee. No water quality impacts are expected from the water additives.

Hydrostatic integrity testing might indirectly impact nonthreatened and nonendangered marine mammals, since plankton species could be entrained and subsequently killed by the seawater intake system. Plankton mortality could indirectly impact invertebrate and fish populations that feed on plankton. Hydrostatic integrity testing would indirectly impact marine mammals, since plankton species (including fish larvae and eggs) could be entrained and subsequently killed by the seawater intake system. Marine mammals feed on invertebrate and fish populations that either feed on different types of plankton or on more mature individuals of the affected ichthyoplankton species. Filtered seawater would be used for the hydrotesting. Considering the overall amount of plankton available in the area, these impacts would be short-term and minor. As stated in **Section 4.1.1,** hydrostatic testing would have a short-term, minor, localized impact on water quality. Therefore, short-term, negligible, localized impacts on phytoplankton would occur as a result of hydrostatic testing

Vessel Traffic. Construction activities, associated with the Proposed Action, would result in increased vessel traffic in the Tampa Bay region. As specified by the Applicant, approximately 1,800 total vessel trips would be required during construction as shown in **Table 4.10-1** (Port Dolphin 2008a). Please see **Section 4.10.1** for more information on construction vessel traffic. Twelve types of vessels might be used during construction (weather contingent); the supply vessel (360 to 600 total trips) and material barges (720 to 900 total trips) represent the most frequent vessel movements. Frequency of vessel movements ranges from 2 trips per year for jack-up and dragline barges to approximately 900 trips per year for material barges. Expected vessel traffic during construction would consist of approximately 1,796 trips over the 11-month construction period. Approximately 125,000 boats were registered in Manatee, Hillsborough, and Pinellas counties in 2006, of which approximately 2,800 are considered commercial and include charter vessels and commercial fishing vessels (HSMV 2005). From a broader perspective, upwards of 1,000 commercial vessels pass through the Straits of Florida daily, and there are tens of thousands of vessel transits annually in the GOM. The worldwide commercial fleet was estimated to include at least 81,867 vessels in 1999 and is reportedly increasing at about 12 percent per year (NRC 2003). Vessel traffic could affect marine mammals by direct collisions with vessels, wave action from boat wakes, noise (which might cause behavioral disturbance), and accidental hydrocarbon spills. Potential impacts of noise from vessel traffic are discussed in the next section (entitled *Noise*). Increased vessel traffic is likely to increase petroleum hydrocarbons discharged into the water; those possible impacts are discussed in the marine mammal sections regarding *Hydrocarbon Spills*.

Dolphins are commonly attracted to moving vessels and spend periods of time following these vessels or swimming within the bow waves of ships traveling at high speeds. It is generally considered that because these species are agile, powerful swimmers, they should be capable of avoiding collisions with oncoming vessels, however, this is not always the case. As noted in a worldwide review by Van Waerebeek et al.

(2007), small-boat propellers have long been recognized as a cause of traumas in bottlenose dolphins and Atlantic spotted dolphins. It is known that bottlenose dolphins in Tampa Bay are occasionally struck by vessels (Wells and Scott 1997). It is not improbable to assume that rough-toothed dolphins too have been victims of vessel collisions; these likely have not been reported or published. Such injuries might or might not be lethal, and are believed to be uncommon and not result in population-level effects. Nonlethal injuries can reduce the breeding success of individuals and could permanently remove some animals from the breeding population (Hubard and Swartz 2002). Vessel traffic that disturbs dolphins could cause them to leave preferred habitats and could alter biologically important behaviors such as feeding, nursing, or resting (Hubard and Swartz 2002).

Short-term, minor, direct, and adverse impacts on nonthreatened and nonendangered marine mammals could occur as a result of increased vessel traffic during construction (without mitigation and monitoring). *MMS NTL No. 2007-G04, Vessel Strike Avoidance and Injured/Dead Protected Species Reporting*, is designed to mitigate impacts on nonthreatened and nonendangered marine mammals, and has been adopted as a mitigation measure for the Proposed Action. In addition, project-related vessel traffic increases would be very small in comparison with existing vessel traffic in the area (see **Section 4.10**). Therefore vessel traffic associated with the Proposed Action would be expected to have minor impacts on non-threatened and non-endangered marine mammals. Applicant-proposed BMPs and minimization measures to avoid or reduce impacts of vessel traffic and noise on marine mammals are found in **Section 4.11**.

Indirect effects from increased vessel traffic include increased wave action due to vessel wakes and scarring of seagrass beds by propellers (EPC 2007). Seagrasses are important habitat for dolphin prey (for more information, see section on fish). Wakes affect seagrass beds by the increase of wave action, which could play a role in the decline of longshore sandbars that help protect seagrasses (Lewis 2002), as well as increased turbidity that, as noted earlier, reduces light availability and, therefore, seagrass production. The potential for adverse impacts on seagrasses would be reduced with the use of BMPs and the Project-specific Wetland and Waterbody Construction and Mitigation Procedures Plan (see **Section 4.11**). The plan would be developed in coordination with appropriate regulatory agencies and implemented prior to and during construction activities.

Noise. Short-term, minor, direct, adverse impacts on nonendangered and nonthreatened marine mammals could occur as a result of noise generated by pile driving, construction vessels, and machinery. Nonendangered and nonthreatened marine mammal hearing capabilities are described in **Section 3.2.6.** Background information on noise impacts on marine mammals and acoustic criteria can be found in **Section 4.2.1.2.1**, discussed in detail under *noise* in *construction impacts*.

Bottlenose dolphins are common in nearshore areas associated with the Proposed Action. While Atlantic spotted dolphins are common in the GOM, the species is not commonly seen in the Tampa Bay area, and tend to be sighted farther from the coast (Griffin and Griffin 2003). Tagging and sighting data document occurrence of the rough-toothed dolphin in waters over the continental shelf off the Gulf Coast of Florida (e.g., Wells et al. 1999, Fulling et al. 2003). The functional hearing range for odontocetes, such as the bottlenose dolphin and Atlantic spotted dolphin, has generally been estimated to lie between 150 Hz and 160 kHz. However, within this range, dolphins are thought to hear best between 20 and 90 kHz (i.e., they are mid-frequency hearing cetaceans) (Nachtigall et al. 2003).

The noise associated with construction would be broadband (including low and high frequencies) noise (JASCO 2008) and most marine mammals present would be capable of hearing it. Most noise would be short-term in duration and moderate in intensity. Noise from pipeline construction activities is not expected to be higher than other underwater noise construction activities near Tampa Bay. Pile-driving noise would be the loudest noise associated with construction. **Table 4.2-17** presents the distance from

noise sources that Level A and Level B harassment of dolphins (mid-frequency cetaceans), could occur for offshore construction activities. **Table 4.2-18** presents the distance from noise sources that Level A and Level B harassment of dolphins (mid-frequency cetaceans), could occur for inshore construction activities. As described in **Section 4.2.1.2.1,** Level A harassment has an exposure criterion of 180 dB re 1 μPa^2-s. Behavioral disturbance criteria for impulse/intermittent sounds is set at a sound pressure level (SPL) value of 160 dB re 1 µPa at 1m and 120 dB re 1 µPa at 1m for continuous noise (70 FR 18871-18875). Additional details on noise criteria and noise types are presented in **Section 4.2.1.2.1.**

The Applicant has estimated that the highest noise levels exceed Level A and B harassment thresholds; however, minimization measures proposed by the Applicant and mitigation measures recommended by agencies (see **Section 4.11**), are anticipated to reduce impacts on ambient noise levels and avoid impacts on non-threatened and non-endangered marine mammals. Implementation of these measures is considered to reduce the likelihood of exposure and potential effects on marine mammals within the zone of influence; however, it is not known whether these measures would reduce noise levels to below

Table 4.2-17. Distance from Broadband Noise Sources Associated with Construction that Level A and Level B Harassment of Nonthreatened and Nonendangered Marine Mammals Could Occur

	Buoy Installation (distance from source)	Pile Driving (distance from source)	Pipe Laying (distance from source)	Pipe Burial (distance from source)
Mid-Frequency Hearing Cetaceans				
Level A	< 1 m	1 to 10 m	< 20 m	< 20 m
Level B	< 20 m to 2.9 km	10 m to 3.1 km	20 m to 6.8 km	20 m to 7.9 km

Source: JASCO 2008

Notes:

Level A harassment: intensities above 180 dB re 1 µPa at 1 m RMS.

Level B harassment (impulse noises): intensities above 160 dB re 1 µPa at 1 m RMS.

Level B harassment (continuous noises): intensities above 120 dB re 1 µPa at 1 m RMS.

Table 4.2-18. Distance from Broadband Noise Sources that Level A and Level B Harassment of Nonthreatened and Nonendangered Marine Mammals Could Occur for Offshore Construction Activities

	Pile Driving (distance from source)	Pipe Laying: Passage Key (distance from source)	Pipe Laying: Tampa Bay (distance from source)	Pipe Burial: Tampa Bay (distance from source)
Mid-Frequency Hearing Cetaceans				
Level A	4 to 20 m	< 20 m	< 20 m	< 20 m
Level B	20 m to 1.7 km	20 m to 1.5 km	20 m to 5.9 km	20 m to 6.6 km

Source: JASCO 2008

Notes:

Level A harassment: intensities above 180 dB re 1 µPa at 1 m RMS.

Level B harassment (impulse noises): intensities above 160 dB re 1 µPa at 1 m RMS.

Level B harassment (continuous noises): intensities above 120 dB re 1 µPa at 1 m RMS.

Level A or Level B thresholds. While the effectiveness of individual measures has not been studied, they are standard measures requested by the NMFS (and USFWS) in a variety of acoustic disturbance projects (e.g., seismic surveys, Navy training exercises, pile-driving exercises, other LNG projects). These measures are widely accepted in the scientific and regulatory community to protect and minimize effects on marine mammals. It is anticipated that short-term (approximately 2 weeks), direct, adverse effects on marine mammals would be potentially moderate to potentially major because of the uncertainty of effectiveness of proposed measures to reduce noise impacts.

Continuous noise created by construction vessels could potentially mask sounds produced and received by marine mammals. Masking occurs when underwater noise interferes with an animal's ability to hear other concurrent sounds such as conspecifics, or predators. This could, in turn, affect an animal's ability to feed, mate, or travel efficiently and safely through an environment. While no data exist for the specific area associated with the Proposed Action, Phillips et al. (2006) found that ambient noise measurements near the mouth of the Crystal River, approximately 130 km (81 mi) north of the Proposed Action area, were 105 dB. While one cannot quantifiably analyze the noise levels specifically in the Proposed Action area, one can assume that the ambient noise levels would increase. However, based on acoustic analyses performed off the northeastern United States using similar equipment and construction techniques, the transient nature and short-term duration of construction vessel noise would reduce the potential for masking to occur (LGL and JASCO 2005). In general, marine mammal exposure to construction vessel noise would only occur for a finite period of time and would not be expected to have long-term population-level impacts on marine mammals.

Dolphins show tolerance of the noise associated with floating and bottom-founded drill-rigs (Richardson et al. 1995). Dolphins TTSs greater than 10 dB were measured during exposures at 179 dB re 1 µPa for 47 to 54 minutes. Hearing sensitivity recovered within 45 minutes after sound exposure (Nachtigall et al. 2003).

Noise from vehicle traffic associated with construction is expected to be similar to other traffic currently in the area of the Project. Noise from pipeline construction activities is not expected to be substantially higher than other underwater noise construction activities near Tampa Bay. Pile-driving noise would be higher than other noise from construction. As noted earlier, monitoring efforts and mitigation measures designed to address acoustic disturbance to marine mammals are anticipated to reduce potential adverse noise impacts to marine mammals.

Dolphins can tolerate boats of all sizes, often approaching and riding the bow or stern waves or showing avoidance behavior linked to previous boat-based harassment (Shane et al. 1986; Richardson et al. 1995). Coastal bottlenose dolphins that are the object of whale-watching activities have been observed to swim erratically (Acevedo 1991), remain submerged for longer periods of time, display less cohesiveness among group members, whistle more frequently, and less often rest when boats are nearby (Janik and Thompson 1996, Nowacek et al. 2001, Buckstaff 2004, Constantine et al. 2004).

Entanglement. Marine mammals could be entangled by anchors, anchor lines, or buoy lines, but the potential for such an event would be low. Long-term, minor, direct and indirect, adverse impacts on nonthreatened and nonendangered marine mammals could occur due to the increased risk of entanglement during routine Port operations.

Lighting. Short-term, minor, direct and indirect, adverse impacts on nonthreatened and nonendangered marine mammals could occur as a result of lights used during construction. Construction activities would take place 24 hours per day, 7 days per week, during the installation period. For identification and safety purposes, construction and support vessels would be required to display lights when operating at night. The use of vessel lights during construction would be short-term, temporary, and transient. All lights

would be installed and used in accordance with NMFS and USFWS guidelines designed to reduce impacts on marine mammals. Additionally, during installation an environmental coordinator would be on-site to ensure no violations would occur. This would decrease attraction by fish and invertebrates to the area, as well as marine mammals that might be attracted by their presence, thereby reducing the vulnerability of ESA-listed marine mammals to possible disorientation, vessel strikes, noise, predation, and entanglement. Short-term, minor, direct and indirect, adverse impacts on marine mammals could occur as a result of lights used during construction.

Marine Debris. Both entanglement in and ingestion of debris have caused the death of or serious injury to marine mammals (Laist 1997). The discharge and disposal of garbage and other solid debris from vessels by lessees is prohibited by the MMS (30 CFR 250.300) and the USCG (MARPOL Annex V, Public Law 100-220 [Statute 1458]) (33 CFR Part 151). *MMS NTL No. 2007-G03, Marine Trash and Debris Awareness and Elimination*, is designed to mitigate impacts of marine debris. The discharge of plastics, including ashes from burned plastics, is strictly prohibited and is therefore never authorized. All plastics must be returned to shore, and are tracked. These prohibitions on the discharge and disposal of garbage and other solid debris from vessels would be incorporated as enforceable conditions into the DWPA license. The USCG enforces MARPOL and the Deepwater Port License and fines or penalties could be assessed where laws and regulations are violated. Short-term, minor, direct, adverse impacts on nonthreatened and nonendangered marine mammals could occur if marine debris were accidentally released during the Proposed Action.

Operations

Seafloor Disturbance and Turbidity. Operations activities would cause long-term disturbances in both soft- and hard-bottom habitat. The placement of buoy system parts and concrete mattresses along the pipeline route, as well as anchor sweep would result in 16.32 acres of long-term disturbance on soft-bottom habitat and 19.42 acres of long-term disturbance on hard-bottom habitat. An additional 18.98 acres of soft substrate/sand habitat would be disturbed due to anchor sweep. It is anticipated that long-term STL buoy anchor chain sweep would cause the resuspension of fine sediments and result in a sediment drape within immediately adjacent areas. Turbidity increases are associated with long-term chain and riser sweep. Turbidity associated with long-term chain scour is expected to be localized and in the lower portion of the water column. This area is not expected to recolonize because of long-term chain scour. Turbidity could spread from the immediate area of the proposed Port and affect different areas depending on the currents. Removal of bottom habitat, along with resident benthic organisms within the area, affects not only the benthic communities, but also the fish assemblages that rely on the benthos for food, which in turn are preyed upon by marine mammals. Once the disturbance ceases, the substrate would be available for recruitment of benthic organisms. Reestablishment of a benthic community similar to that in adjacent areas is expected to take a period of weeks to several years. Marine mammals could be indirectly impacted if benthic prey species were displaced or destroyed by construction activities. Affected species would be expected to recover soon after construction ceased, and would represent only a small portion of food available to marine mammals in the area. Short-term, minor, indirect, adverse impacts on nonthreatened and nonendangered marine mammals could occur as a result of seafloor disturbance caused during construction.

Vessel Traffic. A maximum of 90 SRVs could call on Port Dolphin per year. In the open ocean, SRVs typically travel at speeds of up to 19.5 knots. However, once approaching the vicinity of the terminal, SRVs would slow to about half-speed. Supply and crew vessels are expected to call on the SRVs while at Port Dolphin. Based on the estimated 90 calls a year, 938 supply vessel trips from onshore 22 locations in Tampa Bay are anticipated.

Vessel traffic can affect marine mammals by direct collisions with vessels, wave action from boat wakes, noise (which might cause behavioral disturbance), and accidental hydrocarbon spills. Potential impacts of noise from vessel traffic are discussed in the next section (entitled *Noise*). Increased vessel traffic would likely increase petroleum hydrocarbons discharged into the water; those possible impacts are discussed in the marine mammal sections regarding *hydrocarbon spills*.

Dolphins are commonly attracted to moving vessels and spend periods of time following these vessels or swimming within the bow waves of ships traveling at high speeds. It is generally considered that because these species are agile, powerful swimmers, they should be capable of avoiding collisions with oncoming vessels, however, this is not always the case. As noted in a worldwide review by Van Waerebeek et al. (2007), small-boat propellers have long been recognized as a cause of traumas in bottlenose dolphins and Atlantic spotted dolphins. It is known that bottlenose dolphins in Tampa Bay are occasionally struck by vessels (Wells and Scott 1997). It is not improbable to assume that rough-toothed dolphins too have been victims of vessel collisions; these likely have not been reported or published. Such injuries might or might not be lethal, and are believed to be uncommon and not result in population-level effects. Nonlethal injuries can reduce the breeding success of individuals and could permanently remove some animals from the breeding population (Hubard and Swartz 2002). Vessel traffic that disturbs dolphins could cause them to leave preferred habitats and could alter biologically important behaviors such as feeding, nursing, or resting (Hubard and Swartz 2002).

Adverse impacts on nonthreatened and nonendangered marine mammals could occur as a result of increased vessel traffic during construction (without mitigation and monitoring). *MMS NTL No. 2007-G04, Vessel Strike Avoidance and Injured/Dead Protected Species Reporting*, is designed to mitigate impacts on nonthreatened and nonendangered marine mammals. Any vessel strike of a nonthreatened and nonendangered marine mammal would be considered a "take" under the MMPA. However, project-related increases vessel traffic during construction would be small in comparison with existing vessel traffic in the area (see **Section 4.10**). Therefore, adverse impacts on non-threatened and non-endangered marine mammals from project-related vessel traffic during construction would be short-term and minor. Applicant-proposed BMPs and minimization measures to avoid or reduce impacts of vessel traffic and noise on marine mammals are found in **Section 4.11** and would help to reduce adverse affects on nonthreatened and nonendangered marine mammals.

Indirect effects from increased vessel traffic include increased wave action due to vessel wakes and scarring of seagrass beds by propellers (EPC 2007). The potential for impacts to seagrasses are important because they are habitat for dolphin prey (see **Section 4.2.13**). Wakes affect seagrass beds by the increase of wave action which can play a role in the decline of longshore sandbars that help protect seagrasses (Lewis 2002), as well as increased turbidity that, as noted earlier, reduces light availability and, therefore, seagrass production. Seagrasses would be avoided and mitigated based on the BMPs and the Project-specific Wetland and Waterbody Construction and Mitigation Procedures Plan. The plan would be developed in coordination with appropriate regulatory agencies and implemented prior to and during construction activities.

Noise. Long-term underwater noise impacts would be created by the operation of various equipment and powering systems on the SRVs and other support vessels, as well as from mooring (maneuvering on thrusters during approach to the mooring buoy), and the operation of processing equipment (regasification). An overlap is anticipated between arriving and departing SRVs; consequently, an SRV would be present most of the time. Under the Proposed Action, the Port would operate 24 hours a day, 365 days per year to provide a continuous supply of natural gas.

Background information on noise impacts on marine mammals and acoustic criteria can be found in **Section 4.2.1.2.1**, discussed in detail under *noise* in *construction impacts*.

Noise sources associated with operations include SRV transits and regasification. Noise modeling by JASCO (2008) for the Proposed Action indicates that marine mammals located 1.7 to 3.8 km (1.1 to 2.4 mi) for SRV docking and transit could be disturbed. The largest and most important source of anthropogenic sound is shipping, especially in low frequencies (NRC 2003). Other anthropogenic sound sources in the study areas include recreational boating, dredging, shoreline construction (e.g., bulkheads, revetments, docks, and pile-driving), urban and industrial development, aircraft, and SONARs. However, shipping is a major contribution to underwater SPLs, and its impact is strongest in frequencies from 0.005 to 0.5 kHz (NRC 2003). Noise profiles for the SRVs are within the range of shipping traffic in the area. Most noise would be short-term in duration and moderate in intensity.

Noise levels in the offshore area would be elevated when two SRVs are on buoys at the same time (separated by a distance of approximately 5.0 km (3.1 mi) (JASCO 2008). While SRVs are moored at the Port, main engines would not be operational, but shipboard machinery used to regasify or offload LNG, generate power, and maintain facilities, would produce continuous sources of noise. An additional noise source could include the sound produced by the flow of gas through the proposed flowline, although very little noise in the underwater environment would be expected (JASCO 2008).

Noise modeling was conducted for the SRVs for the offshore transit (full speed was assumed), buoy approach (half speed was assumed), and docking (three thrusters was assumed). However, it was later noted that a total of four thrusters could potentially be used. It was determined that the use of four thrusters rather than three thrusters would cause an increase of 1 or 2 dB re µPa and this difference would not be discernible due to ambient noise (Port Dolphin 2009b). Noise modeling indicates that overall, operational noise associated with the proposed Project is consistent with other man-made underwater noise sources in the area (e.g., commercial shipping, dredging). The source levels and frequencies for noise during routine deepwater port operations are presented in **Section 4.8.1.1**. **Table 4.2-17** and **Table 4.2.-18** present the distance from noise sources that Level A and Level B harassment of marine mammals could occur associated with SRVs under the different operational scenarios.

The SRV traffic associated with the Project would contribute incrementally to the underwater noise environment of the world's oceans. The main sources of vessel noise are propeller cavitation, propeller singing, and propulsion; other sources include auxiliaries, flow noise from water dragging along the hull, and bubbles breaking in the wake (Richardson et al. 1995). Vessel traffic is a major contributor to noise in the world's oceans, especially at low frequencies between 5 and 500 Hz (NRC 2003). During 2004, NOAA and a number of other government, industry, and academic partners convened the first formal meeting ("Shipping Noise and Marine Mammals: A Forum for Science, Management, and Technology") to consider the effects of sounds from large vessels on marine life. During 2007, NOAA convened a symposium to assess quieting applications for large commercial vessels.

The source levels associated with the regasification process are expected to be low (nearly 110 dB in the water, near the vessel). There are no situations where the noise level exceeds 120 dB even a few meters from the vessel (LGL 2008). Therefore, no effects on marine mammals are expected from noise associated with regasification.

The acoustic transponder would emit a 30-kHz signal at 188 to 192 dB re µPa when signaled by an incoming SRV. This signal is within the hearing range of dolphins that would be expected in the area of the Proposed Action. Noise modeling indicates that this signal would drop to below 180 dB re µPa at approximately 3 m (10 feet) and to 160 dB re µPa at approximately 32 m (105 feet). Planned monitoring should detect the presence of dolphins in the vicinity of the buoy. Dolphins might be indirectly affected by the transponder via any detection of the sounds by fish that might be affected by the transponder's signal (see **Section 4.2.1.12**). Such impacts would be short-term and also would not adversely affect dolphins.

Entanglement. Marine mammals could be entangled by anchors, anchor lines, or buoy lines associated with operations of the Port in offshore waters. However, the Applicant has incorporated measures (see **Section 4.11.1**, subsection *Marine Mammal Entanglement*) to reduce the potential for entanglement associated with construction activities. Long-term, minor, direct and indirect, adverse impacts on nonthreatened and nonendangered marine mammals could occur due to the increased risk of entanglement during routine Port operations.

Lighting. SRVs would be guided to the submerged unloading buoys by two lighted buoys floating on the sea surface. The lighted buoys would include flashing yellow lights, with an average lighting level of 900 to 1,000 Candelas. Once SRVs are securely moored, lighted buoys would be taken on board and turned off. Moored SRVs would be required to exhibit light signals appropriate for vessels at anchor. Deck lights also would be used to illuminate working decks during LNG regasification activities. Additionally, during installation, an environmental coordinator would be on site to ensure no violations would occur. All lights would be installed and utilized in accordance with NMFS and USFWS guidelines designed to reduce impacts on marine mammals. This would decrease attraction by fish and invertebrates to the area, as well as their marine mammal predators, thereby reducing the vulnerability of dolphins to possible disorientation, vessel strikes, noise, predation, and entanglement. Long-term, minor, direct, adverse impacts on nonthreatened and nonendangered marine mammals would be expected to occur as a result of lighting used during routine Port operations.

Seawater Intake and Cooling Water Discharge. Seawater would be taken in through one of two sea chests covered with a lattice screen. Impingement of healthy dolphins on the screen is not likely, since the water intake velocity is low (0.15 m/s) and healthy dolphins would be able to swim faster and stronger than the seawater intake velocity. The average swimming speeds for dolphins expected in the area of the Proposed Action include 1.1 to 5.6 m/s for bottlenose dolphins and 5.6 m/s for spotted dolphins (Noren 2004). Fish would not be expected to be impinged on the screen (see impacts section on fish), so dolphins would not be attracted to the screen due to any fish presence. Seawater uptake might indirectly impact threatened and endangered marine mammals, since plankton species could be entrained and subsequently killed by the seawater intake system. Plankton mortality could indirectly impact invertebrate and fish populations that feed on plankton. Long-term, minor, indirect, adverse impacts on nonthreatened and nonendangered marine mammals would be expected to occur as a result of seawater intake associated with the Project.

Cooling water would be discharged at 10 °C (18 °F) above ambient seawater temperature. Modeling indicates that cooling water temperature would be 1 °C (1.8 °F) above ambient temperature within 100 m (328 feet) of the discharge. The cooling water discharge is not expected to reach the seafloor. An increase in temperature could result in short-term behavioral and physiological impacts. Because the cooling water plumes compose a relatively small area, adverse affects to dolphins are unlikely.

Routine Discharges. While SRVs are present at the Port, they would not discharge domestic waste, bilge water, or ballast water. In addition, on the SRVs, gutter bars would be replaced around equipment where oil leaks could occur (e.g., mooring winches, cranes). Rain water from these areas would be drained to a bilge holding tank. No rain water would be discharged overboard, from areas around equipment where oil leaks would occur, while at the buoy. The firewater system discharges consist of uncontaminated seawater from testing the firefighting system on the SRVs. Based on the infrequent nature of the discharge; its short duration; and the lack of contaminants, long-term, minor, indirect, adverse impacts on nonthreatened and nonendangered marine mammals would be expected to occur as a result of other routine discharges associated with the Project.

Marine Debris. Both entanglement in and ingestion of debris have caused the death of or serious injury to marine mammals (Laist 1997). The discharge and disposal of garbage and other solid debris from

vessels by lessees is prohibited by the MMS (30 CFR 250.300) and the USCG (MARPOL Annex V, Public Law 100-220 [Statute 1458]) (33 CFR Part 151). *MMS NTL No. 2007-G03, Marine Trash and Debris Awareness and Elimination*, is designed to mitigate impacts of marine debris. The discharge of plastics, including ashes from burned plastics, is strictly prohibited and is therefore never authorized. All plastics must be returned to shore, and are tracked. These prohibitions on the discharge and disposal of garbage and other solid debris from vessels would be incorporated as enforceable conditions into the DWPA license. The USCG enforces MARPOL and the Deepwater Port License and fines or penalties could be assessed where laws and regulations are violated. Short-term, minor, direct, adverse impacts on nonthreatened and nonendangered marine mammals could occur if marine debris were accidentally released during the Proposed Action

Hydrocarbon Spills. Petroleum products can cause skin and eye irritation and could be toxic if ingested directly or indirectly via fish and invertebrates they prey upon. Cetacean responses to spilled oil are variable, with some observations of attempts to avoid spilled oil and other times, no attempts by the animals to avoid it (Geraci 1990, Smultea and Würsig 1995). Fresh crude oil releases toxic vapors that when inhaled can irritate or damage respiratory membranes, congest lungs, and cause pneumonia. Following inhalation, volatile hydrocarbons can be absorbed into the bloodstream and accumulate in the brain and liver, leading to neurological disorders and liver damage (Geraci and St. Aubin, 1982, Geraci 1990). Toxic vapor concentrations can occur just above the surface of an oil spill and, thus, can be available for inhalation by surfacing marine mammals. Exposure to hydrocarbons is likely to result in primarily sublethal impacts on marine mammals (e.g., decreased health, reproductive fitness, and longevity; and increased vulnerability to disease) with no long-term, population-level impacts.

Oil-spill response activities can affect marine mammals, either through exposure to response chemicals (e.g., dispersants or coagulants) applied to control or break down spilled surface oil, or through disturbance by or collision with spill response vehicles. The chemicals used during a spill response are toxic, but are considered much less so than the constituents of spilled oil (NRC 1989); there is little information regarding their potential effects on marine mammals. The presence of, and noise generated by, oil-spill response equipment and support vessels could temporarily disturb marine mammals in the vicinity of the response action, with affected individuals likely leaving the area. Oil-spill response support vessels can also increase the risk of collisions between these vessels and marine mammals in the vicinity of the spill response. Short-term, minor, direct and indirect, adverse impacts on nonthreatened and nonendangered marine mammals could result from the unlikely occurrence of a hydrocarbon spill during Port operations.

LNG Spills. Short-term, minor, direct, adverse impacts on nonthreatened and nonendangered marine mammals could occur in the unlikely event of an LNG spill. All SRVs are designed with features to minimize the potential for LNG spills (refer to Chapter 2, *Maritime Safety and Related Matters*). However, if an LNG spill were to occur, potential impacts would include exposure to low-temperature LNG at the water surface, possibly resulting in frostbite or death, and asphyxiation by natural gas vapors above the surface of the water. These impacts would likely occur in the immediate vicinity of the spill location; the timeframe of the impact is limited (see **Section 5**). Since LNG does not dissolve in water, the timeframe for these potential impacts would be limited, and no adverse toxic impacts would be expected after the LNG boiled off and the vapors dispersed.

Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

The process would probably result in temporary turbidity increases in the immediate vicinity of the proposed decommissioning activities. These increases would indirectly affect nonthreatened and nonendangered marine mammals by impacting their prey species (see previous sections on *Turbidity*). Additionally, the presence of additional vessels during decommissioning and typical debris-removal practices could potentially affect nonthreatened and nonendangered marine mammals marine mammals (see previous sections on *Vessel Traffic*). The Applicant specified that three types of vessels would be used during decommissioning, which includes one 4-point DSV barge with a 30-ton crane, two tugs to support the DSV barge, and one crew/supply vessel (Port Dolphin 2008a). The Applicant specified that approximately 156 vessel trips would be required for decommissioning over the course of approximately 2 months (Port Dolphin 2007a, 2008a). For more information on vessel traffic associated with decommissioning activities, see **Section 4.10.1**.

Decommissioning activities would occur mainly in the STL buoy area and would not involve any activities along the pipeline route or in nearshore waters. Decommissioning involves no use of explosives. Monitoring efforts during decommissioning would detect presence of marine mammal species and mitigate any impacts. Short-term, minor to moderate, direct and indirect, adverse impacts on nonthreatened and nonendangered marine mammals could occur during Project decommissioning.

4.2.1.7.2 Alternatives

Table 4.2-19 compares impacts from the Proposed Action to each of the alternatives with respect to nonthreatened and nonendangered marine mammals.

Southern Site and Route Alternative. Construction, operation, and decommissioning impacts on nonthreatened and nonendangered marine mammals under the Southern Site Route Alternative would be similar to those under the Proposed Action. Indirect impacts associated with turbidity would be slightly greater because the pipeline route would be longer.

Offshore Interconnection with Gulfstream Pipeline Alternative. Impacts on nonthreatened and nonendangered marine mammals would be less than the Proposed Action under this alternative. Under this alternative the pipeline would not come inshore because of the connection to the Gulfstream Pipeline. The connection would occur approximately 16 km (10 mi) from the mouth of Tampa Bay, in waters with a bottom depth of 20 feet. Seafloor disturbance associated with pipeline disturbance under this alternative would be less in shallow coastal waters and would not occur in Tampa Bay. A more detailed description of seafloor disturbance under this alternative is described in detail under Benthic Resources. There would also be less of an impact of turbidity in shallow coastal waters associated with pipeline installation under this alternative. Nonthreatened and nonendangered marine mammals inhabit shallow coastal waters, as well as deeper waters over the continental shelf (Würsig et al. 2000). However, the potential noise

associated with the Proposed Action is primarily going to be outside of the hearing ranges of the dolphin species likely to occur in the area (Southall 2007).

FSRU Port Design Alternatives. Construction, operation, and decommissioning impacts on nonthreatened and nonendangered marine mammals under the FSRU Alternative would be similar to those under the Proposed Action. The FSRU unit itself would require one set of anchors, as opposed to two sets of anchors for the SRVs included in the proposed Project. Also, use of the FSRU would not require a flexible riser to be pulled off the bottom as the buoy is raised to mate with the SRV. These features would result in decreased seafloor disturbance and turbidity associated with mooring line sweep and raising and lowering of the buoy. The discharge associated with the FSRU alternative would be fresh water. This discharge would travel a longer distance as a thin layer; therefore, the impacts would be minor.

AAV Alternative. Construction, operation, and decommissioning impacts on nonthreatened and nonendangered marine mammals under the AAV Alternative would be similar to those under the Proposed Action.

Suction Piles Anchoring Alternative. The noise impacts associated with pile driving, expected to be potentially moderate to potentially major during on non-threatened and non-endangered marine mammals under the proposed anchoring method (driving piles) would not occur with the use of the Suction Piles Anchoring Alternative. Therefore, use of the Suction Piles Anchoring Alternative would reduce short-term impacts associated with noise during construction from potentially moderate or potentially major, to minor.

No Action Alternative. The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, there would be no direct or indirect impacts on nonthreatened and nonendangered marine mammals. Alternative sources of natural gas might include other Deepwater LNG

Ports or onshore LNG terminals. Other deepwater LNG ports might have impacts on nonthreatened and nonendangered marine mammals that are similar to the Port Dolphin system but in a different geographic location. Onshore LNG terminals would be located in coastal areas where there could be a higher chance of impacting these species; however, it would depend on the location.

Table 4.2-19. Nonthreatened and Nonendangered Marine Mammals Impact Summary

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnection Alternative	FSRU Design Alternative	Suction Pile Anchoring Alternative
Pipeline construction	Minor, short-term, adverse impacts along pipeline route as a result of seafloor disturbance, noise, entanglement, and marine debris. Long-term impacts due to lighting.	Short-term impacts higher than Proposed Action (longer route).	Short-term impacts lower than Proposed Action (shorter route and no nearshore impacts).	No difference from Proposed Action.	No difference from Proposed Action.
Port construction	Minor, short- and long-term, adverse impacts in vicinity of Port comparable to pipeline construction impacts. Potentially moderate to major short-term adverse impacts associated with pile driving.	No difference from Proposed Action.	No difference from Proposed Action.	Short-term impacts as a result of seafloor disturbance and turbidity lower than Proposed Action (less anchors and no flexible riser).	Short-term, minor impacts associated with pile installation, (which is lower than Proposed Action).
Operation of Port	Minor, short-term, adverse impacts in vicinity of Port as the result of seawater intake, routine discharges, marine debris, and potential LNG/hydrocarbon spills; long-term impacts due to noise, entanglement, lighting, seawater intake and discharge.	No difference from Proposed Action.	No difference from Proposed Action.	Short-term impacts comparable to Proposed Action; higher long-term impacts (cool freshwater discharge).	No difference from Proposed Action.
Decommission of Port	No impacts.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.

Notes:

1. Under the No Action Alternative none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur. No direct or indirect impacts on biological resources would be anticipated.
2. The AAV Alternative was carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.2.1.8 Coastal and Marine Birds

4.2.1.8.1 Proposed Action

Sources of potential impacts on marine and coastal birds include lighting on vessels during construction, operations, and decommissioning; disturbance by vessel traffic during construction; and debris (entanglement/ingestion). In addition, marine and coastal birds could be affected in the unlikely event of a minor hydrocarbon spill, LNG release, or natural gas release.

Construction

The main potential impact during construction is disturbance due to vessel traffic in coastal waters. Near the mouth of Tampa Bay, the rerouted pipeline would pass between two NWRs that are important bird areas (see **Figure 3.2-1**). The Proposed Route is approximately 800 m (2,625 feet) from Passage Key NWR and 1,750 m (5,742 feet) from Egmont Key NWR.

Construction vessels would be of the same size and type previously identified, and they would be moving slowly. Taking into account the location of construction, vessel traffic would result in minor adverse impacts on marine and coastal birds. Several BMPs are proposed in **Section 4.11** would minimize disturbance from vessel traffic.

Vessel Traffic. Traffic increases would be short-term and temporary. Approximately 1,800 vessel trips are anticipated during the construction of Port Dolphin (within 11 months). Vessel traffic could result in degraded water quality and disturbance of foraging/reproductive activity. Disturbance often curtails breeding success; excessive disturbance can cause individuals to desert the nest, exposing eggs or chicks to the elements and predation. Interrupted feedings can stress juvenile birds during critical periods in their development (USFWS 2007c). The Project area is a busy Port with vessel traffic. Foraging birds in the Project area are currently exposed to vessel traffic. Also, **Section 4.11** addresses the BMPs and mitigation measures proposed to minimize impacts on birds near the Project area. These restrictions would be mandated on all vessels, except when USCG regulations or safety precautions supersede them. BMPs would reduce physical contact, thereby decreasing impacts on coastal and marine birds.

Short-term, minor, direct, adverse impacts on coastal and marine birds would be expected to occur as a result of increased vessel traffic generated by construction.

Noise. Localized, short-term increases in noise associated with construction could potentially affect coastal birds. The level of impact would vary depending on the bird species, type of vessel or machinery, vessel speed, relative noise level, distance, frequency, and season (MMS 2002b). During Project installation, increased noise levels could temporarily displace coastal and marine birds from commonly used feeding or resting areas, but displaced birds would be expected to return shortly after construction ceased. During construction, increased noise levels could temporarily displace foraging birds, but displaced individuals would be expected to return shortly after construction ceased. The lay barge and support vessels move very slowly down the pipeline corridor during installation activities to decrease the level of disturbance from wakes. Any local noise ordinances would also dictate construction work hours in this area. Animals, in general, tend to become less sensitive to those types of noise and disturbance to which they are repeatedly exposed (Richardson et al. 1995). Because the Proposed Action occurs in a busy Port, birds would be expected to have adapted to the variety of noise levels associated with Port Manatee and local industry.

Short-term, minor, direct and indirect, adverse impacts on wood storks could occur as a result of noise associated with construction.

Lighting. The use of lights on construction and support vessels would be short-term, temporary, and transient. Lights would be installed and used in accordance with USFWS guidelines designed to reduce impacts in comparable construction projects (USFWS 2000). The construction activities would be performed to avoid sensitive areas during bird nesting season, to the extent practicable. In addition, the lay barge and support vessels move very slowly down the pipeline corridor during installation activities. Any local noise ordinances would also dictate construction work hours in this area. BMPs and mitigation measures (see **Section 4.11**) would further minimize impacts on birds near the Project area.

Lighting associated with construction of the Proposed Action would have minor, short-term, adverse impacts on coastal and marine birds in the Project area.

Operations

Vessel Traffic. Traffic increases associated with routine Port operations would be minor compared to the total vessel traffic in the Project area. Through planning, the Applicant has proposed vessel routes that would avoid sensitive receptors (e.g., bird colonies) to the extent feasible and would also limit the number of vessel trips as much as possible. These vessel route and trip restrictions would be mandated on all vessels, except when USCG regulations or safety precautions supersede them. Support and pilot vessel operators would be required to maintain slow, wake-free speeds while navigating through sensitive inland and coastal waterways, and no physical contact with coastal and marine birds would be anticipated.

SRVs and support vessels in transit to and from the Port could result in long-term, minor, direct, adverse impacts on coastal and marine birds.

Noise. Noise created by SRVs and support vessels in transit to and from the Port would be continuous, yet transient, for short periods of time. Animals, in general, tend to become less sensitive to those types of noise and disturbance to which they are repeatedly exposed (Richardson et al. 1995). Because the construction activities, associated with the Proposed Action, occur in a busy Port and shipping channel, wood storks and piping plovers would be expected to have adapted to the variety of noise levels associated with Port Manatee and local industry.

Long-term, minor, direct, adverse impacts on coastal and marine birds could occur as a result of the noise created during routine Port operations.

Lighting. Lighting aboard SRVs would be low, and all lights would be installed and utilized in accordance with USFWS guidelines designed to reduce migratory bird impacts (USFWS 2000). The use of solid or pulsating red lights would be avoided, and all deck lighting would be downshielded to minimize visibility to birds above.

Long-term, minor, direct, adverse impacts on coastal and marine birds could result from the lights used during routine Port operations.

Marine Debris. Birds could be seriously injured or killed if they became entangled in or ingested construction debris or other materials accidentally released by SRVs moored at the Port. Marine debris could also affect a bird's ability to successfully migrate, feed, mate, or nest. Long-term, minor, direct, adverse impacts on coastal and marine birds could occur as a result of marine debris associated with the Project. The discharge and disposal of garbage and other solid debris from vessels by lessees is prohibited by the MMS (30 CFR 250.300) and the USCG (MARPOL Annex V, Public Law 100-220 [Statute 1458]) (33 CFR Part 151). The discharge of plastics, including ashes from burned plastics, is strictly prohibited and is therefore never authorized. All plastics must be returned to shore, and are tracked. These prohibitions on the discharge and disposal of garbage and other solid debris from vessels

would be incorporated as enforceable conditions into the DWPA license. The USCG enforces MARPOL and the Deepwater Port License and fines or penalties could be assessed where laws and regulations are violated.

In addition, no food or garbage would be discharged into the sea. All such materials would be placed in proper containers and disposed of in accordance with applicable regulations. No wildlife would be fed or intentionally attracted to the SRVs or support vessels, and no fishing by crewmembers would be allowed. Given the relatively small amount of marine debris associated with the Project, major increases in sea turtle ingestion of or entanglement in debris would not be expected.

The relatively small amount of marine debris potentially generated at the Port, along with required avoidance measures would result in short-term, minor, adverse impacts on coastal and marine birds.

Hydrocarbon Spills. The impacts of hydrocarbons on birds are caused by the physical and chemical nature of the spill, by clean-up operations, or indirectly through physical damage to the foraging habitats in the Project area. Species that dive for their food or which congregate on the sea surface are particularly at risk (e.g., cormorants, black skimmers, and terns). Although oil ingested by birds during attempts to clean themselves by preening can be lethal, the most common cause of death is from drowning, starvation, and loss of body heat following fouling of plumage by oil (ITOPF 2008). There would be no ship-to-ship fuel oil transfer and the Port would operate under the provisions of an approved oil spill contingency plan. Vessels would be operated in compliance with all applicable spill prevention requirements and would have spill response plans.

Short-term and long-term, minor, direct and indirect, adverse impacts on coastal and marine birds could result from the unlikely occurrence of a hydrocarbon spill.

LNG Spills. Potential impacts would include exposure to low-temperature LNG at the water surface, possibly resulting in frostbite or death, and asphyxiation by natural gas vapors above the surface of the water. These impacts would likely occur in the immediate vicinity of the spill; the timeframe of the impact is limited (see **Section 5**). Since LNG does not dissolve in water, the timeframe for these potential impacts would be limited, and no adverse toxic impacts would be expected after the LNG boiled off and the vapors dispersed. Because of the low temperatures in the vicinity of the spill, coastal and marine birds would be expected to avoid the area.

Short-term, minor, direct, adverse impacts on coastal and marine birds could occur in the unlikely event of an LNG spill.

Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the

FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Therefore, impacts on coastal and marine birds are expected to be reduced, although a specific timeline would be developed at the time of decommissioning and abandonment.

Short-term, minor, direct and indirect, adverse impacts on coastal and marine birds could occur during Project decommissioning.

4.2.1.8.2 Alternatives

Table 4.2-20 compares impacts from the Proposed Action to each of the alternatives with respect to coastal and marine birds.

Southern Site and Route Alternative. Construction, operation, and decommissioning impacts on coastal and marine birds under the Southern Site Route Alternative would be similar to those under the Proposed Action.

Offshore Interconnection with Gulfstream Pipeline Alternative. Impacts on coastal and marine birds would be less than the Proposed Action under this alternative. Under this alternative the pipeline would not come inshore because of the connection to the Gulfstream pipeline. Shorebirds and wading birds inhabit shallow coastal waters and thus would not be impacted under this alternative. Impacts on seabirds and migratory birds would be similar to those under the Proposed Action. Seafloor disturbance associated with pipeline disturbance under this alternative would be less in shallow coastal waters and would not occur in Tampa Bay. A more detailed description of seafloor disturbance under this alternative is described in detail under Benthic Resources. There would also be less of an impact of turbidity in shallow coastal waters associated with pipeline installation under this alternative. There would be no turbidity increases associated with pipeline installation in Tampa Bay under this alternative.

FSRU Port Design Alternatives. Construction, operation, and decommissioning impacts on coastal and marine birds under the FSRU Port Design Alternative would be similar to those under the Proposed Action. The discharge associated with the FSRU alternative would be fresh water. This discharge would travel a longer distance as a thin layer; therefore, the impacts would be minor.

AAV Alternative. Construction, operation, and decommissioning impacts on coastal and marine birds under the AAV Alternative would be similar to those described under the Proposed Action.

Suction Piles Anchoring Alternative. Construction, operation, and decommissioning impacts on coastal and marine birds under the Suction Piles Anchoring Alternative would be similar to or less than those described under the Proposed Action.

No Action Alternative. The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, no direct or indirect impacts on coastal and marine birds would be expected.

Table 4.2-20. Coastal and Marine Birds Impacts Summary

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnect Alternative	FSRU Design Alternative	AAV Alternative	Suction Pile Anchoring Alternative
Pipeline construction	Minor, short-term, adverse impacts along pipeline route as a result of vessel traffic and noise.	Short-term impacts comparable to Proposed Action (route farther from Egmont Key but closer to Passage Key).	Short-term impacts lower than Proposed Action (no nearshore impacts).	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.
Port construction	Minor, short-term, adverse impacts in the vicinity of the Port as a result of vessel traffic and noise.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	Short-term impacts lower than Proposed Action (lower noise levels).
Operation of Port	Minor, short-term, adverse impacts due to potential LNG/hydrocarbon spills. Long-term impacts due to vessel traffic, noise, lighting, marine debris, and potential hydrocarbon spills.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	Long-term impacts higher than Proposed Action (additional lighting).	No difference from Proposed Action.
Decommission of Port	Minor, short-term and long-term, adverse impacts in vicinity of Port are similar to but lower than Port construction impacts.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.

Note: Under the No Action Alternative none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur. No direct or indirect impacts on biological resources would be anticipated.

4.2.1.9 Phytoplankton

4.2.1.9.1 Proposed Action

Construction

Turbidity. Turbidity refers to any insoluble particulate matter suspended in the water column that impedes light passage by scattering and absorbing light energy. Turbidity would indirectly impact phytoplankton, because increases in turbidity would cause a reduction in the depth of light penetration, and would have the potential to negatively impact phytoplankton productivity (Berry et al. 2003).

The extent of the turbidity plume generated would depend on the amount of sediment disturbed, the grain size, and weight of the disturbed sediment particles; the techniques employed to install and bury the pipeline; and the ambient current dynamics. Coarser, heavier sediment particles would resettle quickly (e.g., within hours), while finer, lighter sediment particles would remain suspended for longer periods of time (e.g., days). Sediment concentrations can be high initially and decay rapidly with distance.

As indicated in **Section 4.1.1**, turbidity modeling (SSFATE) conducted by the Applicant was used to estimate the area in which sediment concentrations would continue to exceed 100 mg/L after 30 minutes. Under worst-case conditions, is estimated that sediment concentration would exceed 100 mg/L for less than 2 hours (ASA 2008). The turbidity plumes would be short-lived and remain fairly close to their source. The total areal extent of the turbidity plumes created during pipeline installation is estimated to be approximately 1,894 hectares (4,679 acres) (ASA 2008). However, the actual distance from the source would depend on the source (e.g., HDD, dredge) and prevailing conditions (e.g., weather and tide). Turbidity events could occur any time during Port installation, which would take approximately 11 months. Impacts on phytoplankton are designated as minor because the impacts are expected to be short in duration or localized (in the immediate area of the Port and Pipeline and in the lower portion of the water column, where phytoplankton are expected to be less abundant). Therefore, short-term, minor, indirect, adverse impacts on phytoplankton would occur as a result of turbidity increases associated with the installation of the Port and Pipeline. BMPs are expected to be effective in reducing the magnitude and extent of impacts resulting from sediment suspension during pipeline construction, and therefore, the impact of turbidity on phytoplankton. However, the performance of the measures should be monitored during construction to verify their effectiveness. The Applicant has stated the intention to apply for a variance from state NPDES turbidity standards, which, if granted, would not reduce adverse impacts, and would likely result in an increase in adverse impacts due to turbidity. BMPs are discussed in detail in **Section 4.11**.

Hydrostatic Test Water Intake and Discharges. The proposed use of approximately 24 million gallons of filtered, surface seawater during flushing and hydrostatic testing of the pipeline would result in the entrainment of phytoplankton. This volume includes flooding the pipeline twice, once for flushing and once for hydrostatic testing. Water would be withdrawn from surface waters at a velocity of 0.2 m/s (0.5 feet/s), where phytoplankton is expected to be most abundant. Short-term, minor, direct, adverse impacts from entrainment of phytoplankton would occur during pipeline hydrostatic testing.

As stated in **Section 4.1.1,** the discharge of hydrostatic test water would have a short-term, minor, localized impact on water quality. Therefore, short-term, negligible, localized impacts on phytoplankton would occur. BMPs located in **Section 4.11** would be expected to be effective in reducing the magnitude and extent of impacts of hydrostatic testing on phytoplankton. However, the performance of the BMPs should be monitored during construction to verify their effectiveness.

Lighting. The Applicant has committed to using downshielding on lights used to identify construction vessels and illuminate working decks. Further, lighting on construction vessels would not illuminate surrounding waters. Additionally, during installation an environmental coordinator would be on site to ensure no violations would occur. Therefore, no adverse impacts on phytoplankton are expected to occur as a result of lights associated with the construction vessels.

Operations

Turbidity. Turbidity associated with long-term chain scour would be expected to be localized and in the lower portion of the water column where phytoplankton are lower in abundance. Therefore, long-term, minor, indirect, adverse impacts on phytoplankton would occur as a result of turbidity increases associated with chain-and-riser sweep associated with the operations of the proposed Port.

Lighting. SRVs would be guided to the submerged unloading buoys by two lighted buoys floating on the sea surface. The lighted buoys would include flashing yellow lights, with an average lighting level of 900 to 1,000 Candelas. Once SRVs are securely moored, lighted buoys would be taken on board and turned off. Moored SRVs would be required to exhibit light signals appropriate for vessels at anchor. Deck lights would also be used to illuminate working decks during LNG regasification activities. No adverse impacts on phytoplankton would be expected to occur as a result of lighting used during routine Port operations.

Seawater Intake and Cooling Water Discharge. While at the Port, two SRVs would use approximately 23.66 MGD of seawater as ballast and cooling water over the course of 4 to 8 days. Seawater intake would be through one of two upper or lower sea chests each measuring 1.5 m by 2.0 m (4.9 feet by 6.56 feet). Average water velocity through the lattice screens at the hull side shell would not exceed 0.15 m/s (0.5 feet/s).

Phytoplankton would be entrained in the ballast and cooling water intake of the SRVs. However, the proposed Project area is not a closed system. The plankton community is highly dynamic (e.g., patchy and highly variable in density over space and time). Due to their low motility and that they are greatly affected by the circulatory patterns in the GOM, impacts on phytoplankton would be temporary and minor. Therefore, long-term, minor, direct, adverse impacts on phytoplankton would occur from SRV seawater intake.

Cooling water would be discharged at 10 °C (18 °F) above ambient seawater temperature and would cool to 1 °C (1.8 °F) above ambient seawater temperature within 100 m (328 feet) of the discharge. An increase in temperature could result in adverse impacts on phytoplankton in the discharge plume. Because the two cooling water discharge plumes compose a relatively small area, impacts are expected to be minor. Additionally, as stated above, the plankton community is highly dynamic (e.g., patchy and highly variable in density over space and time). Due to their low motility and that they are greatly affected by the circulatory patterns in the GOM, impacts on phytoplankton would be temporary and minor. Therefore, short-term, minor, localized impacts on phytoplankton would result from the cooling water discharge.

BMPs were proposed by the Applicant to avoid and minimize impacts from the seawater intake and cooling water discharge associated with the operation of the Port (see **Section 4.11)**.

Routine Discharges. Cooling water discharges and testing of the firefighting system would comply with NPDES permit conditions. While SRVs are present at the Port, they would not discharge domestic waste, bilge water, or ballast water. In addition, on the SRVs, gutter bars would be replaced around equipment where oil leaks could occur (e.g., mooring winches, cranes). Rain water from these areas would be

drained to a bilge holding tank. No rain water would be discharged overboard, from areas around equipment where oil leaks would occur, while at the buoy. The firewater system discharges consist of uncontaminated seawater from testing the firefighting system on the SRVs. Based on the infrequent nature of the discharge, its short duration, and the lack of contaminants, impacts on phytoplankton would be expected to be minor.

BMPs found in **Section 4.11** would reduce the impact of routine vessel discharges on phytoplankton.

Hydrocarbon Spills. Phytoplankton could be impacted by the physical contamination, smothering, and toxic effects of hydrocarbons. Based on the amounts of hydrocarbons stored on the SRVs (see **Section 2.3.3**) and the fact that all SRVs are designed with features to minimize the potential for oil spills (see **Section 2.3.10**), the impact is designated as minor and short-term.

LNG Spills. Potential impacts would include exposure to low-temperature LNG at the water surface, possibly resulting in the death of the phytoplankton that would be in contact with the LNG. These impacts would likely occur in the immediate vicinity of the spill; the timeframe of the impact is limited (see **Section 5**). Acute effects would most likely result in loss of phytoplankton very close to the surface of the spilled LNG. Therefore, minor, direct, adverse impacts on phytoplankton would occur in the unlikely event of an LNG spill.

BMPs found in **Section 4.11** would both help to avoid and reduce the impacts of hydrocarbon and LNG spills, which would reduce potential impacts on phytoplankton.

Decommissioning

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action. Decommissioning activities would result in restrictions similar to those described for the construction process. Due to the in-place abandonment procedures for the pipeline, decommissioning activities are anticipated to take less time than construction. Decommissioning activities could result in an increase in turbidity, which would have the potential to negatively impact phytoplankton productivity by reducing the depth of light penetration (Berry et al. 2003). Impacts from these activities are expected to be similar to those discussed above for construction and would be temporary in nature and localized in scope (in the immediate area of the Port). Short-term, minor, direct, adverse impacts on phytoplankton would occur from decommissioning of the Port.

4.2.1.9.2 Alternatives

Table 4.2-21 compares impacts from the Proposed Action to each of the alternatives with respect to phytoplankton.

Southern Site and Route Alternative. Construction, operation, and decommissioning impacts on phytoplankton under the Southern Site Route Alternative would be similar to those under the Proposed

Action. Impacts associated with turbidity would be slightly greater because pipeline route would be longer.

Offshore Interconnection with Gulfstream Pipeline Alternative. Impacts on phytoplankton would be less than the Proposed Action under this alternative. Under this alternative the pipeline would not come inshore because of the connection to the Gulfstream pipeline. The connection would occur approximately 16 km (10 mi) from the mouth of Tampa Bay, in water depth of 6 m (20 feet). Turbidity associated with pipeline installation under this alternative would be less under this alternative.

FSRU Port Design Alternatives. Short-term impacts during construction would be lower under this alternative than under the Proposed Action. There are fewer anchors and no flexible riser and under this alternative; seafloor disturbance and turbidity would be lower. Therefore, impact on phytoplankton would also be lower.

Operation impacts on phytoplankton under the FSRU Port Design Alternative would be approximately 4.8 times higher than under the Proposed Action. As described in **Section 2.1.3.3**, the cooling and ballast water intake for LNGCs serving the FSRU would be approximately 4.8 times higher than for the Proposed Action. The discharge associated with the FSRU alternative would be fresh water. This discharge would travel a longer distance as a thin layer; therefore, the impacts would be minor.

AAV Alternative. Construction, operation, and decommissioning impacts on phytoplankton under the AAV Alternative would be approximately 4.8 times higher than under the Proposed Action. As described in **Section 2.1.3.3**, the cooling and ballast water intake for the AAV Alternative would be approximately 4.8 times higher than for the Proposed Action. The discharge associated with the AAV Alternative would be fresh water. This discharge would travel a longer distance as a thin layer; therefore, the impacts would be minor.

Suction Piles Anchoring Alternative. Construction, operation, and decommissioning impacts on phytoplankton under the Suction Piles Anchoring Alternative would be similar to those under the Proposed Action.

No Action Alternative. The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In

addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, no direct or indirect impacts on phytoplankton would be expected. Other Deepwater LNG Ports would have impacts on phytoplankton that are similar to the Port Dolphin.

Table 4.2-21. Phytoplankton Impacts Summary

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnect Alternative	FSRU Design Alternative	AAV Alternative
Pipeline construction	Minor, short-term, adverse impacts along pipeline route as a result of turbidity and hydrostatic testing and discharges.	Short-term impacts higher than Proposed Action (longer route).	Short-term impacts lower than Proposed Action (shorter route).	No difference from Proposed Action.	No difference from the Proposed Action.
Port construction	Minor, short-term, adverse impacts in the vicinity of the Port as a result of turbidity.	No difference from Proposed Action.	No difference from Proposed Action.	Short-term impacts as a result of turbidity lower than Proposed Action (fewer anchors and no flexible riser).	No difference from the Proposed Action
Operation of Port	Minor, long-term, adverse impacts due to seawater intake and discharges, routine discharges, and potential LNG/hydrocarbon spills. Long-term impacts due to chain sweep and marine debris.	No difference from Proposed Action.	No difference from Proposed Action.	Seawater intake and discharges would be approximately 5 times higher than the Proposed Action. Therefore, long-term, adverse impacts on phytoplankton would be greater than for the Proposed Action.	Seawater intake and discharges would be approximately 5 times higher than the Proposed Action. Therefore, long-term, adverse impacts on phytoplankton would be greater than for the Proposed Action.
Decommission of Port	Minor, short-term adverse impacts would be similar to construction of the pipeline and Port. Impacts of decommissioning would be lower than construction.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from the Proposed Action.

Notes:

1. Under the No Action Alternative none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur. No direct or indirect impacts on biological resources would be anticipated.
2. Suction Pile Anchoring Alternatives were carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.2.1.10 Zooplankton

4.2.1.10.1 Proposed Action

Construction

***Turbidity*.** Turbidity refers to any insoluble particulate matter suspended in the water column that impedes light passage by scattering and absorbing light energy. Turbidity on marine zooplankton results in impacts such as reduced vertical migrations, reduced feeding, direct mortality and toxicity, and physiological impairment (Berry et al. 2003, Byrnes et al. 2003). Laboratory tests indicated that mysids exposed to 230 mg/L of natural sediment and copepods exposed to 1,020 mg/L of natural sediment for 28 days experienced 40 percent and 60 to 80 percent mortality, respectively (Berry et al. 2003). Impacts on zooplankton from turbidity are expected to be restricted to the lower portion of the water column (Byrnes et al. 2003).

The extent of the turbidity plume generated would depend on the amount of sediment disturbed, the grain size, and weight of the disturbed sediment particles, the techniques employed to install and bury the pipeline, and the ambient current dynamics. Coarser, heavier sediment particles would resettle quickly (e.g., within hours), while finer, lighter sediment particles would remain suspended for longer periods of time (e.g., days). Sediment concentrations can be high initially and decay rapidly with distance.

As indicated in **Section 4.1.1**, turbidity modeling (SSFATE) conducted by the Applicant was used to estimate the area in which sediment concentrations would continue to exceed 100 mg/L after 30 minutes. Under worst-case conditions, is estimated that sediment concentration would exceed 100 mg/L for less than 2 hours (ASA 2008). The turbidity plumes would be short-lived and remain fairly close to their source. The total areal extent of the turbidity plumes created during pipeline installation is estimated to be approximately 1,894 hectares (4,679 acres) (ASA 2008). However, the actual distance from the source would depend on the source (e.g., HDD, dredge) and prevailing conditions (e.g., weather and tide). Impacts on zooplankton are designated as minor because the impacts are expected to be short in duration or localized (in the immediate area of the Port and Pipeline and in the lower portion of the water column, where zooplankton are expected to be less abundant). Therefore, short-term, minor, indirect, adverse impacts on zooplankton would occur as a result of turbidity increases associated with the installation of the Port and Pipeline.

Overall turbidity increases would be temporary in duration and localized in scope. Therefore, short-term, minor, indirect, adverse impacts on zooplankton would occur as a result of turbidity increases associated with the installation of the Port and Pipeline.

BMPs found in **Section 4.11** are expected to be effective in reducing the magnitude and extent of impacts resulting from sediment suspension during pipeline construction and therefore, the impact of turbidity on zooplankton. However, the performance of the measures should be monitored during construction to verify their effectiveness. Application for variance from turbidity standards would not be effective in reducing adverse impacts, and could, in fact, result in an increase in adverse impacts.

Hydrostatic Test Water Intake and Discharges. The proposed use of approximately 24 million gallons of surface seawater during flushing and hydrostatic testing of the pipeline would result in the entrainment of zooplankton. This volume includes flooding the pipeline twice, once for flushing and once for hydrostatic testing. Water would be withdrawn from surface waters at a velocity of 0.2 m/s (0.5 feet/s). Therefore, short-term, minor, direct, adverse impacts on zooplankton would occur as a result of pipeline hydrostatic testing intake.

As stated in **Section 4.1.1,** discharge hydrostatic test would have a short-term, minor, localized impact on water quality. Therefore, short-term, negligible, localized impacts on zooplankton would occur.

Lighting. Zooplankton could be attracted to lights, making them vulnerable to predation. The Applicant has committed to using downshielding on lights used to identify construction vessels and illuminate working decks. Further, lighting on construction vessels would not illuminate surrounding waters. Additionally, during installation an environmental coordinator would be on site to ensure no violations would occur. Therefore, the potential impacts on zooplankton would be avoided.

Operations

Turbidity. Impacts from turbidity are expected to be restricted to the lower portion of the water column. Impacts on zooplankton are designated as minor because the impacts are expected to be localized (in the immediate area of the Port and in the lower portion of the water column, where zooplankton are less abundant). Therefore, long-term, minor, indirect, adverse impacts on zooplankton would occur as a result of turbidity increases associated with chain and riser sweep associated with the operations of the proposed Port.

Lighting. Zooplankton could be attracted to lights associated with the STL buoys, making them vulnerable to predation. Lights used to identify SRVs moored at the Port and to illuminate working decks would not intentionally illuminate surrounding waters. Additionally, the plankton community is dynamic and greatly affected by the circulatory patterns in the GOM. Based on these dynamics, impacts on zooplankton would be expected to be long-term, minor, indirect, and adverse.

Seawater Intake and Cooling Water Discharge. Zooplankton would be entrained in the seawater intake. While at the Port, two SRVs would use approximately 23.66 MGD of seawater as ballast and cooling water over the course of 4 to 8 days. Seawater intake would be through one of two upper or lower sea chests each measuring 1.5 m by 2.0 m (4.9 feet by 6.56 feet). Average water velocity through the lattice screens at the hull side shell would not exceed 0.15 m/s (0.5 feet/s).

The daily impact on zooplankton was estimated based on the wet weight of the standing crop of zooplankton on the western Florida shelf ranging from 0.031 to 0.2 mg/m^3 (2.6 x 10^{-7} to 1.7 x 10^{-6} pounds/gallon) and a total seawater intake of 23.66 MGD (Okey and Mahmoudi 2002). Seawater use by the Project would, therefore, remove approximately 2.8 to 18.3 kg (6 to 40 lb) of zooplankton each day. Limitations of this analysis are based on the fact that the distribution and abundance of zooplankton is spatially variable and patchy and the gear used to collect zooplankton might have been too large to collect smaller zooplankton which could be important to total biomass.

Laboratory and field studies of marine organisms indicate that the average efficiency of energy transfer from one trophic level on the food web to the next trophic level is about 10 percent. In other words, only 10 percent of the energy available at one trophic level is passed on to the next (Sumich 1988). Therefore, a loss of 2,245 to 14,681 pounds of zooplankton each year (losing 6 to 40 pounds each day for 365 days per year) would result in the total annual loss of approximately 225 to 1,468 pounds of small planktivorous fish biomass and approximately 23 to 147 pounds of large piscivorous fish biomass. These estimates are conservative because the consumption of zooplankton and small planktivorous fish was assumed to be 100 percent. This represents a minor loss compared to the total amount of biomass available in the GOM.

Long-term, minor, localized impacts on zooplankton would result from the cooling water discharges. Cooling water would be discharged at 10 °C (18 °F) above ambient seawater temperature and would cool to 1 °C (1.8 °F) above ambient seawater temperature within 100 m (328 feet) of the discharge. An

increase in temperature could result in adverse impacts on zooplankton in the discharge plume. Because the two cooling water discharge plumes compose a relatively small area, impacts would be expected to be minor and direct.

BMPs proposed by the Applicant to avoid and minimize impacts from the seawater intake and cooling water discharge associated with the operation of the Port are discussed in detail in **Section 4.11**.

Other Routine Discharges. Cooling water discharges and testing of the firefighting system would comply with NPDES permit conditions. While SRVs are present at the Port, they would not discharge domestic waste, bilge water, or ballast water. In addition, on the SRVs, gutter bars would be replaced around equipment where oil leaks could occur (e.g., mooring winches, cranes). Rain water from these areas would be drained to a bilge holding tank. No rain water would be discharged overboard, from areas around equipment where oil leaks would occur, while at the buoy. The firewater system discharges consist of uncontaminated seawater from testing the firefighting system on the SRVs. Based on the infrequent nature of the discharge, its short duration, and the lack of contaminants, impacts on zooplankton would be expected to be minor.

BMPs outlined in **Section 4.11** would avoid the impact of routine vessel discharges on zooplankton.

Hydrocarbon Spills. Based on the amounts of hydrocarbons stored on the SRVs (see **Section 2.3.3**) and the fact that all SRVs are designed with features to minimize the potential for oil spills (see **Section 2.3.10**), the impact is designated as minor and short-term. Zooplankton could be impacted by physical contamination, smothering, and toxic effects of hydrocarbons. Acute effects would most likely result in loss of populations near the release or accident, but no long-term impacts on areawide populations from loss of these individuals is expected. Overall impacts on zooplankton from hydrocarbon spills would be short-term, minor, direct, and adverse.

LNG Spills. Potential impacts would include exposure to low-temperature LNG at the water surface, possibly resulting in frostbite or death, and asphyxiation by natural gas vapors above the surface of the water. These impacts would likely occur in the immediate vicinity of the spill; the timeframe of the impact is limited (see **Section 5**). Acute effects would most likely result in loss of local populations near the release or accident. Short-term, minor, direct, adverse impacts on zooplankton would occur in the unlikely event of an LNG spill.

BMPs discussed in **Section 4.11** would help to avoid and reduce the impacts of hydrocarbon and LNG spills, which would reduce potential impacts on zooplankton.

Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the

FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Decommissioning activities could cause the resuspension of sediments and an increase in turbidity. Impacts from these activities are expected to be similar to those discussed above for construction and would be temporary in nature and localized in scope (in the immediate area of the Port). Overall, it is expected that decommissioning activities would have short-term, minor, direct, and adverse impacts on zooplankton.

4.2.1.10.2 Alternatives

Table 4.2-22 compares impacts from the Proposed Action to each of the alternatives with respect to zooplankton.

Southern Site and Route Alternative. Construction, operation, and decommissioning impacts on zooplankton under the Southern Site Route Alternative would be similar to those under the Proposed Action. Impacts associated with turbidity would be slightly greater because the pipeline route would be longer.

Offshore Interconnection with Gulfstream Pipeline Alternative. Impacts on zooplankton would be less than the Proposed Action under this alternative. Under this alternative the pipeline would not come inshore because of the connection to the Gulfstream pipeline. The connection would occur approximately 16 km (10 mi) from the mouth of Tampa Bay, in water depth of 6 m (20 feet). Turbidity associated with pipeline installation under this alternative would be less under this alternative.

FSRU Port Design Alternatives. Short-term impacts during construction would be lower under this alternative than under the Proposed Action. There are fewer anchors and no flexible riser and under this alternative; seafloor disturbance and turbidity would be lower. Therefore, impact on zooplankton would also be lower.

Operation impacts on zooplankton under the FSRU Port Design Alternative would be approximately 4.8 times higher than under the Proposed Action. As described in **Section 2.1.3.3**, the cooling and ballast water intake for LNGCs serving the FSRU would be approximately 4.8 times higher than for the Proposed Action. The discharge associated with the FSRU alternative would be fresh water. This discharge would travel a longer distance as a thin layer; therefore, the impacts would be minor.

AAV Alternative. Construction, operation, and decommissioning impacts on phytoplankton under the AAV Alternative would be approximately 4.8 times higher than under the Proposed Action. As described in **Section 2.1.3.3**, the cooling and ballast water intake associated with the AAV Alternative would be approximately 4.8 times higher than for the Proposed Action. The discharge associated with the AAV Alternative would be fresh water. This discharge would travel a longer distance as a thin layer; therefore, the impacts would be minor.

Suction Piles Anchoring Alternative. Construction, operation, and decommissioning impacts on zooplankton under the Suction Piles Anchoring Alternative would be similar to those under the Proposed Action.

No Action Alternative. The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No

Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, no direct or indirect impacts on zooplankton would be expected. Alternative sources of natural gas might include other Deepwater LNG Ports or onshore LNG terminals. Other Deepwater LNG Ports might have impacts on zooplankton that are similar to the Port Dolphin.

Table 4.2-22. Zooplankton Impacts Summary

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnect Alternative	FSRU Design Alternative	AAV Alternative
Pipeline construction	Minor, short-term, adverse impacts along pipeline route as a result of turbidity and hydrostatic testing and discharges.	Short-term impacts higher than Proposed Action (longer route).	Short-term impacts lower than Proposed Action (shorter route).	No difference from Proposed Action.	No difference from Proposed Action.
Port construction	Minor, short-term, adverse impacts in the vicinity of the Port as a result of turbidity.	No difference from Proposed Action.	No difference from Proposed Action.	Short-term impacts as a result of turbidity lower than Proposed Action (fewer anchors and no flexible riser).	Short-term impacts as a result of turbidity lower than Proposed Action (anchors and no flexible riser).
Operation of Port	Minor, short-term, adverse impacts due to seawater intake and cooling water discharges, routine discharges, and potential LNG/hydrocarbon spills. Long-term impacts due to chain sweep and marine debris.	No difference from Proposed Action.	No difference from Proposed Action.	Seawater intake and discharges would be approximately 5 times higher than the Proposed Action. Therefore, long-term, adverse impacts on phytoplankton would be greater than for the Proposed Action.	Seawater intake and discharges would be approximately 5 times higher than the Proposed Action. Therefore, long-term, adverse impacts on phytoplankton would be greater than for the Proposed Action.
Decommission of Port	Minor, short-term adverse impacts would be similar to construction of the pipeline and Port. Impacts of decommissioning would be lower than construction.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.

Note:

1. Under the No Action Alternative none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur. No direct or indirect impacts on biological resources would be anticipated.
2. Suction Pile Anchoring Alternatives were carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.2.1.11 Planktonic Fish and Invertebrates

4.2.1.11.1 Proposed Action

Construction

Turbidity. Turbidity refers to any insoluble particulate matter suspended in the water column that impedes light passage by scattering and absorbing light energy. Activities that resuspend sediments have the potential to negatively impact early life stages of fish species by preventing successful egg and larvae development (USEPA 1976, Colby and Hoss 2004). Turbidity-related impacts often include reductions in growth and feeding rates, and the clogging of respiratory structures, especially when eggs and larvae are demersal (Berry et al. 2003).

The extent of the turbidity plume generated would depend on the amount of sediment disturbed, the grain size, and weight of the disturbed sediment particles, the techniques employed to install and bury the pipeline, and the ambient current dynamics. Coarser, heavier sediment particles would resettle quickly (e.g., within hours), while finer, lighter sediment particles would remain suspended for longer periods of time (e.g., days). Sediment concentrations can be high initially and decay rapidly with distance.

As indicated in **Section 4.1.1**, turbidity modeling (SSFATE) conducted by the Applicant was used to estimate the area in which sediment concentrations would continue to exceed 100 mg/L after 30 minutes. Under worst-case conditions, is estimated that sediment concentration would exceed 100 mg/L for less than 2 hours (ASA 2008). The turbidity plumes would be short-lived and remain fairly close to their source. The total areal extent of the turbidity plumes created during pipeline installation is estimated to be approximately 1,894 hectares (4,679 acres) (ASA 2008). However, the actual distance from the source would depend on the source (e.g., HDD, dredge) and prevailing conditions (e.g., weather and tide). Impacts on planktonic fish and shellfish are designated as minor because the impacts are expected to be short in duration or localized (in the immediate area of the Port and pipeline). Therefore, short-term, minor, indirect, adverse impacts on planktonic fish and shellfish would occur as a result of turbidity increases associated with the installation of the Port and pipeline.

BMPs discussed in **Section 4.11** are expected to be effective in reducing the magnitude and extent of impacts resulting from sediment suspension during pipeline construction and therefore, the impact of turbidity on planktonic fish and shellfish. However, the performance of the measures should be monitored during construction to verify their effectiveness. Application for variance from turbidity standards would not be effective in reducing adverse impacts, and could, in fact, result in an increase in adverse impacts.

Hydrostatic Test Water Intake and Discharges. Planktonic fish and shellfish would be entrained as a result of hydrostatic testing. The proposed use of approximately 24 million gallons of filtered, surface seawater during flushing and hydrostatic testing of the pipeline would result in the entrainment of plankton fish and shellfish. This would be approximately 0.3 percent of the impact of the seawater intake of the Port in one year. Hydrostatic testing would be expected to occur sometime between May and September, during the construction of the proposed pipeline. The impact on any species that would occur in the Project area during that time of the hydrostatic testing is expected to be similar to impacts of cooling water intake during the same time of year. Impacts on plankton would be minor as a result of pipeline intakes and discharges. As stated in **Section 4.1.1,** discharge of hydrostatic test water would have a short-term, minor, localized impact on water quality. Therefore, short-term, negligible, localized impacts on planktonic fish and shellfish would occur.

Lighting. Planktonic fish and shellfish are attracted to lighting during the night (Hickford and Schiel 1999) and would potentially be attracted to the construction area, making them more vulnerable to predation. Lights would be used to identify construction vessels at night and to illuminate working decks. These lights would not intentionally illuminate surrounding waters. Therefore, potential impacts would be short-term, minor, direct, and indirect. Minor adverse impacts on planktonic fish and shellfish would occur as a result of lighting associated with construction.

Operations

Turbidity. Impacts from turbidity are expected to be extremely localized and in the lower portion of the water column. Long-term, minor, indirect, adverse impacts on planktonic fish and shellfish would occur as a result of turbidity increases associated with chain and riser sweep associated with the operations of the proposed Port.

Lighting. Planktonic fish and shellfish could be attracted to the construction area, making them more vulnerable to predation. Lights would be used on SRVs at night to illuminate working decks. Additionally, the plankton community is highly dynamic (e.g., patchy and highly variable in density over space and time). Due to their reduced motility and the fact they are affected by the circulatory patterns in the GOM, impacts on planktonic fish and shellfish would be temporary and minor.

Seawater Intake and Cooling Water Discharge. While at the Port, two SRVs would use approximately 23.66 MGD of seawater as ballast and cooling water over the course of 4 to 8 days. Seawater intake would be through one of two upper or lower sea chests each measuring 1.5 m by 2.0 m (4.9 feet by 6.56 feet). Average water velocity through the lattice screens at the hull side shell would not exceed 0.15 m/s (0.5 feet/s).

Direct impacts of the seawater intake would include entrainment of fish and invertebrate eggs and larvae passing through the intake screen. For the following assessment, mortality of eggs and larvae in the SRVs' seawater intakes was assumed to be 100 percent. These impacts on fisheries resources and EFH were determined to be minor because the quantitative analysis found impacts were slight, but detectable (minor), when compared to state landings of some species by commercial and recreation fisheries, as described in the following analysis.

The need for quantitative assessment of impacts on ichthyoplankton was recognized during earlier reviews of LNG Deepwater Port project license applications that had proposed to use open-loop vaporization systems. The open-loop vaporization systems that were proposed at that time required seawater intakes several times larger than that proposed for Port Dolphin. USCG and the Maritime Administration worked cooperatively with the NMFS staff and other interested parties to develop an ichthyoplankton assessment methodology that used the SEAMAP database to estimate the number of eggs and larvae that could be entrained by the deepwater ports based on the density of eggs and larvae (number of eggs and larvae in 1 million gallons [3,785 m^3] of seawater) (USCG and MARAD 2004).

Based on the species represented in the SEAMAP data and other considerations, such as the availability of data to construct life histories and whether or not a species had EFH in the area, four species were selected to represent broad categories of the species represented in the data. The four finfish species that were selected are red drum (*Sciaenops ocellatus*), red snapper (*Lutjanus campechanus*), Gulf menhaden (*Brevoortia patronus*), and bay anchovy (*Anchoa* spp.). These species were selected to represent a commercially and recreationally important species with significant impacts from overfishing and extensive restrictions on landings through a Federal FMP (red drum), another important commercial and recreational species that is managed under a Federal FMP (red snapper), a commercially important

species with no recreational importance (Gulf menhaden), and an important prey species with limited commercial importance (bay anchovy).

In comments on the assessments for the projects that had proposed open-loop vaporization systems, NMFS stated their preference for closed-loop vaporization systems, such as the one proposed by the Applicant. The primary mitigation identified by NMFS for open-loop systems was substitution of a closed-loop system. However, in evaluations for subsequent deepwater port projects that proposed closed-loop vaporization systems, an analysis of the potential impacts using the quantitative methodology was still conducted.

Based on discussions with NMFS and the FWC, two additional species were identified for analysis based on the Port location off the coast of western Florida. Gag grouper was selected as a commercially and recreationally important species in the Project area that is managed under a Federal FMP. Sheepshead was selected as a species of concern to Florida that is not managed under a Federal FMP. Other species might have EFH in the Project area or occur in the Project area, but these representative species were selected (in cooperation with NMFS) based on economic and ecological importance, availability of life history data, and the similarity to other population types. However, 217 taxa are identified in the SEAMAP samples at the study area. See **Table 3-1 of Appendix G** for the complete list of taxa caught in samples at the study area. It is assumed that impacts on other species in the Project area would be similar to impacts on these representative species.

The SEAMAP database has a number of limitations including the sampling strategy, the efficiency of sampling equipment, and frequency of sampling. Despite the limitations, SEAMAP data have several advantages for this analysis. The data are readily available. The data have been collected consistently since 1983. These data are also available for the area near Port Dolphin. Therefore, the data and methodology used represent the best available data. A complete description of the data, data limitations, and data analysis is provided in **Appendix G**.

To ensure that actual impacts attributable from Port operations are consistent with this analysis, the license, if issued, would, like other Maritime Administration DWPA licenses issued to date, contain a condition requiring pre- and post construction ichthyoplankton sampling. If ichthyoplankton densities exceed levels specified in the monitoring plan, adaptive management would be required. As noted above, the ichthyoplankton assessment model was developed to assess impacts from open-loop vaporization systems. The principal mitigation recommended by NMFS was use of a closed-loop vaporization system. Port Dolphin LLC has proposed to use a closed-loop vaporization system, therefore impacts on ichthyoplankton and related fisheries would be expected to be minor.

While at the Port, the SRVs' seawater intake systems potentially represent an additional mortality source for fish eggs and larvae. To assess the impact of the SRVs' seawater systems, three parameters were calculated: (1) the number of eggs and larvae potentially entrained annually by the vaporization system, (2) the number of age-1 equivalents potentially lost (annually), and (3) annual equivalent yield. The first parameter, the egg and larval entrainment estimates, is an estimate of the number of eggs and larvae lost during seawater intake. It is used as the basis for evaluating the other parameters. The second and third parameters were calculated using the entrainment estimates and represent a more realistic assessment of potential impacts on fisheries resources.

The second parameter, annual age-1 equivalents, projects forward the number of lost eggs and larvae that would have likely survived to age-1 (had they not been entrained by the seawater intake system). This parameter provides a meaningful way to compare the impacts of seawater intake on different species.

The third parameter, annual equivalent yield, considers mortality to the point that the fish would have entered the fishery (i.e., fish would have been at an age/size that could be legally harvested). Annual equivalent yield estimates were calculated to assess potential stress on fish population and compared to Florida fisheries harvest. It is important to note that equivalent yield estimates do not predict direct losses to fish harvests. For example, an equivalent yield that represents 2 percent of some fishing harvest is equivalent to an additional 2 percent fishing stress on a population when compared to that harvest, not a 2 percent loss of that harvest.

The number of eggs and larvae potentially entrained by the SRVs' seawater intake systems each year is a function of (1) seawater usage, and (2) density of the eggs and larvae in data. Note that annual entrainment estimates are based on total seawater intake of 23.66 MGD. This assumes that there would be an SRV moored to both buoys and vaporizing LNG at all times throughout the year. Since two SRVs would only overlap at the buoys for about a day, a more realistic but still conservative value for average seawater intake would be about 14 MGD. **Table 4.2-23** provides a summary of the number of eggs and larvae (for each representative species) estimated to be entrained by the cooling water systems of SRVs each year. A detailed description of the calculation of annual entrainment estimates is provided in **Section 4 of Appendix G**.

Table 4.2-23. Annual Egg and Larvae Entrainment Estimates (Number of Eggs and Larvae) for the Project

Species	Eggs (Number)	Larvae (Number)
Red drum	1,228	4,384
Red snapper	27,304	97,516
Bay anchovies	100,349	358,388
Gag grouper	47,340	169,073
Sheepshead	1,016,697	3,631,060
Spanish sardines	11,760,069	42,000,246

Source: SEAMAP Data 2002

Annual age-1 equivalent estimates and equivalent yield estimates are calculated based on annual entrainment estimates and life history characteristics (e.g., survival rates of eggs and larvae and adult fish) and mortality related to the commercial and recreational fisheries (for equivalent yield) for each representative species (described in **Appendix G**). The average annual age-1 equivalent and equivalent yield estimates for the representative species are presented in **Table 4.2-24**. A complete description of the calculation of age-1 equivalent and equivalent yield estimates is provided in **Appendix G**. **Table 4.2-25** shows the comparison between the annual equivalent yield estimates and the average total harvest (commercial and recreational) for the State of Florida.

Variability and uncertainty of the assessment of impacts on ichthyoplankton is related to mortality and growth of the early life history stages and the distribution of ichthyoplankton. There are relatively few measurements available for mortality and growth for early life history stages of fish (**Appendix G**, Houde 1987). Available data however, indicate that these rates can be highly variable. Mortality rates used for the assessment are generally based on the average of available estimates (described in detail in **Appendix G**). Larval mortality is thought to vary in relation to water temperature, food availability, and predation. In addition, mortality of early life history is also difficult to measure. Distribution of

Table 4.2-24. Annual Age-1 Average Age-1 Equivalent and Equivalent Yield for Assessed Species

Species	Age-1 Equivalent (Number)	Equivalent Yield (Pounds)
Red drum	4	14
Red snapper	38	45
Bay anchovies	187	N/A
Gag grouper	865	1,363
Sheepshead	680	2
Spanish sardines	0	0

Source: SEAMAP Data 2002

Note: N/A = Not Applicable because the Federal commercial landings are not available for this species.

Table 4.2-25. Average (1990–2006) Florida Commercial and Recreational Landings Associated with the Proposed Action

Species	Florida Commercial Landings (lb)[a]	Florida Recreational Landings (lb)[b]	Total Florida West Coast Landings (lb)	Annual Equivalent Yield as a Percent of Total Florida West Coast Landings
Red drum	0	1,296,070	1,296,070	0.00%
Red snapper	543,030	1,259,195	1,802,255	0.00%
Gag grouper	2,028,612	2,839,046	4,867,658	0.03%
Sheepshead	293,918	1,871,372	2,165,290	0.00%
Spanish sardines	1,433,774	NA	1,433,774	0.00%

Sources: NMFS 2006c and NMFS 2007c

Note: N/A = Not Applicable because the Federal commercial landings are not available for this species.

planktonic fish and shellfish eggs and larvae is both temporally and spatially variable and often occurs in patches. Densities can also be variable. The distribution and abundance of fish eggs and larvae depend on spawning behavior of adults, hydrographic structure and transport on a variety of scales (e.g., vertical stratification and coastal currents), duration of the pelagic period, and behavior of larvae (e.g., vertical migration).

To account for natural variability, annual age-1 equivalents and annual equivalent yield were estimated using the lower and upper 95 percent confidence limits of monthly larval density (based on the ratio-based correction factors for fish species) as the basis for lower and upper entrainment estimates (see **Appendix G** for a full description). The results of the sensitivity analysis based on the lower and upper entrainment estimates for annual age-1 equivalents and equivalent yield under the proposed alternative are presented in **Table 4.2-26**. The upper and lower equivalent yield estimates were compared as a percentage of average (1990 to 2006) Florida commercial and recreational landings in **Table 4.2-27**.

Table 4.2-26. Lower and Upper Annual Age-1 Equivalent and Equivalent Yield Estimates Associated with the Proposed Action

Species	Lower Estimates		Upper Estimates	
	Age-1 Equivalents (Number)	Equivalent Yield (lb)	Age-1 Equivalents (Number)	Equivalent Yield (lb)
Red drum	0	1	3	11
Red snapper	20	24	57	67
Bay anchovies*	81	N/A	295	N/A
Gag grouper	320	504	1,412	2,225
Sheepshead	423	2	938	3
Spanish sardines	0	0	32	0

Source: SEAMAP Data 2002

Notes: N/A = Not Applicable

* Federal commercial landings are not available for this species.

Table 4.2-27. Comparison of Lower and Upper Annual Equivalent Yield Estimates Compared to Average (1990–2004) Florida West Coast Florida Commercial and Recreational Landings for Red Drum and Red Snapper

Species	Lower Estimates	Upper Estimate
	Equivalent Yield as a Percent of Total Florida Landings	Equivalent Yield as a Percent of Total Florida Landings
Red drum	0.00%	0.00%
Red snapper	0.00%	0.00%
Gag grouper	0.01%	0.05%
Sheepshead	0.00%	0.00%
Spanish sardines	0.00%	0.00%

Source: SEAMAP Data 2002

Notes: N/A = Not Applicable

* This species is not fished commercially or recreationally.

Gulf menhaden were not represented in the SEAMAP data because this species spawns from October through March; a time when the SEAMAP data were not consistently collected. It is likely that Gulf menhaden would be entrained by seawater intake associated with the Port. However, egg and larval entrainment is likely to be less than entrainment of Spanish sardines. Data collected by Houde et al. (1979) indicate that *Brevoortia* spp. (the genus that includes Gulf menhaden) occurred at depths of less than 30 meters and that *Brevoortia* spp. were less common than any of the other clupeids (e.g., Spanish sardines), suggesting that concentrations of menhaden are relatively low in the eastern GOM.

Pink shrimp (*Farfantepenaeus duorarum*) eggs are demersal and would not be entrained by seawater intake associated with the Proposed Action. Pink shrimp larvae would occur in the area of the Port and would be entrained from the Proposed Action. Adult pink shrimp spawn in water depths of 3.7 to 47.5 m (12 to 156 feet). They spawn offshore of Tampa Bay in highly saline waters primarily from April through September. The larvae develop at sea and enter into estuarine nursery ground as postlarvae at lengths of

about 8 mm (0.3 inches). Planktonic larvae migrate vertically in the water column. They are located near the bottom during the day and nearer to the surface at night (Mulholland 1984). Therefore, the pink shrimp larvae would be more vulnerable to seawater intake at night.

Based on the lobster's (*Panulirus argus*) life history, the seawater intake associated with the Port is only expected to have a minor impact on lobster. Spawning of spiny lobster in Florida occurs in late April through October in deeper offshore waters (FWRI 2007, Simms 1966). Eggs remain attached to the female and would not be entrained the by seawater intake associated with the Port. Once the larvae, called phyllosomes, hatch, they disperse into the water column and are transported long distances via ocean currents and circulation. It is possible that most phyllosomes are carried away in the Gulf Stream (Simms 1966). Lobster larvae undergo diel migrations and are located near the surface during the day and descend at night. Therefore, the lobster larvae would be more vulnerable to seawater intake at night. Free swimming post-larvae, called pueruli, enter shallow water throughout the year, where they settle into the benthic life stage (FWRI 2007, Simms 1966).

It is evident from the minor impacts on finfish predicted by even the most extreme sensitivity cases that the impacts from the closed-loop vaporization system for the proposed Project would be minor. As stated above, if a license is issued, it would, like other Maritime Administration DWPA licenses issued to date, include conditions requiring pre- and post-construction monitoring to ensure that the assumptions made in the analysis are consistent with actual conditions at the port site. Overall, impacts from cooling and ballast water intake on planktonic fish and shellfish are expected to be long-term, minor, direct, and indirect.

Indirect impacts on fisheries resources and other marine species could occur by impingement and entrainment eggs and larvae in the ballast and cooling water intake. Changes in marine biodiversity affect the food web by causing cascading effects up and down the food chain. The following is a qualitative analysis used to describe minor effects of seawater intake on a hypothetical marine fish food chain. This analysis assumes the following: (1) the average weight of an individual fish egg is 0.0000348 lb and the average weight of an individual fish larvae is 0.000898 lb (these weights are based on the average weights of eggs and larvae of 24 marine species [see **Appendix G**]) (USEPA 2002), and (2) the efficiency of energy transfer between trophic levels (i.e., levels on a food chain) is 10 percent (i.e., consumers gain approximately 10 percent of the weight of the prey consumed, described in more detail below). Based on SEAMAP, an average of 3,398 eggs and 12,084 larvae occur in a million gallons of seawater in the Project area (see **Appendix G**). Based on a seawater intake of 23.66 MGD, approximately 29 million eggs and 104 million larvae would be entrained by the deepwater port each year. Based on the average weight of fish eggs and larvae, a biomass of approximately 1,021 pounds of eggs and 93,712 pounds of larvae would be removed from the food web each year for the life of the proposed Project.

Laboratory and field studies of marine organisms indicate that the average efficiency of energy transfer from one trophic level on the food web to the next trophic level is about 10 percent. In other words, only 10 percent of the energy available at one trophic level is passed on to the next (Sumich 1988). Therefore, a loss of 1,021 pounds of eggs and 93,712 pounds of larvae biomass each year would result in the total annual loss of approximately 9,371 pounds of small planktivorous fish biomass and approximately 937 pounds of large piscivorous fish biomass. This represents a minor loss compared to the total amount of biomass available in the GOM. An estimate of biomass of small pelagic fish is 5.8×10^9 pounds and an estimate of biomass of predator species is 1.3×10^7 pounds (SWFWMD 1999, Brown et al. 1999).

Indirect effects on fish and shellfish larvae could also occur because of the entrainment of phytoplankton and zooplankton, which could also serve as food sources. In the GOM, planktivorous fish that could consume fish eggs and larvae include species such as herrings, anchovies, and sardines (Okey and Mahmoudi 2002). Gelatinous zooplankton such as medusae and ctenophores also feed on fish larvae.

Predatory fish in the GOM include species such tunas, marlins, snappers, sharks, mackerel, grouper, and bluefish. Bottlenose dolphins are also predatory. These species feed on fish and shellfish (Okey and Mahmoudi 2002). All species have fairly broad diets and don't depend on any single species for survival. Because of the relatively low biomass that would be entrained by the Port, the broad diet, and broad availability of organisms in the proposed Project area, indirect impacts on the food web that result from the entrainment of planktonic fish and shellfish eggs and larvae would be expected to be minor.

In addition, long-term, minor, localized impacts on planktonic fish and shellfish would result from the cooling water discharges. Cooling water would be discharged at 10 °C (18 °F) above ambient seawater temperature and would cool to 1 °C (1.8 °F) above ambient temperature within 100 m (328 feet) of the discharge. An increase in temperature could result in adverse impacts on planktonic fish and shellfish in the discharge plume. Because the two cooling water discharge plumes compose a relatively small area, impacts are expected to be minor.

BMPs were proposed by the Applicant to avoid and minimize impacts from the seawater intake and cooling water discharge associated with the operation of the Port.

The use of a closed-loop system would result in a reduction in planktonic fish and larvae entrainment, as compared to an open-loop system.

Hydrocarbon Spills. Impacts on planktonic fish and shellfish communities could occur from hydrocarbon releases at the Port. Based on the amounts of hydrocarbons stored on the SRVs (see **Section 2.3.3**) and the fact that all SRVs are designed with features to minimize the potential for oil spills (see **Section 2.3.10**), the impact is designated as minor and short-term. Planktonic fish and shellfish could be impacted by physical contamination, smothering, and toxic effects of hydrocarbons. Acute effects would most likely result in loss of populations near the release/accident, but no long-term impacts on areawide populations from loss of these individuals is expected. Overall impacts on planktonic fish and shellfish from hydrocarbon spills would be short-term, minor, direct, and adverse.

LNG Spills. Potential impacts would include exposure to low-temperature LNG at the water surface, possibly resulting in frostbite or death, and asphyxiation by natural gas vapors above the surface of the water. These impacts would likely occur in the immediate vicinity of the spill; the timeframe of the impact is limited (see **Section 5**). Acute effects would most likely result in loss of local populations near the release or accident. No long-term impacts on areawide populations would be expected.

BMPs discussed in **Section 4.11** would both help to avoid and reduce the impacts of hydrocarbon and LNG spills, which would reduce potential impacts on planktonic fish and shellfish.

Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would

be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Decommissioning activities could cause the resuspension of sediments and an increase in turbidity. Impacts from these activities are expected to be similar to those discussed for construction and would be temporary in nature and localized in scope (in the immediate area of the Port). Short-term, minor, direct, adverse impacts on planktonic fish and shellfish would occur from Project decommissioning.

4.2.1.11.2 Alternatives

Table 4.2-28 compares impacts from the Proposed Action to each of the alternatives with respect to planktonic fish and shellfish.

Southern Site and Route Alternative. Construction, operation, and decommissioning impacts on planktonic fish and shellfish under the Southern Site Route Alternative would be similar to those under the Proposed Action. Impacts associated with turbidity would be slightly greater because the pipeline route would be longer.

Offshore Interconnection with Gulfstream Pipeline Alternative. Impacts on planktonic fish and shellfish would be less than the Proposed Action under this alternative. Under this alternative the pipeline would not come inshore because of the connection to the Gulfstream pipeline. The connection would occur approximately 16 km (10 mi) from the mouth of Tampa Bay, in water depth of 6 m (20 feet). Turbidity associated with pipeline installation under this alternative would be less under this alternative.

FSRU Port Design Alternatives. Short-term impacts during construction would be lower under this alternative than under the Proposed Action. There are fewer anchors and no flexible riser and under this alternative, seafloor disturbance and turbidity would be lower. Therefore, impacts on planktonic fish and shellfish would also be lower.

Operation impacts on planktonic fish and shellfish under the FSRU Port Design Alternative would be 4.8 times higher than under the Proposed Action. As described in **Section 2.1.3.3**, seawater intake and discharges would be approximately 5 times higher than the Proposed Action. The discharge associated with the FSRU alternative would be fresh water. This discharge would travel a longer distance as a thin layer; therefore, the impacts would be minor.

AAV Alternative. Construction, operation, and decommissioning impacts on planktonic fish and shellfish under the AAV Alternative would be approximately 4.8 times higher than under the Proposed Action. As described in **Section 2.1.3.3**, the cooling and ballast water intake for the AAV Alternative would be approximately 4.8 times higher than for the Proposed Action. The discharge associated with the AAV Alternative would be fresh water. This discharge would travel a longer distance as a thin layer; therefore, the impacts would be minor.

Suction Piles Anchoring Alternative. Construction, operation, and decommissioning impacts on planktonic fish and shellfish under the Suction Piles Anchoring Alternative would be similar to those under the Proposed Action.

No Action Alternative. The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No

Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, no direct or indirect impacts on planktonic fish and shellfish would be expected. Alternative sources of natural gas might include other Deepwater LNG Ports or onshore LNG terminals. Other Deepwater LNG Ports might have impacts on planktonic fish and shellfish that are similar to Port Dolphin, but on different species.

Table 4.2-28. Planktonic Fish and Shellfish Impact Summary

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnect Alternative	FSRU Design Alternative	AAV Alternative
Pipeline construction	Minor, short-term, adverse impacts along pipeline route as a result of turbidity and hydrostatic testing and discharges.	Short-term impacts higher than Proposed Action (longer route).	Short-term impacts lower than Proposed Action (shorter route).	No difference from Proposed Action.	No difference from Proposed Action.
Port construction	Minor, short-term, adverse impacts in the vicinity of the Port as a result of turbidity.	No difference from Proposed Action.	No difference from Proposed Action.	Short-term impacts as a result of turbidity lower than Proposed Action (less anchors and no flexible riser).	Short-term impacts as a result of turbidity lower than Proposed Action (less anchors and no flexible riser).
Operation of Port	Minor, short-term, adverse impacts due to cooling water discharges, routine discharges, and potential LNG/hydrocarbon spills. Long-term impacts due to chain sweep, seawater intake, and marine debris.	No difference from Proposed Action.	No difference from Proposed Action.	Seawater intake and discharges would be approximately 5 times higher than the Proposed Action. Therefore, long-term, adverse impacts on planktonic fish and shellfish would be greater than for the Proposed Action.	Seawater intake and discharges would be approximately 5 times higher than the Proposed Action. Therefore, long-term, adverse impacts on planktonic fish and shellfish would be greater than for the Proposed Action.
Decommission of Port	Minor, short-term adverse impact would be similar to construction of the pipeline and Port. Impacts of decommissioning would be lower than construction.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.

Note:

1. Under the No Action Alternative none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur. No direct or indirect impacts on biological resources would be anticipated.
2. Suction Pile Anchoring Alternatives were carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.2.1.12 Federally Managed Fish and Shellfish

4.2.1.12.1 Proposed Action

Construction

Seafloor Disturbance. Seafloor disturbance (described in **Section 4.2.1.6.1**) associated with construction machinery and the activities and direct placement of the buoy components, pipelines, and concrete mattresses would result in direct adverse impacts on demersal (i.e., bottom-dwelling) fish and shellfish. These impacts would include the displacement of demersal fish (though it is expected that fish would avoid the construction zone due to noise) and the displacement crushing of benthic shellfish such as shrimp, stone crabs, and spiny lobsters. Long-term disturbance and moderate, direct impacts on corals would occur as a result of the crushing associated with pile driving in hard- and live-bottom habitat and installation of the pipeline and concrete mattresses onto hard- and live-bottom habitat. Impacts on corals are designated as long-term because the recovery time for corals to recolonize new substrate would be longer than the mobile, benthic shellfish species. The impacts are designated as moderate because of the lower availability and ecological importance of coral species.

The redeposition of sediment (described in **Section 4.2.1.6.1**) would cause additional short-term minor direct adverse impacts on benthic fish and shellfish (e.g., fish eggs, benthic invertebrates, and benthic prey species) through burial. The effects of burial of benthic invertebrates depend on the species mobility and burrowing ability (SCDNR 1995) (see **Section 4.2.1.6.1**). Lobsters buried in sediments deeper than 30 cm (11.8 in) of material are expected to be killed (Thrush et al. 2003). Because shrimp, spiny lobster, and stone crabs are highly mobile and the depth of deposition of resuspended sediments is not expected to exceed 5 mm, the effects are expected to be minor. As stated above, these species are expected to avoid the construction area due to the noise. Some fish and shellfish species deposit demersal eggs that remain on the bottom until larval hatching. Resource agencies suspect high mortality of eggs by smothering, as a result of sedimentation, and of larvae by clogging or abrasion of gill tissues caused by suspended sediment particles (Colby and Hoss 2004). For example, the viability of winter flounder eggs is reduced by 50 percent when the eggs are buried by as little as one half of one egg diameter, approximately 0.5 mm of sediment (Berry et al. 2003). Note that winter flounder eggs are not found in the GOM. Federally managed species with demersal eggs in the Project area include brown shrimp, white shrimp, pink shrimp, gray triggerfish, mutton snapper, and gray snapper.

Benthic fauna serve as food sources for fish and shellfish; therefore, the disturbance or loss of benthic fauna during construction could result in short-term, minor, indirect, adverse impacts on federally managed fish and shellfish. During and shortly after installation of the buoy array components and the pipeline, adult and juvenile individuals are expected to avoid feeding in the immediate vicinity of the proposed Project. Displaced organisms would likely return to the area shortly after construction activities ceased. Short-term and long-term, minor to moderate, direct and indirect, adverse impacts on demersal (i.e., bottom-dwelling) fish and shellfish would occur as a result of seafloor disturbance caused during the installation of the Port and pipeline.

Turbidity. Turbidity refers to any insoluble particulate matter suspended in the water column that impedes light passage by scattering and absorbing light energy. Decreased light penetration reduces the depth of the photic zone, in turn reducing the depth at which primary productivity could occur. Turbidity adversely affects adult fish and shellfish by direct mortality or reduction of growth rates, modifying migration patterns, reducing available food abundance, in part by reducing primary production, or burial of benthic shellfish.

Direct impacts of turbidity include clogged fish gills, lower growth rates, and impacts on egg and larval development (Berry et al. 2003). Indirect impacts include the reduction of abundance in part by a reduction in prey (e.g., a reduction of zooplankton associated with an increase in turbidity) and a reduction in light reducing foraging or predation success (SCDNR 1995). However, these potential impacts would be spatially limited and short-term in nature, as the suspended sediment would redeposit soon after the buoy system array and pipeline components were installed.

The extent of the turbidity plume generated would depend on the amount of sediment disturbed, the grain size, and weight of the disturbed sediment particles; the techniques employed to install and bury the pipeline; and the ambient current dynamics. Coarser, heavier sediment particles would resettle quickly (e.g., within hours), while finer, lighter sediment particles would remain suspended for longer periods of time (e.g., days). Sediment concentrations can be high initially and decay rapidly with distance.

As indicated in **Section 4.1.1**, turbidity modeling (SSFATE) conducted by the Applicant was used to estimate the area in which sediment concentrations would continue to exceed 100 mg/L after 30 minutes. Under worst-case conditions, is estimated that sediment concentration would exceed 100 mg/l for less than 2 hours (ASA 2008). The turbidity plumes would be short-lived and remain fairly close to their source. The total areal extent of the turbidity plumes created during pipeline installation is estimated to be approximately 1,894 hectares (4,679 acres) (ASA 2008). However, the actual distance from the source would depend on the source (e.g., HDD, dredge) and prevailing conditions (e.g., weather and tide). Further, impacts from the temporary turbidity plume would likely affect a few individuals when compared to overall populations found within the Project area. Although the proposed construction could result in the mortality of eggs and larvae of species that are spawning during construction, the overall impacts on fish populations would be expected to be minor since spawning occurs over broad areas. Overall, turbidity events would be short in duration and localized in scope. Therefore, short-term, minor to moderate, direct and indirect, adverse impacts on demersal and pelagic fish and shellfish could result from sediment displacement and turbidity associated with the proposed installation of the Port and pipeline.

BMPs discussed in **Section 4.11** are expected to be effective in reducing the magnitude and extent of impacts resulting from sediment suspension during pipeline construction and therefore, the impact of turbidity on federally managed fish and shellfish. However, the performance of the measures should be monitored during construction to verify their effectiveness. Application for variance from turbidity standards would not be effective in reducing adverse impacts, and could, in fact, result in an increase in adverse impacts.

Hydrostatic Test Water Intake and Discharges. Hydrostatic testing would require the use of approximately 24 million gallons of filtered, surface seawater (treated with an environmentally benign corrosion inhibitor). This volume includes flooding the pipeline twice, once for flushing and once for hydrostatic testing. Water would be withdrawn from surface waters at a velocity of 0.15 m/s (0.5 feet/s). Pelagic fish would not be expected to be entrained based on this intake rate. Upon completion of the test and flushing, the water would be discharged offshore. The discharge would include an "environmentally benign" treatment chemical (HydroHib P) that is not expected to require any treatment prior to discharge. When HydroHib P is mixed with seawater its characteristic becomes benign and is able to be released back into the environment as a benign substance. HydroHib P has been used for applications similar to Port Dolphin's and none have required treatment prior to release back into the environment. Additionally, the discharge would comply with NPDES permit requirements and is expected to be nontoxic upon discharge (GMFMC 2004). Therefore, no adverse impacts on federally managed fish and shellfish would be expected as a result of pipeline dewatering.

Noise. Impacts of noise on fish can range from mortality to disturbance. Continuous sound exposure and loud sounds can temporarily affect the auditory sensitivity of fish by causing an upward shift in auditory threshold. This effect is known as TTS. The duration of the TTS varies depending on the nature of the stimulus, but by definition, there is generally recovery of full hearing over time (Hastings and Popper 2005). Permanent hearing loss or PTS is caused by acoustic trauma (Hastings and Popper 2005). Other potential impacts of sound exposure on fish include physical damage to the ear region, physiological stress responses, and behavioral responses such as startle response, alarm response, avoidance, and a potential lack of response due to masking of acoustic cues. Most of these impacts are either temporary or intermittent and it is unlikely that they would impact fish at the population level. Federally managed fish and shellfish are mobile and would be expected to avoid the construction area due to the noise. This would minimize potential physiological effects on fish.

Hearing for fish that occur in the GOM ranges from 0.02 kHz through 200 kHz (see **Table 3.2-11**). It is assumed that most fish in the GOM could hear the broadband noise (0.001 to 2 kHz) associated with construction of the deepwater port and pipeline and would be affected by it (see **Table 3.2-6**). It should be assumed that the full range of effects, from PTS, TTS, and disturbance, could occur as a result of project-related noise. It is assumed that fish in the immediate vicinity of pile driving could be killed or experience PTS. It is also assumed that effects would be lessened with distance from pile driving. Noise modeling indicates that broadband noise (0.001 to 2 kHz) could travel up to 20 km (13 mi) at 140 dB re 1µPa for pile driving, up to 3.9 km (2 mi) at 120 dB re 1µPa for buoy installation, up to 7.5 km (5 mi) at 120 dB re 1µPa for pipe laying offshore, up to 6 km (4 mi) at 120 dB re 1µPa for pipe laying onshore, and up to 1.6 km (1 mi) at 120 dB re 1µPa for pipe laying at Passage Key. Additional detail on noise modeling is presented in **Section 4.8**. Federally managed fish and shellfish are mobile and would be expected to avoid the construction area due to the noise, minimizing the potential physiological effects on fish. Therefore, short-term, minor, direct, adverse impacts on fish and shellfish would result from noise generated by construction and vessel operations and pile driving.

Lighting. Pelagic fish could be attracted to lights, making them vulnerable to predation. According to the BMPs provided by the Applicant, lights used to identify construction vessels and illuminate working decks would be downshielded but would not illuminate surrounding waters. During installation an environmental coordinator would be on site to ensure no violations would occur. Therefore, the potential impacts on pelagic species associated with construction lights would be avoided and no impacts would occur.

Operations

Seafloor Disturbance. Seafloor disturbance would occur as a result of placement of hard parts of the buoy system, placement of concrete mattresses or other protective cover where the pipeline cannot be buried, long-term chain and riser scour, and resettling of suspended sediments associated with the chain and riser sweep. An estimate of each habitat type that would be disturbed is presented in **Table 4.2-1**.

In areas where hard- and live-bottom habitats are being replaced by components of the buoys, pipelines, and concrete mattresses, adverse impacts on fish and shellfish species that use these habitats would occur. As described in **Section 4.2.1.6**, the new substrate would need to be recolonized by structure-forming biota such as sponges, bryozoans, and hard and soft corals. This would result in a reduction in refuge for juvenile reef fish, stone crabs, and spiny lobsters. Any modifications to limestone outcroppings could result in a reduction of rock ledges and structure that are important habitat for many adult reef fish, stone crabs, and spiny lobsters.

In areas where soft-bottom/sand is replaced by hard components such as concrete mattresses, and anchors/piles associated with the buoy, a shift in associated benthic assemblages could occur. This impact would be beneficial for species that prefer hard-bottom structures such as reef fish.

Additional long-term seafloor disturbance would be caused by the sweeping and scouring of benthic substrate by anchor chains/cables. It is likely that mobile fish and shellfish would avoid this area. Impacts would be long-term and minor because of the localized area of the impact. Overall, long-term, minor to moderate, indirect, adverse and beneficial impacts on fish and shellfish species would occur as a result of seafloor disturbance associated with the operations of the proposed Port.

Turbidity. The anchor cables and flexible risers would have the potential to increase turbidity as they sweep along the bottom substrate. These increases would be temporary, as disturbed sediments would be expected to resettle quickly, but they would occur regularly throughout the life of the Project. This could also result in temporary turbidity increases. Turbidity increases would be short-term in nature, localized in scope, and moderate in intensity, throughout the life of the Project. Therefore, impacts on most fish and shellfish species would be minor. Because fish and shellfish species that inhabit that Project area are mobile, long-term or chronic impacts associated with turbidity are expected to be minimized. Overall, long-term, minor, direct, adverse impacts on fish and shellfish could occur as the result of turbidity increases during routine Port operations.

Noise. Noise generated by SRV engine/boiler operations could have negative direct impacts on fish, including EFH species. As discussed under construction noise, potential impacts of sound exposure on fish could include TTS; physical damage to the ear region; physiological stress responses; and behavioral responses such as startle response, alarm response, avoidance, and a potential lack of response due to masking of acoustic cues. Noise from the routine Port operations would be associated with ship transits, the regasification process on the carriers when moored to the Port, and carrier-maneuvering activities at the Port. Because fish and shellfish species are mobile, only behavioral effects would be expected to occur.

Hearing for fish that occur in the GOM ranges from 0.02 kHz through 200 kHz (see **Table 3.2-11**). Most fish in the GOM could hear the broadband noise (noise over a wide range of frequencies) associated with SRV and tug operations. Noise modeling indicates that broadband noise could travel up to 3.9 km (2 mi) at intensities above 120 dB re µPa for SRV transit, up to 3.7 km (2 mi) at intensities above 120 dB re µPa for buoy approach, and up to 7.1 km (4 mi) at intensities above 120 dB re µPa for SRV docking. It is likely that the acoustic transponder (at 30 kHz) would be heard by Gulf menhaden and American shad if present when a ship calls to the proposed Port. These are not federally managed. However, impacts on these species are expected to be negligible. It is likely that the SRV docking on the buoy would disturb the fish prior to any acoustic impacts. It is unlikely that the acoustic transponder would be heard by any federally managed species. Additional detail on noise modeling is presented in **Section 4.8**. Federally managed fish and shellfish are mobile and would be expected to avoid the construction area due to the noise, minimizing the potential physiological effects on fish.

Lighting. Pelagic fish could be attracted to lights, making them vulnerable to predation. There is no way to determine which pelagic fish in the Project area would be susceptible to lights. The lighted buoys would include flashing yellow lights, with an average lighting level of 900 to 1,000 Candelas. Lighting aboard SRVs would be low. Lights would be used at night to identify vessels moored at the unloading buoy and to illuminate working decks. However, the surrounding waters would not be illuminated. Therefore, impacts on pelagic fish species would be minimized. Overall, short-term, minor, indirect, adverse impacts on pelagic fish species would occur as a result of lighting associated with SRV buoy lights.

Seawater Intake and Cooling Water Discharge. The design of the seawater intake is described in **Section 2.1.1.6.** While at the Port, two SRVs would use approximately 23.66 MGD of seawater as ballast and cooling water over the course of 4 to 8 days. Seawater intake would be through one of two upper or lower sea chests each measuring 1.5 m by 2.0 m (4.9 feet by 6.56 feet). Average water velocity through the lattice screens at the hull side shell would not exceed 0.15 m/s (0.5 feet/s).

Both screens on the seawater intake structure and a seawater intake velocity of 0.15 m/s (0.5 feet/s) would prohibit most juvenile and adult fish from being entrained in the seawater intake. Indirect impacts would occur because planktonic fish and shellfish serve as a source of food for some juvenile and adult fish species. While some juvenile fish could become impinged/entrained, it is expected that those numbers would be minor and no impacts on fish populations would be anticipated. Long-term, minor, direct and indirect, adverse impacts on fish and shellfish would result from the seawater intake associated with Port operations.

Cooling water would be discharged at 10 °C (18 °F) above ambient seawater temperature and would cool to 1 °C (1.8 °F) above ambient temperature within 100 m (328 feet) of the discharge. The cooling water discharge is not expected to reach the seafloor. Therefore demersal fish and benthic shellfish would not be affected. An increase in temperature could result in adverse behavioral and physiological impacts on fish. Because the two cooling water plumes compose a relatively small area, impacts are expected to be minor. Additionally, pelagic fish would be expected to avoid the cooling water discharge. Overall, long-term, minor, localized impacts on pelagic fish would result from the cooling water discharge.

Other Routine Discharges. Cooling water discharges and testing of the firefighting system would comply with NPDES permit conditions. While SRVs are present at the Port, they would not discharge domestic waste, bilge water, or ballast water. In addition, on the SRVs, gutter bars would be replaced around equipment where oil leaks could occur (e.g., mooring winches, cranes). Rain water from these areas would be drained to a bilge holding tank. No rain water would be discharged overboard from areas around equipment where oil leaks would occur while at the buoy. The firewater system discharges consist of uncontaminated seawater from testing the firefighting system on the SRVs. Based on the infrequent nature of the discharge, its short duration, and the lack of contaminants, impacts on federally managed fish and shellfish would be expected to be minor.

Marine Debris. The discharge and disposal of garbage and other solid debris from vessels by lessees is prohibited by the MMS (30 CFR 250.300) and the USCG (MARPOL Annex V, Public Law 100-220 [Statute 1458]) (33 CFR Part 151). The discharge of plastics, including ashes from burned plastics, is strictly prohibited and is therefore never authorized. All plastics must be returned to shore, and are tracked. These prohibitions on the discharge and disposal of garbage and other solid debris from vessels would be incorporated as enforceable conditions into the DWPA license. The USCG enforces MARPOL and the Deepwater Port License and fines or penalties could be assessed where laws and regulations are violated. Long-term, minor, direct and indirect, adverse impacts on federally managed fish and shellfish would be expected to occur as a result of the discharge of marine debris, should this occur.

Although the intentional discharge of marine debris is prohibited by law, discharges associated with offshore structures do occur. Sinking marine debris could also have long-term direct impacts on shellfish and indirect impacts on demersal fish by altering substrate composition, interfering with dissolved gas exchange between sediment pore waters, and releasing heavy metals and other toxic substances.

Hydrocarbon Spills. Minor releases of hydrocarbons (e.g., diesel fuel, lubricants) could result in short-term, minor, direct adverse impacts on juvenile and adult fish, including death or chronic effects. The impacts of hydrocarbons are caused by either the physical nature of the oil (physical contamination and

smothering) or by its chemical components (toxic effects and bioaccumulation). It is anticipated that the immediate response reaction of fish would be avoidance.

Minor releases of hydrocarbons could also result in short-term and long-term, indirect, adverse impacts on EFH species from releases and potential spills that might affect their eggs and food sources. The impacts would depend on the depth of the oil spill and the type of oil that is spilled. It is likely that oil spills at the surface would tend not to sink below depths of 20 m (35 feet) (MMS 2002a, 2002b). When oil sinks to depths around 20 m (35 feet), it is at concentrations several orders of magnitude lower than those demonstrated to have an effect on marine organisms (MMS 2002b). Based on the amounts of hydrocarbons stored on the SRVs (see **Section 2.3.3**) and the fact that all SRVs are designed with features to minimize the potential for oil spills (see **Section 2.3.10**), the impact is designated as minor and short-term.

LNG Spills. Large releases of LNG could result in seawater cooling and freezing of surface layers. Potential impacts would include exposure to low-temperature LNG at the water surface, possibly resulting in frostbite or death. These impacts would likely occur in the immediate vicinity of the spill location; the timeframe of the impact is limited (see **Section 5**). This would result in potential short-term, direct, and minor adverse impacts on fish near the surface, through either behavioral avoidance of colder waters or physiological effects. In addition, there could be short-term indirect adverse impacts on fish from releases and potential spills that might affect their eggs and food sources at the surface.

Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Organisms would be displaced and habitat structures could be temporarily disturbed. Displaced fish and shellfish species would likely return to the area shortly after decommissioning activities ceased. As a result, short-term, minor, direct, and adverse impacts would be anticipated. Decommissioning activities would cause localized removal, turnover, and disruption of sediments, which could potentially displace, bury, or crush benthic organisms. As benthic fauna serve as a food source for federally managed fish and shellfish, impacts on benthic communities from decommissioning of the mooring components could cause individual fish and shellfish to avoid feeding in the area for a short period. Displaced fish and shellfish would return to normal feeding life styles within weeks after decommissioning activities cease. Overall, short-term, minor, direct and indirect, adverse impacts on fish and shellfish species would occur during Project decommissioning.

The Applicant indicated that they would not use explosives during decommissioning, which would help to reduce impacts on federally managed fish and shellfish related to noise and direct mortality.

4.2.1.12.2 Alternatives

Table 4.2-29 compares impacts from the Proposed Action to each of the alternatives with respect to federally managed fish and shellfish.

Southern Site and Route Alternative. The impacts on federally managed fish and shellfish associated with construction, operation, and decommissioning under the Southern Site Route Alternative would be similar to those under the Proposed Action. Impacts associated with turbidity would be slightly greater because pipeline route would be longer.

Offshore Interconnection with Gulfstream Pipeline Alternative. Impacts on federally managed fish and shellfish would be less than the Proposed Action under this alternative. Under this alternative the pipeline would not come inshore because of the connection to the Gulfstream pipeline. The connection would occur approximately 16 km (10 mi) from the mouth of Tampa Bay, in water depth of 6 m (20 feet). Turbidity associated with pipeline installation under this alternative would be less under this alternative.

FSRU Port Design Alternatives. Short-term impacts during construction would be lower under this alternative than under the Proposed Action. There are fewer anchors and no flexible riser and under this alternative; seafloor disturbance and turbidity would be lower. Therefore, impacts on federally managed fish and shellfish would also be lower. The discharge associated with the FSRU alternative would be fresh water. This discharge would travel a longer distance as a thin layer; therefore, the impacts would be minor. Impacts on planktonic fish and shellfish related to the increase in seawater intake associated with this alternative are described in **Section 4.2.11.2**.

AAV Alternative. Construction, operation, and decommissioning impacts on federally managed fish and shellfish under the AAV Alternative would be similar to those under the Proposed Action. Impacts on planktonic fish and shellfish related to the increase in seawater intake associated with this alternative are described in **Section 4.2.11.2**.

Suction Piles Anchoring Alternative. Impacts relating to construction noise on federally managed fish and shellfish under the Suction Piles Anchoring Alternative would be lower than under the Proposed Action. Under this alternative, fish and shellfish mortality related to noise would not be expected, because there would be no pile driving. TTS, PTS, and other physical damage to the ear could still occur depending on the level of noise during construction, but would be less likely under this alternative.

No Action Alternative. The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports.

Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, no direct or indirect impacts on federally managed fish and shellfish would be expected. Alternative sources of natural gas might include other Deepwater LNG Ports or onshore LNG terminals. Other Deepwater LNG Ports might have impacts on federally managed fish and shellfish that are similar to the Port Dolphin, but different species would be affected in different geographic locations.

Table 4.2-29. Federally Managed Fish and Shellfish Impact Summary

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnect Alternative	FSRU Design Alternative	Suction Pile Anchoring Alternative
Pipeline construction	Minor, short-term, adverse impacts along pipeline route as a result of seafloor disturbance, turbidity, hydrostatic testing and discharges, and noise. Minor to moderate long-term impacts due to seafloor disturbance and turbidity.	Short-term impacts higher than Proposed Action (longer route).	Short-term impacts lower than Proposed Action (shorter route).	No difference from Proposed Action.	No difference from the Proposed Action
Port construction	Minor, short-term, adverse impacts in the vicinity of the Port as a result of seafloor disturbance, turbidity, and noise. Minor to moderate long-term impacts due to seafloor disturbance and turbidity.	No difference from Proposed Action.	No difference from Proposed Action.	Short-term impacts lower than Proposed Action (fewer anchors and no flexible riser).	Short-term impacts would be lower because pile driving would not be used.
Operation of Port	Minor, short-term, adverse impacts due to lighting, cooling water discharges, routine discharges, and potential LNG/hydrocarbon spills. Long-term impacts due to chain sweep, seawater intake, and marine debris.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.
Decommission of Port	Minor, short-term adverse impacts would be similar to construction of the pipeline and Port. Impacts of decommissioning would be lower than construction.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.

Notes:

1. Under the No Action Alternative none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur. No direct or indirect impacts on biological resources would be anticipated.
2. The AAV Alternative was carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.2.1.13 Essential Fish Habitat

4.2.1.13.1 Proposed Action

The following is written to support the EFH assessment presented in **Appendix H**. EFH for individual species presented below is in **Appendix H, Table 1-1**. The following constitutes the assessment on EFH based on the project components. The impacts on EFH types are also summarized in **Appendix H, Table 1-2**.

- Pink shrimp
- Stone crab
- Spiny lobster
- Red drum
- Red grouper
- Black grouper
- Gag grouper
- Goliath grouper
- Nassau grouper
- Snowy grouper
- Warsaw grouper
- Yellowedge grouper
- Yellowfin grouper
- Yellowmouth grouper
- Red hind
- Rock hind
- Schoolmaster
- Red snapper
- Vermillion snapper
- Gray snapper
- Yellowtail snapper
- Lane snapper
- Blackfin snapper
- Cubera snapper
- Dog snapper
- Mutton snapper
- Hogfish
- Dwarf sand perch
- Greater amberjack
- Lesser amberjack
- Almaco jack
- Banded rudderfish
- Gray triggerfish
- King mackerel
- Spanish Mackerel
- Cobin
- Coral

Construction

Seafloor Disturbance. Approximately 9,272 acres of benthic habitat (composed of soft-bottom/sand and hard- and live-bottom habitat) would be impacted by construction and installation. A detailed description of the benthic habitat that would be affected is presented in **Section 3.2.5**. A detailed description of the impacts on benthic habitat is presented in **Section 4.2.1.6**.

Disturbance on soft sediments would result in short-term, minor, direct, adverse impacts on EFH. Disturbance of limestone outcropping by pile driving or the laying of concrete mattresses would result in long-term moderate impacts on EFH for fish and shelf species that use structure such as rock ledges as habitat. This habitat structure would not recover; however, other limestone outcroppings would be available in the vicinity of the Project area. Native limestone outcroppings occur along the shorelines and in the bays of the west Central Florida coast (ASA 2008). Limestone outcroppings were identified during the Applicant's benthic survey and would be expected to occur similarly throughout the general area. The crushing of benthic epifauna such as bryozoans, sponges, and corals in hard- and live-bottom habitat would result in long-term, moderate adverse impacts on EFH for juvenile and adult fish and shellfish that utilize these benthic invertebrates as structure. This impact is designated as moderate because of the potential for the epifaunal species to recolonize the area, and the conservative assumptions used in estimating the extent of the potential impacts (See **Section 4.2.1.6**). Given the slow growth rates of these species it would take several years for species composition and density to rebound to pre-construction levels. Additionally, the structural component of the habitat would be reduced because the biota such as

corals, sponges, and algae provide structure for juvenile and adult fish and shellfish species in this low relief habitat (Auster and Langton 1998). Typically, invaded habitats have low natural diversity, including areas of anthropogenic disturbance (Ray 2005). See **Section 4.2.1.6** for additional information.

Additional, short-term, minor, direct, adverse impacts on EFH could occur if seafloor disturbance degraded spawning areas during spawning seasons. Short-term impacts could be caused by construction machinery and activities, and could include the displacement of EFH spawning adults and additional impacts on eggs and larvae. Because eggs and larvae in the Project area are primarily planktonic, impacts on these life stages are primarily related to turbidity. These impacts are described in **Section 4.2.1.11.1**. It is assumed that all fish that have EFH in the Project area for eggs or adults would have spawning habitat in the Project area. Federally managed species with EFH in the Project area spawn at various times throughout the entire year. However, the majority spawn in the late spring, summer, and early fall. Some species that spawn throughout the year include pink shrimp, greater amberjack, and cobia (GMFMC 1998, GMFMC 2005).

The redeposition of sediment would cause additional short-term adverse impacts on EFH. The maximum deposit thickness associated with construction is expected to range from 1 mm to 15 mm (depending on the pipeline burial method). Mechanical plow and clamshell dredge would result in a deposition thickness of approximately 4 or 5 mm.

Proper design and implementation of BMPs and mitigation discussed in **Section 4.11**, including compensatory mitigation for impacts on hard bottom, would minimize impacts on EFH from seafloor disturbance from the construction of the pipeline.

Turbidity. Turbidity refers to any insoluble particulate matter suspended in the water column that impedes light passage by scattering and absorbing light energy. In this case turbidity would impact the water column, which is considered EFH for federally managed pelagic and demersal fish. The areal extent of impact on EFH depends on the turbidity plume generated.

The extent of the turbidity plume generated would depend on the amount of sediment disturbed, the grain size and weight of the disturbed sediment particles, the techniques employed to install and bury the pipeline, and the ambient current dynamics. Coarser, heavier sediment particles would resettle quickly (e.g., within hours), while finer, lighter sediment particles would remain suspended for longer periods of time (e.g., days).

As indicated in **Section 4.1.1**, turbidity modeling (SSFATE) conducted by the Applicant was used to estimate the area in which sediment concentrations would continue to exceed 100 mg/L after 30 minutes. Under worst-case conditions, is estimated that sediment concentration would exceed 100 mg/L for less than 2 hours (ASA 2008). The turbidity plumes would be short-lived and remain fairly close to their source. The total areal extent of the turbidity plumes created during pipeline installation is estimated to be approximately 1,894 hectares (4,679 acres) (ASA 2008). However, the actual distance from the source would depend on the source (e.g., HDD, dredge) and prevailing conditions (e.g., weather and tide). Overall, impacts on EFH would be localized in scope and temporary in duration. Therefore, short-term and long-term, minor, direct, adverse impacts on EFH would occur from turbidity associated with the construction and installation of the Port and pipeline.

BMPs found in **Section 4.11** are expected to be effective in reducing the magnitude and extent of impacts resulting from sediment suspension during pipeline construction and, therefore, the impact of turbidity on EFH. However, the performance of the measures should be monitored during construction to verify their effectiveness. Application for variance from turbidity standards would not be effective in reducing adverse impacts, and could, in fact, result in an increase in adverse impacts.

Hydrostatic Test Water Intake and Discharge. The Proposed Action includes approximately 24 million gallons of filtered, surface seawater (which considered EFH) during flushing and hydrostatic testing of the pipeline. The impacts that this would have on fish populations is covered under **Sections 4.2.1.12** and **4.2.1.13**. The impact of the seawater intake on EFH would be minor because it is a one-time temporary event.

As stated in **Section 4.1.1,** the discharge of hydrostatic test water would have a short-term, minor, localized impact on water quality. Therefore, short-term, negligible, localized impacts on EFH would occur.

Noise. Construction activities that result in noise have the potential to adversely impact EFH for all federally managed species by degrading the water column (SCDNR 1995, Colby and Hoss 2004). Pile driving at the proposed buoy locations would generate the loudest noise during construction, as compared to anchoring operations and pipe laying (see **Section 4.8.1.1**). Most of these impacts would be either temporary or intermittent. Federally managed fish and shellfish are mobile and would be expected to avoid the construction area due to the noise from pre-construction and "ramp up" activities (see **Section 4.11**). Overall, short-term, minor, direct, adverse impacts on EFH would result from noise generated by construction and vessel operations and pile driving.

Lighting. According to the BMPs provided by the Applicant, lights used to identify construction vessels and illuminate working decks would be downshielded but would not illuminate surrounding waters. During installation an environmental coordinator would be on site to ensure no violations would occur. However, as described in **Section 4.2.1.12** (federally managed fish and shellfish) impacts are expected to be minor. Pelagic fish could be attracted to lights, making them vulnerable to predation. Overall, short-term, minor, indirect, adverse impacts on EFH for pelagic species would occur as a result of lighting associated with construction.

Operations

Seafloor Disturbance. Seafloor disturbance would occur as a result of placement of hard parts of the buoy system, placement of concrete mattresses or other protective cover where the pipeline cannot be buried, long-term chain and riser scour, and resettling of suspended sediments associated with the chain and riser sweep. An estimate of each habitat type that would be disturbed is presented in **Table 4.2-1**. Overall, long-term, minor to moderate, indirect, adverse, and beneficial impacts on EFH would occur as a result of seafloor disturbance associated with the operations of the proposed Port.

Turbidity. The anchor cables have the potential to increase turbidity as they sweep along the bottom substrate. Increases would be temporary, as disturbed sediments would be expected to resettle quickly, but they would occur regularly throughout the life of the Project. Turbidity would degrade the water column which would be EFH for all species that occur in the area of the Port. Overall, long-term, minor, direct, and adverse impacts on EFH could occur as the result of turbidity increases during routine Port operations.

Noise. Noise generated by SRV engines, boiler operations, the acoustic transponder, and the SRV thrusters during docking and undocking operations would have negative direct, long-term, minor, adverse impacts on EFH. These noises and impacts are described in **Section 4.2.1.13**. Noise would degrade the water column which would be EFH for all species that occur in the area of the Port.

Lighting. Impacts are expected to be minor. The lighted buoys would include flashing yellow lights, with an average lighting level of 900 to 1,000 Candelas. Lighting aboard SRVs would be low. Lights would be used at night to identify vessels moored at the unloading buoy and to illuminate working decks.

Lights on the SRVs would be downshielded but would not intentionally illuminate surrounding waters. All lights would be installed and utilized in accordance with USFWS guidelines (see **Section 4.11**). Overall, lighting associated with the proposed Port operations would result in direct, short-term, minor, direct, adverse impacts on EFH for pelagic fish species.

Seawater Intake and Cooling Water Discharge. While at the Port, two SRVs would use approximately 23.66 MGD of seawater as ballast and cooling water over the course of 4 to 8 days. Seawater intake would be through one of two upper or lower sea chests each measuring 1.5 m by 2.0 m (4.9 feet by 6.56 feet). Average water velocity through the lattice screens at the hull side shell would not exceed 0.15 m/s (0.5 feet/s).

Long-term, minor, direct and indirect, adverse impacts on EFH would result from the ballast and cooling water intake. These are considered primarily through an analysis of direct impacts on planktonic fish and shellfish populations, as discussed in **Section 4.2.1.11**. The design of the seawater intake is described in **Section 2.3**. Both screens on the seawater intake structure and a seawater intake velocity of 0.15 m/s (0.5 feet/s) would prohibit most juvenile and adult fish from being entrained in the seawater intake. The BMPs and their effectiveness are also described in **Section 4.2.1.11**.

Hydrocarbon Spills. The impacts of hydrocarbons are caused by either the physical nature of the oil (physical contamination and smothering) or by its chemical components (toxic effects and bioaccumulation).

Minor releases of hydrocarbons could also result in short-term indirect adverse impacts on EFH species from releases and potential spills that might affect their eggs and food sources. The impacts would depend on the depth of the oil spill and the type of oil that is spilled. It is likely that oil spills at the surface would tend not to sink below depths of 20 m (35 feet) (MMS 2002a, 2002b). When oil sinks to depths around 20 m (35 feet), it is at concentrations several orders of magnitude lower than those demonstrated to have an effect on marine organisms (MMS 2002b).

As described, the minor releases of hydrocarbons (e.g., diesel fuel, lubricants) could result in short-term and long-term, minor, direct adverse impacts on the water column, soft-bottom, and hard- and live-bottom EFH.

LNG Spills. Large releases of LNG could result in seawater cooling and freezing of surface layers. Potential impacts would include exposure to low-temperature LNG at the water surface, possibly resulting in frostbite or death. These impacts would likely occur in the immediate vicinity of the spill location; the timeframe of the impact is limited (see **Section 5**). This would result in potential short-term, direct, and minor adverse impacts on the water column at the surface, through either behavioral avoidance of colder waters or physiological effects. In addition, there could be short-term, indirect, adverse impacts on fish from releases and potential spills that might affect their eggs and food sources at the surface.

BMPs discussed in **Section 4.11** would both help to avoid and reduce the impacts of hydrocarbon and LNG spills, which would reduce potential impacts on federally managed fish and shellfish.

Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Impacts would be similar in nature to those caused by construction and routine Port construction, but would be limited in duration and intensity. No explosives would be used in decommissioning. Short-term, minor, direct and indirect, adverse impacts on EFH would occur during Project decommissioning.

4.2.1.13.2 Alternatives

Table 4.2-30 compares impacts from the Proposed Action to each of the alternatives with respect to EFH.

Southern Site and Route Alternative. The impacts on EFH associated with construction, operation, and decommissioning under the Southern Site Route Alternative would be similar to those under the Proposed Action. Impacts associated with turbidity would be slightly greater because the pipeline route would be longer.

Offshore Interconnection with Gulfstream Pipeline Alternative. Impacts on EFH would be less than the Proposed Action under this alternative. Under this alternative the pipeline would not come inshore because of the connection to the Gulfstream pipeline. The connection would occur approximately 16 km (10 mi) from the mouth of Tampa Bay, in water depth of 6 m (20 feet). Turbidity associated with pipeline installation under this alternative would be less under this alternative.

FSRU Port Design Alternatives. Short-term impacts during construction would be lower under this alternative than under the Proposed Action. There are fewer anchors and no flexible riser and under this alternative seafloor disturbance and turbidity would be lower. Therefore, impact on EFH would also be lower.

Long-term operation impacts on EFH under this alternative would be 4.8 times higher than the Proposed Action. As described in **Section 2.1.3.3**, seawater intake and discharges would be approximately 5 times higher than the Proposed Action. Therefore, long-term, adverse impacts on EFH would be greater than for the Proposed Action. The discharge associated with the FSRU alternative would be fresh water. This discharge would travel a longer distance as a thin layer; therefore, the impacts would be minor.

AAV Alternative. Operation impacts on EFH under the AAV Alternative would be approximately 4.8 times higher than under the Proposed Action. As described in **Section 2.1.7.4**, the cooling and seawater intake for the AAV Alternative would be approximately 4.8 times higher than for the Proposed Action. The discharge associated with the AAV Alternative would be fresh water. This discharge would travel a longer distance as a thin layer; therefore, the impacts would be minor.

Suction Piles Anchoring Alternative. Impacts relating to construction noise on federally managed fish and shellfish under the Suction Piles Anchoring Alternative would be lower than under the Proposed Action. Impacts under this alternative on fish and shellfish mortality related to noise would are addressed under **Section 4.2.1.12.2**.

No Action Alternative. The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, no direct or indirect impacts on EFH would be expected. Alternative sources of natural gas might include other Deepwater LNG Ports or onshore LNG terminals. Other Deepwater LNG Ports might have impacts on EFH that are similar to the Port Dolphin, but different habitats would be impacted in different geographic locations.

Table 4.2-30. EFH Impacts Summary

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnect Alternative	FSRU Design Alternative	AAV Alternative	Suction Pile Anchoring Alternative
Pipeline construction	Minor, short-term and long-term, adverse impacts along pipeline route as a result of seafloor disturbance and turbidity.	Short-term impacts comparable to Proposed Action; somewhat higher long-term impacts (longer route).	Short-term impacts comparable to Proposed Action; lower long-term impacts (shorter route).	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.
Port construction	Minor, short-term, adverse impacts in the vicinity of the Port as a result of seafloor disturbance and turbidity.	No difference from Proposed Action.	No difference from Proposed Action.	Short-term impacts lower than Proposed Action (fewer anchors and no flexible riser). Seawater intake and discharges would be approximately 5 times higher than the Proposed Action. Therefore, long-term, adverse impacts on EFH would be greater than for the Proposed Action.	Seawater intake and discharges would be approximately 5 times higher than the Proposed Action. Therefore, long-term, adverse impacts on EFH would be greater than for the Proposed Action.	Short-term impacts lower than Proposed Action (lower noise levels).
Operation of Port	Minor, short-term, adverse impacts due to cooling water discharges and routine discharges. Long-term impacts due to chain sweep, turbidity, noise, lighting, seawater intake, marine debris, and potential LNG/hydrocarbon spills.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.
Decommission of Port	Minor, short-term and long-term, adverse impacts in vicinity of Port are similar to but lower than port construction impacts.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.	No difference from Proposed Action.

Note:

1. Under the No Action Alternative none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur. No direct or indirect impacts on biological resources would be anticipated.

4.2.2 Terrestrial Resources

4.2.2.1 Wetlands and Vegetation

4.2.2.1.1 Proposed Action

Construction

The number of wetlands along the Proposed Route has been reduced from 11 initially identified in the Draft EIS to 9 with a total crossing length of 2,596 meters (8,516 feet) (see **Table 4.2-31**). This reduction is due to development in the area, unrelated to this Project, and a refined definition of jurisdictional wetlands. It is important to note that Wetland W-5 was recently disturbed and filled (as of May 13, 2008). No portion of this wetland remains in the Project area. Additionally, the FPL borrow pond was originally delineated as Wetland W-4, but according to both the state and Federal rules, a borrow pond constructed in upland habitat is not jurisdictional. Wetlands were identified during field surveys and include any area that satisfies the requirements of the state and Federal methodology for identifying and delineating wetlands.

Construction across wetlands typically would be in accordance with the FERC Procedures and Port Dolphin's project-specific Wetlands and Waterbody Construction and Mitigation Procedures Plan. The FERC Procedures require that noncultivated wetlands be crossed with a ROW width of no more than 75 feet, unless site-specific justification for a wider ROW has been provided by the Applicant and FERC staff has reviewed the request and either approved or denied the wider right-of-way on a case-by-case basis. Port Dolphin originally proposed to cross wetlands in the project area with its standard ROW width for upland construction (i.e., 100 feet). In a response to a FERC data request, Port Dolphin revised its wetland crossing ROW width for several wetlands and provided justification for using a 100-foot ROW for others (see **Table 4.2-31**). FERC staff has reviewed Port Dolphin's proposal and finds it acceptable.

Specific construction procedures include the use of either low-ground weight construction equipment or the use of timber riprap, prefabricated equipment mats, or terra mats for standard excavation equipment, and the installation of erosion-control devices to minimize sediment flow into the wetland. The majority of impacts on the wetlands along the onshore route would be temporary and short-term while pipeline construction is taking place. The estimated time for construction of the pipeline would be approximately 3 months.

A total of 4.82 hectares (11.9 acres) of wetlands would be impacted during the construction and operation phases of the Project. Approximately 4.33 hectares (10.71 acres) of wetland impacts would be minor, short-term, and adverse and recovery measures would be taken to ensure restoration of the wetlands. The only long-term wetland alteration includes the permanent conversion of Forested and Scrub-Shrub wetland habitats to Emergent marsh wetland habitats in the 30-foot (9-meter) permanent ROW. This conversion would be necessary to maintain the operational ROW in accordance with Federal regulations. The operation of the pipeline would result in permanent impacts to 1.19 acres (2.3 percent) of the entire Project area.

Moderate, direct, and long-term adverse impacts on wetlands would consist of the permanent conversion of the forested and shrubby habitat to emergent herbaceous wetlands. This would be necessary to maintain the operational ROW in accordance with Federal regulations. The Applicant has used existing disturbed lands and ROWs to reduce overall impacts on wetlands. The permanent loss of the forested component of the wetland habitat would impact the system's ability to provide valuable wildlife habitat,

however since the forested component is small (1.19 acres), this impact would be expected to be minor.

Table 4.2-31. Acres of Impacts on Wetlands in the Proposed Onshore Route

Wetland	NWI Classification Type [NWI Code]	Acres of Impact from Construction Activities	Length of Crossing (feet)	Width of Construction Corridor (feet)	Justification for 100-foot ROW	Acres of Impact from Operations of the Pipeline
W-1	Estuarine Open Water/ Scrub-Shrub [EOW/SS (3)]	1.88	2,769.4	100	Width of wetland and slope necessitates extra space for two-way equipment travel along one bank.	0.0
W-2	Palustrine Forested/ Scrub-Shrub [PFO/SS]	0.60	505.2	100	Extra space is needed for the safe movement of HDD equipment at the FPL tank farm.	0.35
W-3	Palustrine Scrub-Shrub/Forested [PSS/FO]	1.91	1,224.5	100	The dead end at the end of this area necessitates extra space for the safe turnaround of equipment.	0.84
W-6	Palustrine Emergent/ Scrub-Shrub [PEM/SS]	0.07	120.6	75	Complies with FERC recommended width.	0.00
W-7	Palustrine Scrub-Shrub [PSS]	0.03	22.3	75	Complies with FERC recommended width.	0.00
W-8	Palustrine Scrub-Shrub/Emergent [PSS/EM]	0.15	168.7	75	Complies with FERC recommended width.	0.00
W-9	Palustrine Emergent/ Lacustrine Limnetic Open Water (excavated)[PEM/L1OW (x)]	5.46	3,533.2	100	High-voltage power lines and the FPL tank farm necessitate extra space for two-way equipment travel along one bank.	0.00
W-10	Palustrine Emergent [PEM]	0.37	137.9	75	Complies with FERC recommended width.	0.00
W-11	Palustrine Open Water [POW]	0.24		75	Complies with FERC recommended width.	0.00
Total	-	**10.71**		**-**	**-**	**1.19**

Source: Port Dolphin 2008d

The existing forested habitats in the Project area are dominated by exotic species. If native species are successful in revegetating restored areas, the removal of the exotic component of the system would be expected to benefit the habitat as well as the fish and wildlife that could utilize it. The Applicant also would be willing to provide compensatory mitigation for the loss of the forested and shrubby component due to the loss of wetland and wildlife habitat functions that they provide, even though there would be no net loss in wetland acres. (Port Dolphin 2007e).

Compensatory mitigation for the long-term impacts from the Project would be provided through mitigation banks located in close proximity to the proposed Project area. The Applicant has commenced discussions with the Braden River Mitigation Bank. Both forested and herbaceous mitigation are available. The Onshore Post-Construction Recovery and Mitigation Plan provides detailed descriptions of the onshore wetland impacts recovery and mitigation.

Restoration of upland areas would be in accordance with the Project-specific Upland Erosion Control, Revegetation, and Maintenance Plan. The specific recovery plan would address revegetation activities for upland areas.

Operations

Approximately 1.19 acres (0.48 hectare) of wetlands would be impacted from the operation of the pipeline. Permanent impacts from pipeline operations would be expected to occur on Wetlands 2 and 3. However, only a small portion of the wetlands are forested and are dominated by nonnative species. The ROW for the pipeline would prevent trees and some larger shrubs from reestablishing directly over or adjacent to the pipeline. This would not result in a net loss of wetlands, but rather a conversion to emergent or smaller shrub type. Impacts on Wetlands 2 and 3 would be expected to be moderate, long-term, and adverse.

Permanent impacts from pipeline operations would also occur on Wetland 9, the extractive pond Open Water habitat. A permanent levee would be constructed to isolate the area where the proposed pipeline would be placed and the water in the proposed ROW would be pumped out. Therefore, the pipeline would be placed underground, and the water in the ponds would not be restored. These ponds have little to no vegetation and were formed during mining and other extractive activities. Therefore, impacts on these ponds are expected to be minor and short-term.

Proper design and implementation of BMPs and mitigation, including the FERC Procedures, would minimize impacts on wetlands and vegetation during routine operations.

Decommissioning

Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action. Decommissioning activities would result in restrictions similar to those described for the construction process. Due to the in-place abandonment procedures for the pipeline, decommissioning activities are anticipated to take less time than construction.

Impacts associated from decommissioning would be reassessed prior to decommissioning based upon environmental conditions and laws at that time. Aboveground decommissioning of the pipeline would consist of all of the aboveground equipment and the pipe being removed. The underground decommissioning would consist of the removal of any hydrocarbons in the pipe through flushing, filling

the pipe with treated fresh water, capping the ends of the pipe, and burying or covering the ends of the pipeline.

The impacts on wetlands and vegetation from the decommissioning activities would be minor and short-term. Proper design and implementation of BMPs and mitigation, including the FERC Procedures, would minimize impacts on wetlands and vegetation during decommissioning.

Upsets/Accidents. Any upsets or accidents during construction would be handled by an SPCC Plan to respond to spills of any size. Additionally, measures would be taken to minimize any drilling fluid release (or frac-outs) from the HDD construction methodology. Impacts would be minimized in the event of a frac-out as the drilling entry and exit holes have been located away from the sensitive areas. Additionally, the use of nontoxic additives and development of a contingency plan would further minimize impacts. In the event of a frac-out, containment would occur in an expedited manner, resulting in a potential for minor and short-term impacts on the wetland system. All other potential accidents would be mitigated as required by the FERC methodologies.

With the appropriate methods in place, impacts from all potential upsets would be expected to be minor, short-term, and adverse.

4.2.2.2 Freshwater and Terrestrial Wildlife

4.2.2.2.1 Proposed Action

Construction

The only possible fish habitat impacted would be in the south conveyance ditch at Port Manatee, the reservoirs, drainage canals, and the inundated wetland sites. Minimal fishery resources are potentially present in these areas; however, if present, reestablishment of populations is expected following completion of construction and ROW restoration. As a result, minor and short-term impacts would occur on the fish habitat, and thus, impacts on fisheries would be anticipated to be minor, short-term, and adverse.

Most onshore wildlife species in the vicinity of the proposed Project area would be expected to have adapted to the variety of noise levels associated with Port Manatee, local industry, and the maintenance associated with the existing pipeline and would likely move back into the area following the construction.

Adverse, minor, short-term effects would occur on wildlife as a result of temporary noise disturbances associated with the pipeline construction activities. Incidental contact with personnel and equipment could result in trampling or crushing of these species. Moderate, long-term, adverse impacts could occur on less-mobile wildlife from direct physical effects associated with construction activities. BMPs such as stopping construction equipment to allow wildlife to leave the area would minimize the impacts associated with construction.

The impacts on wildlife habitat from the construction of the valve station and the aboveground facilities and loss of habitat would be moderate, permanent, and adverse, but the sites chosen were selected based on prior disturbance of the area, the industrial nature of the area, and the minimal resources present at those locations; therefore, the impacts on wildlife would be minor and short-term.

Fisheries and wildlife habitat would be restored according to the FERC Plan (see **Section 2.3.9**). Proper design and implementation of BMPs and mitigation including the FERC Plan would minimize impacts on wildlife.

Operations

Most onshore wildlife species in the vicinity of the proposed Project area would be expected to have adapted to the variety of noise levels associated with Port Manatee, local industry, and the maintenance associated with the existing pipeline. The area within the ROW corridor would be fully restored to pre-construction conditions according to the FERC Procedures (see **Section 2.3.9**); therefore, no impacts on wildlife would be experienced during the operational phase.

Decommissioning

Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action. Decommissioning activities would result in restrictions similar to those described for the construction process. Due to the in-place abandonment procedures for the pipeline, decommissioning activities are anticipated to take less time than construction.

Minor, adverse, short-term effects would occur on wildlife as a result of temporary noise disturbances associated with the pipeline decommissioning activities. Incidental contact with personnel and equipment could result in trampling or crushing of these species. Adverse, major, long-term impacts could occur on less-mobile wildlife from direct physical effects associated with decommissioning activities. Proper implementation of BMPs, such as stopping construction equipment to allow wildlife to leave the area, would minimize the impacts associated with decommissioning.

Upsets/Accidents. Any upsets or accidents during construction would be handled by contingency planning and development of an SPCC Plan to respond to spills of any size. Such impacts tend to be temporary, and therefore, potential impacts on wildlife would be minor, short-term, and adverse.

4.2.2.3 Threatened and Endangered Species

Section 7 consultation with the USFWS has been initiated to address the existence of suitable habitat and listed species within the proposed onshore route. The BA has been completed and is presented in **Appendix E**. The Applicant conducted a field survey in January 2007 and again in October and November 2007 for the presence of threatened and endangered species.

Federally endangered wood storks were observed foraging in the proposed construction area during the latter surveys. No known rookeries are located in the Project area. The FERC Procedures would address methods for restoring wetland vegetation and functions and values associated with wood stork foraging habitat, therefore, the Port Dolphin project would not be likely to adversely affect the wood stork.

Additional potential federally listed species found in Manatee County include Audubon's crested caracara and the Eastern indigo snake. Neither of these species was observed during the surveys. The proposed onshore pipeline, valve station, and the aboveground facilities do not cross suitable habitat for the caracara, so this species would not be expected to be adversely affected by the proposed Project.

Although the Eastern indigo snake was not observed during the survey, Federal protection measures are presented in **Section 4.11.5** should the snake be observed during construction activities. Two state species of special concern could potentially be found in the proposed construction area. They include the Florida burrowing owl and the Florida gopher frog. A wildlife survey conducted by the Applicant indicated the presence of a gopher tortoise (a state species of special concern) on the property where the

interconnection station would be located. Prior to initiation of construction, additional wildlife surveys would be completed to determine if the gopher tortoise is present. FWC protective measures are presented should any of these species be observed during construction activities. An Environmental Coordinator would be present during construction operations and would follow the required Federal and state guidelines should any listed species be observed.

4.2.2.3.1 Proposed Action

Construction

Potential Federal- and state-listed species in the vicinity of the proposed Project area would be expected to have adapted to the variety of noise levels associated with Port Manatee, local industry, and the maintenance associated with the existing pipeline and would likely move back into the area following the estimated 3 months of construction. Minor, short-term, adverse effects would occur on these species as a result of temporary noise disturbances associated with the pipeline, valve station, and aboveground facilities construction activities.

The following sections describe specific construction impacts for the potential Federal- and state-listed species.

Eastern Indigo Snake. The Applicant would survey for the Eastern indigo snake before construction of the pipeline, valve station, and the aboveground facilities begins. Protective measures would be implemented to avoid the potential impacts on the Eastern indigo snake from direct physical effects associated with construction activities should it be observed during construction activities. Incidental contact with personnel and equipment could result in trampling or crushing of the Eastern indigo snake.

If issued, the license would require the mitigation and monitoring plan following the USFWS Standard Protection Measures (USFWS 2004b) for the Eastern indigo snake be developed prior to construction. The protection measures and BMPs would be incorporated into the plan.

Proper design and implementation of the federally required mitigation and monitoring plan and protection measures would ensure the project would not adversely affect the Eastern indigo snake in the long-term; however, short-term disturbances during onshore pipeline construction could occur if a snake had to be relocated.

Wood Stork. Although wood storks were observed during one of the surveys, rookeries are not known within or adjacent to the proposed construction area, and occasional foraging wood storks in the proposed construction area could leave the active construction ROW with minimal disruption. The FERC Procedures (see **Section 2.3.9**) would address methods for restoring wetland vegetation and functions and values associated with wood stork foraging habitat thus the Project is not likely to adversely affect the wood stork. Proper design and implementation of the required wetland mitigation measures would ensure the Project would not adversely affect the wood stork in the long-term; however short-term disturbances during onshore pipeline construction could occur.

Audubon's Crested Caracara. The proposed onshore pipeline, valve station, and the aboveground facilities do not cross suitable habitat for the caracara, therefore this species is not expected to be affected by the Project.

Gopher Tortoise. The Applicant would survey for the gopher tortoise before construction of the pipeline, valve station, and the aboveground facilities begins. Protective measures would be implemented to avoid the potential impacts on the gopher tortoise from direct physical effects associated with construction

activities for the pipeline, valve station, and aboveground facilities should the tortoise be observed. Incidental contact with personnel and equipment could result in trampling or crushing of an individual or their burrow. The Applicant would survey for active and inactive gopher tortoise burrows before construction begins. If an active gopher tortoise burrow is identified within the proposed path of construction, the Environmental Coordinator would investigate the burrow and acquire the required gopher tortoise relocation permits from FWC. If an inactive burrow is found, a silt fence that is trenched properly would be placed around it to preclude disturbance during construction. After the construction ends, the fence would be removed.

The five FWC options available to address the presence of gopher tortoises on lands slated for development are avoid development, avoid destruction of tortoise burrows, mitigate for incidental take of tortoises, and relocate tortoises on site or relocate them off site. Relocation and incidental take both require permits from the FWC (FWC 2007c).

The Division of Habitat and Species Conservation's Species Conservation Planning Section Tallahassee staff and Regional Biologists issue two types of tortoise relocation permits. The standard tortoise relocation permit is available for development projects which require the relocation of more than five tortoises on site or relocation of any number of tortoises off site. The special tortoise relocation permit is available online for projects which require the relocation of five or fewer tortoises on site. Incidental take permits are issued for activities that impact areas currently occupied by gopher tortoises and to mitigate any accidental impacts on tortoises by providing a degree of habitat protection as outlined in the FWC's Gopher Tortoise Habitat Protection Guidelines. BMPs would include a briefing with construction personnel, and educational materials would be provided and posted on the gopher tortoise. In the event that construction personnel come into contact with a gopher tortoise, all activities would cease until the tortoise has moved away from the area (FWC 2007c) or has been moved from the area using approved FWC means.

Proper design and implementation of the required FWC procedures and BMPs would ensure the Project would not adversely affect the gopher tortoise; however short-term disturbances during onshore pipeline construction could occur.

Florida Burrowing Owl. The Applicant would survey for the Florida burrowing owl before construction of the pipeline, valve station, and the aboveground facilities begins. Protective measures would be implemented to avoid the potential impacts on the Florida burrowing owl from direct physical effects associated with construction activities should the owl be observed. Incidental contact with personnel and equipment could result in trampling or crushing of an individual or their burrow. If a Florida burrowing owl burrow is identified within the proposed path of construction, the Environmental Coordinator would investigate the burrow and contact the FWC. Protection criteria for nonurban situations or situations where numerous burrows would be impacted are addressed by the FWC on a case-by-case basis (FWC 2007a).

BMPs would include a briefing with construction personnel and educational materials on the owl would be provided and posted. In the event that construction personnel come into contact with an owl, all activities would cease until it has moved away from the area or has been moved from the area using approved means.

Proper design and implementation of the required FWC procedures and BMPs would ensure the Project would not adversely affect the Florida burrowing owl; however, short-term disturbances during onshore pipeline construction could occur.

Florida Gopher Frog. The Applicant would survey for the Florida gopher frog before construction of the pipeline, valve station, and the aboveground facilities begins. Protective measures would be implemented to avoid potential impacts on the Florida gopher frog from direct physical effects associated with construction activities should the frog be observed. The Florida gopher frog is not active during the day, except during the spring when it moves to ponds for mating. Incidental contact with personnel and equipment could result in trampling or crushing of an individual or their burrow. If a Florida gopher frog burrow is identified within the proposed path of construction, the Environmental Coordinator would investigate the burrow and contact the FWC. Protection criteria and permitting by the FWC is on a case-by-case basis (FWC 2007c).

BMPs would include a briefing with construction personnel and educational materials on the Florida gopher frog would be provided and posted. In the event that construction personnel come into contact with a frog, all activities would cease until it has moved away from the area or has been moved from the area using approved means.

Proper design and implementation of the required FWC procedures and BMPs would ensure the Project would not adversely affect the Florida gopher frog; however, short-term disturbances during onshore pipeline construction could occur.

Table 4.2-32 provides a list of state and federally listed species potentially impacted by the proposed onshore pipeline route.

Operations

Most potential Federal- and state-listed species in the vicinity of the proposed Project area would be expected to have adapted to the variety of noise levels associated with Port Manatee, local industry, and the maintenance associated with the existing pipeline. The area within the ROW corridor would be fully restored to pre-construction conditions according to the FERC Procedures (see **Section 2.3.9**); therefore, no impacts on potential Federal- and state-listed species would be experienced during the operational phase.

Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Table 4.2-32. Terrestrial State and Federally Listed Species Potentially Occurring Near the Revised Proposed Onshore Route

Common Name	Scientific Name	Federal Status	State Status	Likelihood of Occurrence Resulting in an Impact
Mammals				
Florida mouse	*Peromyscus floridanus*		SSC	Not likely, species is mobile
Birds				
Audubon's crested caracara	*Caracara cheriway*	T	T	Not likely, species is mobile
Brown pelican	*Pelecanus occidentalis*		SSC	Not likely, species is mobile
Florida burrowing owl	*Speotyto cunicularia floridana*		SSC	Possible, site-specific surveys conducted and none observed
Little blue heron	*Egretta caerulea*		SSC	Not likely, species is mobile
Peregrine falcon	*Falco peregrinis*		E	Not likely, species is mobile
Roseate spoonbill	*Platalea ajaja*		SSC	Not likely, species is mobile
Snowy egret	*Egretta thula*		SSC	Not likely, species is mobile
Southeastern American kestrel	*Falco sparverius paulus*		T	Not likely, species is mobile
Tricolor heron	*Egretta tricolor*		SSC	Not likely, species is mobile
White ibis	*Eudocimus albus*		SSC	Not likely, species is mobile
Wood stork	*Mycteria americana*	E	E	Not likely, species is mobile
Reptiles				
American alligator	*Alligator mississippiensis*		SSC	Not likely, species is mobile
Eastern indigo snake	*Dymarchon corais couperi*	T	T	Not likely, species is mobile
Gopher tortoise	*Gopherus polyphemus*		SSC	Possible, any individuals would be relocated
Amphibians				
Florida gopher frog	*Rana capito*		SSC	Possible, commensal with gopher tortoises; any individuals would be relocated

Source: USFWS 2007a, FNAI 2007, Rogers et al. 1996, Ashton and Ashton 1981

Notes: T = Threatened; E = Endangered; SSC = Species of Special Concern

Most potential Federal- and state-listed species in the vicinity of the proposed Project area would be expected to have adapted to the variety of noise levels associated with Port Manatee, local industry, and the maintenance associated with the existing pipeline and would likely move back into the area following decommissioning of the pipeline.

Minor, short-term, adverse effects would occur on potential Federal- and state-listed species as a result of temporary noise disturbances associated with the pipeline decommissioning activities. See **Section 4.2.2** for more information on each of the potential Federal- and state-listed species. Decommissioning activities and procedures related to listed species would be similar to those presented for construction activities. Proper design and implementation of the required FWC procedures and BMPs would ensure decommissioning activities would not adversely affect Federal- and state-listed species.

Upsets/Accidents. Any upsets or accidents during construction would be handled by contingency planning and development of an SPCC Plan to respond to spills of any size. Such impacts tend to be temporary, and therefore, potential impacts on Federal- and state-listed species would be minor, short-term, and adverse.

4.2.2.4 Alternatives

Table 4.2-33 compares impacts from the Proposed Action to each of the alternatives with respect to terrestrial biological resources.

Southern Site and Route Alternative. The location of the onshore pipeline route, valve station, and aboveground facilities for the Southern Site and Route Alternative would be the same for the Proposed Action. Impacts presented and discussed for the Proposed Action would be the same for impacts associated with the Southern Site and Route Alternative.

Offshore Interconnection with the Gulfstream Pipeline Alternative. If the Offshore Interconnection with the Gulfstream Pipeline Alternative was chosen, the onshore pipeline, valve station, and aboveground facilities would not be constructed. No additional impacts other than the existing impacts associated with the operation and decommissioning of the existing onshore Gulfstream Pipeline would occur.

FSRU Port Design Alternative. The location of the onshore pipeline route, valve station, and aboveground facilities for the FSRU Port Design Alternative would be the same for the Proposed Action. Impacts presented and discussed for the Proposed Action would be the same for impacts associated with the FSRU Port Design Alternative.

AAV Vaporization Alternative. Construction, operation, and decommissioning impacts on terrestrial biological resources under the AAV Vaporization Alternative would be similar to those under the Proposed Action.

Suction Piles Anchoring Alternative. Construction, operation, and decommissioning impacts on terrestrial biological resources under the Suction Piles Anchoring Alternative would be similar to those under the Proposed Action.

No Action Alternative. The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, no direct or indirect impacts on coastal and marine or terrestrial resources would be expected. Means to satisfy the Nation's energy demands might result in increased use of existing land-based terminals, greater reliance on declining domestic oil and gas resources, or development of alternate means of importing LNG. Alternative sources of natural gas can include other Deepwater LNG Ports or onshore LNG terminals. Other Deepwater LNG Ports could have adverse impacts on terrestrial resources, but in a different geographic location. Onshore LNG terminals can be located in coastal areas where there would be greater likelihood of adversely impacting terrestrial resources.

Table 4.2-33. Terrestrial Biological Resources Impacts Summary

Impact	Proposed Action	Southern Site and Route Alternative	FSRU Design Alternative
Wetlands			
Pipeline Construction	Minor, short-term, adverse impacts on 10.71 acres.	No difference from Proposed Action.	No difference from Proposed Action.
Operation of Pipeline	Moderate, long-term, adverse impacts on 1.19 acres.	No difference from Proposed Action.	No difference from Proposed Action.
Decommission of Pipeline	Minor, short-term, adverse impacts.	No difference from Proposed Action.	No difference from Proposed Action.
Accidents/Upsets	Minor, short-term, adverse impacts.	No difference from Proposed Action.	No difference from Proposed Action.
Vegetation			
Pipeline Construction	Minor, short-term, and long-term, adverse impacts.	No difference from Proposed Action.	No difference from Proposed Action.
Operation of Pipeline	Minor, short-term, adverse impacts.	No difference from Proposed Action.	No difference from Proposed Action.
Decommission of Pipeline	Minor, short-term, adverse impacts	No difference from Proposed Action.	No difference from Proposed Action.
Accidents/Upsets	Minor, short-term, adverse impacts	No difference from Proposed Action.	No difference from Proposed Action.
Fisheries			
Pipeline Construction	Minor, short-term, adverse impacts.	No difference from Proposed Action.	No difference from Proposed Action.

Impact	Proposed Action	Southern Site and Route Alternative	FSRU Design Alternative
Onshore Wildlife			
Pipeline Construction	Minor to moderate, short-term and long-term, adverse impacts as a result of mortality. Minor, short-term, adverse impacts from noise.	No difference from Proposed Action.	No difference from Proposed Action.
Valve Station and Aboveground Facilities Construction	Minor to moderate, short-term and long-term, adverse impacts as a result of mortality. Minor, short-term, adverse impacts from noise.	No difference from Proposed Action.	No difference from Proposed Action.
Operation of Pipeline	No impacts.	No difference from Proposed Action.	No difference from Proposed Action.
Decommission of Pipeline	Minor, short-term, adverse impacts from construction and noise.	No difference from Proposed Action.	No difference from Proposed Action.
Accidents/Upsets	Minor, short-term, adverse impacts	No difference from Proposed Action.	No difference from Proposed Action.
Threatened and Endangered Species			
Construction of Pipeline	Minor, short-term, adverse impacts from construction noise.	No difference from Proposed Action.	No difference from Proposed Action.
Operation of Pipeline	No impacts.	No difference from Proposed Action.	No difference from Proposed Action.
Decommission of Pipeline	Minor, short-term, adverse impacts from noise.	No difference from Proposed Action.	No difference from Proposed Action.
Accidents/Upsets	Minor, short-term, adverse impacts	No difference from Proposed Action.	No difference from Proposed Action.

Notes:

1. Under the No Action Alternative none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur. No direct or indirect impacts on terrestrial biological resources would be anticipated.
2. The Offshore Interconnection Alternative was carried forward but not presented in the table since no impacts on terrestrial biological resources would be anticipated.
3. AAV Vaporization, and Suction Pile Anchoring Alternatives were carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.3 Cultural Resources

Section 106 of the NHPA, as amended, requires USCG to take into account the effects of its undertakings on properties listed in, or eligible for listing in, the NRHP. Section 106 also requires the USCG to afford the ACHP with an opportunity to comment on those undertakings.

The following discussion of cultural resources impacts includes an analysis of impacts and a determination of impact duration and severity. Included in the discussion are elements of the project description that could cause impacts as well as mitigation measures proposed to minimize potential impacts. Applicant-proposed measures for minimizing potential environmental impacts are those that have been committed to by the Applicant and incorporated into the project design, and are listed in **Section 4.** If further measures are recommended by agencies to mitigate potential adverse impacts, they are stated at the end of each analysis and in **Section 4.11**. For analyses where no mitigation measures are stated, none have been identified to further reduce potential adverse impacts.

4.3.1 Impacts of the Proposed Action

Onshore

The onshore portion of the Project would include a 6.4-km (4-mi) interconnect from the landfall at Port Manatee to the Gulfstream Natural Gas System LLC pipeline system and the TECO Bayside Gate System. The construction corridor for the pipeline would be 30 m (100 feet) wide to encompass work space. The Gulfstream interconnection station parcel is adjacent to the Gulfstream parcel and measures 3 acres. The onshore Port Manatee valve station is 0.07 acres and would be located just east of the Gulfstream valve station within Port Manatee property. Staging areas, a pipeyard, a concrete batch plant, and a storage facility would be located within Port Manatee.

Archeological surveys of the Project's APE have not resulted in the identification of any archeological sites or historic structures that are eligible for listing in the NRHP. It is anticipated that additional workspace, and staging areas might be necessary during construction; such areas would be surveyed and identified archeological sites would be avoided. Port Dolphin indicated it would use only existing access roads or ROW for access.

Offshore

The marine portion of the Project includes offshore and nearshore elements. Construction of the offshore element involves installation of North and South LNG buoy moorings comprising the Port, anchors, feeder lines, and a segment of connecting 36-inch diameter pipeline that together encompass an approximately 22-acre area on the seafloor within Federal waters. Construction of the nearshore element would involve installation of an approximately 42-mile-long pipeline from the Federal-State waters boundary approximately 29 miles west-southwest of the entrance into Tampa Bay, Florida, to an HDD landfall between the existing Gulfstream Pipeline and the Port Manatee Shipping Channel in southeastern Tampa Bay at Port Manatee.

Archeological field surveys utilizing a marine magnetometer, high-resolution side-scan sonar, and sub-bottom profiler and subsequent data evaluation performed for the Project identified high-probability areas for containing prehistoric archeological resources and remote sensing targets with potential for representing historic shipwreck remains. Specifically, the geophysical survey conducted by SEARCH identified areas in the west-central portion of the mooring area as having high probability for prehistoric archeological sites, as well as 11 sonar contacts (3 in Federal waters, 8 in Florida waters), 3 unidentified side-scan sonar contacts (1 in Federal waters), and 15 unidentified magnetic anomalies (all but 1 in Florida waters) interpreted as possible historic shipwreck remains. Based on the results and recommendations from the Project archeological assessment surveys, the proposed Port Dolphin LNG system would be constructed, operated, and decommissioned to avoid adverse impacts on the identified archeologically sensitive areas, and, therefore, would have no potential for causing adverse effects on archeological resources that are listed in or eligible for listing in the NRHP. Furthermore, in the event of unanticipated discovery of cultural resources, Port Dolphin would follow an Unanticipated Discoveries Plan (see **Appendix I**), including stopping work as appropriate and notifying appropriate authorities.

4.3.1.1 Construction

Onshore

Pipeline construction would have little potential for adverse impacts on cultural resources provided that an archeological survey of any unsurveyed areas, as noted below, is performed prior to construction, and all identified cultural resources are avoided with proper buffer distances. The Applicant would also

complete all outstanding consultation regarding the Project with the Florida Division of Historic Resources (FDHR) and federally recognized Native American tribes. Federally recognized tribes have a role in NHPA compliance actions in terms of review and comment. The NHPA requires the identification and consideration of potential adverse effects on properties that might be significant due to their traditional or historic importance to federally recognized tribes.

Interconnection Stations, Valve Station, and Work Spaces. Surveys conducted within the TECO and Gulfstream Interconnection stations and the TECO Bayside Gate station did not encounter any evidence for archeological sites. Surveys of the pipeline corridor resulted in the identification of two AOs within the APE; both have been found not eligible by the SHPO. The two historic structures identified within one-half mile of the Port Dolphin pipeline corridor (8MA1210 and 8MA1211) have been determined not eligible for listing on the NRHP. The third recorded structure (8MA1324) has not been evaluated for eligibility. This third structure lies more than one-half mile southeast of the TECO Interconnection Station and the TECO Bayside Gate station, and more than 1 mile southwest of the Gulfstream Interconnection Station. Although these stations include aboveground structures, they would be located sufficiently far away from 8MA1324 to eliminate visual intrusion into the viewshed or setting of this structure. No historic structures were identified within the APE.

It is anticipated that several workspaces, and staging and pull out areas would extend beyond the 61-m-(100-foot-) wide survey corridor. The precise parameters and locations of these facilities are not yet known. Therefore, the FERC staff has recommended that the Applicant defer construction and use of the onshore facilities and staging, storage, and temporary work areas until the Applicant consults the Florida SHPO regarding the need for survey of any newly identified pullouts, staging areas, extra workspaces, and pipe and contractor yards; and files the SHPO's comments, any required survey reports, and the SHPO's comments on the reports. All material filed with the Commission containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering as follows: **"CONTAINS PRIVILEGED INFORMATION--DO NOT RELEASE."**

Offshore

Offshore construction activities (deepwater port and pipeline installation and construction barge anchoring operations) have the potential for direct and indirect, temporary and permanent adverse impacts on prehistoric and historic cultural resources in the Project's marine APE. Direct adverse impacts could include the physical destruction or damage to all or a portion of a site, or alteration or removal of a historic property. Indirect adverse impacts could include the introduction of elements that diminish the integrity of the site or alter settings associated with historic properties. Construction impacts resulting from the installation of the 36-inch submarine gas transmission pipeline through conventional trenching using anchor barges and concrete mattresses, installation of the piggable-Y and flow-lines, and the anchoring of support vessels would have the potential to cause significant long-term, adverse impacts on archeologically sensitive areas identified within the marine Project APE. The archeological survey reports (LAI 2006, LAI 2007, SEARCH 2008) for the proposed Deepwater Port and marine pipeline routes have reviewed and identified from the survey data and research archeologically sensitive areas for which avoidance by a distance of 305 m (1,000 feet) is recommended to prevent or minimize Project-related adverse impacts on these areas. Avoidance of archeologically sensitive areas by a distance of 305 m (1,000 feet) is anticipated to mitigate both direct and indirect adverse project impacts to less than significant levels.

4.3.1.2 Operations

Onshore

Operation of the Project would have no impact on cultural resources, as all cultural resources would have been identified for onshore sections of the pipeline and ancillary facilities prior to the in-service date. Routine maintenance on existing facilities would not result in any new impacts.

Offshore

Once the port components are installed, operation of the Port Dolphin project would have no impact on cultural resources since no new areas of seafloor would be impacted by routine operational activities. The only potential impacts of operation that could occur are those from the anchoring of support vessels within the offshore archeologically sensitive areas designated as avoidance zones. Designation of protective buffer zones of 305 m (1,000 feet) around archeologically sensitive areas would mitigate adverse project impacts associated with support vessel anchoring.

4.3.1.3 Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Onshore

Abandonment of the pipeline facilities would be subject to the approval of the FERC under Section 7(b) of the NGA. The impacts would be reassessed prior to the decommissioning based upon environmental conditions and laws at the time. No adverse impacts on cultural resources would be expected as a result of decommissioning.

Offshore

The impacts would be reassessed prior to the decommissioning based upon environmental conditions and laws at the time. Decommissioning of the Port Dolphin project could have adverse impacts on cultural resources (e.g., anchoring of decommissioning support vessels). To prevent adverse impacts from decommissioning activities, 1,000-foot radius avoidance zones centered on areas identified as archeologically sensitive should be designated by the Applicant, and direct or indirect disturbances, such as those occurring from support vessel anchoring within them.

4.3.2 Alternatives

Table 4.3-1 compares impacts from the Proposed Action to each of the alternatives with respect to cultural resources.

4.3.2.1 Southern Site and Route Alternative

Onshore

Surveys conducted within the APE for onshore portion of the Southern Pipeline Alternative encountered two archeological sites and four AOs. Site 8MA1228, recorded during a survey by Janus Research in 2001, consisted of a single lithic flake. The FDHR has concurred that this site is not eligible for listing in the NRHP. Site 8MA1478 and AOs 1 through 4, all of which were recorded during the 2007 SEARCH survey, were recommended as not eligible for listing in the NRHP, and FDHR concurred with this recommendation on June 5, 2007 (see **Appendix C**). Surveys would need to be completed for any unsurveyed portions of the planned pipeline, staging areas, and access roads.

No historic structures lie within the APE for the Southern Pipeline Route. Three recorded historic structures occur within one-half or more miles of the proposed Southern Pipeline Route; two have been determined not eligible for listing on the NRHP and one has not been evaluated (8MA1324). Even should 8MA1324 be determined eligible at a later date, construction of an underground pipeline would represent only a temporary impact on the viewshed or setting of this structure.

Offshore

The Southern Site and Route Alternative would have an offshore pipeline length of 74 km (46 mi) and a construction footprint that is 9,323 acres in size. The offshore construction method would involve conventional trenching using anchor barges and concrete mattresses where necessary. Construction of the alternative would have no direct or indirect impacts on cultural resources provided that an archeological survey of any unsurveyed portions of the route is performed prior to construction, and all identified cultural resources are avoided with proper buffer distances. The Applicant would also complete all outstanding consultation regarding the Project with the USCG, FDHR, and federally recognized Native American tribes.

4.3.2.2 Offshore Interconnection with the Gulfstream Pipeline Alternative

Onshore

With the use of this alternative, which would connect the Port with an existing natural gas pipeline and eliminate the need for an onshore pipeline, onshore construction would not occur. Therefore, impacts on onshore cultural resources would be reduced by use of this alternative.

Offshore

The proposed Site and Interconnect to the Existing Gulfstream Pipeline Alternative would require construction of a 29-km (18-mi) pipeline interconnect to the Gulfstream Pipeline with a 249-acre construction footprint. Installation of the pipeline would require conventional trenching using anchor barges and concrete mattresses where necessary, with HDD or boring under sensitive areas. Construction of the alternative would have no direct or indirect impacts on cultural resources provided that an archeological survey of any unsurveyed portions of the route is performed prior to construction, and all identified cultural resources are avoided with proper buffer distances. Furthermore, in the event of

unanticipated discovery of cultural resources, Port Dolphin would follow an Unanticipated Discoveries Plan (see **Appendix I**), including stopping work as appropriate and notifying appropriate authorities. The Applicant would also complete all outstanding consultation regarding the Project with the USCG, FDHR, and federally recognized Native American tribes as required by the NHPA.

4.3.2.3 FSRU Port Design Alternative

Onshore

Onshore impacts would be the same for the FSRU alternative since the interconnection pipeline would be the same.

Offshore

Anticipated impacts associated with construction, operation, and decommissioning of the FSRU Port Design Alternative would likely be lower than those of the proposed SRV port configuration, because a single set of anchors is required for the FSRU to support continuous vaporization and send-out of natural gas, while an SRV system requires two sets of anchors to allow simultaneous operation of two SRVs while one is shutting down and the other is starting up. Results and recommendations from the Project archeological assessment surveys would need to be considered to construct, operate, and decommission the FSRU Port in such a way as to avoid identified archeologically sensitive areas, thereby eliminating or mitigating potential adverse effects on archeological resources that are listed in or eligible for listing in the NRHP.

4.3.2.4 AAV Vaporization Technology Alternative

Construction, operation, and decommissioning impacts under the AAV Vaporization Technology Alternative would be similar to those under the Proposed Action.

4.3.2.5 Suction Piles Anchoring Alternative

Construction, operation, and decommissioning impacts under the Suction Piles Anchoring Alternative would be similar to those under the Proposed Action.

4.3.2.6 No Action Alternative

The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is

possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, there would be no direct or indirect adverse impacts on submerged or onshore cultural resources. Means to satisfy the Nation's energy demands might result in increased use of existing land-based terminals, greater reliance on declining domestic oil and gas resources, or development of alternate means of importing LNG. Alternative sources of natural gas can include other Deepwater LNG Ports or onshore LNG terminals. Other Deepwater LNG Ports could have adverse impacts on cultural resources, but in a different geographic location. Onshore LNG terminals can be located in coastal areas where there would be greater likelihood of adversely impacting cultural resources.

Table 4.3-1. Summary of Impacts on Cultural Resources

Impacts	Proposed Action	Southern Site and Route Alternative	Offshore Interconnection Alternative	FSRU Design Alternative
Construction				
Onshore Archeological Resources	No adverse impacts from known project components. Possible adverse impacts resulting from construction of unidentified, work areas.	Similar to Proposed Action.	No onshore component, no impact.	No onshore component, no impact.
Aboveground Historic Structures	No adverse impacts from known project components. Possible temporary impacts resulting from construction of unidentified, work areas.	Similar to Proposed Action.	No onshore component, no impact.	No onshore component, no impact.
Submerged Archeological Resources	No adverse impacts.	Similar to Proposed Action; higher risk of unanticipated cultural discovery (longer route).	Similar to Proposed Action; lower risk of unanticipated cultural discovery (shorter route).	Similar to Proposed Action.
Operations				
Onshore Archeological Resources	No adverse impacts.	Similar to Proposed Action.	No onshore component, no impact.	No onshore component, no impact.
Aboveground Historic Structures	No adverse impacts.	Similar to Proposed Action.	No onshore component, no impact.	No onshore component, no impact.
Submerged Archeological Resources	No adverse impacts.	Similar to Proposed Action.	Similar to Proposed Action.	Similar to Proposed Action.
Decommissioning				
Onshore Archeological Resources	No adverse impacts.	Similar to Proposed Action.	No onshore component, no impact.	No onshore component, no impact.
Aboveground Historic Structures	No adverse impacts.	Similar to Proposed Action.	No onshore component, no impact.	No onshore component, no impact.
Submerged Archeological Resources	No adverse impacts.	Similar to Proposed Action; higher risk of unanticipated cultural discovery (longer route).	Similar to Proposed Action; lower risk of unanticipated cultural discovery (shorter route).	Similar to Proposed Action.

Notes:

There would be no impacts from the No Action Alternative.

The AAV Vaporization and Suction Pile Anchoring Alternatives were carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.4 Geological Resources

The following discussion of geological resources impacts includes an analysis of impacts and a determination of impact duration and severity. Included in the discussion are elements of the project description that would both produce impacts and are proposed to minimize potential impacts. Applicant-proposed measures for minimizing potential environmental impacts are those that have been committed to by the Applicant and incorporated into the project design, and are listed in **Section 4.11**. If further measures are recommended by agencies to mitigate potential adverse impacts, they are stated at the end of each analysis and in **Section 4.11**. For analyses where no mitigation measures are stated, none have been identified to further reduce potential adverse impacts.

Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to mineral resources and potential geologic hazards are considered when evaluating potential impacts of the Port Dolphin project on geological resources. Generally, impacts on geological resources or caused by geologic hazards can be avoided or minimized through proper siting, foundation and structural engineering design, erosion-control measures, and construction/operation techniques. The main geologic hazards that might occur on the offshore component of the Project include the following:

- Faults – sediment tectonics
- Slope Stability – slope steepening, slumps, creep, debris flow
- Shallow Gas in Sediments – strength reduction, hydrates (frozen gas and water)
- Seafloor Depressions – blowouts, pockmarks
- Seafloor Feature – sediment waves, man-made structures.

Analysis of potential impacts associated with geological resources typically includes the following steps:

- Identify and describe the geological resources that could potentially be impacted or affect the proposed development
- Examine the Project and the potential impacts or impacts related to the resource
- Assess the significance of potential impacts or impacts
- Provide mitigation measures to minimize the potential impacts or effects, as necessary.

Impacts on offshore geologic resources include direct physical disturbance to the seafloor during construction, routine operations, and decommissioning activities. These impacts could result from the following:

- Installation of the STL subsea system, including placement of components on the seafloor and anchoring of construction barges
- Plowing of the seafloor, placement of concrete mattresses, and anchoring of barges during pipeline installation
- Sweeping of the seafloor due to movement of STL mooring lines during routine operations
- Decommissioning activities consisting of the STL subsea system removal from the seafloor and anchoring of construction vessels (Port Dolphin 2007c).

Geological resources generally would not be impacted by the Project. Some localized, short-term changes in sedimentation would be expected. It is not expected that the Project would cause destruction

of any unique geologic feature, increase erosion potential, prevent recovery of mineral resources, increase the potential for geologic hazards (e.g., seismicity), or alter soil composition or structure.

For the purposes of the impacts analysis, and in the absence of data obtained from multiple core samples and similar investigative survey methods along alternative routes, conditions of the hard-bottom seafloor are assumed to be identical for the proposed and alternative routes.

4.4.1 Impacts of the Proposed Action

4.4.1.1 Construction

Port installation would include the installation of two mooring systems, STL buoys, flexible risers, umbilicals, and STL buoy pick-up system. The anchoring system would anchor the mooring buoys to the seafloor using traditional techniques. It is estimated that the installation of the mooring lines and anchors would directly affect 0.22 hectares (0.56 acres) of sediment and 0.012 hectares (0.032 acres) of hard bottom (Port Dolphin 2007c). Impacts on sediments and the seafloor would result from excavation necessary to install the anchoring system and the disturbance of seafloor sediments associated with the installation. There would be short-term, minor, direct, and adverse impacts on seafloor topography from the installation of the Port. The installation of the piles, manifolds, and flowline would cause short-term localized disturbances to the existing seafloor topography as a result of excavation and equipment movement associated with the Port installation.

Plowing is the proposed technique for laying the pipeline, but might not be achievable over the entire length of the pipeline. The offshore pipeline from the piggable-Y to the bulkhead would be approximately 68 km (42 mi) long. Installation would result in seafloor impacts as a result of excavation and equipment movement necessary to install the pipeline. Geohazard surveys along the proposed route indicate 58 percent of the offshore route would be located in soft-bottom seafloor, and could be plowed (Port Dolphin 2007c).

The pipe would be covered where the geologic character of the seafloor is unsuited for burial, such as hard-bottom seafloor. Cover techniques might involve the use of a concrete mattress that would be positioned by a crane and divers or submersible vehicles. Alternatively, rocks could be laid over the pipe to provide a protective cover. Of the total length of the pipeline, approximately 42 percent would be considered either unplowable or marginally plowable and would be covered by concrete mattresses or other external protection. This includes an extensive hard-bottom area at a depth of about 14 to 20 m (45 to 65 feet) where no gap for the pipeline could be located. The width of seafloor that would be affected by mattresses is 4 m (13 feet). Therefore, a total area of 16.54 hectares (40.87 acres) of seafloor would be affected. This would include 9.24 hectares (22.84 acres) of soft bottom and 7.29 hectares (18.03 acres) of hard bottom. The reason that some soft-bottom areas would be covered by mattresses is because the curvature of the route would not allow plowing in some areas (Port Dolphin 2007c).

In addition to the seafloor directly disturbed by plowing and placement of concrete mattresses, the seafloor would be disturbed by anchoring of the pipelaying barge. It has been assumed that all pipelaying and burial activities would be performed from large anchored barges with high-capacity anchoring systems. The mattress placement operations would be performed using a flat deck support crane barge with a 4-point mooring system using Workboat-style anchors. During pipeline installation, barge anchor cables would be expected to sweep the seafloor causing disturbance of the underlying sediments and terrain. Short-term, minor, direct, adverse impacts on seafloor sediments and topography would be expected as a result of anchor sweep. Impacts on sediments associated with anchor sweep would be expected to be short-term because over time seafloor currents would be expected to reestablish pre-disturbance sediment and terrain characteristics.

Short-term, minor, direct, adverse impacts on sediments and topography would be expected during Port and pipeline installation.

Impacts on natural geologic resources in onshore areas would be expected where HDD is used to install the pipeline, as a result of disturbance to natural geologic features. Impacts on soils would be expected as a result of disturbance associated with excavation and fill necessary to install the onshore pipeline, Port Manatee valve station, and Gulfstream and TECO Interconnection Station, and potential erosion and sedimentation associated with the pipeline installation.

To avoid coastal mangroves, nearshore pipeline installation would be accomplished by implementing HDD techniques. The technique would be implemented to install the pipeline under the mangroves. Long-term, minor, direct impacts on natural geological resources would be expected to occur as a result of drilling to accommodate pipeline installation in this area. The remainder of the pipeline would be installed by using an open cut trench method. Approximately 20 hectares (45 acres) of soils would be temporarily impacted during the construction within the 30-m- (100-foot-) wide pipeline ROW.

There is no set ROW in Federal or state waters, and FDEP has stated that no buffer would be imposed in potential sand resource areas (Dow 2009). Port Dolphin LLC has stated that a buffer that would extend 61 m (200 feet) on either side of the installed pipeline or a total width of 122 m (400 feet) would be sufficient to protect the pipeline. Therefore, it is assumed that recovery of sand for beach renourishment would be prohibited within the 122-m (400-foot) buffer. As described in **Section 3.4**, there is only one permitted and active sand borrow area in the vicinity of the Project, but other potential areas have been identified along the proposed pipeline route. **Figure 3.4-5** shows the identified potential sand borrow areas in the Project vicinity. The areas other than Borrow Area IX have been identified as potential resources, but not investigated or permitted. Therefore, no restrictions exist that would preclude other uses, such as pipeline installation and operation. From the figure, it is clear that there are several potential sand resource sites between the proposed pipeline route and the nearby beach areas to the south. These potential areas have not been evaluated for their suitability for beach renourishment, but represent total potential sand resources.

In comments on the Draft EIS dated May 29, 2008, the Town of Longboat Key identified Borrow Area IX and the High Volume Sand Shoal as the "current and long-term, white, beach-compatible sand source for its beach-management plan." The town requested that these areas be avoided, and proposed four alternative routes to avoid the identified areas. The Applicant submitted a revised pipeline route in December 2008 (Addendum II) that closely followed one of the routes proposed by Longboat Key. A second alternative, the Offshore Interconnection Pipeline Route Alternative, is discussed in **Section 4.1.6**. A third alternative, approaching the Gulfstream Pipeline through an area identified by Longboat Key as having few potential sand resources and then paralleling the Gulfstream Pipeline into Tampa Bay was evaluated and not carried forward for detailed evaluation. The screening evaluation is discussed in **Section 2.1.4.6**.

As noted in **Section 3.4.3**, four potential sand resource areas have been evaluated; Borrow Area IX, the High Volume Sand Shoal, the Longboat Key-identified potential sand resources, and the ROSS potential sand resource area. **Table 4.4-1** tabulates the areas of each potential sand resource area, the total potential volume of recoverable sand, length of the pipeline route that passes through the area, the volume of potential sand resources impacted by the Proposed Pipeline Route, and the percentage of total potential resource volume impacted by the Proposed Pipeline Route. Calculations for each potential sand resource area group have been made based on the area of the group and the length of the pipeline that would pass through the area. For example, all of the areas identified by Longboat Key were added together, and the potential volume of sand was calculated based on the low sand depth assumption and for the high sand depth assumption. This total volume was compared to the volume that would be obstructed by the

Proposed Route, which passes through three areas identified by Longboat Key. The Proposed Pipeline Route completely avoids Borrow Area IX and the High Volume Sand Shoal Area. The Proposed Pipeline Route passes through potential areas identified by Longboat Key, including the area identified in Federal waters as F-2, in their May 28, 2008, comments for a distance of 3.9 km (2.4 mi), and through the ROSS area for a distance of approximately 25.3 km (15.7 mi). These lengths were used to calculate the volumes in **Table 4.4-1.**

Table 4.4-1. Impacts on Potential Sand Borrow Areas

	Size of Area (acres)	Volume of Area (cubic yards)		Length of pipeline through impacted area (feet)	Volume of Impacted Area (cubic yards)		Percentage of potential volume impacted
		3.75-foot average depth	9.5-foot average depth		3.75-foot average depth	9.5-foot average depth	
Borrow Area IX	264	14,374,800	36,416,160	0	0	0	0.00%
High Volume Sand Shoal	4,500	245,025,000	620,729,999	0	0	0	0.00%
Longboat Key Potential Areas	128,000	6,969,599,993	17,656,319,982	12,858	6,428,904	16,286,556	0.09%
ROSS Area	538,000	29,294,099,971	74,211,719,926	38,187	19,093,486	48,370,164	0.07%

In 2006, Longboat Key used approximately 1,360,000 m^3 (1,790,000 y^3) of sand resources for their beach renourishment project. Assuming Longboat Key's next major beach renourishment project requires a similar amount of sand the proposed pipeline route would result in a loss of beach quality sand from the Longboat Key-identified potential sand resource areas equivalent to 2 to 5.5 beach renourishment projects. The loss of sand resulting from the proposed pipeline obstruction on ROSS-identified resources would result in the loss of 10.6 to 27.0 beach renourishment projects. No loss of beach quality sand within Borrow Area IX or the High Volume Sand Shoal is anticipated to occur.

In comments submitted on the docket dated May 28, 2009, on behalf of the Town of Longboat Key, additional potential sand resource areas were identified in Federal waters based on geotechnical data collected by the Applicant in their surveys of the Proposed Pipeline Route. These areas are several miles farther away from the beach areas on Longboat Key than many of the areas identified earlier. The proposed pipeline route passes through one of these areas (F-2). In both the comments submitted in 2008 and 2009, Longboat Key stressed the importance of having beach renourishment sources close to the beaches. They noted the significant additional costs of hauling sand resources long distances. As noted previously, Longboat Key has identified Borrow Area IX and the High Volume Sand Shoal as their long-term source of sand. Therefore, since the area identified in the 2009 comments is small (approximately 587 acres) and more than 12 miles from Longboat Key in Federal waters, there appear to be several potential areas, in addition to Borrow Area IX and the High Volume Sand Shoal, that could contain suitable sand that are closer to the beaches on Longboat Key than the newly identified areas.

Based on analysis of the available information and conservative assumptions on the volume of recoverable sand in potential resource areas, the impacts from the pipeline route passing through the three areas identified by Longboat Key and the northern portion of the ROSS area are long-term, minor, direct, and adverse. It would not be expected that the volumes of sand excluded from consideration for beach renourishment would have any substantial impact on the beach renourishment projects, and, therefore, there would be no short-term or long-term related impacts, such as excessive beach erosion, loss of tourist interest in the area, or degradation of roadways and transportation. Impacts on previously undisturbed soils would be expected to be long-term, minor, direct, and adverse because the pipeline alignment and locations for the Port Manatee valve station and Gulfstream Interconnection Station occur in areas previously disturbed by pipeline placement, agriculture, and urbanization.

Short- and long-term, minor, direct, and adverse impacts on geology and soils would be expected as a result of constructing the onshore pipeline, Port Manatee valve station, and Gulfstream and TECO Interconnection Station. No adverse impacts on Prime Farmland would be expected because there are no prime farmland soils mapped in Manatee County so there is no Prime Farmland in the county.

In response to Federal, state, and local requirements, BMPs have been included in project design or proposed by the Applicant to reduce environmental impacts, and are discussed in **Section 4.11**.

4.4.1.2 Operations

Anchor chains and cables from the buoy and flexible risers would chafe bottom sediments between each anchor in the anchoring system. The estimated affected area from the anchor chains/cables at both buoys would be approximately 8.9 hectares (22 acres) (5.2 hectares [12.95 acres] of soft bottom and 3.7 hectares [9.15 acres] of hard bottom) (Port Dolphin 2007c). The seafloor around the north and south buoy locations includes both soft-bottom and hard-bottom areas. The anchor layouts have been planned to minimize the amount of hard-bottom habitat contacted. Impacts on hard-bottom and sediments from the chaffing of the anchor chains/cables and flexible riser would last for the duration of the Project, but would be expected to return to preconstruction conditions over time after the decommissioning.

Long-term, minor, direct, adverse impacts on sediments would be expected from Port Dolphin operations.

Placement of concrete mats on the seafloor could result in localized modification of currents and depositional characteristics resulting in minor modification of seafloor topography adjacent to the pipeline over time.

Long-term, minor, direct, adverse impacts on seafloor topography would be expected to occur in areas where concrete mats are used to cover the offshore pipeline.

Impacts on potential sand resources would occur for the duration of Port Dolphin operations and would result from restricted use and recovery of sand resources for beach renourishment projects. The volumes of sand impacted by the operation of the pipeline and the buffer around it would be the same as discussed in **Section 4.1.1.1**, Construction Impacts. For the reasons discussed in **Section 4.1.1.1**, the impacts from the operation of the Proposed Pipeline would be long-term, minor, direct, and adverse.

No adverse impacts on geology or soil resources would be expected as a result of operating the onshore pipeline, Port Manatee valve station, and Gulfstream Interconnection Station because no new land disturbance would be expected.

In response to Federal, state, and local requirements, BMPs have been included in project design or proposed by the Applicant to reduce environmental impacts, are discussed in **Section 4.11**.

4.4.1.3 Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Short-term, minor, direct, adverse impacts would be expected on seafloor topography and sediments during the decommissioning of the Project.

There would be no plowing of the seafloor and no anchoring along the pipeline route during decommissioning. Seafloor impacts during decommissioning are expected to be similar to those from installation of the STL subsea system. The impacts would be concentrated around the north and south buoy locations.

Terrestrial decommissioning of the Project would consist of the removal of all aboveground pipeline-related equipment and facilities. Decommissioning of the pipeline would consist of the removal of any hydrocarbons in the pipe through flushing, filling the pipe with treated freshwater, and capping the ends of the pipe.

Minor, adverse impacts on soils would be expected during the demolition of aboveground facilities as a result of ground disturbance associated with equipment and structure removal. No adverse impacts on geology or soils would be expected as a result of decommissioning of the buried pipeline.

Potential impacts on geologic and soils resources would be reassessed prior to decommissioning based upon environmental conditions and laws at that time.

4.4.2 Alternatives

Table 4.4-3 compares impacts from the Proposed Action to each of the alternatives with respect to geological resources.

4.4.2.1 Southern Site and Route Alternative

Based on information provided by the Applicant's geophysical surveys, the Southern Port Site and Route Alternative geological conditions would be similar to the Proposed Route for the offshore portions until the southern Route approaches the entrance to Tampa Bay. Since the southern route would pass through the area between Anna Maria Island and Passage Key, the pipeline would run through the High Volume Sand Shoal and Borrow Area IX, and adjacent to and within the boundaries of the Terra Ceia AP. As

proposed, the Southern Route Alternative enters the Terra Ceia AP from the northwest and traverses primarily soft-bottom and some hard-bottom areas for 4.8 km (3 mi). The pipeline exits the preserve, and traverses another 5.8 km (4 mi) along the northern boundary before re-entering the preserve at the northeastern corner for 1.1 km (0.7 mi). Less than 10 percent of the Southern Route Alternative overlaps with the Proposed Route in Tampa Bay as it approaches the landfall area at Port Manatee. For the offshore areas, the seafloor conditions are similar. Therefore the impacts related to the Southern Site and Route Alternative would be slightly higher because of the greater length. The offshore portion of the Southern Route Alternative is 74 km (46 mi), or about 6.4 km (4 mi) longer than the proposed route. Because impacts related to gas transmission line installation account for most of the total, the overall impact area for the Southern Site and Route Alternative would be greater for the gas transmission line installation (Port Dolphin 2007c).

Short-term and long-term, minor, direct, adverse impacts on seafloor sediments and topography would be expected during Port and gas transmission line installation, operation, and decommissioning. Impacts associated with Port installation, operation, and decommissioning would be expected to be the same or similar to those discussed for the proposed location and route.

Impacts on sand resources from implementation of the Project along the Southern Route Alternative would be larger in both area and volume of potential sand resources, and would directly impact Borrow Area IX. The southern pipeline route would cross four partially overlapping potential sand sources, including Longboat Key, ROSS, High Volume Sand Shoal, and Borrow Area IX.

Impacts on sand resources have been calculated using the same assumptions used in calculating the impacts for the Proposed Route. A buffer zone of 122 m (400 feet) centered on the pipeline and average sand depths of 1.1 m (3.75 feet) and 2.9 m (9.5 feet) were used to calculate volumes. The impacts on sand resources are detailed in **Table 4.4-2**.

Table 4.4-2. Impacts on Potential Sand Borrow Areas along the Southern Site and Route Alternative

	Size of Area (acres)	Volume of Area (cubic yards)		Length of pipeline through impacted area (feet)	Volume of Impacted Area (cubic yards)		Percentage of potential volume impacted
		3.75-foot average depth	9.5-foot average depth		3.75-foot average depth	9.5-foot average depth	
Borrow Area IX	264	14,374,800	36,416,160	1,766	883,115	2,237,225	6.14%
High Volume Sand Shoal	4,500	245,025,000	620,729,999	12,302	6,151,033	15,582,617	2.51%
Longboat Key Potential Areas	125,000	6,806,249,993	17,242,499,983	24,046	12,022,998	30,458,260	0.18%
ROSS Area	538,000	29,294,099,971	74,211,719,926	50,227	25,113,744	63,621,485	0.09%

In 2006, Longboat Key used approximately 1,360,000 m^3 (1,790,000 y^3) of sand resources for their beach renourishment project. Assuming Longboat Key's next major beach renourishment project requires a similar amount of sand the southern pipeline route would result in a loss of beach quality sand from Borrow Area IX equivalent to 0.5 to 1.2 renourishment projects. The loss of beach quality sand resulting from the proposed pipeline obstruction on ROSS-identified resources would result in sand loss equivalent to 14.0 to 35.5 beach renourishment projects.

Potential impacts on geologic and soils resources would be reassessed prior to decommissioning based upon environmental conditions and laws at that time.

4.4.2.2 Offshore Interconnection with the Gulfstream Pipeline Alternative

Detailed information about seafloor conditions is only available for the proposed pipeline route. However, considering the known geologic conditions of the west Florida shelf, it is a reasonable assumption that seafloor conditions in the alternative routes are similar to the proposed route (Port Dolphin 2007c). Impacts associated with the offshore interconnection alternative would be expected to be similar to those associated with the offshore component of the proposed alternative. However, the length of area impacted in association with gas transmission line placement under the offshore interconnection alternative is approximately 28.8 km (18 mi) and under the proposed alignment it is 67.6 km (42 mi). No adverse impacts on seafloor geology or terrestrial geology and soils would be expected shoreward of the offshore interconnection because the gas transmission line is the existing Gulfstream Pipeline. Impacts associated with Port and offshore gas transmission line installation, operation, and decommissioning would be expected to be the same or similar to those discussed for the proposed location and route.

Short-term and long-term, minor, direct, adverse impacts on seafloor sediments and topography would be expected during Port and gas transmission line installation, operation, and decommissioning. No adverse impacts would be expected along the nearshore or terrestrial components of pipeline because the gas transmission line ties into and utilizes existing Gulfstream Pipeline shoreward of the offshore interconnection.

Potential impacts on geologic and soils resources would be reassessed prior to decommissioning based upon environmental conditions and laws at that time.

4.4.2.3 FSRU Port Design Alternative

Under the FSRU alternative, the FSRU and gas transmission line would be in the same locations as the Port and transmission lines under the proposed alternative. Construction, operation, and decommissioning impacts and mitigations would be expected to be the same under both alternatives.

Short-term and long-term, minor, direct, adverse impacts on sediments and topography would be expected during FSRU and gas transmission line installation, operation, and decommissioning.

Potential impacts on geologic and soils resources would be reassessed prior to decommissioning based upon environmental conditions and laws at that time.

4.4.2.4 AAV Vaporization Technology Alternative

Construction, operation, and decommissioning impacts under the AAV Vaporization Technology Alternative would be similar to those under the Proposed Action.

4.4.2.5 Suction Piles Anchoring Alternative

Construction, operation, and decommissioning impacts under the Suction Piles Anchoring Alternative would be similar to those under the Proposed Action.

4.4.2.6 No Action Alternative

The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the License, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, the Port Dolphin pipeline would not be constructed, so no adverse impacts on seafloor hard bottom, sediments, or topography resulting from Port and gas transmission line installation, operation, or decommissioning would occur. No adverse impacts on offshore or terrestrial geologic or soil resources would be expected under the No Action Alternative. Means to satisfy the Nation's energy demands might result in increased use of existing land-based terminals, greater reliance on declining domestic oil and gas resources, or development of alternate means of importing LNG. Alternative sources of natural gas can include other Deepwater LNG Ports or onshore LNG terminals. Other Deepwater LNG Ports might have similar impacts on geologic resources, but in a different geographic location. Onshore LNG terminals would be located in coastal areas where there would be greater likelihood of impacting geologic resources in the nearshore and coastal areas.

Table 4.4-3. Summary of Impacts on Geology

Impacts	Proposed Action	Southern Site and Route Alternative	Offshore Interconnection Alternative	FSRU Design Alternative
Construction				
Port anchoring system impacts on seafloor sediments and topography.	Short-term, minor, direct, and adverse.	Short-term, minor, direct, and adverse. Type and level of impacts expected to be similar to the Proposed Action.	Short-term, minor, direct, and adverse. Type and level of impacts expected to be similar to the Proposed Action.	Short-term, minor, direct, and adverse. Type of impacts expected to be similar to Proposed Action, but to a lesser degree because there would be only one mooring system.
Pipeline installation impacts on seafloor sediments and topography.	Short-term, minor, direct, and adverse.	Short-term, minor, direct, and adverse. Type of impacts expected to be similar to the Proposed Action, but to a greater degree because the gas transmission line would extend for 74 km (46 mi) offshore. Under Proposed Action the gas transmission line would extend for 67.6 km (42 mi) offshore.	Short-term, minor, direct, and adverse. Type of impacts expected to be similar to the Proposed Action, but to a lesser degree because the new gas transmission line would extend for 28.8 km (18 mi) offshore. Under the Proposed Action the gas transmission line would extend for 67.6 km (42 mi) offshore.	Short-term, minor, direct, and adverse. Type of impacts expected to be similar to the Proposed Action. The offshore gas transmission line would extend for 67.6 km (42 mi) offshore along the same alignments under both alternatives.
Anchor sweep impacts on seafloor sediments and topography.	Short-term, minor, direct, adverse.	Short-term, minor, direct, and adverse. Type of impacts expected to be similar to the Proposed Action, but to a greater degree because the gas transmission line would extend for 74 km (46 mi) offshore. Under the Proposed Action the gas transmission line would extend for 67.6 km (42 mi) offshore.	Short-term, minor, direct, and adverse. Type of impacts expected to be similar to the proposed action, but to a lesser degree because the new gas transmission line would extend for 28.8 km (18 mi) offshore. Under the Proposed Action the gas transmission line would extend for 67.6-km (42-mi) offshore.	Short-term, minor, direct, and adverse. Type of impacts expected to be similar to the Proposed Action. The offshore gas transmission line would extend for 67.6 km (42 mi) offshore along the same alignments under both alternatives.
HDD drilling impacts on geology.	Long-term, minor, direct, and adverse.	Long-term, minor, direct and adverse. Type and level of impacts expected to be similar to the Proposed Action.	No adverse impacts are expected.	Long-term, minor, direct and adverse. Type and level of impacts expected to be similar to the Proposed Action.

Impacts	Proposed Action	Southern Site and Route Alternative	Offshore Interconnection Alternative	FSRU Design Alternative
Construction (continued)				
Pipeline installation impacts on previously undisturbed soils.	Long-term, minor, direct, and adverse.	Long-term, minor, direct and adverse. Type and level of impacts expected to be similar to the Proposed Action.	No adverse impacts are expected.	Long-term, minor, direct and adverse. Type and level of impacts expected to be similar to the Proposed Action.
Pipeline installation erosion and sedimentation impacts on soils.	Short-term, minor, direct, and adverse impacts.	Long-term, minor, direct and adverse. Type and level of impacts expected to be similar to the Proposed Action.	No adverse impacts are expected.	Long-term, minor, direct and adverse. Type and level of impacts expected to be similar to the Proposed Action.
Pipeline installation impacts on prime farmland soils and Prime Farmland.	No adverse impacts are expected.	No adverse impacts are expected.	No adverse impacts are expected.	No adverse impacts are expected.
Operation				
Bottom chafing from anchor chains and cables associated with buoys and flexible risers.	Long-term, minor, direct, and adverse.	Long-term, minor, direct and adverse. Type and level of impacts expected to be similar to the Proposed Action.	Long-term, minor, direct and adverse. Type and level of impacts expected to be similar to the Proposed Action.	Long-term, minor, direct and adverse. Type and level of impacts expected to be similar but less than the Proposed Action.
Modification of seafloor topography adjacent to the pipeline due to changes in current and depositional characteristics associated with concrete mats.	Long-term, minor, direct, and adverse.	Long-term, minor, direct, and adverse. Type and level of impacts expected to be similar to the Proposed Action.	Long-term, minor, direct, and adverse. Type of impacts expected to be similar to the Proposed Action, but to a lesser degree because the new gas transmission line would extend for 28.8 km (18 mi) offshore. Under the Proposed Action the gas transmission line would extend for 67.6 km (42 mi) offshore.	Long-term, minor, direct and adverse. Type and level of impacts expected to be similar to the Proposed Action.

Impacts	Proposed Action	Southern Site and Route Alternative	Offshore Interconnection Alternative	FSRU Design Alternative
Operation (continued)				
Loss of future potential sand resources along and adjacent to the pipeline alignment.	Long-term, minor, direct, and adverse.	Long-term, minor direct, and adverse. Type of impacts expected to be similar to the Proposed Action. The level of impact would increase to a minor degree because the proposed pipeline was realigned to avoid potential impacts to known sand resources.	No adverse impacts are expected.	No adverse impacts are expected.
Decommissioning				
Impacts on seafloor sediments and topography due to seafloor disturbance associated with buoy, riser, umbilical, mooring lines, and pile anchor removal.	Short-term, minor, direct, and adverse.	Short-term, minor, direct, and adverse. Type and level of impacts expected to be similar to the Proposed Action.	Short-term, minor, direct, and adverse. Type and level of impacts expected to be similar to the Proposed Action.	Short-term, minor, direct, and adverse. Type and level of impacts expected to be similar to the Proposed Action.
Impacts on soils from ground disturbance associated with removal and demolition of equipment and structures.	Negligible adverse effects.	Negligible adverse effects. Type and level of impacts expected to be similar to the Proposed Action.	No adverse impacts are expected.	Negligible adverse effects. Type and level of impacts expected to be similar to the Proposed Action.

Notes:

There would be no impacts from the No Action Alternative.

The AAV Vaporization and Suction Pile Anchoring Alternatives were carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.5 Marine Areas and Land Use

4.5.1 Impacts of the Proposed Action

4.5.1.1 Construction

This section discusses impacts on those resource areas defined by their human use and value. As discussed in **Section 3.5**, the Port facility and pipeline would, for the life of the Project and even after, impact future uses in the areas of impact. As discussed in **Section 2.3**, the Port facilities footprint would include the buoys and the pipeline. The port footprint would be 22 acres. Direct impacts on the port footprint would include constant disturbance from anchors (0.088 acres from mooring anchors) and mooring line sweep. Indirect impacts on the 22 acres would include use restriction for recreation and commercial marine activities within the entire 22 acres. **Figure 2.1-7** shows the conceptual footprint of the Port.

The following discussion of marine areas and land use impacts includes an analysis of impacts and a determination of impact duration and severity. Included in the discussion are elements of the project description that would both produce impacts and are proposed to minimize potential impacts. Applicant-proposed measures for minimizing potential environmental impacts are those that have been committed to by the Applicant and incorporated into the project design, and are listed in **Section 4.** If further measures are recommended by agencies to mitigate potential adverse impacts, they are stated at the end of each analysis and in **Section 4.11**. For analyses where no mitigation measures are stated, none have been identified to further reduce potential adverse impacts.

The Applicant conducted geophysical surveys along the offshore pipeline corridor 914 m (3,000 feet) wide for the length of the offshore pipeline, which is approximately 67 km (42 mi). Not all of the 3,000-foot corridor would be directly impacted by the pipe; however, finite areas along the surveyed area would be directly impacted by anchor placement for construction equipment. The geophysical survey was used to develop an anchor handling plan to avoid sensitive areas such as cultural resources. The Applicant has estimated that each anchor would impact 33.4 square meters (m^2) (360 square feet [ft^2]) of submerged land. Anchors would be required during pipelaying, plowing, backfilling, and mattress placement activities resulting in a total of 2,480 separate anchor placements along the pipeline construction corridor. Anchor placement would result in approximately 27.5 acres of impacts in finite areas along the surveyed corridor, and an additional 8,992 acres of impacts to the seafloor from anchor sweep (Port Dolphin 2008d).

Subsequent to the original geophysical surveys, the Applicant conducted site-specific geotechnical surveys in order to develop the construction plan for the pipeline. The construction footprint for the offshore pipeline corridor has been revised based on additional geotechnical surveys. For the offshore pipeline, the construction corridor has been revised from the original 914 m (3,000 feet) corridor to 20.4 m (67 feet). The construction corridor would be reduced even further to 6.1 m (20 feet) in areas where concrete mattresses were used to protect the pipeline instead of burial. The offshore construction footprint for the pipeline has been calculated to be approximately 331 acres (Port Dolphin 2008d). The Applicant plans to use mattresses in hard-bottom areas, in transition areas where HDD construction techniques would be employed, and along the corridor under the Sunshine Skyway Bridge (due to ruble from bridge restoration projects). **Figure 2.3-9** shows the typical construction corridor for the offshore pipeline construction. During construction, USCG would require a Clearance Zone around equipment for safety purposes. All ships and recreational vessels would be required to navigate around the Clearance Zone during construction.

The construction corridor for the onshore portion of the pipeline would be limited to 30 m (100 feet) wide for the length of the onshore pipeline, which is approximately 6.6 km (4.1 mi). It is expected that the entire construction corridor would be impacted during construction. One side of the construction corridor would be used for travel by construction equipment, and the other side would be used for spoil. **Figure 2.3-9** shows the typical construction corridor for the onshore pipeline construction. The total onshore construction footprint for the onshore portion of the pipeline has been calculated to be approximately 45 acres.

Table 4.5-1 shows the marine areas and land use traversed by the proposed pipeline. The offshore pipeline would be constructed through both hard and soft bottom areas. Hard-bottom areas include live benthic habitat and areas where rock outcroppings are on or near the surface of the seafloor. Soft-bottom areas include sand resource areas, and state disposal areas for materials taken from vessel transportation fairways. All disposal areas are within the state waters of Florida in Manatee County. The onshore pipeline would traverse both agricultural and urban areas, water and wetlands. The following paragraphs discuss in detail marine areas and land uses traversed by the Project and specific impacts.

Table 4.5-1. Marine Areas and Land Use Areas Traversed by the Proposed Route Alternative

Location	Marine Area or Land Use Type	Crossing Length in miles (mi)	Construction Area in Acres (67-foot corridor offshore, and 100-foot corridor onshore)
Offshore	Hard-bottom areas	15 mi	3,388 acres
	Sandy-bottom areas (including sand resource areas and spoil areas)	27 mi	5,894 acres
	Identified sand source areas (LBK and ROSS)	(8.6 mi)	(70 acres)
	Tampa/Hillsborough Bay Channel spoil areas	(4 mi)	(32 acres)
	Nearshore fish havens	0	0
	National preserves and wildlife refuges	0	0
	Total Offshore	***42mi***	***9,272 acres***
Onshore	Urban and built-up (100)	0.6 mi	5.3 acres
	Agriculture (200)	0.7 mi	8.2 acres
	Upland Forest (400)	0.6 mi	7.5 acres
	Water (500)	0.7 mi	2.5 acres
	Wetlands (600)	0.9 mi	10.7 acres
	Transportation, communications, and utilities (800)	1.1 mi	10.5 acres
	Total Onshore	***4.1mi***	***45 acres***

Source: Port Dolphin 2007b,d

Note: Length and areas are rounded to nearest whole number for planning purposes

Shipping Fairways, Waterways, and Channels. The proposed Port would be installed outside shipping fairways and navigation channels, and would have no direct impacts on shipping lanes or channels from

increased traffic and potential collisions with support vessels during construction. There would be short-term, minor, adverse, indirect impacts on shipping lanes or channels from increased traffic and potential vessel collisions with pipeline barge and support vessels associated with pipeline installation. Short-term, minor, direct, adverse impacts would occur because the pipeline placement would cross no shipping fairways.

Recreational Fisheries. Direct and indirect adverse impacts on recreational fisheries from the proposed Port installation would be similar to impacts on commercial fisheries (discussed in **Section 4.9**), and would include temporary exclusion during the proposed Port and pipelines construction, displacement of fish due to noise disturbance in the work area, and an increase in sediment loads during installation. The impacts would be temporary and minor. Minor, indirect, beneficial impacts would occur from induced conservation associated with the Safety Zone. The Safety Zone would extend approximately 850 m (2,789 feet) from the center of each buoy and encompass approximately 561 acres.

Sand Resources. Beach communities in Manatee and surrounding counties rely on sand resources from the submerged lands within Florida state waters to renourish the local beaches along the waterfront. The proposed offshore pipeline would cross identified potential sand resource areas identified by both the ROSS database and the Longboat Key community. The pipeline would cross approximately 13.9 km (8.6 mi) of identified sand area.

Benthic Habitats. The Applicant conducted extensive geotechnical and geophysical surveys along the proposed pipeline route to identify and quantify benthic habitat. Surveys concluded that both hard-bottom and live-bottom habitats as well as soft-bottom/sand habitats existed along the corridor.

Onshore Impacts. Construction on the onshore portion of the Project is expected to take 100 days to install the HDDs and bores; ditch, string, and weld the pipeline components; construct the aboveground facilities; and test and commission the pipeline. No residential area would be traversed by the onshore portion of the pipeline. To minimize impacts during construction, Port Dolphin would follow the FERC Plan and Procedures.

An interconnection site would be constructed at the terminus of the Port Dolphin pipeline to connect with the existing Gulfstream pipeline and the Proposed TECO Bayside pipeline. The Proposed interconnection site would be located on a place zoned for industrial use adjacent to the existing Gulfstream pipeline facility. Following construction of the pipeline and aboveground facilities, the Applicant would restore the construction ROW following the FERC Procedures (see **Section 2.3.9**). Except for ROWs permanently converted to natural gas use (e.g., aboveground facilities), preconstruction land use that would not interfere with the safe operation of the pipeline would be allowed to resume.

Construction impacts on marine areas and land uses would be minor to moderate, short-term, direct, and adverse. The Maritime Administration and USCG have recommended the Applicant repair any damage to roadways caused by construction. This would effectively mitigate all construction damage potentially caused by construction activities. The FERC and the Applicant have also developed BMPs to avoid and reduce impacts on resources. BMPs are industry standards developed through lessons learned. BMPs can become regulations or agency permit requirements which are required to effectively reduce impacts on natural resources. Mitigations and BMPs are outlined in **Section 4.11**.

4.5.1.2 Operations

Under the DWPA implementing regulations, the USCG is authorized to establish a permanent mandatory Safety Zone around deepwater ports whether a vessel is present or not. The USCG and Maritime Administration may establish ATBA/NAA zones around Port Dolphin during the operation of the

deepwater port to ensure the safe operation of the Port, as well as other users in the adjacent waters of the Port. These safety restrictions might directly or indirectly impact non-Project vessels.

- **Safety Zone.** Commercial and recreational fishing would be precluded from the Safety Zone for the life of the Project. Under the DWPA implementing regulations, the USCG is authorized to establish a permanent mandatory Safety Zone around deepwater ports whether a vessel is present or not. The Safety Zone would extend approximately 850 m (2,789 feet) from the center of each buoy and encompass approximately 561 acres. This is a result of maintaining 500 m (1,641 feet) from the moored LNGC (maximum of approximately 350 m [1,148 feet] length) as it weathervanes (rotates) around the buoy. All unauthorized vessels would be prohibited from anchoring or transiting the proposed Safety Zone at any time. The USCG would have the primary jurisdiction for the Safety Zone.
- **No Anchoring Area.** If a License is issued, the USCG may designate a mandatory NAA around the Port and the pipeline. The NAA restrictions would extend beyond the buoy anchors with an approximately 1,000-m (3,280-foot) radius around each of the buoys.
- **Area to be Avoided.** The ATBA would be established at the request of USCG to the IMO. The ATBA would extend with an approximately 1,200-m (3,937-foot) radius around each of the buoys, and would include the area between the buoys. This would help ensure that other vessels do not interfere with Port operations, including maneuvering of LNG and support vessels.

In general, the Safety Zone, NAA, and ATBA would be established at all times. SRV traffic would be coordinated by Port personnel. The actual size of the ATBA that would be requested of IMO would be determined through the advice and consent of USCG and would appear on subsequent editions of the nautical charts. The ATBA is meant to discourage vessel traffic and is normally recommendatory. The Safety Zone, NAA, and ATBA are shown in **Figure 2.3-11.**

Operation of the adjacent submerged and onshore land adjacent to the pipeline would be consistent with current MMS leasing and operation activities in Federal waters, with FDEP in State waters, and with the FERC guidelines for onshore pipeline operation and maintenance activities. MMS and FDEP do not have standard widths for permanent ROW in Federal and state waters. For pipelines located in submerged lands, MMS and FDEP both require that the owner of the pipeline manage the safe operation through protection practices and pipeline testing activities. Port Dolphin LLC has stated that a 400-foot buffer would be necessary where sand is harvested for beach renourishment projects in order to maintain the integrity of the pipeline.

4.5.1.3 Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to

decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

4.5.2 Alternatives

As discussed in **Section 2.1**, the Maritime Administration and USCG considered several alternatives to the Proposed Action that also meet the purpose and need. This section compares the alternatives to the Proposed Action to broaden the scope of options that might be available to reduce or avoid impacts associated with the Proposed Action with respect to marine areas and land use. **Table 4.5-2** compares impacts from the Proposed Action to each of the alternatives with respect to land resources.

Table 4.5-2. Marine Areas and Land Use Impact Comparison for Each Alternative

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnection with Gulfstream Pipeline Alternative	FSRU Port Design Alternative
Hard-bottom area*	3,026 acres	3,934 acres	1,816 acres	0.016 acres (at port only)
Offshore spoil areas	32 acres	32 acres	0 acres	NA
Sand resource areas	68 acres	103 acres	0 acres	NA
Urban and built-up (100)	5.28 acres	5.28 acres	0 acres	NA
Agriculture (200)	8.22 acres	8.22 acres	0 acres	NA
Upland forest (400)	7.5 acres	7.5 acres	0 acres	NA
Water (500)	2.51 acres	2.51 acres	0 acres	NA
Wetlands (600)	10.7 acres	10.7 acres	0 acres	NA
Transportation, communications, and utilities (800)	10.46 acres	10.46 acres	0 acres	NA

Notes:

NA = No difference between alternatives.

There would be no impacts from the No Action Alternative.

The AAV Vaporization and Suction Pile Anchoring Alternatives were carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.5.2.1 Southern Site and Route Alternative

Impacts on marine areas and land use are expected to be similar in nature to those of the Proposed Site and Route Alternative. However, the buoy anchor plan for this alternative has a footprint of 30 acres, and the offshore pipeline route would be 73.9 km (46 mi). Assuming the maximum construction corridor of 20 m (67 feet), the construction footprint would be 374 acres for the pipeline. The total construction footprint for this alternative is estimated to be 9,323 acres, or 9 percent less than the proposed alternative. For impacts on sand resource areas, assuming a 400-m (1,312-foot) buffer centered on the pipeline, a total of 103 acres of the available area would be restricted for use in beach renourishment. Although still a small percentage of the total sand resources, this impact would be greater than the impact for the proposed route.

4.5.2.2 Offshore Interconnection with the Gulfstream Pipeline Alternative

Impacts on marine areas and land use are expected to be similar in nature to those of the Proposed Site and Route Alternative. However, the offshore pipeline route would be 28.8 km (18 mi), resulting in a total construction footprint of 249 acres. There would be no impacts associated with sand resources, and onshore land use with this alternative. The overall construction footprint for the offshore interconnection pipeline alternative is 60 percent less than the area consumed by the Proposed Action.

4.5.2.3 FSRU Port Design Alternative

Overall footprint of the FSRU would result in approximately 11 acres of impacts on marine areas. This would include both the finite impacts from eight anchor piles, and the area in between those anchors. This impact would be approximately 50 percent less than the area necessary for the Proposed Action.

4.5.2.4 AAV Vaporization Technology Alternative

Construction, operation, and decommissioning impacts under the AAV Vaporization Technology Alternative would be similar to those under the Proposed Action.

4.5.2.5 Suction Piles Anchoring Alternative

Construction, operation, and decommissioning impacts under the Suction Piles Anchoring Alternative would be similar to those under the Proposed Action.

4.5.2.6 No Action Alternative

The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, no adverse impacts from pipeline installation on Florida coastal areas would be expected. Consistency with state coastal management programs in Florida would not be necessary for pipeline construction through coastal waters. There would be no minor, short-term impacts as a result of construction through those areas. No impacts on land use onshore would be expected. No impacts on residences would occur from construction of onshore pipelines. Land cover changes to forested wetlands would naturally occur. There would be no land use restrictions for property owners because of the Proposed Action.

Means to satisfy the Nation's energy demands might result in increased use of existing land-based terminals, greater reliance on declining domestic oil and gas resources, or development of alternate means of importing LNG. Alternative sources of natural gas can include other Deepwater LNG Ports or onshore LNG terminals. Other deepwater LNG ports would have impacts on land uses that are similar to Port Dolphin but in a different geographic location. Onshore LNG terminals would be constructed on the already limited coastal landscape, restricting use of those areas for other uses such as residential, or retail commercial. Due to limited industrial areas along the coast for LNG siting, several LNG facilities might be in close proximity increasing the risk of explosion that might affect the local community. As energy demands grow, onshore LNG facilities may need to expand industrial areas, restricting use of adjacent lands.

4.6 Recreation and Aesthetics

The following discussion of impacts on recreational activities and aesthetic areas includes an analysis of impacts and a determination of impact duration and severity. Included in the discussion are elements of the project description that would both produce impacts and are proposed to minimize potential impacts. Applicant-proposed measures for minimizing potential environmental impacts are those that have been committed to by the Applicant and incorporated into the project design, and are listed in **Section 4.11**. If further measures are recommended by agencies to mitigate potential adverse impacts, they are stated at the end of each analysis and in **Section 4.11**. For analyses where no mitigation measures are stated, none have been identified to further reduce potential adverse impacts.

4.6.1 Impacts of the Proposed Action

4.6.1.1 Construction

Port construction equipment would be located at the site of the Project for the duration of construction. Pipeline construction equipment would move toward the proposed Port location from onshore. It is anticipated that no recreational or commercial boating activities would be allowed in the construction zones. Boaters in the OCS would be able to see construction vessels and some buoy components above the water line in MMS blocks PB545 and PB589. Visible vessels and components from the Port are consistent with current uses in these areas. It is common to see large deepwater vessels in Tampa Bay and Port Manatee. There would be no construction within the Egmont shipping channel or constructed waterways within Tampa Bay, therefore shipping lanes would not be delayed due to construction of the Proposed Action. Overall, short-term, minor, direct and indirect, adverse impacts on recreational fishing from the proposed Port installation would include temporary exclusion during the proposed Port and pipelines construction due to noise disturbance in the work area, and an increase in sediment loads during installation.

Visual resources would be impacted during the construction of the Port Dolphin port and pipelines. The proposed pipeline route would alter visual resources in three ways: (1) the construction workforce, equipment, and activity would temporarily alter viewscapes; (2) maintenance of the ROW would alter vegetation patterns; and (3) construction and operation of the aboveground valve station and

interconnection station would permanently alter the viewscape. Construction would be visible to recreational boaters, residents, and visitors for the duration of the construction. Impacts could be adverse or beneficial, depending on the perception of the affected person. From the water, the viewscape would represent one of several industrial projects along the coastline for the area. Onshore, the pipeline and facilities would be located in mostly commercial and industrial areas. Furthermore, a portion of the proposed pipeline would traverse a small recreational area that contains a 500-foot airplane runway. The pipeline would run along the road and not directly impact the runway, but use would be limited during construction activities. Therefore, short-term, minor, direct, and indirect, adverse impacts on recreation and aesthetics would occur during the construction of the proposed Port.

4.6.1.2 Operations

As indicated in **Figure 4.6-1**, the Port facilities would be hardly visible to the naked eye from the shore. In Federal waters, the viewscape for boaters and fishermen would be consistent with current sights and viewscapes already in the area. Therefore, negligible, direct and indirect, adverse impacts on recreation and aesthetics would be expected from the operation of the deepwater port.

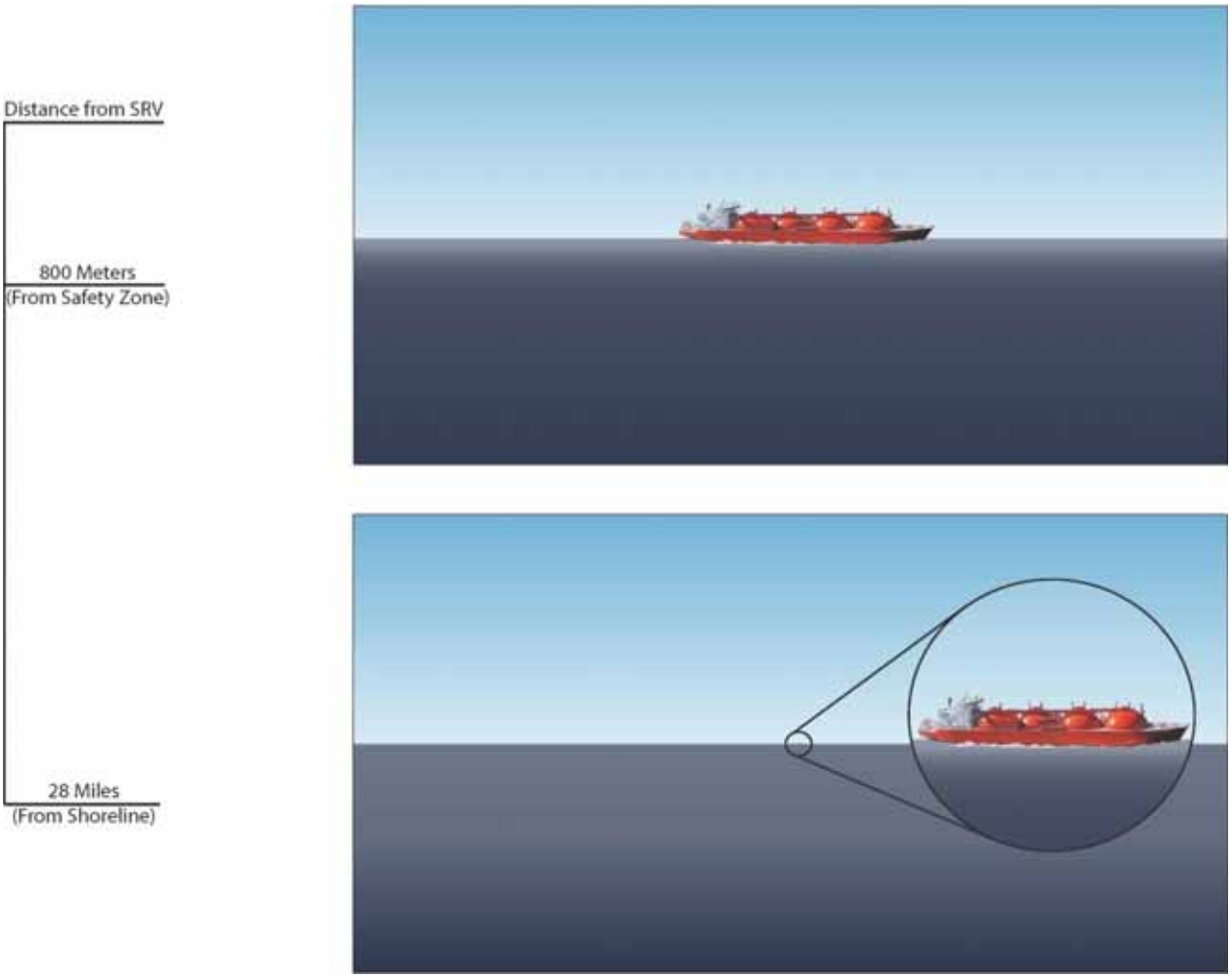


Figure 4.6-1. Viewscape of an SRV at Port from the Closest Offshore and Onshore Vantage Points

During operation, interconnection facilities and the valve station would be aboveground onshore. These facilities would alter the viewscape for the life of the Project. The Maritime Administration and the USCG have recommended the Applicant fence and screen aboveground facilities adjacent to the ROW. Depending on the success of the growth, the plantings would improve the viewscape by creating a more natural landscape than allowed by the aboveground facilities. The FERC and the Applicant have developed BMPs to avoid and reduce impacts on resources impacted by the Project. BMPs are industry standards developed through lessons learned. BMPs can become regulations or agency permit requirements which are required to effectively reduce impacts on natural resources. Mitigations and BMPs are outlined in **Section 4.11**.

4.6.1.3 Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Therefore, impacts on recreational and aesthetic features are expected to be reduced, although a specific timeline would be developed at the time of decommissioning and abandonment.

Decommissioning activities would result in restrictions similar to those described for the construction process. Due to the in-place abandonment procedures for the pipeline, decommissioning activities are anticipated to take less time than construction. Therefore, impacts on recreational and aesthetic features are expected to be reduced, although a specific timeline would be developed at the time of decommissioning and abandonment.

4.6.2 Alternatives

As discussed in **Section 2.1**, the Maritime Administration and USCG considered several alternatives to the Proposed Action that also meet the purpose and need. This section compares the alternatives to the Proposed Action to broaden the scope of options that might be available to reduce or avoid impacts associated with the Proposed Action with respect to recreation and aesthetics. **Table 4.6-1** compares impacts from the Proposed Action to each of the alternatives with respect to recreation resources.

Impacts on recreational and aesthetic resources would be similar to the Proposed Site and Route Alternative. This alternative is approximately 6.4 km (4 mi) longer than the Proposed Site and Route Alternative; therefore, construction would take an estimated 4 additional days, resulting in a longer restriction in the construction safety zone and a longer timeframe for visual impacts.

During operation, interconnection facilities and the valve station would be aboveground onshore. These facilities would alter the viewscape for the life of the Project. The Maritime Administration and the USCG have recommended the Applicant fence and screen aboveground facilities adjacent to the ROW. Depending on the success of the growth, the plantings would improve the viewscape by creating a more natural landscape than allowed by the aboveground facilities. The FERC and the Applicant have developed BMPs to avoid and reduce impacts on resources impacted by the Project. BMPs are industry standards developed through lessons learned. BMPs can become regulations or agency permit requirements which are required to effectively reduce impacts on natural resources. Mitigations and BMPs are outlined in **Section 4.11**.

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Therefore, impacts on recreational and aesthetic features are expected to be reduced, although a specific timeline would be developed at the time of decommissioning and abandonment.

Decommissioning activities would result in restrictions similar to those described for the construction process. Due to the in-place abandonment procedures for the pipeline, decommissioning activities are anticipated to take less time than construction. Therefore, impacts on recreational and aesthetic features are expected to be reduced, although a specific timeline would be developed at the time of decommissioning and abandonment.

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Impacts on recreational and aesthetic resources would be similar to the Proposed Site and Route Alternative. This alternative is approximately 6.4 km (4 mi) longer than the Proposed Site and Route Alternative; therefore, construction would take an estimated 4 additional days, resulting in a longer restriction in the construction safety zone and a longer timeframe for visual impacts.

4.6.2.1 Southern Site and Route Alternative

Impacts on recreational and aesthetic resources would be similar to the Proposed Site and Route Alternative.

4.6.2.2 Offshore Interconnection with the Gulfstream Pipeline Alternative

Impacts on recreational and aesthetic resources would be similar to the Proposed Site and Route Alternative. This alternative is approximately 39 km (18 mi) shorter than the Proposed Site and Route Alternative; therefore, the construction timeframe would be reduced by 40 days, resulting in a shorter timeframe for visual impacts.

4.6.2.3 FSRU Port Design Alternative

Impacts on recreational and aesthetic resources would be similar to the Proposed Site and Route Alternative.

4.6.2.4 AAV Vaporization Technology Alternative

Construction, operation, and decommissioning impacts under the AAV Vaporization Technology Alternative would be similar to those under the Proposed Action.

4.6.2.5 Suction Piles Anchoring Alternative

Construction, operation, and decommissioning impacts under the Suction Piles Anchoring Alternative would be similar to those under the Proposed Action.

4.6.2.6 No Action Alternative

The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural

gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, no adverse impacts from pipeline installation on Florida recreational or aesthetic resources would be expected. There would be no minor, short-term impacts as a result of construction through those areas. No impacts on people who enjoy the aesthetic and recreational areas would be expected. Means to satisfy the Nation's energy demands might result in increased use of existing land-based terminals, greater reliance on declining domestic oil and gas resources, or development of alternate means of importing LNG.

Alternative sources of natural gas can include other Deepwater LNG Ports or onshore LNG terminals. Other deepwater LNG ports would have impacts on recreational and aesthetic areas that are similar to Port Dolphin but in a different geographic location. Onshore LNG terminals would be constructed on the already limited coastal landscape, restricting use of those areas for other uses such as residential or retail commercial. Due to limited industrial areas along the coast for LNG siting, several LNG facilities might be in close proximity increasing the risk of explosion that might affect the local community. As energy demands grow, onshore LNG facilities would need to expand industrial areas, restricting use of adjacent lands.

Table 4.6-1. Recreation and Aesthetics Impact Comparison for Each Alternative

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnection with Gulfstream Pipeline Alternative	FSRU Port Design Alternative
Restricted recreation and commercial fishing during construction	11 months	+4 days	-40 days	Short-term impacts comparable to Proposed Action.
Restricted recreational boating activities during construction	11 months	+4 days	-40 days	Short-term impacts comparable to Proposed Action.
Construction visibility near and onshore (aesthetics)	11 months	+4 days	-40 days	Short-term impacts comparable to Proposed Action.
Operations restriction on boating and fishing activities	Long-term impacts within the Safety Zone, ATBA and NAA.	Long-term impacts comparable to Proposed Action.	Long-term impacts comparable to Proposed Action.	Long-term impacts comparable to Proposed Action.
Operation visibility (aesthetics)	Long-term impacts minor from shore.	Long-term impacts comparable to Proposed Action.	Long-term impacts comparable to Proposed Action.	Long-term impacts comparable to Proposed Action, but slightly greater.

Notes:

Timelines are based on pipeline length and assume the construction methods are similar between alternatives.

There would be no impacts from the No Action Alternative.

The AAV Vaporization and Suction Pile Anchoring Alternatives were carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.7 Air Quality

This section addresses potential impacts on air quality associated with the Project, potential alternatives, and the No Action Alternative. Short-term, moderate, direct, adverse impacts on air quality would occur during construction of the deepwater Port, pipelines, and onshore facilities. Air quality impacts have been evaluated for both the pipeline facility and the interconnection station under the following conditions: emissions/impacts due to short-term construction activities associated with mobile emissions/sources; and emissions/impacts due to long-term, routine operations associated with stationary emission sources (the interconnection station).

The following discussion of air quality impacts includes an analysis of impacts and a determination of impact duration and severity. Included in the discussion are elements of the project description that would both produce impacts and are proposed to minimize potential impacts. Applicant-proposed measures for minimizing potential environmental impacts are those that have been committed to by the Applicant and incorporated into the project design, and are listed in **Section 4.11**. If further measures are recommended by agencies to mitigate potential adverse impacts, they are stated at the end of each analysis and in **Section 4.11**. For analyses where no mitigation measures are stated, none have been identified to further reduce potential adverse impacts.

Construction-related activities and emissions for the pipeline and station facility do not require Federal, state, or local air quality permit authorization due to their short-term duration. However, long-term, routine emissions from the interconnection station do require FDEP permit authorization under F.A.C. Rule 62-210.300, and construction of the station cannot commence until an FDEP air quality permit authorization is granted. An FDEP air quality, minor source construction permit application would be prepared and submitted for authorization of the interconnection station. The main sources of emissions during construction would be the diesel engines used aboard the pipeline/derrick barge, anchor-handling tug supply (AHTS) vessels, crew boat, and supply boat. During operation of the Port, emissions from the SRV vaporization boilers and power generation engines are the primary source of air emissions and would have a direct, adverse impact on air quality during the life of the Project. Short-term, minor, direct, adverse impacts would be created by the SRVs as they transit to and from the buoys, and from the standby generators onshore, when they are in operation.

Air quality impacts associated with the Project are expected to be minor. No sensitive receptors would be exposed to substantial increases in pollution concentrations. No substantial increase in emissions of greenhouse gases would occur (greenhouse gas emissions are addressed in **Section 7**). Increased emissions of criteria pollutants from Port operations would exceed the New Source Review threshold under the CAA; impacts onshore would not be major. Mitigation of impacts in the Port vicinity would be achieved by incorporating Best Available Control Technology (BACT) to limit SRV emissions.

Potential air pollutant emissions and impacts were assessed for a number of design alternatives. Emissions for construction and decommissioning for the pipeline installation and interconnection were estimated for three route alternatives: the Proposed Site and Pipeline Route, the Southern Site and Route Alternative, and the Offshore Interconnection to Gulfstream Pipeline Alternative. Anticipated construction activities for the Port are not affected by the Port location and the associated pipeline route. For the FSRU Port Design Alternative, potential air pollutant emissions and impacts for construction, operation, and decommissioning were assessed.

4.7.1 Impacts of the Proposed Action

4.7.1.1 Construction

Regulated criteria pollutants and HAPs would be emitted during construction of the Port, offshore pipelines, and onshore terminals. Construction activities occurring at the Port site would include installation of driven piles, anchors, chains, buoys, and flexible risers. Construction at the Port would take approximately 3.5 months.

The emissions generated during construction of offshore natural gas pipelines would be expected to cause short-term, minor, direct, adverse impacts on air quality in the vicinity of the Port and along the pipeline route extending from the Port to the terminal at Port Manatee. Construction activities would cause a temporary reduction of local ambient air quality due to emissions generated by auxiliary mobile equipment working offshore from pipeline construction. These emissions would come from fuel combustion and would consist primarily of NO_x and CO_2, in addition to smaller amounts of VOCs, PM_{10}, and SO_2.

The pipeline installation (including the surveys, gas transmission line, flowline, manifolds, hot-tap, hydrostatic testing, and mattress installations) would take approximately 6 months. Certain manufactured components (e.g., anchor piles, mooring lines, gas transmission pipeline, manifolds and flowlines, unloading buoys, and miscellaneous consumables) would be shipped to the region, stored temporarily at an existing onshore staging yard, and transported for offshore installation. Emissions associated with manufacturing of these components would occur away from the Project area. Transport for offshore installation would be accomplished using supply vessels.

During pipeline construction activities, the construction equipment would be moved along the pipeline route as construction proceeds. A pipe-lay/derrick barge would be stationed along the pipeline route, plowing the trench and then laying each section of the pipeline. It would then be moved to the next location along the pipeline route. Therefore, the total emissions from the construction activities would be dispersed along the construction route.

Emissions during construction of the onshore components are primarily associated with diesel engine emissions from trucking operations, trenching equipment, and pipe-laying equipment, including a heavy-lift crane. All these construction activities are mobile sources. **Table 4.7-1** presents the estimated emissions during construction. Under the CAA, regulatory thresholds generally do not apply to temporary, construction-related emissions from mobile sources.

Table 4.7-1. Estimated Emissions During Construction (Proposed Route)

Project Component	NO_x (tpy)	CO (tpy)	SO_2 (tpy)	$PM_{10}/PM_{2.5}$ (tpy)	VOC (tpy)	H_2SO_4 (tpy)
Port	235.1	58.5	3.0	7.45	7.5	2.0
Pipeline (offshore)	417.95	95.75	5.0	7.12	11.3	3.3
Total – offshore (tpy)	**653.1**	**154.3**	**8.0**	**14.6**	**18.8**	**5.3**
Pipeline (onshore)	23.74	5.11	1.56	1.68	1.88	0.0
Interconnection Station	5.35	1.15	0.35	0.38	0.42	0.0
Total – onshore (tpy)	**29.1**	**6.3**	**1.9**	**2.1**	**2.3**	**0.0**

Source: Port Dolphin 2008c

Air Quality Impacts of Onshore Construction Activities (Pipeline and Interconnection Station). An air modeling analysis for criteria pollutants was performed using USEPA's SCREEN3 model. The analysis provides a preliminary assessment of ambient air quality impacts during construction of the proposed pipeline and interconnection station, as summarized in **Table 4.7-2.** Results of this highly conservative "worst-case" modeling assessment indicate that potential impacts could exceed NAAQS/FAAQS limits.

Table 4.7-2. Air Quality Impacts of Onshore Construction Activities Predicted by SCREEN3

Pollutant	Averaging Time	NAAQS (µg/m^3)	FAAQS (µg/m^3)	Impact Concentration (µg/m^3)
CO	1-hour	40,000	40,000	10,600
	8-hour	10,000	10,000	7,231
NO_2	Annual	100	100	116
PM_{10}	24-hour	150	150	846
$PM_{2.5}$	24-hour	35		740
	Annual	15		46
SO_2	3-hour	1,300	1,300	1,766
	24-hour	365	260	757
	Annual	80	60	46

Source: Port Dolphin 2008c

In response to Federal, state, and local requirements, BMPs have been included in project design or proposed by the Applicant to reduce environmental impacts. Construction activities are intermittent/short-term events associated with mobile construction sources. Any impacts would be expected to be temporary and would be confined to the immediate vicinity of the construction site. As such, onshore construction activities would not contribute to long-term impacts and would not be subject to Federal or state permit requirements.

4.7.1.2 Operations

During Port operations, the sources of air emissions would consist of the boilers, power generation engines, and thermal oxidizers on each of the SRVs accessing the Port; supply vessel engine emissions in transit and at the Port; and the emergency engines at the onshore interconnection station. This section provides a summary of potential criteria pollutant and HAPs emissions associated with operation of the Port.

Operating Scenarios. Two unloading buoys would be utilized so that natural gas can be delivered in a continuous flow by overlapping the arrival and departure of SRVs. Up to two SRVs would operate within the Safety Zone at any time. The SRVs would vaporize and deliver up to a combined 1,200 MMscfd of natural gas into the Port Dolphin pipeline system. The maximum regasification capacity of each SRV would be 1,200 MMscfd of natural gas. The maximum throughput capacity of the buoy system is also 1,200 MMscfd, and therefore, one SRV is capable of fully utilizing the deepwater Port. The LNG storage capacity of each SRV would not exceed an estimated 217,000 m^3. The worst-case scenario from an emissions perspective has two 217,000 m^3 SRVs supplying the Port with natural gas, where each SRV would regasify with approximately 50 percent of its installed regasification capacity (i.e., 600 MMscfd per vessel).

While moored at the unloading buoys, vaporization and ship hoteling activities would be conducted onboard the SRVs. Under the worst-case emissions scenario, the emissions sources on each SRV would operate in the following manner:

- Up to four 278 MMBtu/hr natural gas-fired marine boilers, equipped with low-NO_x burners and SCR for NO_x emissions reduction. These boilers are used for LNG vaporization while docking at the buoy. When two SRVs are docked at the Port simultaneously, both SRVs would not be able to vaporize LNG at full capacity. Cumulative operation of all boilers from all SRVs in the exclusion zone would not exceed 1,112 MMBtu/hr.
- Two dual-fuel (DF) engines with capacity of 11.4 MW each, plus one DF engine with capacity of 5.7 MW, all equipped with SCR to reduce NO_x emissions and with oxidation catalysts to reduce CO and VOC emissions. These engines provide electrical power for SRV positioning, LNG vaporization, and hoteling. Engines would operate in natural gas combustion mode while the SRV is in the exclusion zone; less than one percent of fuel energy would be provided by low-sulfur distillate fuel oil.
- Two additional DF engines with capacity of 11.4 MW each, without emissions controls. These engines would be used for propulsion and would not operate within the approach or exclusion zones.
- One 220-MMBtu/hr vapor combustor that would only be used during upset conditions. The vapor combustor provides the capability to burn off LNG to relieve excess pressure in the LNG tanks during initial hookup to the buoy or during periods with low gas send-out.

At any given time, there can be up to two SRVs within the exclusion zone. Each SRV would operate within the following limits:

- The maximum heat load from all boilers may not exceed 556 MMBtu/hr.
- The maximum cumulative engine operation may not exceed 14.93 MW. Only engines with emissions controls may operate.

Support vessels would also operate within the exclusion zone, including one crew boat with a 700-horse-power (hp) diesel engine and one supply boat with a 700-hp diesel engine. Each support vessel would operate within the exclusion zone for no more than 1 hour per day.

The potential effects of the routine activities on local and regional air quality conditions near the Port site are determined by the air pollutant emissions from the Project and the effect of those emissions on existing ambient air quality, based on the results of the air dispersion modeling. Emissions from offshore operations are expected to produce moderate impacts in the vicinity of Port, and no major impact onshore or at Class I Areas. Emissions from the onshore interconnection station would have the potential to produce high (intermittent) short-term impacts in the immediate vicinity of the station, with no major impact at Class I Areas.

Operation of onshore facilities would also produce air emissions. Proposed onshore emissions sources include a 402-hp standby diesel generator at the Gulfstream Interconnect station and a 91-hp standby diesel generator at the TECO Interconnect station. Routine operation of these generators would be limited to 2 hours per week for testing and maintenance.

Criteria Pollutant Emissions. The criteria pollutant emissions are based on information obtained by the Applicant from representative equipment suppliers, plus standard USEPA emissions factors. Marine boiler NO_x emissions are based on 10 ppm by volume, on a dry basis (ppmvd), corrected to 3 percent

oxygen (O_2). This NO_x emissions level is expected to be achieved by the application of low-NO_x burner (LNB) technology, in combination with SCR. According to the representative manufacturer, CO emissions at full load are expected to be 10 ppmvd at 3 percent O_2. These NO_x and CO outlet concentrations are equivalent to emissions levels of approximately 0.037 lb/MMBtu and 0.015 lb/MMBtu, respectively. The emissions of the other criteria pollutants (i.e., PM_{10}, SO_2, and VOCs) are based on the appropriate emissions factors cited for natural gas combustion, as adjusted for the design heating value of natural gas, in the USEPA's AP 42 *Compilation of Air Pollutant Emission Factors*, (USEPA 2000). The maximum hourly and annual criteria pollutant emissions from the SRV vaporization boilers are summarized in **Table 4.7-3**.

Table 4.7-3. Potential Criteria Pollutant Emissions from SRV Vaporization Boilers

Pollutant	Emissions Factor (lb/MMBtu)	Emissions (lb/hr/boiler)	Maximum Hourly Emissions (lb/hr)[a]	Annual Emissions (tpy)[b]
PM_{10}	0.00745	2.28	9.11	39.92
SO_2	0.0006	0.13	0.51	2.25
NO_x (as NO_2)	0.037	11.31	45.26	198.23
CO	0.015	4.59	18.35	80.36
VOC (as CH_4)	0.005	1.465	6.60	28.88
Ammonia (NH_3)[c,d]	0.00449	1.37	5.49	24.03
H_2SO_4[d]	N/A	0.084	0.34	1.48
Pb	< 0.001	< 0.001	< 0.001	0.003

Emissions factor source: USEPA 2000

Notes:

a. Hourly emissions are based on four vaporization boilers each rated at 276 MMBtu/hr per boiler.

b. Annual emissions are based on the maximum daily send-out rate of 1,200 MMscfd.

c. Emissions factors for ammonia correspond to SCR ammonia slip of 10 ppm.

d. Ammonia and sulfuric acid are not regulated as criteria pollutants.

N/A = Not applicable

The PM_{10}, NO_x, CO, and VOC emissions for the power generation engines are based on information obtained by the Applicant from a representative engine manufacturer. The SO_2 emissions were based on the use of low-sulfur diesel fuel with maximum sulfur content of 0.05 percent by weight. The maximum hourly and annual criteria pollutant emissions from the power generation engines are summarized in **Table 4.7-4**.

Potential annual emissions of criteria pollutants from all sources during routine operations are summarized in **Table 4.7-5**. Potential emissions of NO_x, VOC, and CO exceed the major source threshold of 100 tpy.

Hazardous Air Pollutant Emissions. The HAPs emissions from routine operations were estimated using USEPA emissions factors from the AP-42 and USEPA's Factor Information Retrieval (FIRE) databases (USEPA 2000). The maximum hourly and annual HAPs emissions are summarized in **Table 4.7-6**. As shown in this table, the Project would not qualify as a major HAPs source; the maximum emissions rate for any individual HAP is less than 10 tpy and the highest emissions rate of all HAPs combined is less than 25 tpy.

Table 4.7-4. Potential Criteria Pollutant Emissions from Power Generation Engines

Pollutant	Emissions Factor (g/kWh)	Emissions (lb/hr/engine)	Maximum Hourly Emissions (lb/hr)[a]	Annual Emissions (tpy)[b]
PM_{10}	0.0065	0.18	0.72	3.14
SO_2	N/A	3.13	12.52	54.84
NO_x (as NO_2)	0.20	5.52	22.10	96.78
CO	0.165	4.56	18.23	79.84
VOC (as CH_4)	0.15	4.14	16.57	72.58
NH_3[c,d]	N/A	0.42	1.66	7.28
H_2SO_4[d]	N/A	2.05	8.22	36.0

Notes:

a. Maximum hourly emissions are based on four power generation engines each rated at 11.4 MW.

b. Total annual emissions are based on the maximum daily send out rate of 1,200 MMscfd.

c. Ammonia emissions are based on SCR ammonia slip of 10 ppmvd at 3 percent O2.

d. Ammonia and sulfuric acid are not regulated as criteria pollutants.

N/A = Not applicable

Table 4.7-5. Criteria Pollutant Emissions from Deepwater Port Routine Operations

Pollutant	Maximum Emissions (lb/hr)	Annual Emissions (tpy)
$PM_{10/2.5}$	10.39	43.13
SO_x	13.43	57.13
NO_x	100.96	298.96
CO	44.28	161.11
VOC	24.16	101.59
NH_3[a,b]	7.152	31.33
H_2SO_4[b]	8.81	37.5
Lead	< 0.001	0.0026

Note:

a. Ammonia emissions are based on SCR ammonia slip of 10 ppmvd at 3 percent O2.

b. Ammonia and sulfuric acid are not regulated as criteria pollutants.

Table 4.7-6. Potential HAPs Emissions from SRV Vaporization Boilers and Power Generation Engines

Pollutant	Maximum Emissions (lb/hr)	Annual Emissions (tpy)
Formaldehyde	0.93	4.07
Benzene	0.30	1.27
Toluene	0.11	0.47
Xylene	0.072	0.31
n-Hexane	2.16	9.45
Acetaldehyde	0.0093	0.041
Acrolein	0.0029	0.013
Naphthalene	0.05	0.21
HAP (other VOC)	0.0023	0.01
Arsenic	< 0.001	0.001
Beryllium	< 0.001	< 0.001
Cadmium	0.0013	0.006
Chromium	0.0017	0.0074
Cobalt	< 0.001	< 0.001
Manganese	< 0.001	0.002
Mercury	< 0.001	0.0014
Nickel	0.0025	0.011
Selenium	< 0.001	< 0.001
Total – all HAPs		**15.9**

Source: Port Dolphin 2008c

Emissions from Interconnection Station. Potential sitewide emissions for the interconnection station are summarized in **Table 4.7-7**. Emissions sources include fugitive emissions from process components, condensate tank (capacity 350 barrels), and a 91-hp standby generator. Emissions are below the major source threshold of 100 tpy for all criteria pollutants. An FDEP minor stationary construction air quality permit would be required under F.A.C. Rule 62-210.300.

Potential HAPs emissions for the interconnection station are summarized in **Table 4.7-8**. Emissions from the interconnection station would not qualify as a major HAPs source, since the maximum emissions rate for any individual HAP is less than 10 tpy and the highest emissions rate of all HAPs combined is less than 25 tpy.

Once construction activities are completed, emissions generated during operation of the offshore pipelines are not expected to cause adverse impacts on air quality in the vicinity of the Port. The pipelines would be installed underwater, and would be closed systems. Only minor emissions of natural gas, called fugitive emissions, would occur at pipeline connections. Because these fugitive emissions are very small, they are not regulated by permit or source-specific requirements. Any leaks found would be repaired and would be subject to more rigorous monitoring until fugitive emissions were reduced.

Table 4.7-7. Potential Sitewide Emissions at the Interconnection Station

Interconnection Station Sitewide Total Emissions		
Compound	**Emissions Rate**	
	lb/hr	**tpy**
VOC	10.11	41.43
H_2S	0.094	0.41
NO_x	2.81	0.15
CO	0.60	0.031
$PM_{10/2.5}$	0.20	0.010
SO_2	0.19	0.010

Source: Port Dolphin 2008c

Table 4.7-8. Potential HAPs Emissions at the Onshore Interconnection Station

Interconnection Station Sitewide Total HAP Emissions		
Compound	**Emission Rate**	
	lb/hr	**tpy**
Formaldehyde	0.00075	3.89E-05
Benzene	0.0219	0.0949
Toluene	0.0048	0.0179
Ethylbenzene	0.0018	0.0090
Xylene	0.0086	0.036
1,3-Butadiene	2.48E-05	1.29E-06
Acetaldehyde	0.00049	2.53E-05
Acrolein	5.86E-05	3.05E-06
Naphthalene	5.37E-05	2.79E-06
n-Hexane	0.194	0.853
Total HAP	**0.235**	**1.011**

Source: Port Dolphin 2008c

LNG Release. Although natural gas is not a criteria pollutant, releases of unburned natural gas could contribute to the formation of certain criteria pollutants (e.g., particulate matter) and could have an adverse impact on air quality. In addition, methane (a component of natural gas) has been identified by USEPA as a greenhouse gas, releases of which could contribute to global warming. Operation of the Project is not expected to result in releases of LNG or vaporized natural gas (other than minor fugitive emissions from system leakage), unless an accident occurs. Estimated emissions of CH_4 from routine operations are discussed in **Section 7** under ***Greenhouse Gasses***. Accidental releases of LNG or vaporized natural gas could, however, present localized safety concerns, which are discussed in **Section 5**.

Dispersion Modeling and Results. The impacts of routine operational activities on ambient air quality were predicted from 3 years of modeling (i.e., 1990, 1992, and 1996) using the CALPUFF dispersion model (Version 5.711a). Receptors were placed around the perimeter of the exclusion zone surrounding the deepwater Port, around the property line of onshore facilities, at identified Class II sensitive areas, and at two Class I areas (Chassahowitzka NWR and Everglades National Park). Emissions sources included in CALPUFF modeling of routine operations include sources associated with both the deepwater Port and the interconnection station.

A three-dimensional field of meteorological variables for the CALPUFF modeling domain was developed using the CALMET meteorological processor (Version 5.53a). Mesoscale data sets developed using the mesoscale meteorological models MM4 and MM5 provided initial fields for the CALMET analysis. The mesoscale fields for 1990, 1992, and 1996 have been widely distributed and approved for use by FLMs, and were specifically approved by FWS and USEPA for use in this application (Port Dolphin 2007j). The CALMET analysis incorporated hourly wind, temperature, and cloud cover data from 37 surface stations, plus twice daily temperature and wind profile measurements from six upper air stations.

The dispersion results from the Port Dolphin project were compared to the Class I and Class II SILs. These results are summarized in **Tables 4.7-9** and **4.7-10**, respectively. Predicted air quality concentrations at Class I Area receptors are all below the Class I SILs by at least a factor of 10, reflecting the distance (more than 100 km) between offshore emissions sources and the nearest Class I areas. Peak predictions at Class I and II areas include impacts from both onshore and offshore sources. Predicted impacts at Class II receptors are below the SILs for all pollutants. (The CALPUFF modeling results for the interconnection station were overly conservative. The standby generators were modeled as operating constantly at full load. CALPUFF predictions for receptors immediately adjacent to the interconnection station were therefore omitted from **Table 4.7-10**. In its review of the Project's application for a CAA preconstruction permit as discussed in **Section 3.7.3**, USEPA could require the Applicant to use the most recently approved versions of dispersion modeling software, and the results might differ from the results presented in the EIS. A separate analysis for the interconnection station using SCREEN3 is described below.)

Modeling Results for the Interconnection Station. In light of the CALPUFF modeling results showing major impacts in the vicinity of the interconnection station, additional air modeling was performed using USEPA's SCREEN3 model to assess impacts for CO, NO_2, PM_{10}, $PM_{2.5}$, and SO_2. The SCREEN3 analysis reflects more accurate estimates for both routine emissions from the emergency generator and source-receptor distances. Comparison of SCREEN3 model predictions with Class II SILs is provided in **Table 4.7-11**. Results show that emissions from routine operations of the station would not exceed SILs, and therefore would cause a minor to moderate contribution to an exceedance of NAAQS and FAAQS limits.

The dispersion modeling results were also compared to the NAAQS and FAAQS, combining project impacts with worst-case air quality background concentrations. The results are presented in **Table 4.7-12**. These results demonstrate that, absent impacts from any existing nearby emissions sources, the impacts of the Project alone, plus background, do not exceed any ambient air quality standards.

Air Quality-Related Values. The Port is within 300 km (186 mi) of two Class I areas, the Chassahowitzka NWR (150 km) and Everglades National Park (244 km). Impacts of Port operations on AQRVs at these Class I areas were evaluated as part of the CALPUFF modeling analysis.

Table 4.7-9. Predicted Ambient Air Quality Impacts at Class I Areas

Pollutant	Averaging Period	Highest Modeled Concentration (µg/m^3)	PSD Class I Increment (µg/m^3)	Class I Significant Impact Level (µg/m^3)
NO_x	Annual	0.0007	2.5	0.1
SO_2	3-hour	0.028	25	1.0
	24-hour	0.018	5	0.2
	Annual	0.0004	2	0.1
$PM_{2.5}$	24-hour	0.030	N/A	N/A
	Annual	0.0004	N/A	N/A
PM_{10}	24-hour	0.030	8	0.32

Source: Port Dolphin 2008c

Table 4.7-10. Predicted Peak Impacts from Routine Operations at Class II Receptors

Pollutant	Averaging Period	Highest Modeled Concentration (µg/m^3)	PSD Class II Increment (µg/m^3)	Class II Significant Impact Level (µg/m^3)
NO_x	Annual	0.2	25	1
CO	1-hour	81	N/A	2,000
	8-hour	46	N/A	500
SO_2	3-hour	23.7	512	25
	24-hour	3.2	91	5
	Annual	0.1	20	1
$PM_{2.5}$	24-hour	2	N/A	N/A
	Annual	0.1	N/A	N/A
PM_{10}	24-hour	11	30	5

Source: Port Dolphin 2008c

Table 4.7-11. SCREEN3 Predicted Impacts of Interconnection Station Routine Operation on Ambient Air Quality

Pollutant	Averaging Period	Highest Modeled Concentration (µg/m^3)	Class II Significant Impact Level (µg/m^3)
NO_2	Annual	0.55	1
CO	1-hour	36	2,000
	8-hour	6.3	500
SO_2	3-hour	6.7	25
	24-hour	0.4	5
	Annual	0.01	1
$PM_{2.5}$	24-hour	0.4	5
	Annual	0.01	1
PM_{10}	24-hour	0.4	5

Source: Port Dolphin 2008c

Table 4.7-12. Predicted Worst-Case Impacts on Ambient Air Quality

Pollutant	Averaging Period	Highest Modeled Concentration µg/m^3)	Ambient Background (µg/m^3)	Total (µg/m^3)	NAAQS (µg/m^3)	FAAQS (µg/m^3)
NO_x	Annual	0.2	17	17.2	100	100
CO	1-hour	81	5,029	5,110	40,000	40,000
	8-hour	46	3,429	3,485	10,000	10,000
SO_2	3-hour	23.7	266	289.7	1,300	1,300
	24-hour	3.2	99	102.2	365	260
	Annual	0.1	12	12.1	80	60
$PM_{2.5}$	24-hour	2.0	30.9	342.9	35	35
	Annual	0.1	12.4	12.5	15	15
PM_{10}	24-hour	11	99	110	150	150

Source: Port Dolphin 2008c

Regional Haze. Potential impacts of the Project on regional haze were evaluated following procedures recommended in FLAG 2000 (FLM 2000). Visibility change was evaluated using Method 2 (recommended by the Interagency Workgroup on Air Quality Modeling [IWAQM] (USEPA 1998) and the alternative Method 6. For Chassahowitzka NWR, the largest predicted extinction change is 3.60 percent, below the 5 percent contribution threshold, while the largest predicted Delta-Deciview change is 0.354, below the change threshold of 0.5. The peak impacts predicted at Chassahowitzka NWR reflect contributions from both onshore (interconnection station) and offshore (deepwater Port) emissions sources. Peak impacts on regional haze predicted at Everglades National Park are lower by more than a factor of two.

Acid Deposition. Potential impacts of air emissions from Project operation on acid deposition were evaluated using the CALPOST processor to analyze the predicted deposition rates. Predictions were compared to the deposition assessment threshold (DAT) of 0.01 grams per hectare per year (g/ha-yr), recommended for the eastern United States. For Chassahowitzka NWR, the largest predicted annual deposition rate is 0.0019 g/ha-yr, while the maximum prediction for Everglades National Park is 0.00042 g/ha-yr. These results demonstrate that predicted acidic deposition would be well below the DAT for both Class I areas.

In response to Federal, state, and local requirements, BMPs have been included in project design or proposed by the Applicant to reduce environmental impacts. Potential impacts of air emissions from project operations would be reduced by incorporation of operating restrictions and use of BACT on SRVs to limit pollutant emissions. Within the approach and exclusion zones, SRVs would only use those engines and boilers equipped with SCR control to limit NO_x emissions, and would only combust natural gas as fuel. These measures employ proven technology and would substantially reduce the potential impacts of the Project on air quality. BMPs are discussed in **Section 4.11**.

4.7.1.3 Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Impacts of air emissions from decommission of the Port are expected to have minor, temporary impacts in the vicinity of the Port (lower than from construction), with no major impact onshore or at Class I Areas.

Air pollutant emissions would result since there would be vessel activity associated with decommissioning. However, compared to installation activities, the shorter duration of decommissioning and use of fewer vessels would result in much lower emissions. Decommissioning would use a DSV and locally sourced barges and tugs, if available. **Table 4.7-13** shows estimated emissions for decommissioning activities. These emissions levels would be expected to cause a minor impact on air quality, would be temporary, and would cease upon completion of decommissioning.

Table 4.7-13. Estimated Emissions During Decommissioning

	NOx (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} $PM_{2.5}$ (tpy)	VOC (tpy)	H_2SO_4 (tpy)
Total	74.1	17.0	0.87	2.2	402.0	0.57

Source: Port Dolphin 2008c

4.7.2 Alternatives

Table 4.7-14 compares impacts from the Proposed Action to each of the alternatives with respect to air quality.

4.7.2.1 Southern Site and Route Alternative

The Southern Site and Route Alternative would be approximately 8 km (5 mi) longer than the Proposed Route. Certain emissions associated with the pipeline installation are typically dependent on the length of the pipeline. These include emissions from vessels associated with trenching, installing the pipeline, backfilling, and installing mats. The total CO_2 emissions for the construction, operation, and decommissioning activities for the Southern Route are 80,919 tons, or about 8,000 tons more than the Proposed Route Alternative.

4.7.2.2 Offshore Interconnection with Gulfstream Pipeline Alternative

Construction impacts for the offshore interconnection alternative are similar to the Proposed Action pipeline construction for the short-term air impacts, and would have shorter period of long-term air impacts based on a shorter route for the pipeline construction. Under this alternative, there would be lower impacts onshore from the pipeline construction than the proposed action. However, the impacts of

air emissions from the construction of the pipeline interconnect are higher on both the short-term and long-term emissions for the area in the vicinity of the offshore interconnection. There are no major impacts from this Proposed Action onshore or at the Class I area. The air emissions impacts from the Port construction would not be different under this alternative compared to the Proposed Action. The operation of the offshore interconnect has no air emissions associated and therefore no impact. If the offshore interconnect is capped off and left in place for decommissioning there would be little or no impact from the offshore interconnect.

4.7.2.3 FSRU Port Design Alternative

Construction and decommissioning impacts for the FSRU would be similar to that described for the proposed site. The potential air emissions for construction and decommission would be potentially slightly higher for the FSRU and AAV alternative compared to the Proposed Action depending on the structures required underwater for the FSRU and the mobile sources required to move the FSRU. More construction would be required at the Port for the alternative than the Proposed Action. The air impacts related to the ship maneuvers and the tugs that would be required for the FSRU alternative are significant when compared to the Proposed Action. Mobile source emissions could potentially be much higher than the Proposed Action. Therefore, potential air impacts from operation could be greater than the Proposed Action. Regarding decommissioning, emissions and impacts could be higher, lower, or similar to the Proposed Action depending on the underwater structures that remain in place.

4.7.2.4 AAV Vaporization Technology Alternative

Construction and decommissioning impacts for AAV alternative would be similar to that described for the Proposed Action. The potential air emissions for construction and decommissioning would be potentially slightly higher for the AAV alternative compared to the Proposed Action depending on the structures required underwater for the AAV. More construction would be required at the Port for this alternative than the Proposed Action. The potential changes in the air emissions related to the AAV operation compared to the proposed Project are small. In particular, the air impacts related to the ship maneuvers and the tugs that would be required for the FSRU and AAV alternative are much greater when compared to the Proposed Action. Mobile source emissions could potentially be much higher than the Proposed Action. The AAV operation has potentially lower emissions for the vaporization of the LNG. Therefore, potential air impacts from operation could be greater than the Proposed Action. Regarding decommissioning; emissions and impacts could be higher, lower, or similar to the Proposed Action depending on the underwater structures that remain in place.

4.7.2.5 Suction Piles Anchoring Alternative

Construction, operation, and decommissioning impacts under the Suction Piles Anchoring Alternative would be similar to those under the Proposed Action.

4.7.2.6 No Action Alternative

The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under this alternative, the additional infrastructure proposed by the Applicant would not be built and there would be no potential for impacts on air quality associated with the Project construction and operation. Means to satisfy the Nation's energy demands might result in increased use of existing land-based terminals, greater reliance on declining domestic oil and gas resources, or development of alternate means of importing LNG. Alternative sources of natural gas can include other Deepwater LNG Ports or onshore LNG terminals. Use of fuel sources other than natural gas would have the potential to cause adverse impacts on air quality, both regionally and nationally, that could be less than, equal to, or greater than the impact of the Project, depending on the nature of the alternative source.

Table 4.7-14. Summary of Impacts on Air Quality

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnection Alternative	FSRU Design Alternative
Impacts of air emissions from pipeline construction.	Moderate impacts along pipeline route; no significant impact at Class I Areas.	Short-term impacts comparable to Proposed Action; somewhat higher long-term impacts (longer route).	Short-term impacts comparable to Proposed Action; shorter long-term impacts (shorter route); lower impacts onshore.	No difference from Proposed Action.
Impacts of air emissions from Port construction.	Moderate impacts in vicinity of Port; no significant impact onshore or at Class I Areas.	Slight differences in impact from Proposed Action. Different location means higher impacts at some locations, lower elsewhere.	No difference from Proposed Action.	Short-term and long-term impacts higher than Proposed Action (more construction at Port).

Impact	Proposed Action	Southern Site and Route Alternative	Offshore Interconnection Alternative	FSRU Design Alternative
Impacts of air emissions from construction of pipeline interconnect.	High short-term (temporary) impacts in vicinity of inter-connect. No significant impact at Class I Areas.	No difference from Proposed Action	Higher short-term and long-term emissions and impacts than Proposed Action in vicinity of offshore interconnect; no significant impact onshore or at Class I Areas.	No difference from Proposed Action.
Impacts of air emissions from operation of Port.	Moderate impacts in vicinity of Port; no significant impact onshore or at Class I Areas.	Same emissions as Proposed Action. Slight differences in impact from Proposed Action. Different location means higher impacts at some locations, lower elsewhere.	No difference from Proposed Action.	AAV means lower emissions to vaporize LNG. Short-term and long-term emissions from Port might be higher, lower, or roughly the same, depending on emissions from LNGC and support vessels.
Impacts of air emissions from operation of interconnect station.	High (intermittent) short-term impacts in vicinity of interconnect. No significant impact at Class I Areas.	No difference from Proposed Action.	Offshore interconnect has no emissions, no impact.	No difference from Proposed Action.
Impacts of air emissions from decommission of Port.	Moderate, temporary impacts in vicinity of Port (lower than from construction). No significant impact onshore or at Class I Areas.	Same emissions as Proposed Action. Slight differences in impact from Proposed Action. Different Port location means higher impacts at some locations, lower elsewhere.	No difference from Proposed Action.	Emissions and impacts might be higher, lower, or roughly the same as Proposed Action, depending on what underwater structures are left in place.
Impacts of air emissions from decommission of interconnect station.	Moderate, temporary impacts in vicinity of Port and onshore interconnect (lower than from construction). No significant impact onshore or at Class I Areas.	No difference from Proposed Action.	Little or no impact. (Cap off and leave interconnect in place).	No difference from Proposed Action.

Notes:

There would be no impacts from the No Action Alternative.

The AAV Vaporization and Suction Pile Anchoring Alternatives were carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.8 Noise

The following discussion of noise impacts includes an analysis of impacts and a determination of impact duration and severity. Included in the discussion are elements of the project description that would both produce impacts and are proposed to minimize potential impacts. Applicant-proposed measures for minimizing potential environmental impacts are those that have been committed to by the Applicant and incorporated into the project design, and are listed in **Section 4.11**. If further measures are recommended by agencies to mitigate potential adverse impacts, they are stated at the end of each analysis and in **Section 4.11**. For analyses where no mitigation measures are stated, none have been identified to further reduce potential adverse impacts.

4.8.1 Impacts of the Proposed Action

This section addresses potential noise impacts associated with the proposed Project onshore and offshore. Project-related noise would be generated during construction and operation of the Port. The magnitude and frequency of noise can vary considerably over the course of the day and throughout the week. This variation would be caused in part by changing weather conditions and the equipment in use at the time.

4.8.1.1 Construction

Activities that would produce the greatest amount of airborne noise during construction include Port construction; pipe-laying; and vessel traffic for transporting equipment, materials, piles, and workers to the site. Activities that would produce the greatest amount of underwater noise during construction include mooring buoy anchor installation, pipe-laying, and construction vessel traffic. SRVs, buoys, and associated facility infrastructure would be built at a shipyard, so there would be no associated noise affecting the Project area. Onshore construction is expected to last approximately 3 months, so construction-related noise would be short-term. Offshore construction noise sources from installation of the STL buoys would occur approximately 45 km (28 mi) from land, whereas noise from the pipeline installation would occur in a phased process along the pipeline route. Construction time would be of short duration (6 months). Noise from vehicle traffic associated with construction is expected to be similar to other traffic currently in the Project area. Noise from pipeline construction activities is not expected to be much higher than other underwater noise construction activities near Tampa Bay. Noise from pile-driving would be higher than noise from other construction equipment. However, mitigation measures proposed by the Applicant, and other mitigation measures that might be required would help to reduce potential impacts on ambient noise levels and avoid potential impacts on marine mammals. Temporary behavioral changes of birds, fish, and ocean mammals in the immediate area of active construction could occur during relatively brief periods of time.

Onshore construction from the installation of the Port Dolphin pipeline would occur over a 3-month period near Port Manatee in Tampa Bay. Standard onshore pipeline construction equipment would be used including backhoes, dump trucks, cranes, bulldozers, and side-booms.

Noise levels in suburban neighborhoods typically range from 50 to 60 dBA during the day and 40 to 50 dBA at night (FHWA 1980). The pipeline construction activity closest to residential receptors would occur in Manatee County, Florida, near Port Manatee within Tampa Bay. The closest residence would be approximately 122 m (400 feet) south of the proposed onshore pipeline route. At this distance, noise from construction activities would be approximately 70 to 75 dBA. Port Dolphin pipeline construction noise would have a short-term, direct, minor impact on sound levels in the vicinity of the construction activities.

Construction noise impacts associated with the installation of the STL buoy system would occur approximately 45 km (28 mi) offshore. A noise level of 90 dBA would dissipate to about 20 dBA 45 km (28 mi) away. Consequently, offshore construction noise would not impact populations onshore.

Two measurements used by some Federal agencies to relate the time-varying quality of environmental noise to its known effects on people are the equivalent sound level (L_{eq}) and the day-night sound level (L_{dn}). The L_{eq} is an A-weighted sound level containing the same sound energy as the instantaneous sound levels measured over a specific time period. Noise levels are perceived differently, depending on length of exposure and time of day. The L_{dn} takes into account the duration and time the noise is encountered. Late night and early morning (10:00 pm to 7:00 am) noise exposures are penalized +10 decibels, to account for people's greater sensitivity to sound during the nighttime hours.

Construction of the proposed pipeline and tie-in of the pipeline from Port Manatee to the interconnection station would result in temporary increases in the ambient noise level. Construction noise levels would vary during the construction period, depending on the activity and the construction phase. There are no known noise sensitive areas (NSAs) within 610 m (2,000 feet) of HDD locations.

HDD operations could take between 3 to 4 weeks each to complete and typically operate 24 hours per day. Projected noise levels from HDDs are normally about 88 dBA. Decibel level of 88 dBA ia a level where ear protection is not required as defined by OSHA rules and regulations. However, noise levels from HDD activities would be considered high for nighttime hours and would be considerably higher than the FERC requirements for full-time operations of construction activities. Consequently, it is recommended that prior to the start of construction, the following information should be filed at each HDD location: (a) the estimated number of days of drilling required at each location, and whether drilling would be done 24 hours per day; and (b) a description of any noise mitigation that would be implemented during drilling activity to reduce noise impacts at the NSAs below an L_{dn} of 55 dBA or 10 dBA over background if ambient levels are above an L_{dn} of 55 dBA.

It is anticipated that the noise generated by both onshore and offshore HDD operations would be less than that caused by ongoing large bulk carrier ships that traverse the shipping lanes in the same area of the planned HDD. Noise generated by the HDD operations would be above the water surface (either on land or on a fixed jack-up vessel) but would travel down the jack-up into the water. Noise travelling down the jack-up would quickly dissipate and would have a minimal effect on underwater noise. The noise from HDD operations, both onshore and offshore, is primarily from the diesel engines that power the drilling and pull-in winches. These operations have a relatively small footprint and in the past, noise abatement has been accomplished by encapsulating the equipment in temporary tents and canvas or constructing a sound absorption-barrier.

Construction of fixed components onshore near Port Manatee would include the construction of a new gas transmission pipeline, including two flowlines, the PLEM and piggable-Y, and HDD onshore; and a tie in to the Gulfstream LLC and TECO lines via a hot tap. This construction would occur at Port Manatee and along several roads in the area. There is an office building approximately 15 m (50 feet) from the proposed construction site. The employees would be exposed to noise levels of approximately 85 dBA from construction activities. The closest residential populations to the construction site would be approximately 122 m (400 feet) from the proposed route and would be exposed to noise levels of approximately 70 to 75 dBA. Construction operations on the pipeline would be limited to the hours of 7:00 a.m. to 9:00 p.m. to maintain compliance with local noise ordinances. Impacts from construction noise would be moderate, short-term, direct, and adverse.

Construction of the proposed pipeline and interconnection station would affect the local noise environment. The ambient sound level of a region is defined by the total noise generated within the

specific environment and is usually composed of sounds emanating from natural and artificial sources. At any location, both the magnitude and frequency of environmental noise can vary considerably over the course of a day and throughout the week. This variation is caused in part by changing weather conditions and the effect of seasonal vegetative cover.

Based on the evaluation criteria described previously, Port and pipeline construction would result in short-term, minor, direct, adverse impacts on the airborne noise environment. In response to Federal, state, and local requirements, BMPs have been included in project design or proposed by the Applicant to reduce environmental impacts (see **Section 4.11**).

Underwater Noise. Noise associated with the operation of machinery and increased vessel traffic during construction of the proposed Port Dolphin project could impact offshore biological resources. When underwater objects vibrate, they create sound-pressure waves that alternately compress and decompress the water as the sound waves travel, radiating sound waves in all directions away from the source. The impact that a man-made sound can have on sea life depends on its loudness, the acoustic frequency pattern at the location where the marine organisms detect the sound, the distance of the animal from the sound source, and the hearing sensitivity of the organism. Sound intensity decreases with distance from the noise source, with high-frequency components of noise decreasing more rapidly with distance than low-frequency components (Richardson et al. 1995). Additional noise impacts on biological resources are discussed further in **Section 4.2**.

During construction, underwater noise would be created by construction vessels (e.g., barges, tugboats, supply/service vessels) and machinery (e.g., pile-driving and pipe-laying equipment, trenching equipment) operating either intermittently or continuously throughout the area. Port construction would take approximately 6 months (weather contingent) from December through June. The third-octave band source levels for construction modeling scenarios over frequencies ranging from 10 through 2,000 Hz are presented in **Table 4.8-1**. Underwater noise would travel in all directions from the source. **Table 4.8-2** presents the distance (based on the radius of noise traveling in all directions) that the noise levels from construction equipment are expected to be heard. Pile driving would only occur offshore at the STL buoy locations, the other noises sources would occur both offshore and in Tampa Bay.

Vessel traffic associated with construction would be a relatively continuous noise source during that period. **Table 4.8-3** details the vessels that would be used during Port and pipeline construction, as well as their respective noise levels. Vessel noise, which is transmitted through air and water, would be created by propulsion machinery, thrusters, generators, and hull vibrations, and would vary with ship and engine size. Machinery noise from underwater construction would be transmitted through water and would vary in duration and intensity. Medium-sized support and supply vessels generate noise within frequencies between 20 Hz and 10 kHz with source levels between 130 and 160 dB re 1 μPa at 1 m (3 feet) (Richardson et al. 1995).

Sound propagation modeling was performed to predict the radii of noise impacts from construction and operational activities. The sound propagation model used several parameters, including expected water column sound speeds, bathymetry (water depth and shape of the ocean bottom), and bottom geoacoustic properties (how much noise is reflected off of the ocean bottom) to estimate the radii of noise impacts (JASCO 2008).

The proposed pipeline would be constructed within a half of a mile of the Terra Ceia AP, about 7 km (4.5 mi) from manatee critical habitat and about 18.5 km (11.5 mi) from a manatee protection area. As discussed in **Section 4.2**, noise from construction activities would produce noise levels above Level A or Level B harassment thresholds at varying distances (see **Tables 4.2-3** and **4.2-4**).

Table 4.8-1. Third-Octave Band Source Levels for Construction Modeling Scenarios

Freq (Hz)	Pile Driving[a]	Anchor Operations[b]	Pipe-laying[b]	Tug Anchor Pull[c]	Tug Half-Speed Transit[c]	Dredging[d]
	Source level (dB re μPa)					
10	202.0	175.6	164.7	202.8	188.7	153.0
12.5	202.0	170.0	166.2	196.5	182.7	153.0
16	192.0	162.7	162.7	193.1	174.1	153.0
20	187.0	158.3	165.5	191.1	167.5	153.0
25	184.0	151.8	169.0	196.7	165.2	165.0
31.5	186.0	149.1	159.6	188.8	172.2	162.0
40	188.0	146.6	156.2	177.3	182.2	169.0
50	184.0	147.9	157.7	176.4	170.2	172.0
63	188.0	153.3	154.3	179.2	167.1	171.0
80	198.0	153.2	152.2	178.8	164.9	172.0
100	200.0	156.4	153.0	178.1	161.8	179.0
125	204.0	162.2	159.8	176.7	166.0	178.0
160	208.0	155.6	152.5	175.9	167.6	180.0
200	209.5	151.4	149.8	173.5	167.5	179.0
250	209.0	151.7	152.2	178.8	164.8	177.0
315	204.0	143.6	142.4	172.8	165.2	177.0
400	204.5	145.2	147.2	165.4	165.2	176.0
500	205.0	145.8	144.8	170.7	169.8	173.0
630	198.0	145.5	142.7	168.8	159.9	170.0
800	195.0	150.5	147.5	165.1	158.6	169.0
1,000	194.0	150.8	148.7	164.2	163.6	169.0
1,250	195.0	142.7	141.7	167.3	161.0	169.0
1,600	194.0	138.6	136.1	165.9	164.9	169.0
2,000	192.0	143.2	139.3	166.5	164.2	169.0
Broadband	**216.2**	**177.2**	**173.9**	**205.2**	**190.8**	**187.7**

Notes:

a. Source levels for the impact hammer estimated assuming a pulse length of 100 milliseconds from an MHU 3000 impact hammer.

b. Source levels for anchor operations and pipelaying operations estimated based on the Castoro II barge.

c. Source levels for tug anchor pull and half speed transit are based on the Britoil 51 tug.

d. Source levels for dredging are based on the Aquarius dredge.

Table 4.8-2. Distances that 95 Percent of the Noise Associated with Construction Would Travel

Sound Pressure Level (dB re 1μPa)	Buoy Installation	Impact Hammering	Pipe-Laying: Offshore	Pipe-Laying: Inshore	Pipe-Laying: Passage Key, Live Boat
	Distance from Source (km)				
190	< 0.2	0.03	< 0.2	< 0.2	< 0.2
180	< 0.2	0.18	< 0.2	< 0.2	< 0.2
170	< 0.2	1.1	< 0.2	< 0.2	< 0.2
160	< 0.2	4.5	< 0.2	< 0.2	< 0.21
150	< 0.2	14.4	0.52	0.39	0.24
140	0.35	> 20	2	0.89	0.49
130	1.4	> 20	3.8	2.1	0.95
120	3.9	> 20	7.5	6	1.6

Table 4.8-3. Noise Emissions Sources During Construction

Operation	Auxiliary Equipment/ Comments	Engine Specifications	Assumptions
Offshore Facility (DWP)			
Anchor-Handling Support Vessels	ROV winches and hydraulic pumps, thrusters, sonar, survey equipment	Two 3,750-hp diesel engines	Operating for 24 hours/day for a period of 3.5 months at 100% load
Supply Boat	Bow thruster	671-hp diesel engine	
Crew Transfer Boat		671-hp diesel engine	
Tug		800-hp diesel engine	
Onshore Facility			
Hydraulic Excavator 330D	Caterpillar C9 ACERT	Two 268-hp diesel engines	Operating for a period of 50 days
Track-Type Tractor D7R	Caterpillar 3176C	One 240-hp diesel engine	Operating for a period of 50 days
Two-Ton Utility Truck	Ford F450 Diesel Power Stroke	One 350-hp diesel engine	Operating for a period of 50 days
One-Ton P/U Truck	Ford Power Stroke 6 Liter Diesel	Two 200-hp diesel engines	Operating for a period of 60 days
One-Ton Welding Trucks	Ford Power Stroke 6 Liter Diesel	Four 33-hp diesel engines	Operating for a period of 55 days

Operation	Auxiliary Equipment/ Comments	Engine Specifications	Assumptions
Onshore Facility (continued)			
Welding Machine 300 Amp.	Lincoln 300 Amp. Diesel	Four 33-hp diesel engines	Operating for a period of 55 days
Welding	Gas Metal Arc	E70S electrode	Hourly consumption as 20 lb/hour Annual consumption as 2,700 lb/year
Offshore Pipeline Facility			
Jackup: Port Manatee HDD Operation (Normal; Phase 1)	Diesel Engine	3,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/day and 27 days at 50% load
Spud Lay Barge: Shallow lay barge operation. Barge has no propulsion. Two tugs are used. (Normal; Phase 2)	Tug	1,200-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 59.4 days at 75% load
	Tug	1,200-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 59.4 days at 75% load
East Jackups. (Normal; Phase 2)	Jackup	3,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 27 days at 75% load
	Jackup	3,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 27 days at 75% load
West Jackups. (Normal; Phase 2)	Jackup	3,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 27 days at 75% load
	Jackup	3,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 27 days at 75% load
Pipelay Barge: Large lay barge pipeline operation. Barge has no propulsion. Uses two tugs. (Normal; Phase 3)	Tug	2,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 37 days at 85% load
	Tug	2,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 37 days at 85% load
Dragline Barge. (Normal; Phase 3)	Barge	600-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 6 days at 100% load

Operation	Auxiliary Equipment/ Comments	Engine Specifications	Assumptions
Offshore Pipeline Facility (continued)			
Plow Lay Barge: Plow burial of pipeline. Barge has no propulsion. Uses two tugs. (Normal; Phase 4)	Tug	2,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 113 days at 85% load
	Tug	2,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 113 days at 85% load
4-Pt DSVs for two supply vessels: Mattress armoring. (Normal; Phase 4)	Vessel	1,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 108 days at 100% load
	Vessel	1,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 108 days at 100% load
4-Pt DSVs for two supply vessels: Mattress armoring. (Downtime; Phase 4)	Vessel	1,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 12 days at 15% load
		1,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 12 days at 15% load
	Vessel	1,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 12 days at 15% load
		1,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 12 days at 15% load
Vessel: Gauge, fill, test, dewater and drying operations (Normal; Phase 5)	Vessel	300-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 13 days at 35% load
		300-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 13 days at 35% load
	Vessel	300-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 13 days at 35% load
		300-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 13 days at 35% load

Operation	Auxiliary Equipment/ Comments	Engine Specifications	Assumptions
Offshore Pipeline Facility (continued)			
Survey vessel (Normal; Not a particular phase)	Vessel	1,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 54 days at 50% load
	Vessel	1,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 54 days at 50% load
Jackup: Port Manatee HDD Operation (Downtime; Phase 1)	Jackup	3,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 3 days at 15% load
Spud Lay Barge: Shallow lay barge operation. Barge has no propulsion. Two tugs are used. (Downtime; Phase 2)	Tug	1,200-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 6.6 days at 15% load
	Tug	1,200-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 6.6 days at 15% load
East Jackups. (Downtime; Phase 2)	Jackup	2,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 3 days at 15% load
	Jackup	2,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 3 days at 15% load
West Jackups. (Downtime; Phase 2)	Jackup	2,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 3 days at 15% load
	Jackup	2,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 3 days at 15% load
Pipelay Barge: Large lay barge pipeline operation. Barge has no propulsion. Uses two tugs. (Downtime; Phase 3)	Tug	2,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 4 days at 15% load
	Tug	2,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 4 days at 15% load
Dragline Barge (Downtime; Phase 3)	Barge	600-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 1 day at 15% load
Plow Lay Barge: Plow burial of pipeline. Barge has no propulsion. Uses two tugs. (Downtime; Phase 4)	Tug	2,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 13 days at 15% load
	Tug	2,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 13 days at 15% load

Operation	Auxiliary Equipment/ Comments	Engine Specifications	Assumptions
Offshore Pipeline Facility (continued)			
4 Pt DSVs for two supply vessels: Mattress armoring. (Downtime; Phase 4)	Vessel	1,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 12 days at 15% load
		1,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 12 days at 15% load
	Vessel	1,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 12 days at 15% load
		1,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 12 days at 15% load
Vessel: Gauge, fill, test, dewater, and drying operations (Downtime; Phase 5)	Vessel	300-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 1 days at 15% load
		300-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 1 days at 15% load
	Vessel	300-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 1 days at 15% load
		300-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 1 days at 15% load
Survey Vessel. (Downtime; Not a particular phase)	Vessel	1,000-hp diesel engine using bunker C fuel oil with 0.05% sulfur content	Operating for 24 hours/ day and 6 days at 15% load

During the construction period, impact hammering would produce the loudest noise levels, but would likely occur for short periods of time. Noise from impact hammering would encompass a 4.5-km radius at 160 dB offshore and a 1.9-km radius inshore. 160 dB represents the Level B threshold for impulse/intermittent noise. Noise impacts from pipe laying and pipe burial are similar and would encompass a 7- to 9-km radius at 120 dB offshore and a 6- to 7-km radius at 120 dB inshore. For the Level A threshold, noise impacts from impact hammering offshore and pipe laying and burial would encompass an area less than 0.20 km. Impact hammering inshore would encompass a radius that is approximately 0.30 km at the Level A threshold. The radii of noise impacts vary depending on water depth because the transmission of lower-frequency sound waves can be significantly reduced in shallower water. As a result, the Level A and Level B radii in Passage Key are much shorter than the radii in Tampa Bay and offshore.

Although sounds created by construction equipment and vessels would be continuous during pipeline installation, activities would progress slowly along the route as the pipeline is laid and buried, and the

trench backfilled. Thus, any one area would be subject to the maximum sound levels for only a day or two each time as the construction activities pass that area.

Short-term, minor to major, direct, adverse impacts on the underwater noise environment would occur during Port and pipeline installation. BMPs and mitigation measures designed to limit impacts on marine life are discussed in **Section 4.11.** An additional mitigation method includes pipe laying during construction activities within a thin layer of sand. Through noise propagation modeling, it is estimated that a reduction in radii by 3 to 4 km could be obtained by adding a 2.5-m (8.2-foot) layer of sand during pipe-laying activities. This effect would be slightly more pronounced at the inshore sites where the water is shallower.

4.8.1.2 Operations

Under the proposed Project, long-term airborne and underwater noise impacts would be created by the operation of various equipment and powering systems on the SRVs and other support vessels and would be greatest in the immediate vicinity of the Port. Impacts of noise on biological resources are presented in **Section 4.2**.

Airborne noise. Vessels and equipment that would contribute to the airborne noise environment during routine deepwater port operations are presented in **Tables 4.8-3** and **4.8-4**. The major source of airborne noise would be from the vaporization of the LNG at the mooring buoy. Under the proposed Project, an overlap is anticipated between arriving and departing SRVs; consequently, an SRV would be present most of the time. Under the Proposed Action, the Port would operate 24 hours a day, 365 days per year to provide a continuous supply of natural gas. Noise levels in the offshore area would be elevated when two SRVs are on buoys (separated by a distance of approximately 3.1 miles) at the same time.

Table 4.8-4. Estimated Source Sound Levels from Equipment Used During Routine Operations on the Shuttle Regasification Vessel

Equipment	BHP	Sound Level in A-weighted Decibels [dBA]			
		1 m	1 km	5 km	Precautionary Zone Boundary
Air Compressor	125	98	38	24	36
Gas Compressor	1,200	108	48	34	46
BOG compressor	720	108	48	34	46
LNG tank pump	310	97	37	23	35
LNG send-out pump	2,060	97	37	23	35
Mobile Crane	N/A	109	49	35	47
Crane	274	108	48	34	46
Jib crane	550	105	45	31	43
Total (all equipment combined)		**115**	**55**	**41**	**53**

Source: USCG 2004

While SRVs are moored at the Port, main engines would not be operational, but shipboard machinery used to regasify or offload LNG, generate power, and maintain facilities, would produce continuous sources of noise. **Table 4.8-4** shows estimated equipment above-water sound levels using the dBA scale

at 1 m (3 feet), 1 km (0.6 mi), 5 km (3.1 mi), and at the boundary of the No Anchoring (Precautionary) Zone (1,500 m [4,921 feet]) from equipment that might operate on the SRVs. The 1-m (3-foot) sound levels represent the equipment source sound level without attenuation from any enclosure; the 1-km (0.6-mi) and 5-km (3.1-mi) sound levels reflect attenuation of sound over distance from the spreading of sound waves. The noise levels produced by the equipment would lessen as a result of transmission loss as noise moves through the SRV structure and from atmospheric attenuation. The data in **Table 4.8-4** indicates that there would be a minor noise impact outside the designated 1,500-m (4,921-foot) No Anchoring (Precautionary) Zone. Given the anticipated low noise contributions from the Proposed Action to onshore ambient noise levels, it is anticipated that noise impacts from Port operational activities would be short-term, minor, direct, and adverse.

Crew and supply boat radio transmitting operations would be of relatively short duration and conducted at a low power setting; therefore minor noise impact is expected. An additional noise source would come from SRV foghorns, which would generate warning signals at a sound level of 146 dBA (100 Hz) at 1 m (3.3 feet), as required by USCG regulation (33 CFR 67.10). This level is required for the foghorn to be audible at 3.22 km (2 mi). In addition, the device must sound a 2-second blast every 20 seconds during low-visibility conditions (less than 2-mi visibility). Foghorn operation would be intermittent and infrequent and at this distance would have no effect on onshore receptors. Routine operation noise impacts are expected to occur for the life of the project. The impact on existing noise levels is not expected to be readily discernable over the typical background noise level for oceans of 50 to 55 dBA at the No Anchoring (Precautionary) Zone boundary 1,500-m (4,921-foot) and beyond; therefore, routine operation noise impacts would be minor.

Foghorns installed on the SRVs would generate warning signals with a sound level of 146 dBA (100 Hz) at a 1.6-km (1-mi) distance that would be audible within a 3.2-km (2-mi) radius, as per USCG regulation 33 CFR 67.10. Foghorn operation would be infrequent and would create temporary noise level increases.

Noise levels from the other support vessels and transit carriers are estimated to range from 85 to 120 dBA at the source (USCG and MARAD 2006). The vessels and carriers would travel on established navigation routes, thereby passing specific receptors, and would not likely cause major long-term noise impacts onshore or offshore.

The Port would be constructed approximately 45 km (28 mi) from shore; consequently, noise generated by the vaporization process would not affect noise-sensitive areas onshore. Machinery noise generated during normal Port operation hours would vary in duration and intensity and would be similar to noise generated by fixed oil and gas structures, which range between 20 to 40 dBA above background levels and have a frequency spectrum of 30 to 300 Hz at a distance of 30 m (98.4 feet) from the source (MMS 2006). Support vessel trips would originate from existing facilities onshore and would follow established routes in nearshore waters, reducing noise effects. Noise generated from service vehicle traffic would be transient and particularly variable in intensity, depending on the source. Service vessels transmit mechanically based noise through both air and water, from propulsion and generator machinery, and from hull noise generated during transit.

Under the proposed Project, compression equipment would not be installed at the interconnection station. The Applicant has committed to installing equipment and components that would minimize the noise impact on the surrounding environment. Since onshore noise-sensitive areas are several miles away from the Port, there would be no discernible noise effects on onshore receptors (see **Table 4.8-2**). Although noise from Port operations could result in annoyance to recreational boaters and fisherman, the proposed Safety Zone would minimize the potential for recreational boaters and fishing vessels to operate in the immediate vicinity of the Port. Under the DWPA implementing regulations, the USCG is authorized to establish a permanent mandatory Safety Zone around deepwater ports whether a vessel is present or not.

The Safety Zone would extend approximately 850 m (2,789 feet) from the center of each buoy and encompass approximately 561 acres. All unauthorized vessels would be prohibited from anchoring or transiting the proposed Safety Zone at any time. The USCG would have the primary jurisdiction for the Safety Zone. Calculations indicate that at this distance, the expected noise level would be less than 53 dBA for equipment that might operate on typical SRVs. This noise level would not be readily discernable over a noise range of 50 to 55 dBA, which is the typical ocean background noise level.

In the event of an accident, emergency vessels and equipment would also cause short-term, minor to moderate, direct, adverse impacts. Monitoring of noise levels, and mitigation if noise levels are higher than anticipated, have both been requested by NMFS. Mitigation and monitoring procedures can be found in **Section 4.11.**

Based on the evaluation criteria described previously, long-term, minor, direct, adverse impacts on the airborne noise environment would occur during routine Port operations.

Underwater Noise. Sources of underwater noise from the Port operations include regasification and SRV operations. Underwater noise modeling was conducted for the SRVs for the offshore transit (full speed was assumed), buoy approach (half speed was assumed), and docking (three thrusters was assumed). However, it was later noted that a total of four thrusters could potentially be used. It was determined that the use of three thrusters rather than four thrusters would cause an increase of 1 or 2 dB re µPa and this difference would not be discernible due to ambient noise (Port Dolphin 2009b). Noise modeling indicates that overall, operational noise associated with the proposed Project is consistent with other man-made underwater noise sources in the area (e.g., commercial shipping, dredging). The third-octave band source levels for operational modeling scenarios are presented in **Table 4.8-5**. The distance that 95 percent of the SRV noise would attenuate, under different operational scenarios is presented in **Table 4.8-6**. An additional underwater noise source is the sound produced by the flow of gas through the proposed flowline, although very little noise in the underwater environment would be expected (JASCO 2008). **Table 4.8-7** provides an estimate of underwater or 1-octave band levels for regasification on one SRV. Noise modeling indicates that operational noise associated with the proposed Project is consistent with other man-made underwater noise sources in the area (e.g., commercial shipping, dredging). Long-term, minor to moderate, direct, adverse impacts on the underwater noise environment would occur during routine Port operations.

4.8.1.3 Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Table 4.8-5. Third-Octave Band Source Levels for Operational Modeling Scenarios (source depth is 6 m in all cases).

Frequency (Hz)	SRV, full speed transit	SRV, half speed transit	SRV, docking	SRV, docking, all 4 thrusters (not modeled)
10	171.0	162.4	171.5	172.7
12.5	171.0	162.4	171.5	172.7
16	171.0	162.4	171.5	172.7
20	171.0	162.4	171.5	172.7
25	171.0	162.4	171.5	172.7
31.5	171.0	162.4	171.5	172.7
40	171.0	162.4	171.5	172.7
50	171.0	162.4	171.5	172.7
63	171.0	162.4	171.5	172.7
80	171.0	162.4	171.5	172.7
100	171.0	162.4	171.5	172.7
125	169.1	160.5	169.6	170.7
160	167.0	158.4	167.4	168.6
200	165.0	156.4	165.5	166.7
250	163.1	154.5	163.6	164.7
315	161.1	152.5	161.6	162.7
400	159.0	150.4	159.5	160.6
500	157.1	148.5	157.5	158.7
630	155.1	146.5	155.5	156.7
800	153.0	144.4	153.5	154.6
1000	151.0	142.4	151.5	152.7
1250	149.1	140.5	149.6	150.7
1600	147.0	138.4	147.4	148.6
2000	145.0	136.4	145.5	146.7
Broadband	**182.1**	**173.5**	**182.6**	**183.7**

Source: Port Dolphin 2009b

Table 4.8-6. Distance That 95 Percent of the SRV Noise, Under Different Operational Scenarios, Would Travel

Sound Pressure Level (dB re µPa)	Transit	Buoy Approach	Docking
	Distance from Source (km)		
190	< 0.01	< 0.01	< 0.01
180	< 0.01	< 0.01	< 0.01
170	< 0.01	< 0.01	0.01
160	0.01	0.01	0.05
150	0.04	0.05	0.22
140	0.29	0.32	1.2
130	1.4	1.4	3.5
120	3.9	3.7	7.1

Source: Richardson et al. 1995

Table 4.8-7. Estimate of 1-Octave Band Levels for Regasification on One SRV

Center Frequency	Source Level (dB re 1 µPa 1m)
31.5	131.8
63	135.5
125	139.2
250	143.0
500	146.5
1,000	148.9
2,000	151.2
Broadband	164.6

Source: Richardson et al. 1995

It is expected that noise impacts from decommissioning would be limited to the immediate vicinity of the vessels and would be temporary and minor. Decommissioning of the Project would result in temporary noise due to diesel-powered vehicles, cranes, compressors, generators, and other miscellaneous tools. **Table 4.8-3** shows the typical vessels that would be used during port decommissioning, along with associated engine horsepower ratings and auxiliary equipment that might be expected during this 2.5-month process.

Demolition noise from decommissioning of the proposed pipeline could be heard by adjacent populations. Vehicle traffic associated with the decommissioning of the proposed pipeline would be similar to noise from vehicle traffic associated with construction. Noise impacts from vehicle traffic would only last the length of decommissioning operations. Demolition of the pipeline would not occur during decommissioning. Therefore, noise impacts from the pipeline decommissioning are only anticipated to be from vehicular transit along the pipeline, and are anticipated to be minor, short-term, direct, and adverse. Underwater noise levels from decommissioning would be similar to the levels from construction activities, as described in **Section 4.2**.

Short-term, minor, direct, adverse impacts on airborne noise receptors in the vicinity of the Port would occur during decommissioning. Noise generated by decommissioning vessels, machinery, and activities would create temporary, localized increases in both airborne and underwater noise levels. Impacts would be similar to those described in **Section 4.8**. No impacts on landside sensitive noise receptors would occur because decommissioning activities would occur far enough offshore that noise would attenuate to an imperceptible level before reaching onshore receptors. Potential noise impacts on biological resources are discussed in **Section 4.2.1**. Direct impacts on existing sound levels from decommissioning activities would mainly involve vessel engine operation noise. Mitigation measures for decommissioning activities would be similar to those used for construction activities, as described previously.

4.8.2 Alternatives

Table 4.8-8 compares impacts from the Proposed Action to each of the alternatives with respect to noise.

4.8.2.1 Southern Site and Route Alternative

Airborne and underwater noise impacts from the construction and operation of the Port at the Southern Site would be similar to the impacts discussed for the Proposed Site and Route. This alternative offers slight benefits to noise receptors as compared to the Proposed Action, which would be approximately 51.5 km (32 mi) from Port operations. Noise receptors closest to the pipeline would be the same distance from construction as under the Proposed Action.

Underwater noise levels would be similar to those described under the Proposed Action. In addition, since the onshore portion of the Southern Site and Route Alternative is similar to the route of the Proposed Action, the closest residence to the construction site would be the same, approximately 122 m (400 feet). Consequently, populations would be exposed to noise levels of approximately 70 to 75 dBA during construction activities.

The buoy array configuration and route for the Southern Site and Route Alternative would be similar to that of the Proposed Action. However, the length of the pipeline route would be about 12 percent longer (75.8 km [47.1 mi.]) than the Proposed Route (67.8 km [42.1 mi.]) from Port Manatee, so the construction period would be proportionally longer. Construction activity noise levels would not be louder in magnitude as compared to the Proposed Action. Noise impacts would be minor and cease at the end of the construction period.

4.8.2.2 Offshore Interconnection with Gulfstream Pipeline Alternative

Under this alternative, the construction period for the pipeline would be shorter. No noise impacts would be expected on populations onshore since airborne noise would be expected to diminish to negligible levels.

Underwater noise impacts associated with Port construction would be the same as under the Proposed Action. However, under this alternative, the pipeline would be shorter than under the Proposed Action by approximately 40 percent. Consequently, the underwater area that noise levels would impact would be about 40 percent less than under the Proposed Action

4.8.2.3 FSRU Port Design Alternative

Airborne and underwater noise impacts from operation of the Port under the FSRU Port Design Alternative would be similar to the impacts discussed for the Proposed Site and Route. Construction impacts would be less than under the Proposed Action. This alternative would result in less construction

noise from a reduction in facilities permanently attached to the seafloor. Both airborne and underwater noise impacts would be less than under the Proposed Action. Pile driver noise impacts would be expected to be reduced under this alternative because fewer anchors would be needed for the single FSRU mooring.

Airborne and underwater noise impacts from pipeline construction would be the same as under the Proposed Action.

4.8.2.4 AAV Vaporization Technology Alternative

Construction, operation, and decommissioning impacts under the AAV Vaporization Technology Alternative would be similar to those under the Proposed Action.

4.8.2.5 Suction Piles Anchoring Alternative

The installation of suction pile anchors would produce low levels (111 to 118 dB) of continuous underwater noise. Frequencies would range from low (12.5 Hz) to very high (2,000 Hz), and would be audible to marine mammals. This noise could cause marine mammals to temporarily avoid the construction area, but would not exceed NOAA's 120-dB criterion for continuous noise. Therefore, construction impacts under the Suction Piles Anchoring Alternative would be substantially less than those under the Proposed Action. Operation and decommissioning impacts under the Suction Piles Anchoring Alternative are expected to be similar to the Proposed Action.

4.8.2.6 No Action Alternative

The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, the additional infrastructure proposed by the Applicant would not be built and there would be no potential for noise impacts associated with the Project construction and operation. Means to satisfy the Nation's energy demands might result in increased use of existing land-based terminals, greater reliance on declining domestic oil and gas resources, or development of alternate means of importing LNG. Alternative sources of natural gas can include other Deepwater LNG Ports or onshore LNG terminals. Other Deepwater LNG Ports could have adverse noise impacts, but in different geographic locations. Onshore LNG terminals can be located in coastal areas where there would be greater likelihood of adverse noise impacts on humans and coastal resources.

Table 4.8-8. Summary of Impacts for Noise

Impacts	Proposed Action	Southern Site and Route Alternative	Offshore Interconnection Alternative	FSRU Design Alternative
Airborne noise from construction.	Short-term, minor, direct, adverse impacts.	Impacts would be equal to or less than those under the Proposed Action.	Impacts would be equal to or less than those under the Proposed Action.	Impacts would be equal to or less than those under the Proposed Action.
Underwater noise from construction.	Short-term, minor to major, direct, adverse impacts.	Impacts would be the same as those under the Proposed Action.	Impacts would be the same as those under the Proposed Action.	Impacts would be equal to or less than those under the Proposed Action.
Airborne noise from operation.	Long-term, minor, direct, adverse impacts.	Impacts would be equal to or less than those under the Proposed Action.	Impacts would be the same as those under the Proposed Action.	Impacts would be equal to or less than those under the Proposed Action.
Underwater noise from operation.	Long-term, minor to moderate, direct, adverse impacts.	Impacts would be the same as those under the Proposed Action.	Impacts would be the same as those under the Proposed Action.	Impacts would be equal to or less than those under the Proposed Action.
Airborne noise from decommissioning.	Short-term, minor, direct, adverse impacts.	Impacts would be equal to or less than those under the Proposed Action.	Impacts would be equal to or less than those under the Proposed Action.	Impacts would be equal to or less than those under the Proposed Action.
Underwater noise from decommissioning.	Short-term, minor to major, direct, adverse impacts.	Impacts would be the same as those under the Proposed Action.	Impacts would be the same as those under the Proposed Action.	Impacts would be equal to or less than those under the Proposed Action.

Notes:

There would be no impacts from the No Action Alternative.

The AAV Vaporization and Suction Pile Anchoring Alternatives were carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.9 Socioeconomic Resources and Environmental Justice

The following discussion of socioeconomic resources and environmental justice includes an analysis of impacts and a determination of impact duration and severity. Included in the discussion are elements of the project description that would both produce impacts and are proposed to minimize potential impacts. Applicant-proposed measures for minimizing potential environmental impacts are those that have been committed to by the Applicant and incorporated into the project design, and are listed in **Section 4.11**. If further measures are recommended by agencies to mitigate potential adverse impacts, they are stated at the end of each analysis and in **Section 4.11**. For analyses where no mitigation measures are stated, none have been identified to further reduce potential adverse impacts.

This section addresses the potential for direct and indirect impacts that the proposed activities would have on the local or regional economy (i.e., new business or loss of business that affects employment); employment; the procurement of goods and services; changes to population, housing, and infrastructure (e.g., schools, police, and fire services); and social conditions. Also evaluated are environmental justice concerns including disproportionately high and adverse human health or environmental impacts on low-income or minority populations. Adverse and beneficial impacts are designated as minor, moderate, or major based on the magnitude or intensity of the anticipated impacts.

Construction and operation of the Project would have long-term, minor, beneficial direct impacts on socioeconomic resources through increased employment and purchase of goods and services. Adverse impacts related to employment, population, housing, and public services would be minor and easily absorbed within the existing Tampa Bay-St. Petersburg regional resources and socioeconomic infrastructure. The onshore construction and support operations would be conducted at available existing facilities.

As described in the following sections, the Project impacts have been reviewed and determined that disproportionate impacts on low-income or minority populations or increased health and safety risks to children would not be expected. No substantial change to the local or regional economy, population, housing, infrastructure, or employment would be expected.

4.9.1 Impacts of the Proposed Action

4.9.1.1 Construction

Commercial and Recreational Fisheries. Commercial and recreational vessels, including those engaged in commercial fishing, would be temporarily excluded from the vicinity of construction activities for approximately 6 months during onsite construction along the pipeline route from Port Manatee to the STL buoys, from late-2010 through mid-2011, potentially resulting in minor space-use conflicts. Recreational fishing activity would also be temporarily excluded for the 6-month duration of Port construction. This would start around late 2010 and last until mid 2011 (Port Dolphin 2007f). During the 12 weeks of pipeline construction, fishing activity would also be temporarily excluded from a 500-m- (1,640-foot-) wide fishing exclusion zone centered on the pipeline route. Direct impacts on fisheries would occur in segments and would be localized to the immediate surrounding area. Following completion of each pipeline segment, the area would recover. Impacts on commercial fishing and the local fisheries resources from the Proposed Port and route construction would be short-term, minor, direct, and adverse. Adverse impacts would be short-term in nature.

The NMFS Fishing Statistics and Economics Division (SED) used data from 2006 to analyze the total number of commercial fishery landings off of the western coast of Florida (NMFS 2006b). They also analyzed the total number of commercial fishery landings for the Tampa-St. Petersburg area (NMFS

2007d). All commercial fishing vessels with a Federal permit for any federally regulated fishery are required to submit vehicle trip reports (VTRs) for every trip, whether the trip takes place in state territorial waters or in the EEZ. A fisheries model was created using the SED landing data and compared it to the total fishing area in the area of the proposed Port and pipeline route, to estimate future quantities and values of landings potentially lost due to the exclusion of commercial fishing activity. The landing totals for the western coast of Florida are shown in **Table 4.9-1**. The landing totals for Tampa Bay-St. Petersburg, proportional to the entire western coast of Florida, are shown in **Table 4.9-2**.

Table 4.9-1. Landings by Distance from U.S. Shores, 2006, State of Florida West Coast

Species	0–3 Miles		3–200 Miles		Total	
	Pounds (in thousands)	Dollars (in thousands)	Pounds (in thousands)	Dollars (in thousands)	Pounds (in thousands)	Dollars (in thousands)
Finfish Subtotals	16,004	$11,744	18,996	$42,245	34,999	$53,989
Shellfish Subtotals	21,340	$93,105	12,574	$46,929	33,914	$140,034
Totals	**37,344**	**$104,849**	**31,570**	**$89,174**	**68,913**	**$194,023**

Source: NMFS 2006b

Notes: * 0–3 miles are within state waters. 3–200 miles are within the EEZ.

Table 4.9-2. Tampa Bay-St. Petersburg Landings by Year, Compared to the State of Florida

Year	Finfish and Shellfish Fisheries (in pounds)	Dollars
Tampa Bay-St. Petersburg, total 2006	11,900,000	$27,600,000
State of Florida, total 2006	68,913,000	$194,023,000
Percent that Tampa-St. Petersburg composes Western Florida coast totals	17.3 percent	14.2 percent

Source: NMFS 2007g

When comparing the tables, Tampa Bay-St. Petersburg accounts for 17.3 percent of the total Western Florida fish landings in pounds and 14.2 percent in total dollars. When comparing the total area of the proposed Port and pipeline route to Tampa Bay-St. Petersburg as a whole, the construction area of the proposed Port and pipeline route makes up a small portion of the overall Tampa-St. Petersburg and GOM aquatic area. The total estimated offshore construction footprint is about 9,272 acres.

Conservative estimates place the square mileage of Tampa Bay (approximately 400 square miles) and the area of the GOM from which the finfish and shellfish data were compiled for **Table 4.9-2** at approximately 1,000 mi^2 (TBEP 2007). The areas that would be affected by the offshore construction, including all areas for the offshore port and the pipeline route, including all ROWs, would involve only 26.1 of those square miles, for a total of 2.6 percent of the area used by commercial fishermen caught. Assuming an even distribution of finfish and shellfish in this area, this comes out to an estimated 309,400 pounds of fish, or 2.6 percent of the 11,900,000 caught by commercial fishermen in Tampa Bay-St. Petersburg and the surrounding areas. The projected value of the impact on commercial fishing during construction is $591,760, or 2.6 percent of $27,600,000.

The estimate of losses to commercial fisheries does not take into account the relocation of commercial fishing. Figures of total catch, percent of total catch, and overall values are reasonably assumed to be overestimations, representing a maximum value based on ideal conditions and an even distribution of finfish and shellfish. Adverse impacts on fishing would be felt during the duration of the offshore construction phase, and would be distributed among the various commercial fishing businesses. This economic impact, when compared to the overall landings of Tampa-St. Petersburg and the western Florida coast as a whole, would be short-term, minor, direct, and adverse. The estimate for losses to commercial fisheries does not account for the potential for fishers to relocate their activities to other fishing grounds outside the offshore construction area. Rather, they assume that the exclusion of commercial fishing activity from the area would result in lost landing revenues to fishers that fish in the area, thereby reducing their net incomes.

Based on NMFS commercial fishing permit data, commercial fishers in the locations of the proposed Port and pipeline route would likely be displaced by project construction. Given the nearby locations of fishing areas suitable to these types of commercial fishing and preferred by the finfish and shellfish in question, displacement of fishers from the Port area would likely place the greatest pressure on areas to the north of the proposed Port and pipeline route. A suggested mitigation measure that would alleviate most direct adverse impacts on commercial and recreational fishing would be to relocate fishing activities to these surrounding areas. Fishing the areas around the affected area would be effective, since areas in the general vicinity would still be able to provide the species of finfish and shellfish that commercial fishers catch to ensure profitability. Shellfish and finfish that evacuate the construction area would relocate to these surrounding areas, and commercial and recreational fishers would still be able to secure landings similar to those that would have occurred on the proposed Port and pipeline route construction areas. Other possible mitigation measures to minimize impacts on commercial and recreational fishing would be to halt construction during peak fishing seasons. As the schedule currently stands, the construction of the proposed Port and pipeline route is scheduled to begin in late 2010 and continue for approximately 6 months, until mid 2011, therefore avoiding the peak recreational fishing effort in Tampa Bay. The estimated effect of these mitigation measures on the proposed Port and pipeline route would be to substantially decrease adverse impacts on commercial and recreational fishing. The decrease would reduce the expected impacts far below the maximum threshold of 2.6 percent presented previously.

There would be temporary, indirect noise and activity disturbance in the work area during installation of the Proposed Port and Pipeline Route. Potential impacts on commercially harvested fish would be temporary and minor, resulting in fish displacement followed by rapid recolonization (see **Section 4.2.1**). No mitigation is suggested for socioeconomic impacts associated with impacts on fish since the impacts would be negligible and short-term.

Marine Recreation and Tourism. Impacts associated with marine recreation and tourism would include temporary exclusion during the proposed Port and pipeline route construction, displacement of fish due to noise disturbance in the work area, and an increase in sediment loads during construction. The impacts would occur for the duration of construction, and the anticipated impacts would be short-term, minor, direct, and adverse.

As shown in **Table 3.9-5**, more than 52 percent and less than 5 percent of recreational fishing trips in the Tampa Bay area took place in inland waters and the EEZ, respectively. The potential for impacts with construction barges would most likely occur inside Tampa Bay, near Port Manatee and the area of the pipeline landfall. The extent of navigable waters within Tampa Bay itself is approximately 400 mi^2 (TBEP 2007). The size of a single construction barge, ranging in size from approximately 91.5 m (300 feet) to 99 m (350 feet), in comparison to all of Tampa Bay, is quite small. Yet these construction barges would block portions of Tampa Bay from being used for recreational fishing. Their noise could drive fish from local areas into deeper waters farther from shore. Therefore, impacts of construction

barges on recreational fishing vessels would be short-term, minor, direct, and adverse. Approximately 40 percent of the total recreational fishing trips in 2005 occurred from March through June (see **Table 3.9-6**). Direct and indirect adverse impacts on recreational fisheries from installation of the proposed Port and pipeline route would be similar to impacts on commercial fisheries.

Land-based Socioeconomic Conditions. Proposed Port and pipeline route construction would have direct and indirect positive impacts and economic benefits. Installation of the proposed Port and pipeline route would have direct and indirect, short-term, minor, and beneficial impacts on the economies of Manatee, Hillsborough, and Pinellas counties; other Florida counties; and other southeastern states due to increased employment and the purchase of goods and services. Approximately $23 million worth of goods and services would be required for construction, and these goods and services would be purchased from the local economy (Port Dolphin 2007f).

It is estimated that construction activities would temporarily employ 594 nonlocal workers, which would have a direct, beneficial impact on the local economy (Port Dolphin 2007f). Fifty-four nonlocal workers would be temporarily employed (i.e., 3 months) for onshore construction and approximately 540 nonlocal workers would be employed (i.e., 6 months) for offshore construction. However, the offshore construction workers would spend the majority of the time on the offshore vessels and only spend short periods of time onshore during crew changes and time off (Port Dolphin 2007f). Construction workers spending a portion of their wages locally for food, shelter, and entertainment would have a short-term, indirect, minor, and beneficial impact on the local economy. Other indirect, beneficial impacts would be noticed through the taxes generated by purchases, as well as payroll deductions.

In addition, it is estimated that approximately 82 local temporary jobs would be created during construction of the Port (Port Dolphin 2007f). Short-term, direct, minor, beneficial impacts on the local economy would be expected as a result of the creation of temporary employment. Since the economic impacts of construction would be positive, no mitigation measures are necessary.

Employment data for 2004 (see **Table 3.9-9**) show that there were 68,289 employees working in the construction industry within the ROI, out of a total of 562,111 workers employed in construction in Florida (Census Bureau 2000). The number of construction workers required for the proposed construction is relatively small compared to the available work force within the local region, and very small compared to the work force in the state. Each job created by Port and pipeline construction would generate additional jobs within the region, due to the many companies that supply goods and services to support construction activities. Indirect impacts from the proposed construction are expected to be short-term, minor, direct, and beneficial on local employment and the local economy; no long-term, beneficial, or adverse impacts on employment, population, personal income, or poverty levels, or other demographic or employment indicators are expected from construction.

Most Port and pipeline construction workers would be housed on the construction vessels during construction activities and remain offshore, except for crew changes when workers would return to their homes. Therefore, construction workers' reliance on local housing would be minor and expected to result in minor, short-term, direct, adverse impacts on the local housing market. If a large portion of the nonlocal construction workers are not housed on the construction vessels, construction could reduce the availability of housing, especially during the spring and summer, the peak seasons for tourism. In areas of seasonal tourism, nonlocal construction workers could displace tourists, which could be a concern for motel operators who depend on recurring business and could be reluctant to provide housing for construction workers. However, based on the large number of vacant housing units in the ROI (126,878 units), in 2000 (see **Table 3.9-11**), it is expected that ample housing would be available in the region. There would be no displacement of local citizens or tourists. The large number of vacant housing units would mitigate any adverse impacts.

Changes in economic factors also could impact the social fabric of a community. For example, increases in employment could stimulate the need for new housing units, and as a result, increase demand for community and social services such as primary and secondary education, fire and police protection, and health care. There would also be short-term minor adverse and beneficial impacts on public services from an increase in construction workers. A major temporary benefit would be increased employment in the local area. This would be a beneficial impact on the local tax base. Conversely, an influx of construction workers and their families would increase demand on existing public services, which might result in an overall adverse impact on public services. However, due to the large size of the work force and economy of the local region, the relatively small number of construction workers required for the proposed construction, and the temporary nature of the construction, no impacts on social conditions are anticipated. Since no impacts are anticipated, no mitigation measures would need to be implemented.

Environmental Justice. As discussed in **Section 3.9.2.2**, the ROI does not have disproportionately high minority or low-income populations compared to Florida. However, Hillsborough County does have disproportionately high percentages of minority residents compared to the state.

Guidance developed by the Interagency Federal Working Group on Environmental Justice recommends evaluating three criteria: (1) whether health or other environmental impacts of a project or alternative are above generally accepted norms (as measured by risks and rates), (2) whether the risk or rate of hazard or other environmental exposure appreciably exceeds or is likely to appreciably exceed those of the general population, and (3) whether health or other environmental impacts occur as a result of cumulative or multiple exposures. Analysis of potential impacts from the proposed Project show that construction of the proposed Port and pipeline route would not impose health or other environmental impacts above generally accepted norms, and would not impose hazards or exposures appreciably higher than those of the general population. Since construction of the proposed Port and pipeline route would have short-term, beneficial, minor, direct impacts on local employment, there would be no disproportionately high and adverse impacts on low-income or minority populations. Since no impacts on Environmental Justice would occur, no mitigation measures are necessary.

4.9.1.2 Operations

Commercial and Recreational Fisheries. Port operations would have long-term, minor, direct, adverse impacts on fisheries resources due to turbidity increases, noise, routine discharges, and direct losses from cooling water intake. These impacts are discussed in detail in **Sections 4.1.1.2** and **4.2.1.8**. No major reduction in populations of the commercially and recreationally important species available to the fishing industries is anticipated. Therefore, measurable secondary economic impacts, such as reduced employment in fishing or fishing-related industries, also are not anticipated. Long-term, minor, indirect, beneficial impacts on fisheries would occur from induced conservation associated with excluded fishing in the Safety Zone. Under the DWPA implementing regulations, the USCG is authorized to establish a permanent mandatory Safety Zone around deepwater ports whether a vessel is present or not. The Safety Zone would extend approximately 850 m (2,789 feet) from the center of each buoy and encompass approximately 561 acres. This is a result of maintaining 500 m (1,641 feet) from the moored LNGC (maximum of approximately 350 m [1,148 feet] length) as it weathervanes (rotates) around the buoy. All unauthorized vessels would be prohibited from anchoring or transiting the proposed Safety Zone at any time. The USCG would have the primary jurisdiction for the Safety Zone.

Pipeline inspection and maintenance would cause short-term, indirect, minor, adverse impacts on commercial fishing from noise and activity disturbance. Most species of demersal and pelagic fish would avoid maintenance areas. Potential impacts on commercial fishing would be short-term, indirect, minor, and adverse resulting in fish displacement followed by rapid recolonization. As the pipeline would be buried below the seafloor, the pipeline would not damage fishing gear (e.g., trawls, nets, and traps).

A mitigation measure that would alleviate most direct adverse impacts on commercial and recreational fishing would be for the fishers to relocate their fishing activities to surrounding areas. Areas in the general vicinity would still be able to provide the species of finfish and shellfish that commercial fishers seek.

Impacts on recreational fisheries would be similar to those on commercial fisheries, as described above, including impacts on fish populations and the prohibition of fishing in the Safety Zone. No major reduction in populations of the commercially and recreationally important species available to the fishing industries would be anticipated. Therefore, measurable secondary economic impacts, such as reduced charter operations, also are not anticipated. Because the Safety Zone would prohibit fishing within the vicinity of the Port, it is not anticipated that these potential localized impacts would have a measurable economic impact on the regional fishing industry. Relocating activities to surrounding areas would substantially reduce the impacts of reduced fishing charters and the loss of available recreational fishing areas as a result of the Safety Zone.

Impacts on shellfish would be negligible because the proposed facilities do not traverse any known commercial shellfish beds. The Port would cause permanent loss of approximately 22 acres of benthic substrata. The pipeline construction, including a 67-foot construction corridor, would occur over approximately 67 km (42 mi), resulting is a temporary loss of substrata. Permanent and temporary impacts would result is a loss of a fraction of fishing grounds within the western Florida coast (approximately 2.6 percent). The benthic substrata impacted by the offshore Port are typical for the western Florida coast and are not protected or unique. Since there would be no adverse impacts on shellfish populations, no mitigation measures are necessary.

Commercial Shipping. As shown in **Figure 2.1-14**, the proposed Port and pipeline route lie outside the Shipping Fairway, which is outlined in light red. Changes in traffic due to construction would be expected to occur. These changes are expected to occur for the duration of the operation of Port Dolphin. Impacts and mitigation with respect to commercial shipping are discussed in **Section 4.10.1**, Transportation.

Marine Recreation and Tourism. If a License is issued, the USCG may designate a mandatory NAA and recommendatory ATBA to further facilitate Port operations, safety, and security. The ATBA would encourage all vessels without a specific destination within the ATBA to operate outside the area. The USCG would also recommend vessels maintain a predictable course at a speed no greater than 10 knots while inside the ATBA. The NAA restrictions would extend beyond the buoy anchors with an approximately 1,000-m (3,280-foot) radius around each of the buoys. The ATBA would extend with an approximately 1,200-m (3,937-foot) radius around each of the buoys, and would include the area between the buoys. The Safety Zone, ATBA, and NAA for the Port are shown in **Figure 2.3-11**. Port operations likely would limit recreational activities within the ATBA/NAA. The Applicant would be encouraged to develop communications protocols with parties who have an interest in transiting the ATBA/NAA area such as fishing or recreational boating.

Impacts on fishing charter trips and aquatic recreational activities within the Safety Zone are expected to be minimal, adverse, and remedied by mitigation. No major reduction in populations of the commercially and recreationally important species available to the fishing industries is anticipated. Therefore, measurable secondary economic impacts, such as reduced charter operations, also are not anticipated. The mitigation measure of relocating activities to surrounding areas would substantially reduce the impacts of reduced fishing charters and the loss of available aquatic recreational areas as a result of the Safety Zone. Expected results would be similar to what had occurred previously in the Safety Zone.

Land-based Economic Conditions. Direct and indirect, long-term, minor, beneficial impacts would occur from operations of the Port throughout its projected lifespan of 25 years primarily due to the purchase of goods and services, and increased employment. The Port would employ 17 permanent workers, who would represent a minor percentage of the regional civilian labor force. Crew changes would take place at the Port, as well as at the LNG loading facility. The Applicant estimated that approximately $36 million worth of goods and services would be purchased for operations from the local economy throughout the life of the project (Port Dolphin 2007f).

There also would be short-term, minor, adverse, and beneficial, indirect impacts from the demand for housing for Port workers. Based on the relatively small number of Port workers and the large number of vacant housing units in the immediate region, it is expected that the induced regional demand for housing for Port workers would be minor and would be met by available supply. No overall adverse impact on public services would be anticipated, due to the large size of the work force and economy of the local region, and the relatively small number of Port workers.

Indirect, long-term, minor, adverse impacts could also occur from operations of the Port due to loss of revenue to commercial fisheries. Losses in revenue can be expected to affect other linked industries, such as suppliers and vendors, if excluding commercial fishing activities from the ATBA/NAA reduces landings. An analysis was undertaken to calculate the potential indirect costs of fishing exclusions to associated shoreside businesses. In the analysis, the loss of revenue projected by the analysis of the potential economic impacts of the fishery exclusion zones (see **Section 4.9**) was treated as a reduction in expenditures by the fishers to the fishing industry (North American Industrial Classification [NAIC] 11411). Any expected adverse impacts would be mitigated by relocating fishing activities to the areas surrounding the proposed Port and pipeline route. The measures are expected to mitigate any expected adverse impacts. Therefore, no adverse impacts would be expected as a result of lost revenue by commercial fisheries because of a lack of available areas for commercial landings.

Sand Resources. The Town of Longboat Key expressed concerns over the Port Dolphin pipeline route, asserting that the route and safety corridor initially proposed would lead to a substantial loss of sand resources. The town expressed concerns that future beach renourishment projects would either not be possible or would be more expensive and difficult because restrictions on dredging near the proposed pipeline would make large volumes of sand resources inaccessible to harvest, resulting in increased costs. Without these sand resources the Town of Longboat Key fears the tourism industry would diminish as the beaches recede. The town also stated that if beach renourishment activities were not continued, upland loss and damages to beach front properties could occur.

In response to the concerns expressed by the town, the Applicant revised the pipeline route to avoid permitted sand borrow areas. The sand resource locations and quantities of sand that would be inaccessible after construction of the pipeline are minimal and alternative resources exist nearby (see **Section 4.1.1)**. Therefore the proposed Port and pipeline route would have short- and long-term, indirect, minor, adverse impacts on sand resources and beach economies.

Environmental Justice. According to the Interagency Federal Working Group on Environmental Justice guidance, impacts from the operations of the proposed Port and pipeline route would not impose health or other environmental impacts above generally accepted norms, and would not impose hazards or exposures appreciably higher than those of the general population. Since operations of the proposed Port and pipeline route would have beneficial impacts on local employment, there would be no disproportionately high and adverse impacts on low-income or minority populations.

4.9.1.3 Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

Commercial Fisheries. The decommissioning of Port Dolphin would take an estimated 2 months to remove all offshore fixed components, excluding pipelines. During Project decommissioning, the ATBA/NAA would continue to be enforced, and commercial fishing would continue to be excluded from the vicinity of the Port. Vessel activity associated with pipeline decommissioning and the resulting fishing exclusions would occur near one or both ends of the pipeline.

Potential impacts on fisheries resources associated with the Port operations would terminate and return to ambient conditions upon the decommissioning of the facilities. Complete removal of all undersea, aboveground Port infrastructures would result in the loss of hard substrata habitat that might have developed over the life of Port operations. To minimize potential fisheries impacts associated with the decommissioning of the Port facilities; it would be possible to leave some of the facilities' underwater structure in place to function as an artificial reef. All decommissioning activities would be conducted in accordance with approved plans required by the licensing authority, and in compliance with all applicable and appropriate regulations and guidelines in place at the time of decommissioning. Necessary equipment and total trips for decommissioning are discussed in **Section 4.10**, Navigation and Transportation.

Any benefits to fisheries resulting from the fishing exclusions within the ATBA/NAA would be removed. The removal of the ATBA/NAA would reopen that area to marine recreation and tourism. This would cause a slight beneficial impact on commercial fishing. Since there is a beneficial impact, no mitigation measures would be necessary.

Land-based Socioeconomic Conditions. Proposed Port and pipeline route decommissioning would have both direct and indirect economic benefits, similar in character although smaller in scale compared to those that would result from Project construction. Construction workers spending a portion of their wages locally would have an indirect, short-term, beneficial impact on the local economy, and other indirect, beneficial impacts would be noticed through the taxes generated by purchases, as well as payroll deductions. Indirect impacts from the decommissioning activities are expected to be short-term and beneficial on local employment and the local economy. Potential short-term, indirect, adverse impacts from the demand for housing and public services would be expected to be minor.

Environmental Justice. No environmental justice impacts are expected as a result of decommissioning. Since decommissioning of the proposed Port and pipeline route would have beneficial impacts on local employment, there would be no disproportionately high and adverse impacts on low-income or minority populations.

4.9.2 Alternatives

Table 4.9-3 compares impacts from the Proposed Action to each of the alternatives with respect to socioeconomic resources.

4.9.2.1 Southern Location and Pipeline Route

Impacts on commercial fisheries, socioeconomics, and environmental justice from construction, operations, and decommissioning of the Southern Site and Route Alternative would be similar to those for the proposed Port and pipeline route. The Southern Route Alternative would be longer in overall length, therefore the duration and spatial extent would be greater than that of the proposed Port and pipeline route. With more construction, a slight beneficial increase in construction spending and employment would be expected.

4.9.2.2 Offshore Interconnection with the Gulfstream Pipeline Alternative

Impacts on commercial fisheries, and environmental justice from construction, operations, and decommissioning of the Offshore Interconnection with Gulfstream Pipeline Alternative would be similar to those compared to the Proposed Port and pipeline route. The Offshore Interconnection Alternative would be shorter in overall length (18.9 km [18 mi] as opposed to 67.6 km [42 mi]) than the Proposed Action. The duration and spatial extent would be less than that of the proposed Port and pipeline route. Less construction would mean less of an economic and employment impact in the ROI and surrounding areas since there would be far less construction and less labor would be needed.

4.9.2.3 FSRU Port Design Alternative

Impacts on commercial fisheries, socioeconomics, and environmental justice from construction, operations, and decommissioning of the FSRU Port Design Alternative would be similar to those compared to the Proposed Port and pipeline route. The FSRU Alternative would have a slight increase in beneficial impacts on economics and labor since an FSRU would have to be constructed, but the benefit would not be felt in the ROI and surrounding areas as the FSRU would be built off-site. The pipeline length would be unchanged, so similar beneficial economic impacts are expected for the FSRU Alternative when compared to the proposed Port and pipeline route.

4.9.2.4 AAV Vaporization Technology Alternative

Construction, operation, and decommissioning impacts under the AAV Vaporization Technology Alternative would be similar to those under the Proposed Action.

4.9.2.5 Suction Piles Anchoring Alternative

Construction, operation, and decommissioning impacts under the Suction Piles Anchoring Alternative would be similar to those under the Proposed Action.

4.9.2.6 No Action Alternative

The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under this alternative, the additional infrastructure proposed by the Applicant would not be built and there would be no potential for impacts on socioeconomic conditions associated with the project construction and operation. No jobs would be created in Florida from construction, operations, and decommissioning of the Port. Furthermore, coastal communities would not benefit from the increased revenues from the sales of goods and services to support the Port. Means to satisfy the Nation's energy demands might result in increased use of existing land-based terminals, greater reliance on declining domestic oil and gas resources, or development of alternate means of importing LNG. Alternative sources of natural gas can include other Deepwater LNG Ports or onshore LNG terminals. Use of fuel sources other than natural gas, would have the potential to cause adverse impacts on socioeconomic resources, both regionally and nationally, that could be less than, equal to, or greater than the impact of the Project depending on the nature of the alternative source.

Table 4.9-3. Summary of Impacts on Socioeconomics and Environmental Justice

Impacts	Proposed Action	Southern Site and Route Alternative	Offshore Interconnection Alternative	FSRU Design Alternative
Construction				
Commercial and Recreational Fishing	Short-term, minor, direct, and adverse. Adverse impacts would be short-term in nature and mitigated.	Similar to Proposed Action.	Similar to Proposed Action.	Similar to Proposed Action.

Impacts	Proposed Action	Southern Site and Route Alternative	Offshore Interconnection Alternative	FSRU Design Alternative
Construction (continued)				
Marine Recreation and Tourism	Would occur for the duration of construction; impacts would be short-term, minor, direct, adverse and mitigated.	Similar to Proposed Action.	Similar to Proposed Action.	Similar to Proposed Action.
Onshore Economic Conditions (Economic Benefits)	Direct and indirect positive impacts and economic benefits.	Slight beneficial increase in construction spending and employment.	Slight beneficial decrease.	Similar to Proposed Action.
Environmental Justice	No impacts are expected.	No impacts are expected.	No impacts are expected.	No impacts are expected.
Operations				
Commercial and Recreational Fishing	Long-term, minor, direct, adverse impacts.	Similar to Proposed Action.	Similar to Proposed Action.	Similar to Proposed Action.
Marine Recreation and Tourism	Minimal and adverse impacts.	Similar to Proposed Action.	Similar to Proposed Action.	Similar to Proposed Action.
Onshore Economic Conditions (Employment, construction spending)	Direct and indirect long-term minor beneficial impacts.	Similar to Proposed Action.	Similar to Proposed Action.	Similar to Proposed Action.
Environmental Justice	No impacts are expected.	No impacts are expected.	No impacts are expected.	No impacts are expected.
Decommissioning				
Commercial and Recreational Fishing	Slight beneficial impact.	Similar to Proposed Action.	Similar to Proposed Action.	Similar to Proposed Action.
Marine Recreation and Tourism	Slight beneficial impact.	Similar to Proposed Action.	Similar to Proposed Action.	Similar to Proposed Action.
Onshore Economic Conditions (Employment, construction spending)	Direct and indirect long-term minor beneficial impacts would occur (similar to construction).	Similar to Proposed Action.	Similar to Proposed Action.	Similar to Proposed Action.
Environmental Justice	No impacts are expected.	No impacts are expected.	No impacts are expected.	No impacts are expected.

Notes:

There would be no impacts from the No Action Alternative.

The AAV Vaporization and Suction Pile Anchoring Alternatives were carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.10 Navigation and Transportation

The following discussion of navigation includes an analysis of impacts and a determination of impact duration and severity. Included in the discussion are elements of the project description that would both produce impacts and are proposed to minimize potential impacts. Applicant-proposed measures for minimizing potential environmental impacts are those that have been committed to by the Applicant and incorporated into the project design, and are listed in **Section 4.11**. If further measures are recommended by agencies to mitigate potential adverse impacts, they are stated at the end of each analysis and in **Section 4.11**. For analyses where no mitigation measures are stated, none have been identified to further reduce potential adverse impacts.

This section addresses potential impacts on transportation and navigation associated with the project, potential alternatives, and the No Action Alternative. Impacts on transportation and navigation would occur if an action caused long-term interference with access to transportation routes, crowding of routes resulting in substantially increased risks of collisions, or other mishaps (e.g., grounding), or a substantial change over existing conditions. A minor adverse impact indicates vessel traffic could be somewhat affected, but no additional risk of crowding, collision, or mishaps is anticipated; moderate adverse impact indicates the additional traffic due to the Project might cause some increase in crowding and mitigation measures might be required to minimize the risk of mishaps; and major adverse impact indicates the project would result in a substantial change over existing conditions, causing a risk of mishap that would be difficult to mitigate.

4.10.1 Impacts of the Proposed Action

Factors associated with the Proposed Action that could affect navigation and transportation in the ROI include an increase in vessel traffic, establishment of Safety Zone and ATBA/NAA, and increases in roadway and railway traffic. The ROI for the Proposed Action includes the proposed offshore Project location (as shown on **Figure 2.3-1**), nearshore Project location (as shown on **Figure 2.3-2**), and the onshore Project location (as shown on **Figure 2.3-3**). Impacts associated with the alternatives to the Proposed Action are discussed in **Section 4.10.2**.

4.10.1.1 Construction

Offshore impacts

Vessel traffic. A variety of vessels are required for varying durations during construction of Port Dolphin and, therefore, a temporary increase in vessel traffic would be expected. Construction is anticipated to last for approximately 11 months and would move along the pipeline corridor. Construction is planned to begin in August 2010. A description of the activities that would take place during construction is provided in **Section 2.3.11**.

Construction activities would require a number of different types of vessels of various sizes. The duration that each vessel would be onsite would vary according to its role in construction activities. **Table 4.10-1** summarizes vessel traffic by vessel type and the number of trips along Egmont Channel to Port Manatee during construction activities. A Port vessel entering Tampa Bay via Egmont Channel, proceeding to Port Manatee, conducting its port business, and then exiting Tampa Bay via Egmont Channel would result in two vessel trips along Egmont Channel.

Many of the vessels required for construction would travel to the construction site and remain for several months, while others would make two trips (one round trip) along Egmont Channel to Port Manatee for a specific purpose. Survey vessels would generate two trips (one round trip) per day for 2 months (Port

Dolphin 2007k, Port Dolphin 2008a). Workers would travel from the offshore construction site to shore on weekly shifts; therefore, there would be one crew vessel round trip from the offshore construction site to Port Manatee per week (two trips per week). Offshore construction is anticipated to take place 24 hours a day, and shift changes would occur twice a day during off-peak hours at 12:00 p.m. and 12:00 a.m. (Port Dolphin 2008a). Only portions of the total 540 workers expected to be employed for offshore construction activities would come onshore at these weekly crew exchanges for time off (Port Dolphin 2007e).

Water barges would provide fresh water for slurry make-up used for HDD. There are three planned HDD crossings, therefore it is expected that the water barges would make 3 round trips (6 trips) along Egmont Channel during construction.

The increase in vessel traffic from construction activities along Egmont Channel would be moderate, but short-term. As shown in **Table 4.10-1**, 1,832 vessel trips along Egmont Channel would be expected. As shown in **Table 3.10-1**, there were 7,956 vessel trips along Egmont Channel to Port Manatee, Port of Tampa, and Port of St. Petersburg in FY 2008. It is expected that the construction of Port Dolphin would moderately increase the risk of crowding, collisions, or mishaps within Egmont Channel during the 11-month construction period.

Table 4.10-1. Port Dolphin Construction Vessels

Vessel Type	Number of Each Vessel Type Required	Approximate Size (m)	Trips per Year for Each Vessel Type (approximate)	Duration (approximate)
Survey vessel	1	46 x 24	120	2 months
Pipelaying/derrick barge	1	122 x 30	4	11 months (depending on weather)
Anchor handling support vessel	2	55	4	
Offshore tug	4	55	16	
Backfill barge	1	46 x 24	4	
Supply vessels	6	Various*	600	
Crew boats	1	24	80	
Bridge pull-in barge	1	76 x 13	4	
Material barges	5	61 x 12	900	
Jack-up barge	5	42 x 24	10	
Hopper barge	12	46 x 24	24	
Dragline barge	1	46 x 23	2	
Diving vessel spread	4	43 x 12	64	
Total	**44**	**--**	**1,832**	

Source: Port Dolphin 2007a, 2008a, and 2008f

Note: *Typical supply vessels would be 34 m and 56 m in length (3 each)

As discussed in **Section 3.10**, the vast majority of vessels in Tampa Bay are recreational vessels. The results of a Sea Grant survey (2004) indicated that approximately 66,874 pleasure boat trips were taken through Tampa Bay (Sidman et al. 2004). The Sea Grant survey also revealed that the overwhelming

majority of recreational vessels operate within a few miles of the coast, and are therefore not impacting vessel traffic in Egmont Channel. Based on the evaluation criteria presented in **Table 4.0-1**, the Port construction vessel traffic would represent a short-term, moderate, direct adverse impact on vessel traffic in Egmont Channel.

No mitigation and minimization measures are available that could remediate the short-term, moderate, direct adverse impact on vessel traffic along Egmont Channel as a result of Port construction vessel traffic.

Port calls. The 1,832 vessel trips along Egmont Channel shown in **Table 4.10-1** from Port construction vessels would be 916 calls to Port Manatee. Therefore, calls by Port construction vessels would more than double the number of calls to Port Manatee, where only 532 vessel calls were recorded in FY 2008 (see **Tables 3.10-1** and **4.10-1**). It is expected that an increase in vessel calls to Port Manatee would result in a moderate increase in the risk of mishaps and vessel crowding within the Port Manatee channel and Port Manatee's berthing space. As shown in **Table 3.10-3**, Port Manatee is busiest from August to October. As discussed in **Section 3.10.2.1**, Port Manatee is currently undergoing expansion, which when completed would include one-half mile of new deepwater berthing and modern docks and new navigational safety features including a 1,300-foot-diameter turning basin and improved turning configuration where the Port's channel intersects the main Tampa Bay Shipping Channel. Phase One of this expansion was completed in 2007 (MCPA 2009), and it is expected that the entire expansion would result in Port Manatee being able to handle additional vessel calls, resulting in minor impacts from vessel calls by the Project.

No mitigation and minimization measures are available that could remediate the short-term, minor, direct adverse impact on Port Manatee as a result of Port construction vessel traffic.

Construction Safety Zone. A construction Safety Zone would be established around the areas of active construction. The construction Safety Zone around the Port could be as much as 500 m (1,641 feet), resulting in a traffic-free area of approximately 48.5 acres (Port Dolphin 2007d). As construction and installation of the pipeline progresses, an associated construction Safety Zone would also move along the pipeline construction corridor as wide as 914 m (3,000 feet) and as long as 762 m (2,500 feet) (Port Dolphin 2008a).

Direct, adverse impacts would be expected from construction activities and the establishment of the construction Safety Zone during construction of the proposed Port. Movement of the construction Safety Zone along the offshore pipeline route could inconvenience recreational users who might be forced to navigate around these Safety Zones, but the size of the Safety Zone would not be cumbersome enough to prohibit recreational vessel movement in Tampa Bay. Commercial vessels would be less likely to be affected because the proposed construction corridor avoids major shipping fairways, including Egmont Channel, and only crosses the minor Gulf Intracoastal Waterway, which is west of the Port Manatee shipping channel at the entrance to Tampa Bay. The pipeline construction would not cross the shipping channel for Port Manatee. Enforcement of the construction Safety Zone could result in localized short-term, minor, direct, adverse impacts on vessel traffic in Tampa Bay. The potential for short-term, adverse impacts as a result of the construction Safety Zone would increase as the pipeline construction progresses further into Tampa Bay because that is where the vessel traffic is heaviest. Based on the evaluation criteria presented in **Table 4.0-1**, minor, direct, short-term, adverse impacts would be expected from offshore pipeline construction activities and the establishment of the construction Safety Zone during construction of the proposed Port.

Onshore impacts

Construction associated with the proposed Project could impact onshore traffic in multiple ways. First, materials and supplies would be delivered using existing onshore modes such as local roadways and possibly the CSX Railroad, which would increase vehicle traffic on those transportation routes. Second, construction workers commuting to and from construction sites would increase traffic on local roadways. Third, local traffic on the roadways that would be crossed during construction of the onshore pipeline would be slowed while construction is taking place.

Delivery of construction materials. During onshore construction, there would be almost constant traffic to and from the construction site. This traffic would include the transport of construction materials, supplies for crew members, and the exchange of crews.

It is anticipated that onshore construction activities would result in delivery of supplies and equipment via tractor trailer. These tractor trailers would travel regionally using I-10, I-4, and I-75 and would use U.S. Highway 41 to access Port Manatee (FDOT 2005). It is estimated that approximately 680 semi-truck trips would be required to deliver pipeline components and construction equipment and materials for the Port Manatee valve station and the Gulfstream/TECO interconnection station (Port Dolphin 2008a). Most deliveries would occur prior to the start of construction. Approximately 3.8 million vehicles annually use the portion of U.S. Highway 41 that provides access to Port Manatee from I-275, and 15 percent (556,000 vehicles) of this traffic is tractor trailer traffic. Approximately 1.1 million vehicles annually use Piney Point Road, which provides access to Port Manatee from U.S. Highway 41, and 13 percent (135,000 vehicles) of this traffic is tractor trailer traffic.

It is estimated that it would take approximately 60 days to construct the Port Manatee valve station and the Gulfstream/TECO interconnection station. Both facilities would be constructed simultaneously (Port Dolphin 2008a). The construction of the stations would involve the use of multiple types of construction trucks (e.g., an asphalt truck, aggregate truck, dump truck, welder's truck, and concrete truck) and construction equipment (e.g., a bulldozer, front-end loader, track hoe, and crane) (Port Dolphin 2008a).

Construction supplies could be delivered via barge or railway (Port Dolphin 2008a). Selection of the mode of transportation would depend on the location of the pipe mill and coating yard. Railway transport could be used for large, permanent gas handling equipment such as vessels, skids, and line pipe (Port Dolphin 2008a). It is not anticipated that the CSX railroad would be used to transport personnel (Port Dolphin 2008a).

Therefore, the proposed Project would have short-term, minor, direct, adverse impacts on the regional and local road network from delivery of construction equipment and materials. It is anticipated that the CSX Railroad would be able to accommodate any increased trips associated with the delivery of Project construction materials and would result in no adverse impacts on railway traffic.

No mitigation and minimization measures are available that could remediate the short-term, minor, direct, adverse impact on the regional and local road network from delivery of construction equipment and materials. However, delivery of construction materials via barge or railway would alleviate traffic on U.S. Highway 41 and at the Port Manatee access control center, reducing adverse impacts. No adverse impacts on railway traffic are expected as a result of the delivery of construction materials; therefore no mitigation and minimization measures are necessary.

Commuting workers. Workers would travel to and from the offshore construction site on weekly shifts. Only portions of the 540 workers would come onshore at the weekly crew exchanges for time off (Port Dolphin 2007e). Short-term, minor, direct, adverse impacts on vehicle traffic at Port Manatee and on the

regional roadways are expected from this small amount of workers coming onshore from the offshore construction site for time off.

Onshore pipeline construction activities are expected to employ 82 workers, but a peak average of 54 workers would be working on site at any given time (Port Dolphin 2007e). Construction of the Port Manatee valve station and the Gulfstream/TECO interconnection station is expected to employ 10 workers. Due to the existing transportation infrastructure in the Project area, an increase of 64 workers commuting to the onshore construction sites would have a short-term, minor, direct, adverse impact on transportation in the region.

No mitigation and minimization measures are available that could remediate the short-term, minor, direct adverse impact on the regional and local road network from workers coming onshore from the offshore construction site for time off, and workers commuting to the onshore construction sites.

Construction of the onshore pipeline. The onshore portion of the pipeline would extend from the Florida coastline at Port Manatee to the proposed interconnection station along Buckeye Road. Most construction, including the staging area and installation activities, is anticipated to take place within a 100-foot ROW centered on the pipeline route. Slick bore technology (uncased) would be used for certain road and other short distance crossings. These crossings include the crossing of U.S. Highway 41, Reeder Road, O'Neil Road, and Buckeye Road (Port Dolphin 2007b). A new county road, 31st Terrace East Road, would be constructed along the pipeline route. This road would also be crossed using slick bore technology (uncased) (Port Dolphin 2008f). The slick bore method of construction can require excavation of pits at either end of the proposed slick bore. Once excavated, a length of pipe would be installed by boring a horizontal hole under the highway or railroad track and pushing the pipe into the bored hole. The traffic on the roadways that would be crossed using slick bore technology would need to be slowed down while the construction is taking place. Construction is not anticipated to be conducted during peak traffic hours; therefore slowing of traffic represents a localized short-term, direct, minor, adverse impact on the traffic on the roadways that would be crossed by the onshore pipeline.

To minimize impacts on traffic, construction is not anticipated to be conducted during peak traffic hours. Florida Department of Transportation (FDOT) would also require specific work zone safety measures at the locations where pipeline construction would impact local vehicle traffic (FDOT 2008b) that could include a notice on its Web site under "current projects" to notify roadway users that this construction would be taking place, and road signs to notify vehicle drivers that their speed is about to be decreased. Flagmen might also be required to direct and slow traffic during construction activities that cross or are adjacent to roadways to ensure worker and driver safety.

The construction of the pipeline under the CSX Railroad is proposed to be accomplished via uncased dry jack and bore technology (Port Dolphin 2007b). Boring and jacking, or pipe jacking, is a method that utilizes a horizontal jack to install pipe in a single pass. This technology is commonly used when crossing roads, highways, railroads, waterways (in some instances), and other special crossings. It is anticipated that the crossing would take no more than 2 weeks to be completed, from start to finish (Port Dolphin 2008a). Port Dolphin would be required to get a permit for the railroad crossing from CSX. The permit would require specific plans for traffic controls and other safety measures as deemed appropriate by CSX.

No adverse impacts would be expected to the operations of the CSX Railroad; therefore, no mitigation or minimization measures are necessary.

4.10.1.2 Operations

Vessel traffic. During operations, the Project would result in at least one SRV being present offshore year round, and it is likely that two SRVs would be present (Port Dolphin 2007d). The SRVs would typically be connected to the buoy approximately 4 to 8 days, depending on the cargo-capacity and send-out rate of the LNG. The two separate buoys would allow natural gas to be delivered in a continuous flow, without interruption, by scheduling an overlap between arriving and departing SRVs (Port Dolphin 2007h). It is estimated that between 45 and 90 SRVs would use Port Dolphin annually with either 1 or 2 vessels present at any given time (Port Dolphin 2008a).

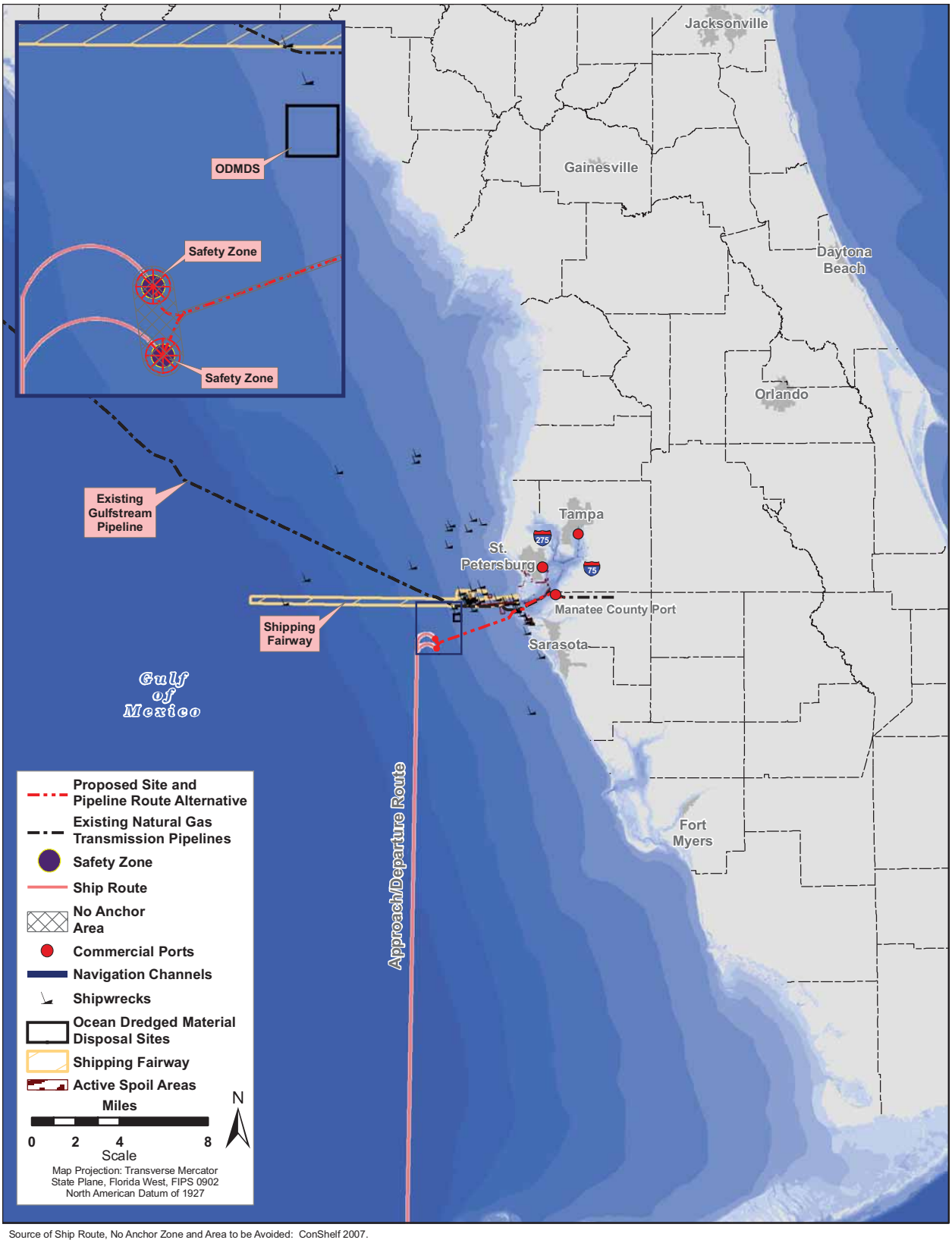
The SRVs would approach the terminal generally west until the SRV passes west of Key West. From this point, the course would change to generally north, roughly paralleling the west coast of Florida until reaching the general area of the terminal. Cruising speed of the SRV would be 19.5 knots; under normal conditions the average speed in the arrival zone would be less than about 14 knots (Port Dolphin 2008a). **Figure 4.10-1** shows the anticipated route SRVs would take in approaching the terminal. Once the LNGC is within 2 NM of the terminal, the captain would determine the best approach based on wind, current, and visibility. The SRVs would slow to a speed of less than 3 knots once inside the Safety Zone (Port Dolphin 2008a). Once the SRV has completely offloaded, it would travel out of the GOM with the shortest route west of Key West, always with a minimum 12 NM to the nearest shallow water. SRV approach and departure routes would avoid the existing shipping fairway, Egmont Channel (Port Dolphin 2008a).

Vessel traffic of Port operations was calculated by the number of times each vessel used Egmont Channel. Therefore, a Port vessel entering Tampa Bay via Egmont Channel, proceeding to Port Manatee, conducting its port business, and then exiting Tampa Bay via Egmont Channel would be two vessel trips along Egmont Channel. Buoy maintenance and inspection would occur once per year (2 trips), which would have a minor impact on vessel traffic. However, it is estimated that supply vessels would make 2 round trips to shore per week, which would result in 4 trips along Egmont Channel per week (208 trips per year). One crew vessel would make one round trip to shore per day, which would average 2 trips along Egmont Channel per day (720 trips per year) (Port Dolphin 2007d). This would result in a total of 928 trips along Egmont Channel per year for operation of the proposed Port.

Project operation vessel trips along Egmont Channel would result in long-term, minor, direct adverse impacts on vessel traffic along Egmont Channel (see **Table 3.10-1**). The operation of the Port is expected to require 928 vessel trips along Egmont Channel annually. In comparison, there were 7,956 vessel trips along Egmont Channel to Port Manatee, Port of Tampa, and Port of St. Petersburg in FY 2008. It is anticipated that an increase of 928 vessels trips annually along Egmont Channel for operation of the proposed Port would increase the risk of crowing, collision, or mishaps in the Egmont channel.

As discussed in **Section 3.10**, the vast majority of vessels in Tampa Bay are recreational vessels. The results of a Sea Grant survey (2004) indicated that approximately 66,874 pleasure boat trips were taken through Tampa Bay (Sidman et al. 2004). The Sea Grant survey also revealed that the overwhelming majority of recreational vessels operate within a few miles of the coast, and are therefore not impacting vessel traffic in Egmont Channel. Based on the evaluation criteria presented in **Table 4.0-1**, the Port operation vessel traffic would represent a short-term, minor, direct, adverse impact on vessel traffic in Egmont Channel.

No mitigation and minimization measures are available that could remediate the long-term, minor, direct adverse impact on vessel traffic along Egmont Channel as a result of Port operation vessel traffic.



Source of Ship Route, No Anchor Zone and Area to be Avoided: ConShelf 2007.

Figure 4.10-1. Typical SRV Approach Route to Port Dolphin

Port calls. The 928 vessel trips along Egmont Channel annually from Port operation vessels would be 464 calls to Port Manatee per year. Therefore, calls by Port operation vessels would increase the number of calls to Port Manatee, where only 532 vessel calls were recorded in FY 2008 (see **Tables 3.10-1** and **4.10-1**). It is expected that an increase in vessel calls to Port Manatee would result in a moderate increase in the risk of mishaps and vessel crowding within the Port Manatee channel and Port Manatee's berthing space. As discussed in **Section 3.10.2.1**, Port Manatee is currently undergoing expansion, which when completed would include one-half mile of new deepwater berthing and modern docks and new navigational safety features including a 1,300-foot-diameter turning basin and improved turning configuration where the Port's channel intersects the main Tampa Bay Shipping Channel. Phase One of this expansion was completed in 2007 (MCPA 2009), and it is expected that the entire expansion would result in Port Manatee being able to handle additional vessel calls, resulting in minor impacts from vessel calls by the Project.

No mitigation and minimization measures are available that could remediate the long-term, minor, direct adverse impact on Port Manatee as a result of Port operation vessel traffic.

Permanent Safety Zone and recommended ATBA/NAA. Under the DWPA implementing regulations, the USCG is authorized to establish a permanent mandatory Safety Zone around deepwater ports whether a vessel is present or not. The Safety Zone would extend approximately 850 m (2,789 feet) from the center of each buoy and encompass approximately 561 acres. This is a result of maintaining 500 m (1,641 feet) from the moored LNGC (maximum of approximately 350 m [1,148 feet] length) as it weathervanes (rotates) around the buoy. All unauthorized vessels would be prohibited from anchoring or transiting the proposed Safety Zone at any time. The USCG would have the primary jurisdiction for the Safety Zone.

If a License is issued, the USCG may designate a mandatory NAA and recommendatory ATBA to further facilitate Port operations, safety, and security. The NAA restrictions would extend beyond the buoy anchors with an approximately 1,000-m (3,280-foot) radius around each of the buoys. The ATBA would extend with an approximately 1,200-m (3,937-foot) radius around each of the buoys, and would include the area between the buoys. The Safety Zone, ATBA, and NAA for the Port are shown in **Figure 2.3-11**.

The establishment of a permanent Safety Zone, a mandatory NAA, and recommended ATBA to further facilitate Port operations, safety, and security during operations would have a direct adverse impact on marine transportation and navigation. The permanent mandatory Safety Zone around the Port would be in effect whether a vessel is present or not. The establishment of these areas would require vessels to alter their travel routes that previously included these areas, but due to the large area of navigable waters in Tampa Bay (210,467 acres) is it anticipated that locating an alternative route would not be an issue for these vessels (Port Dolphin 2007e). No adverse impacts would be expected on coastal or nearshore recreational or commercial fishing or shipping operations due to the establishment of the Safety Zone, NAA, or the ATBA. Based on the evaluation criteria presented in **Table 4.0-1**, long-term, minor, direct adverse impacts on vessel traffic would be expected from establishment of a permanent Safety Zone, a mandatory NAA, and recommended ATBA for Port operations.

No mitigation and minimization measures are available that could remediate the long-term, minor, direct, adverse impact on vessel traffic in Tampa Bay as a result of the establishment of a permanent Safety Zone, a mandatory NAA, and recommended ATBA for Port operations. No adverse impacts would be expected on coastal or nearshore recreational or commercial fishing or shipping operations due to the establishment of these areas; therefore, no mitigation or minimization measures are necessary.

Onshore impacts

Commuting workers. Operation of the Port would employ 17 permanent workers, who would represent a minor percentage of the regional civilian labor force (Port Dolphin 2007f). Crew changes would take place at the Port, as well as at the LNG loading facility. It is anticipated that these workers would come onshore via the dedicated crew vessel at regular intervals for time off. Due to the existing transportation infrastructure in the Project area, an increase of 17 workers commuting to Port Manatee to board the crew vessel would have no adverse impact on transportation in the region.

No adverse impacts would be expected on the regional and local road network as a result of the workers required for Port operation commuting to Port Manatee; therefore, no mitigation or minimization measures are necessary.

4.10.1.3 Decommissioning

Decommissioning would be expected 25 years after commencement of operations. It is expected that requirements for decommissioning and removal would have changed. The owner would be required to adhere to all applicable requirements of the appropriate Federal agencies at the time, and submit a decommissioning plan to the Secretary for approval.

The proposed decommissioning procedure for the buoys would be to remove each buoy, riser, and umbilical; and eight mooring lines. The landing pad would be removed as well. In the case of pile anchors, the anchors would be cut subsurface, with the top portion being removed and the lower portion remaining in place. Subject to negotiated land lease conditions, the proposed decommissioning of the offshore pipeline involves removing the PLEM and interfaces, flooding the existing pipe, sealing, and abandoning in place. Offshore pipelines would be filled with seawater and left in place. Pipelines would be marked as required by MMS. Onshore portions of the pipeline would be decommissioned through the FERC abandonment process in accordance with the FERC guidelines at the time the Applicant applies to decommission the onshore pipeline. Abandoned pipelines would be removed if necessary by a future project at the expense of that project sponsor. Impacts from pipeline removal would be included as part of the NEPA analysis required for that action.

The decommissioning of Port Dolphin would take an estimated 2 months to remove all offshore fixed components, excluding pipelines (Port Dolphin 2008a). The process of decommissioning the pipeline would only take a few months and would include cleaning and capping the pipeline and removing the buoy array and aboveground infrastructure. The impacts on navigation and transportation would be reassessed prior to decommissioning based upon environmental conditions and laws at that time.

Offshore impacts

Vessel traffic. Necessary equipment and total vessel trips for decommissioning are shown in **Table 4.10-2**. The DSV barge and offshore tug are only estimated to make two trips (one round trip) to shore during the entire decommissioning process. The crew/supply vessel is estimated to make two trips (one round trip) to shore per day. It is likely that a clearance zone would be established during the decommissioning process; however, the area would be limited to the STL buoy area and would not include the pipeline corridor.

It is expected that the increase in vessel traffic associated with decommissioning activities would be minor. Following completion of decommissioning, there would be no vessel traffic associated with Port Dolphin, which would be considered a beneficial impact. Based on the evaluation criteria presented in

Table 4.10-2. Port Dolphin Decommissioning Vessels

Vessel Type	Number of Vessels Required	Total Trips Required
DSV barge	1	2
Offshore tug	1	2
Crew/Supply vessels	1	150
Total	**3**	**154**

Source: Port Dolphin 2008a

Table 4.0-1, the Port decommissioning vessel traffic would represent a short-term, minor, direct, adverse impact on vessel traffic along Egmont Channel and at Port Manatee.

No mitigation and minimization measures are available that could remediate the short-term, minor, direct, adverse impact on vessel traffic along Egmont Channel and at Port Manatee as a result of Port decommissioning vessel traffic. Impacts on vessel traffic associated with the decommissioning process would be similar to those described above for the construction of the Port. Impacts are expected to be minor (Port Dolphin 2007d).

During decommissioning, safety clearances would be published in Notices to Mariners (Port Dolphin 2008a).

Onshore impacts

Removed offshore equipment would arrive at Port Manatee, and then be transported via truck for recycling, reuse, or disposal. Required equipment for removal of onshore components would include one 50-ton crane, two semi-trucks, two welding rig trucks, and three pickup or crew trucks (Port Dolphin 2008a).

The result of this analysis is that no adverse impacts would be expected on vehicle traffic as a result of the onshore equipment required for decommissioning purposes. It is anticipated that surrounding roads (i.e., U.S. 41, I-275, and I-75) would be able to accommodate the short-term, minor, direct increase in vehicles used for transporting removed offshore equipment.

No adverse impacts would be expected on vehicle traffic as a result of the onshore equipment required for decommissioning purposes; therefore, no mitigation or minimization measures are necessary. No mitigation and minimization measures are available that could remediate the short-term, minor, direct, adverse impact on vehicle traffic resulting from the transport of removed offshore equipment.

4.10.2 Alternatives

Table 4.10-3 compares impacts from the Proposed Action to each of the alternatives with respect to navigation and transportation.

4.10.2.1 Southern Site and Route Alternative

The Southern Site and Route Alternative components would be essentially the same as those discussed in **Section 4.10.1** for the Proposed Action. The offshore pipeline route would be 6.4 km (4 mi) greater under the Alternative, which is a 9 percent increase as compared to the Proposed Action. The

construction of the longer pipeline would likely result in more vessel traffic due to the increased time required to lay a longer length of pipe. The onshore portion of the Southern Route Alternative, which proceeds east of U.S. 41 and rejoins the Proposed Route when it turns east under U.S. 41, would be the same length and impact the same roadways as the Proposed Route. Therefore, the only difference between the Proposed Action and the Southern Site and Route Alternative is the 9 percent increase in the offshore pipeline length.

4.10.2.2 Offshore Interconnection with the Gulfstream Pipeline Alternative

The offshore pipeline route would be 38.8 km (24 mi) shorter under the Alternative, which is a 57 percent decrease as compared to the Proposed Action. This decreased length of pipe would result in less vessel traffic during construction activities due to the decreased time required to lay a shorter length of pipe. The elimination of the onshore portion of the pipeline associated with this alternative could result in a reduction of onshore impacts on navigation and transportation. Due to the shorter offshore pipeline length, less pipe and construction materials would be required. This could result in a smaller number of semi-trucks being required to move the construction materials, which could result in less vehicle traffic as compared to the Proposed Action. In addition, there would be no workers commuting to Port Manatee to construct the onshore pipeline, which would result in less impact on the regional roadway network as compared to the Proposed Action. The decrease in vessel traffic during construction activities and the elimination of the onshore portion of the pipeline associated with this alternative would result in less adverse impacts on navigation and transportation as compared to the Proposed Action.

4.10.2.3 FSRU Port Design Alternative

Under this alternative it is anticipated that the same number of LNGCs would be used as described under the Proposed Action. Impacts on navigation and transportation would be similar to the Proposed Action.

4.10.2.4 AAV Vaporization Technology Alternative

Construction, operation, and decommissioning impacts under the AAV Vaporization Technology Alternative would be similar to those under the Proposed Action.

4.10.2.5 Suction Piles Anchoring Alternative

Construction, operation, and decommissioning impacts under the Suction Piles Anchoring Alternative would be similar to those under the Proposed Action.

4.10.2.6 No Action Alternative

The No Action Alternative is considered to be the continuation of existing conditions of the affected environment without implementation of the Proposed Action. Under the No Action Alternative, the Maritime Administrator would deny the license, or the Governor of an adjacent coastal state would disapprove the Project under the Deepwater Port Act, or the applicant could withdraw the license application. Any of these actions or the disapproval of any other permitting agency could result in the Project not proceeding. This would mean that the proposed Port and the associated pipeline(s) would not be constructed. Accordingly, none of the potential environmental impacts, either positive or negative, associated with construction and operation of the proposed Project would occur.

Other license applications for projects designed to satisfy demand for natural gas might be submitted to the Maritime Administration or the FERC, and these projects, should they go forward, could have greater, lesser, or similar impacts in comparison with the Proposed Action. Other means might be used to satisfy

the nation's energy demands, such as expansion of existing ports or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase in the long term, consumers might have fewer and potentially more expensive options for obtaining natural gas in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be enhanced in other ways unforeseen at this point, including further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, nuclear, wind, solar, hydroelectric power, or biomass (e.g., wood or corn pellets) to compensate for the reduced availability of natural gas. In addition, a portion of the demand might be met through energy conservation. However, it is purely speculative to predict the resulting action(s) that would be taken by the potential end users of the natural gas proposed to be supplied by the Proposed Action and the associated direct and indirect environmental impacts of that use.

Under the No Action Alternative, there would be no direct or indirect adverse impacts on navigation and transportation. Means to satisfy the Nation's energy demands might result in increased use of existing land-based terminals, greater reliance on declining domestic oil and gas resources, or development of alternate means of importing LNG. Alternative sources of natural gas can include other Deepwater LNG Ports or onshore LNG terminals. Other Deepwater LNG Ports could have adverse impacts on navigation and transportation, but in a different geographic location.

Table 4.10-3. Navigation and Transportation Impacts Associated with the Alternatives, as Compared to the Proposed Action

Impacts	Proposed Action	Southern Site and Route Alternative	Offshore Interconnection Alternative	FSRU Design Alternative
Increase in vessel traffic during construction	1,832 total vessel trips	+ increase to estimated approx. 1,997 vessel trips	– reduction to estimated approx. 788 vessel trips	No change
Increase in vessel traffic during operation	928 vessel trips per year	No change	No change	No change
Safety Zone during construction	1. Size for Port: approx. 850 m (2,789 feet) 2. Size for pipeline: 200 m (656 feet) along the centerline of the pipeline	1. No change 2. – time	1. No change 2. time	No change
ATBA at Port during operation	1,200-m (3,937-foot) radius around each of the buoys	No change	No change	No change
Road and railway traffic during construction	1. 680 total semi-truck trips to deliver materials 2. Portions of 540 offshore workers coming onshore for time off 3. 64 workers commuting to onshore construction sites	1. + increase to estimated approx. 741 semi-truck trips 2. No change 3. No change	1. semi-truck trips 2. No change 3. 0	No change
Road and railway traffic during operation	17 workers	No change	No change	No change

Notes:

There would be no impacts from the No Action Alternative.

The AAV Vaporization and Suction Pile Anchoring Alternatives were carried forward but not presented in the table because there were no differences from the construction, operation, and decommissioning impacts of the Proposed Action.

4.11 BMPs, Mitigation and Minimization Measures, and Monitoring

NEPA, the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C. 4371 et seq.), and 40 CFR 1508.20 Mitigation defines to include:

(a) Avoiding the impact altogether by not taking a certain action or parts of an action

(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation

(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment

(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action

(e) Compensating for the impact by replacing or providing substitute resources or environments.

In an EIS, mitigation measures must be considered for impacts that would not by themselves be considered significant but would contribute to lessen the environmental impact of the project overall.

4.11.1 Applicant-Proposed BMPs and Minimization Measures

The Applicant has identified the following BMPs and minimization measures for the construction and operation of the proposed Port, which are contained within the *Port Dolphin Energy LLC Deepwater Port License Application, Volume II, Appendix F,* as revised (Port Dolphin 2007e). The Applicant has committed to implementing these measures to comply with state and local requirements for permits, and to reduce potentially adverse environmental impacts if a license is issued for the proposed deepwater Port. The Applicant would also comply with Federal mitigation requirements.

Water Quality Impacts

1. Trenching and burial of the gas transmission pipeline would be performed using a pipeline plow to the maximum extent practicable. The towed plow trenching and burial technology was selected primarily because it does not fluidize bottom sediments. Therefore, it causes minimal impacts from sediment resuspension in comparison to other more conventional trenching and burial technologies (e.g., clamshell dredging).
2. Minimize the duration of construction to minimize impacts on marine resources by using the most efficient and effective construction equipment and methods available.
3. The use of turbidity curtains when installation is performed by clamshell dredge under the Skyway Bridge and during HDD. The use of turbidity curtains or other mitigation methods as practicable in OFW.
4. Filtered seawater would be used for the hydrotesting. An environmentally benign dye, Hydro Tag Green Fluorescent Dye, would be added to the flooding and test water. HydroHib P would be added to the water and would not be required to be treated prior to discharge. HydroHib P has been verified by the USEPA as demonstrated by NPDES permits.
5. Fresh water for the onshore pipe would be discharged on land using industry-standard filtering procedures prior to release.
6. No discharges would be made from the SRVs while at Port (i.e., bilge water, sanitary wastes, grey water, and ballast water).
7. Desalination freshwater-generation systems would be turned off while vessels are moored; therefore no chlorine or hypersaline wastewater would be discharged.

8. On the SRVs, gutter bars shall be placed around equipment where oil leaks could occur, (e.g., mooring winches, cranes). Rain water from these utility areas shall be drained to a bilge holding tank. No rain water from the utility areas would be discharged overboard while at the buoy.
9. Vessels would have secondary containment around hydrocarbon-containing equipment and systems as practicable.

Marine Mammal Vessel Strikes

Manatee Vessel Strike Mitigation Measures for active installation/decommissioning vessel operations:

1. Vessel operators and crews must maintain a vigilant watch for marine mammals and slow down or stop their vessels to avoid striking sighted protected species.
2. If a manatee is within 50 yards of a construction or support vessel underway, all operations would discontinue until it has left the vicinity of its own volition.
3. If a manatee is within 91 m (300 feet) of an active construction or support vessel underway, it would be observed and the vessel would proceed with caution, following the guidelines below:
   - Resume vessel at slow speeds
   - Stay on parallel course with manatee; follow behind, or next to, at an equal or lesser speed
   - Do not cross path of manatee
   - Do not attempt to steer or direct manatees away
   - Do not allow the vessel to come between a mother and her calf.
4. Practical speeds would be maintained to the extent possible when applicable. Guidelines for speeds include the following:
   - No wake/idle speeds when the draft of the vessel is less than 1.2 m (4 feet) from seafloor. All vessels would follow routes of deep water whenever possible.
   - All construction vessels transiting to and from the Port from shore would not exceed 10 knots, during regular operations.
   - Avoid sudden changes in speed and direction.
   - Speeds during installation would be well under 10 knots; vessel could be stationary during certain phases of installation.
   - Higher speeds would only be used if safety reasons warrant.
   - Reduce vessel speed to 10 knots or less when mother/calf pairs or large assemblages of manatees are observed near an underway vessel, when safety permits.
5. Members of the vessel crew would be encouraged to undergo fisheries training for observing mammals. Topics covered in the training course might include reporting procedures, collision emergency procedures, and marine mammal presence detection using a reference guide specific to the GOM species of marine mammals.
6. During installation and decommissioning, lookouts are required to scan for surfacing mammals and report sightings to the captain, who would notify the Environmental Coordinator.

7. Offshore construction activities would be temporarily terminated if manatees were observed in the area and there is the potential for harm of an individual. The Environmental Coordinator would be called in to determine the appropriate course of action.
8. During construction of the facility, an Environmental Coordinator would be on site and would be responsible for communicating with NOAA Fisheries Service and USFWS/FWC personnel, as appropriate.
9. If a collision seems likely, emergency collision procedures would be followed.
10. Vessel crews must report sightings of any injured, entangled, or dead protected species immediately, regardless of whether the injury or death is caused by your vessel. For marine mammals, notify the NMFS Southeast U.S. Marine Mammal Stranding Network Hotline telephone number: 877-433-8299. For sea turtles, notify the NMFS Southeast Regional Office at: 727-824-5312. Also notify the FWC Wildlife Alert hotline: 888-404-3922.

Whale Vessel Strikes

1. Vessel operators and crews must maintain a vigilant watch for marine mammals and slow down or stop their vessels to avoid striking sighted protected species.
2. When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel.
3. When small cetaceans are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible.
4. When cetaceans are sighted while a vessel is underway, attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.
5. Reduce vessel speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface can indicate the presence of submerged animals in the vicinity of the vessel; therefore, prudent precautionary measures should always be exercised.
6. Whales can surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.
7. If a whale is within 100 yards of a construction or support vessel underway, all operations would cease until it is greater than 91 m (300 feet) from vessel. If the whale is within 91 m (300 feet) of an active construction or support vessel underway, it would be observed and the vessel would proceed with caution, following the guidelines below:
   - Resume vessel at slow speeds.
   - Stay on parallel course with whale, following behind, or next to, at an equal or lesser speed.
   - Do not cross path of whale.
   - Do not attempt to steer or direct whale away.
   - If a whale exhibits evasive or defensive behavior, stop the vessel until the whale has left the immediate area.
   - Do not allow the vessel to come between a mother and her calf.

8. Practical speeds would be maintained to the extent possible. Guidelines for speeds include the following:
   - No wake/idle speeds where the draft of the vessel provides less than a 4-foot clearance from the bottom. All vessels would follow routes of deep water whenever possible.
   - All construction vessels transiting to and from the Port from shore would not exceed 10 knots, during regular operations as most collisions causing lethal or severe injuries involve vessels moving at 10 knots or faster.
   - Avoid sudden changes in speed and direction.
   - Speeds during installation would be well under 10 knots; vessel could be stationary during certain phases of installation.
   - Higher speeds would only be used if safety reasons warrant.
9. Members of the vessel crew would be encouraged to undergo fisheries training prior to activity. Topics in the training course include reporting procedures, collision emergency procedures, and marine mammal presence detection (surfacing near wake).
10. During installation and decommissioning, lookouts would be required to scan for surfacing mammals and report sightings to the captain, who would notify the Environmental Coordinator.
11. Offshore construction activities would be temporarily terminated if whales or dolphins were observed in the area and there is the potential for harm of an individual. The Environmental Coordinator would be called in to determine the appropriate course of action.
12. During construction of the facility, an Environmental Coordinator would be on site and be responsible for communicating with NOAA Fisheries Service and USFWS/FWC personnel, as appropriate.
13. If a collision seems likely, emergency collision procedures would be followed.
14. Vessel crews must report sightings of any injured, entangled, or dead protected species immediately, regardless of whether the injury or death is caused by your vessel. For marine mammals, notify the NMFS Southeast U.S. Marine Mammal Stranding Network Hotline telephone number: 877-433-8299. For sea turtles, notify the NMFS Southeast Regional Office at: 727-824-5312. Also notify the FWC Wildlife Alert hotline: 888-404-3922.

Marine Mammal Acoustic Disturbances

Marine Mammal Acoustic Disturbance Mitigation Measures:

1. Anchors for the unloading buoys would be driven piles, which would occur over an approximately 2-week period. The use of enclosures and mufflers on equipment would be a viable option.
2. Vessel crew and contractors would be requested to use equipment and procedures that minimize noise. The use of enclosures and mufflers on equipment would be a viable option, as well as minimizing the use of thrusters.
3. All vessel crew members and contractors would be requested to "ramp-up" (also known as "soft start" or "slow build up"), which entails the gradual increase in intensity of a sound source. "Soft start" is a practiced mitigation measure used during pile driving (see recent NEPA documents and take permit authorizations) (MMS 2008, NMFS 2008) and seismic surveys (Weir and Dolman 2007, Abgrall et al. 2008). The intent of ramp-up is to either avoid or reduce the

potential for instantaneous hearing damage to an animal (from the sudden initiation of an acoustic source at full power) that might be located in close proximity. Increasing sound levels are designed to warn animals of pending operations, and to allow sufficient time for those animals to leave the immediate area.

4. To minimize excessive noise, engines on all equipment and vessels would be maintained in accordance with manufacturer's recommendations.

5. Sound-muffling devices or engine covers would be used where appropriate and engines and equipment would be turned off when not active during construction activities.

Marine Mammal Entanglement

Marine Mammal Entanglement Mitigation Measures to Prevent Entanglement in Anchor Lines or other Lines used in Project Area:

1. Any lines or other equipment that have the potential to become a source of entanglement for marine mammals would only be deployed as long as necessary to complete the construction or decommissioning task and would then be removed from the site.

2. Any lines or other equipment that have the potential to become a source of entanglement for marine mammals would be kept as taut as possible to prevent entanglement; however, a certain amount of slack is necessary to account for currents, tides, and other factors.

3. In the unlikely event that entanglement appears likely, the operator would remove the source as quickly as possible or take in the slack.

4. If temporary buoys need to be placed, materials such as heavy chains or cables would be used instead of material that could enable entanglement.

5. In the unlikely event a mammal becomes entangled, notify the NMFS Protected Resources or Sustainable Fisheries Division, Southeast Regional Office: 727-824-5312 or 727-824-5305, the FWC Wildlife Alert hotline: 888-404-3922, and the local authorized sea turtle stranding/rescue organization.

Marine Mammal Entanglement Mitigation Measures to Prevent Entanglement in or Ingestion of Marine Debris:

1. All vessel crew members and contractors would be responsible for ensuring that no debris would inadvertently enter the water, thus reducing the chance of entanglement and eliminating pollution to marine habitats.

2. Training courses on preventing marine debris would be provided for personnel working on the project. Methods for preventing accidental debris in the water include securing all materials, disposing of materials, and methods for recovering lost debris overboard. Training course material would be modeled by those developed by the Offshore Operators Committee.

3. Regulations state that no food or garbage would be discharged; all waste would be offloaded onshore for proper disposal.

4. No wildlife would be fed or attracted to the vessel, and no fishing would be allowed.

Sea Turtle and Smalltooth Sawfish Vessel Strikes

Sea Turtle and Smalltooth Sawfish Vessel Strike Mitigation Measures for active installation/ decommissioning vessel operations:

1. All personnel associated with the project shall be advised of the potential presence of sea turtles and smalltooth sawfish and the need to avoid collisions,
2. All vessel crew members and contractors would participate in a fisheries training for sea turtle and smalltooth sawfish presence and emergency procedures in the unlikely event a sea turtle or smalltooth sawfish is struck by a vessel.
3. All construction personnel are responsible for observing water-related activities for the presence of these species.
4. All construction personnel shall be advised that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the ESA.
5. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include the following:
   - Operation of any moving equipment closer than 15 m (50 feet) to a sea turtle or smalltooth sawfish shall cease.
   - Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 15-m (50-foot) radius of the equipment.
   - Activities may not resume until the protected species has departed the Project area of its own volition.
6. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a 4-foot clearance from the bottom. All vessels would preferentially follow deepwater routes (e.g., marked channels) whenever possible.
7. Lighting would be downshielded to prevent unnecessary upward illumination while illuminating the vessel decks only. Lights would not illuminate surrounding waters.
8. Lighting used during all operational activities would be regulated according to USCG requirements, without using excessive wattage or quality of lights.
9. Once an operational activity is completed, all lights used only for that activity would be extinguished.
10. During installation and decommissioning, lookouts are required to scan for surfacing turtles and report sightings to the captain, who would notify the Environmental Coordinator.
11. During construction of the facility, an Environmental Coordinator would be on site.
12. Any collision with or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the NMFS Protected Resources or Sustainable Fisheries Division, Southeast Regional Office: 727-824-5312 or 727-824-5305, the FWC Wildlife Alert hotline: 888-404-3922, and the local authorized sea turtle stranding/rescue organization.

Sea Turtle and Smalltooth Sawfish Entanglement

Sea Turtle and Smalltooth Sawfish Entanglement Mitigation Measures to Prevent Entanglement in Anchor Lines, other Lines used, or siltation barriers in Project Area:

1. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment.
2. Siltation barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the NMFS's Protected Resources Division, St. Petersburg, Florida.
3. Any lines or other equipment that have the potential to become a source of entanglement for sea turtles or smalltooth sawfish would only be deployed as long as necessary to complete the task and would then be removed from the site.
4. Any lines or other equipment that have the potential to become a source of entanglement for sea turtles or smalltooth sawfish would be kept as taut as possible to prevent entanglement; however, a certain amount of slack is necessary to account for currents, tides, and other factors.
5. If entanglement appears likely, the operator would remove the source as quickly as possible or take in the slack.
6. If temporary buoys need to be placed, materials such as heavy chains or cables would be used instead of void material that could enable entanglement.
7. Lines with mandated modifications, such as knotless and nonfloating material, would be used on construction vessels.
8. Any collision with or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the NMFS's Protected Resources Division (727-824- 5312), the FWC Law Enforcement (1-850-488-6251), and the local authorized sea turtle or smalltooth sawfish stranding/rescue organization, as appropriate.

Sea Turtle Entanglement Mitigation Measures to Prevent Entanglement in or Ingestion of Marine Debris:

1. All vessel crew members and contractors would be responsible for ensuring that no debris would inadvertently enter the water, thus reducing the chance of entanglement and eliminating pollution to marine habitats.
2. Training courses on preventing marine debris would be provided for personnel working on the project. Methods for preventing accidental debris in the water include securing all materials, disposing of materials, and recovering lost debris overboard. Training course material would be modeled by those developed by the Offshore Operators Committee.
3. Regulations state that no food or garbage would be discharged; all waste would be offloaded onshore for proper disposal.
4. No wildlife would be fed or attracted to the vessel and no fishing would be allowed.

Pelagic Bird Impacts

Pelagic Bird Impact Mitigation Measures: The following restrictions would be mandated on all vessels, except when USCG regulations or safety precautions supersede them:

1. Lighting used during all activities would be installed and utilized in accordance with NMFS and USFWS guidelines without using excessive wattage or quantity of lights to complete the activity.
2. Lighting would be downshielded to prevent unnecessary upward illumination, while directing the light to decks as needed.

3. Lighting would be turned off when not being used.
4. Plan vessel routes to avoid sensitive receptors (e.g., bird colonies) to the extent feasible.
5. Limit the number of vessel trips by using full-capacity crew boats as much as possible.
6. If a pelagic bird is injured, immediately notify the USFWS Division of Migratory Birds, Southeast Regional Division office (404-679-7189).

Benthic Habitat Impacts

1. Anchor locations were optimized to minimize impacts on benthic habitat. See discussion in **Section 4.2.1.6**.
2. Additional geophysical surveys have been performed in water depths of 14 to 20 m (45 to 65 feet) to look for reef gap. Unable to locate any for 3 NM north or 3 NM south of surveyed corridor.
3. Minimize duration of construction by using BMPs for installation.
4. Identify avoidance zones of critical habitat areas for placement of installation barge anchors.
5. Midline buoys would be utilized to the extent practicable on anchor chains to reduce the amount of anchor chain sweep.
6. During installation operations, vessel sizes would be selected to provide vessels adequate to perform the work, but minimized to reduce the number and type of anchors, where possible.
7. During detailed design, an anchoring plan would be developed that would provide procedures for anchor deployment to minimize impacts on hard- and live-bottom habitat.
8. A Mitigation Plan to compensate for unavoidable impacts on hard bottom would be developed during the permitting process.

Pelagic Habitat Impacts

1. The SRVs are closed systems, requiring no intake of water for heating LNG. However, a minimal amount of intake water would be required to cool generators. Discharge would be no greater than 10 °C above ambient temperature.
2. Thermal discharge of SRV cooling water meets USEPA criterion of less than or equal to 1.8 °F (1 °C) above ambient at edge of 100-m (328-foot) mixing zone.
3. No discharges would be made from the SRVs (i.e., bilge water, sanitary wastes, and grey water).
4. Desalination freshwater-generation systems would be turned off while vessels are moored, therefore no chlorine or hypersaline wastewater would be discharged.
5. Spill response plan and emergency response plans would be implemented.
6. The SRVs would include secondary containment around hydrocarbon-containing equipment and systems.
7. Utilization of BTA, a closed-loop system, would significantly reduce the loss of marine organisms. The innovative engineering design has resulted in operational aspects of the terminal that would provide for significant reductions of daily intake volumes compared to other conventional regasification processes presently proposed throughout the United States.

8. An intake rate of 9.5 MGD of seawater for engine-cooling purposes would substantially reduce the potential for entrainment of plankton individuals compared to open-loop vaporization systems, which can use five times more volume.
9. Limit seawater intake velocity to less than 0.15 m/s (0.5 feet/s) to ensure that older larval stages and juveniles would be able to avoid impingement or entrainment.
10. Use of pipeline plow to bury the pipeline to the extent practicable to reduce turbidity.
11. Vessels would have secondary containment around hydrocarbon-containing equipment and systems as practicable.
12. During the regasification operations, the vessel would not discharge any ballast water.
13. Spill response plan and emergency response plans would be implemented.
14. Vessels would be in compliance with MARPOL Annex I and Annex IV and USCG regulations.

Cultural Resources Impacts

1. All components would be placed to avoid potential significant targets by having a minimum of a 200-foot clearance.
2. All anchor chains would be located to avoid potential significant targets by having a minimum of a 200-foot clearance.
3. In the event of unanticipated discovery of cultural resources, Port Dolphin would follow an unanticipated discoveries plan, including stopping work as appropriate and notifying appropriate authorities.

Air Quality and Noise Impacts

1. Maintain engines on all equipment and vessels in accordance with recommended manufacturer operation and maintenance procedures.
2. Turn off machinery when not in use.
3. Construction equipment would be operated according to manufacturers' specifications to minimize noise effects, including proper use and operation of any sound-muffling devices or engine covers.
4. Change out of crews and delivery of supplies would follow normal vessel routes that avoid sensitive receptors. The number of trips would be limited by using full-capacity crew boats to the maximum extent possible.
5. The design of the project and operations meets USEPA's BACT requirements and complies with NAAQs.
6. Mufflers and shielding would be used where feasible.

Terrestrial Pipeline and Facilities Impacts

1. Use of HDD method under mangroves to avoid impacts.
2. Development of contingency plan for potential loss of drilling fluids.
3. Use of Environmental Coordinator onsite during installation of pipeline.
4. Implementation of project-specific Wetland and Waterbody Construction and Mitigation Plan.

5. Restoration of wetlands after construction, and replacement of in-kind wetlands in critical habitat areas.
6. Utilize BMPs and FERC's Upland Erosion Control, Revegetation and Maintenance Plan.
7. Use of existing ROWs, and minimize size of ROWs.
8. Use of areas at Port Manatee previously used for similar activities.
9. Regrade areas and revegetate.

Safety and Security Impacts

Potential security and safety impacts are minimized through vessel design criteria, which require certain safety and security features, including the following:

- Leak detection systems
- Double hull construction
- Tank construction and testing requirements
- Cargo tank instrumentation
- Structural analysis
- Isolation, construction, and testing requirements for piping and pressure vessels
- Emergency shutdown systems
- Pressure venting systems
- Vacuum protection systems
- Fire detection, prevention, and response systems.

Potential security and safety impacts also are minimized through operational procedures, including the following:

- Navigation procedures
- Spill response procedures
- Emergency response procedures
- Personnel training requirements
- Weather forecasting and information dissemination procedures
- Procedures and manning requirements for major evolutions
- Maintenance and service procedures
- Occupational, health, and safety training procedures
- Environmental monitoring programs
- Speed limits and operating hours
- Clearing procedures.

Potential security and safety impacts also are minimized through the imposition of restricted areas, such as the following:

- Safety Zone
- No Anchor (Precautionary) Zone
- Area to Be Avoided.

4.11.2 The Maritime Administration/USCG-Recommended Mitigation Measures

If issued, the Deepwater Port License would contain conditions requiring development and implementation of appropriate mitigation and monitoring measures. USCG would recommend the following measures for inclusion in the mitigation and monitoring plans, should a license be granted:

- Aboveground facilities adjacent to the ROW would be fenced and screened by existing and planted shrubs and trees to improve aesthetics.
- Fuel combustion sources would result in emissions of NO_x and CO, and, to a lesser extent, emissions of VOCs, SO_2, and particulate matter. During the vaporization process, the boilers would be fired by natural gas only. The boilers would be equipped with low NO_x burners and SCR to minimize emissions of NO_x, CO, and VOCs. Emissions of SO_2 and particulate matter from natural gas combustion would be minimal compared to the combustion of other fossil fuels because of the negligible sulfur and noncombustible content in natural gas. Potential annual emissions would be limited by a fuel use restriction.
- The power generation engines would supply electrical power for the vaporization process. Potential emissions are based on use of natural gas (greater than 99 percent) with a small amount (less than 1 percent) of diesel pilot fuel and an SCR and oxidation catalyst to control NO_x and CO/VOC emissions. SO_2 emissions would be limited by fuel use restrictions.
- Monitoring of the operation phase of the Port Dolphin project would focus on measuring the noise source levels of the LNGCs and the regasification process and on verifying the acoustic propagation models used to predict the sound fields generated by the project. This program would be conducted during the first year of project operation.
- The Maritime Administration agrees that mitigation and monitoring of egg, fish, and crustacean mortality should be required to demonstrate impacts consistent with those analyzed in the EIS. Further details of this effort, including the duration of monitoring, would be developed in coordination with NOAA and USEPA as part of a detailed monitoring and mitigation plan being developed by the Maritime Administration. Onsite sampling for ichthyoplankton, lobster, and shrimp densities should include 3 years of data prior to the start of operations. If a license is issued, Port Dolphin Energy LLC would be required to conduct site-specific, year-round surveying to collect data on existing fish and invertebrate ichthyoplankton populations. Data collection shall begin as soon as a license is issued, and continue for a minimum of 3 years. Furthermore, one year of data collection must be completed prior to the start of operations. Surveying shall be developed and coordinated with state and Federal natural resources agencies. If ichthyoplankton densities exceed levels specified in the monitoring plan, adaptive management of impacts would be required.
- If any roadways are damaged during onshore construction activities, such as using the slick bore method for installing pipeline under roadways, then the damaged roadway would be repaired to the preconstruction state.

4.11.3 FERC Recommended Mitigation and Monitoring Measures

If the FERC Commission authorizes the onshore pipeline portion of the Port Dolphin project, the FERC staff recommends that the following measures be included as specific conditions in the Commission's Order (Order). The FERC staff believes that these measures would further mitigate the environmental impacts associated with the construction and operation of the proposed Project. Mitigation measures

1 through 9 are standard conditions typically recommended by the FERC staff for pipeline projects. FERC staff recommendations 10 through 13 are project-specific.

1. Port Dolphin shall follow the construction procedures and mitigation measures described in its application and supplements (including responses to data requests) and as identified in the EIS, unless modified by the Order. Port Dolphin must do the following:
   a. Request any modification to these procedures, measures, or conditions in a filing with the Secretary of the Commission (Secretary)
   b. Justify each modification relative to site-specific conditions
   c. Explain how that modification provides an equal or greater level of environmental protection than the original measure
   d. Receive approval in writing from the FERC Director of the Office of Energy Projects (OEP) before using that modification.
2. The Director of OEP has delegated authority to take whatever steps are necessary to ensure the protection of all environmental resources during construction and operation of the project. This authority shall allow the following:
   a. The modification of conditions of the Order
   b. The design and implementation of any additional measures deemed necessary (including stop work authority) to ensure continued compliance with the intent of the environmental conditions, as well as the avoidance or mitigation of adverse environmental impacts resulting from project construction and operation.
3. Prior to any construction, Port Dolphin shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, environmental inspectors (EIs), and contractor personnel will be informed of the EI's authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs before becoming involved with construction and restoration activities.
4. The authorized facility locations shall be as shown in the EIS and as supplemented by filed alignment sheets. **As soon as they are available, and before the start of construction**, Port Dolphin shall file with the Secretary any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

   Port Dolphin's exercise of eminent domain authority granted under NGA section 7(h) in any condemnation proceedings related to the Order must be consistent with these authorized facilities and locations. Port Dolphin's right of eminent domain granted under NGA section 7(h) does not authorize it to increase the size of its natural gas pipeline to accommodate future needs or to acquire a ROW for a pipeline to transport a commodity other than natural gas.
5. Port Dolphin shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, pipe storage yards, and other areas that would be used or disturbed and have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, and documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be

clearly identified on the maps, sheets, and aerial photographs. Each area must be approved in writing by the Director of OEP **before construction in or near that area**.

This requirement does not apply to extra workspace allowed by the *Upland Erosion Control, Revegetation, and Maintenance Plan,* minor field realignments per landowner needs, and requirements which do not affect other landowners or sensitive environmental areas such as wetlands. Examples of alterations requiring approval include all route realignments and facility location changes resulting from the following:

a. Implementation of cultural resources mitigation measures

b. Implementation of endangered, threatened, or special concern species mitigation measures

c. Recommendations by state regulatory authorities

d. Agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

6. **Within 60 days of the acceptance of this certificate and before the start of construction**, Port Dolphin shall file an initial Implementation Plan with the Secretary for review and written approval by the Director of OEP. Port Dolphin must file revisions to the plan as schedules change. The plan shall identify the following:

   a. How Port Dolphin will implement the construction procedures and mitigation measures described in its application and supplements (including responses to data requests), those identified in the EIS, and those required by the Order

   b. How Port Dolphin will incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to onsite construction and inspection personnel

   c. The number of EIs assigned per spread, and how the company will ensure that sufficient personnel are available to implement the environmental mitigation

   d. Company personnel, including EIs and contractors, who will receive copies of the appropriate material

   e. The training and instructions Port Dolphin will give to all personnel involved with construction and restoration (initial and refresher training as the project progresses and personnel change), with the opportunity for OEP staff to participate in the training session(s)

   f. The company personnel (if known) and specific portion of Port Dolphin's organization having responsibility for compliance

   g. The procedures (including use of contract penalties) Port Dolphin will follow if noncompliance occurs

   h. For each discrete facility, a Gantt or PERT chart (or similar project-scheduling diagram), and dates for

      i. the completion of all required surveys and reports

      ii. the mitigation training of onsite personnel

      iii. the start of construction

      iv. the start and completion of restoration.

7. Port Dolphin shall employ at least one EI per construction spread. The EI shall be:

a. Responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or other authorizing documents

b. Responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 5 above) and any other authorizing document

c. Empowered to order correction of acts that violate the environmental conditions of the Order, and any other authorizing document

d. A full-time position, separate from all other activity inspectors

e. Responsible for documenting compliance with the environmental conditions of the Order, as well as any environmental conditions/permit requirements imposed by other Federal, state, or local agencies

f. Responsible for maintaining status reports.

8. Port Dolphin shall file updated status reports with the Secretary, prepared by the EI on a biweekly basis until all construction and restoration activities are complete. On request, these status reports will also be provided to other Federal and state agencies with permitting responsibilities. Status reports shall include the following:

   a. The current construction status of the project, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally sensitive areas

   b. A listing of all problems encountered and each instance of noncompliance observed by the EIs during the reporting period (both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other Federal, state, or local agencies)

   c. Corrective actions implemented in response to all instances of noncompliance, and their cost

   d. The effectiveness of all corrective actions implemented

   e. A description of any landowner/resident complaints which might relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns

   f. Copies of any correspondence received by Port Dolphin from other Federal, state, or local permitting agencies concerning instances of noncompliance.

9. Port Dolphin must receive written authorization from the Director of OEP **before commencing service of the project**. Such authorization will only be granted following a determination that rehabilitation and restoration of the ROW and other areas affected by the project are proceeding satisfactorily.

10. Port Dolphin shall not begin construction of the onshore portion of the project until it has filed documentation that all Section 7 consultations with the USFWS regarding the onshore portion of the project have been completed and Port Dolphin has received written notification from the Director of OEP that construction or use of mitigation may begin.

11. Prior to the start of construction, Port Dolphin shall file for each HDD location the following: (a) the estimated number of days of drilling required for each location, and whether drilling would be done 24 hours per day; and (b) a description of any noise mitigation which would be implemented during drilling activity to reduce noise impacts at the NSAs below 55 dBA L_{dn}, or 10 dBA over background if ambient levels are above 55 dBA L_{dn}.

12. Port Dolphin shall not begin construction and use of the onshore facilities and staging, storage, and temporary work areas until Port Dolphin consults the Florida SHPO regarding the need for survey of any newly identified pullouts, staging areas, extra workspaces, and pipe and contractor yards; files the SHPO's comments, any required survey report(s), and the SHPO's comments on the reports. All material filed with the Commission containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering as follows: **"CONTAINS PRIVILEGED INFORMATION--DO NOT RELEASE."**

4.11.4 NOAA/NMFS Recommended Mitigation and Monitoring Measures

In a scoping letter dated August 9, 2007, NMFS expressed concerns that the entrainment of marine organisms could affect the sustainability of marine and estuarine fisheries (see **Appendix C**). NMFS recommended that mitigative measures be developed and proposed to ensure that unavoided entrainment impacts are fully offset. The mitigation plan should be linked to a plan for adaptive management of the deepwater Port to identify and require operational or mechanical modifications to minimize adverse fishery impacts.

The NOAA/NMFS Southeast Region Habitat Conservation Division has developed the *Southeast Regional LNG Monitoring Plan Considerations* (Plan Considerations) (see **Appendix C**) for LNG terminal construction and operation in the GOM. Although the Plan Considerations were developed for open-loop regasification systems, two of the considerations (Questions 6 and 7 are represented as A and B) are applicable to the proposed Project.

A. LNG facilities must transport the regasified product to market through pipelines. These pipelines begin at the terminal and can tie-in with other natural gas pipelines located either offshore or onshore. Often, these pipelines are proposed to be considered on productive water bottoms or through wetlands, both of which could be designated as EFH supportive of marine fishery resources. If a pipeline impacts EFH, the NMFS recommends the habitat be restored after the pipeline has been constructed. Alternatively, NMFS might recommend a different pipeline route that would avoid or minimize impacts on EFH.

   Monitoring of the pipeline ROW is necessary to document pre-construction conditions as well as the level of successful restoration and the need for remedial actions. The following constitutes typical monitoring recommendations associated with the installation of pipelines in areas classified as EFH.

   1. The license should conduct a pre-construction survey of the pipeline ROW and all work areas to document pre-project conditions. The survey should include a GIS analysis using recent aerial photographs of the Project area with the pipeline ROW superimposed on the photograph and identify all habitat types using Cowardin codes (Cowardin et al. 1979) or other accepted measures. The survey also should identify elevations of all wetland areas crossed and include a description of major wetland vegetative communities, including seagrass beds. Where shell reefs could be impacted, the survey should document the geographic extent and productivity of those shell reefs.

   2. Ground photographs of those portions of the pipeline ROW which cross marsh should be taken prior to construction and immediately after construction. The photographs should be taken at 500-foot intervals from the center of the ROW with two photographs being taken at each location, one in each direction. GPS should be used during photography such that pre- and post-construction could be taken from the same locations.

3. Following one growing season after construction, the license should undertake a post-construction survey similar to that taken prior to construction. The intent of the post-construction survey is to identify areas where pre-construction contours were not successfully restored or where vegetative or shell reef communities did not become reestablished.
4. All monitoring information should be provided to the NMFS within 3 months of its development.

B. Reporting the Monitoring Result

1. Monitoring methodologies, sample locations, monitoring results and analysis, and any resulting recommendations for change of facility operations or monitoring protocols are to be prepared and submitted to the Federal licensing agency and the NMFS annually.
2. Annual reports are to be submitted by March 30 and would encompass the previous calendar year (or portion of a year if monitoring was not conducted for an entire 12-month period).

In a letter dated May 29, 2008, the Southeast Regional Office requested that the measures such as press in piles or pile sleeves be considered to reduce the noise impacts associated with pile driving.

NOAA/NMFS recommends that the Applicant develop a mitigation plan to compensate for unavoidable impacts on hard-bottom estuarine and marine habitats. The mitigation plan should include the following elements: (1) conceptual description of the overall mitigation plan; (2) quantification of anticipated hard-/live- bottom impact acreage versus proposed mitigation acreage and justification for the proposed mitigation acreage; (3) scientific criteria for determining mitigation success; (4) a project and mitigation implementation schedule; (5) targeted hard-/live- bottom climax communities expected in mitigation area(s), including their acreage and configurations; (6) materials and methods to be used to achieve the intended mitigation; (7) comprehensive 5-year monitoring and reporting schedules; and (8) contingency plans by which equivalent mitigation would be completed if the proposed mitigation fails.

During the Section 7 Endangered Species Act consultation process, NMFS submitted the following BMPs or harm avoidance measures for protected species to the USCG and MARAD. The following BMPs were considered for their effectiveness at reducing the potential for adverse effects on protected species (threatened and endangered species, and marine mammals). These measures are required to be implemented by Port Dolphin to avoid harm to ESA-listed species, as well as marine mammals protected under the MMPA, associated with the construction, operation, and decommissioning of the Port Dolphin Deepwater Port.

A. Pile-Driving Conditions

The following measures shall be required during any pile-driving activity associated with Port Dolphin.

1. All project personnel and contractor personnel shall be advised that there are civil and criminal penalties for harming or harassing protected species. Informational materials regarding protected species identification shall be provided to Project personnel.
2. For impact hammers, the power of the hammer shall be reduced to minimum energy levels required to drive a pile; thus, reducing the amount of noise produced in the marine environment. Additional measures shall be considered, when feasible, such as bubble curtains, Micarta© pile caps, and pile-driving sleeves.
3. A 250-m zone of influence (ZOI) shall be established around a pile to be monitored (a 200-m radius to the 160-dB isopleths and an additional 50-m watch zone). The Environmental Coordinator (EC) or at least one person designated as a Protected Species Observer (PSO) by the

EC shall monitor the 250-m ZOI to prevent or minimize potential adverse impacts on protected species.

4. Each PSO used shall be instructed in surveying for protected species, data recording, and be familiar with species that might occur in the area. A viewing platform, such as the highest point on a barge that has an unobstructed view in all directions, should be used to conduct effective observations. Each PSO shall be provided with the equipment necessary to conduct effective observations (e.g., a two-way radio dedicated to protected species communication, ear protection, polarized sunglasses, binoculars, and any necessary data recording equipment that might be required).

5. The 250-m ZOI around a pile shall be observed for protected species prior to beginning any pile driving. PSOs to protected species observations shall be used to visually monitor the impact zone for at least 45 minutes prior to beginning all pile-driving activities (each time a hammer is started).

6. Each time a pile-driving hammer is started, "dry firing" or "ramping up" of the hammer shall be conducted for at least 15 minutes to allow animals the opportunity to leave the area. Dry firing of a pile-driving hammer is a method of raising and dropping the hammer with no compression of the pistons, producing a lower-intensity sound than the full power of the hammer. Ramping up involves slowly increasing the power of the hammer and noise produced over the ramp-up period (and bubble curtains turned on if used).

7. The 45-minute observation period may occur during dry firing and ramping up of the pile-driving hammer (i.e., observations may begin 30 minutes prior to dry firing or ramp-up). Pile driving shall be stopped if any protected species are sighted within the 250-m impact zone, or a protected species is observed moving toward the ZOI. Pile driving shall not restart until the animal is confirmed to be outside of the impact zone. If at any time a protected species is observed in the safety zone during dry firing or ramp-up, the hammer shall be shut down until the animal has left the safety zone of its own volition; ramp-up procedures shall then be repeated.

8. Pile driving is expected to last at least 2 weeks. For pile-driving activities, the designated PSO shall intermittently scan the ZOI to watch for animals in the area (and to ensure bubble curtains are functioning properly if they are used). Any time an animal is observed in the impact zone during pile driving, all activities shall stop and the animal continually observed until it has left the area of its own volition.

9. Pile driving may continue into nighttime hours only if ramp-up/dry-firing protocols and visual clearing of the impact are conducted during daylight hours and bubble curtains are utilized.

10. Records shall be maintained of all protected species sightings in the area, including date and time, weather conditions, species identification, approximate distance from the pile, direction and heading in relation to the pile driving, and behavioral observations. When animals are observed in the impact zone, additional information and corrective actions taken such as a shutdown of the pile driver, duration of the shutdown, behavior of the animal, and time spent in the safety zone will be recorded. The PSOs shall also identify and record large schools of fish, marine mammals, *Sargassum*, jellyfish aggregations, or other indicators of biologically productive areas. Data shall be recorded on the types of piles driven (material construction, diameter and length of pile, wall thickness), the type and power of the hammer used, the number of cold starts, strikes per minute, and the duration of the pile-driving activities.

11. If a take of a listed species occurs, reinitiation of consultation is required. If a take of a listed species occurs from pile-driving activities, a report of the incident must be submitted by email to NMFS' Protected Resources Division at takereport.nmfsser@noaa.gov.

Please report all other dead or injured protected species to your local stranding network contacts. A list of sea turtle stranding responders is available at http://www.sefsc.noaa.gov/seaturtleSTSSN.jsp. A list of marine mammal stranding network responders for each state is available at http://www.nmfs.noaa.gov/pr/health/networks.htm or can be reported to the marine mammal stranding hotline at 877-433-8299.

All other dead or injured protected species incidents shall be reported to NMFS' Southeast Regional Office by telephone at 727-824-5312, or by fax at 727-824-5309.

B. Noise-Monitoring Study

Port Dolphin shall monitor noise levels during construction and operation of the LNG terminal to address uncertainties in the estimated noise levels, document propagation characteristics, and verify the impact zones estimated in the EIS. A noise-monitoring plan shall be submitted for review to NMFS, USCG, and MARAD for review prior to the start of pile-driving activities. A noise-monitoring report shall be submitted to NMFS, USCG, and MARAD detailing methods, noise levels measured during construction and operation of the terminal, verification of the noise levels predicted from construction and operation activities, and effectiveness of the noise-reduction methodologies utilized during construction. NMFS is available to assist with the development of the noise-monitoring plan and data collection protocols.

C. Construction Conditions

1. During construction of the facility, the EC must be on site.
2. Port Dolphin shall instruct all personnel associated with the project of the potential presence of protected species. Personnel associated with the project shall undergo a briefing of the potential presence of protected species in the project area and harm avoidance and any other mitigation requirements. All construction personnel are responsible for observing water-related activities for the presence of these species.
3. Personnel shall be informed that there are civil and criminal penalties for harming, harassing, or killing sea turtles and smalltooth sawfish protected under the ESA. The responsible party shall be held accountable for any protected species harmed, harassed, or killed as a result of construction activities.
4. During construction, lookouts are required to scan for protected species and report sightings to the EC.
5. If a protected species is seen within 100 yards of marine construction activities, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment within 100 yards of a protected species. Activities may not resume until the animal has departed the project area of its own volition.
6. In order to avoid causing injury or disturbance to protected species during activities associated with construction of the Port Dolphin, construction and support vessels shall follow the NMFS Vessel Strike Avoidance Measures and Reporting for Mariners (see below) during construction activities and when in transit between the terminal location and shore.
7. Use of HDD shall be used under mangroves to avoid impacts.
8. All vessel crew members and contractors shall participate in a fisheries training for protected species presence and emergency procedures in the unlikely event a protected species is struck by a vessel.
9. All construction personnel are responsible for observing water-related activities for the presence of protected species.

10. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a 4-foot clearance from the bottom. All vessels would preferentially follow deepwater routes (e.g., marked channels) whenever possible.
11. Lighting will be downshielded to prevent unnecessary upward illumination, while only illuminating the vessel decks. Lights will not illuminate surrounding waters. Lighting used during all operational activities would be regulated according to USCG requirements, without using excessive wattage or quantity of lights. Once an operational activity is completed, all lights used only for that activity would be extinguished.
12. If a dead or injured protected species is observed and is unrelated to the project, it will be reported, as requested, to the local stranding network contacts. The appropriate contact will be selected from either the current list of sea turtle stranding responders available at http://www.sefsc.noaa.gov/seaturtleSTSSN.jsp or the list of marine mammal stranding network responders available at http://www.nmfs.noaa.gov/pr/health/networks.htm. All other observed dead or injured protected species must be reported to the NMFS Southeast Regional Office by telephone at 727-824-5312 or by fax at 727-824-5309, or by email at takereport.nmfsser@noaa.gov if the death or injury was the result of Port Dolphin activities.

D. Vessel Strike Avoidance Measures and Reporting for Mariners

The NMFS has determined that collisions with vessels can injure or kill protected species (e.g., endangered and threatened species, and marine mammals). The following standard measures should be implemented to reduce to discountable levels the risk associated with vessel strikes or disturbance of these protected species. NMFS should be contacted to identify any additional conservation and recovery issues of concern, and to assist in the development of measures that might be necessary.

Protected Species Identification Training. Vessel crews should use an Atlantic and GOM reference guide that helps identify protected species that might be encountered in U.S. waters of the Atlantic Ocean, including the Caribbean Sea, and GOM. Additional training should be provided regarding information and resources available about Federal laws and regulations for protected species, ship strike information, critical habitat, migratory routes and seasonal abundance, and recent sightings of protected species.

Vessel Strike Avoidance. In order to avoid causing injury or death to marine mammals and sea turtles the following measures should be taken when consistent with safe navigation:

1. Vessel operators and crews shall maintain a vigilant watch for marine mammals and sea turtles to avoid striking sighted protected species.
2. When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel.
3. When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible.
4. When small cetaceans are sighted while a vessel is underway (e.g., bow-riding), attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.
5. Reduce vessel speed to 10 knots or less when mother/calf pairs, groups, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface could indicate the presence of submerged animals in the vicinity; therefore, prudent

precautionary measures should always be exercised. The vessel shall attempt to route around the animals, maintaining a minimum distance of 100 yards whenever possible.

6. Whales might surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel, and when safety permits, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.

E. Additional Requirements for the North Atlantic Right Whale

1. If a sighted whale is believed to be a North Atlantic right whale, Federal regulation requires a minimum distance of 500 yards be maintained from the animal (50 CFR 224.103 (c)).
2. Vessels entering North Atlantic right whale critical habitat are required to report into the Mandatory Ship Reporting System.
3. Mariners shall check with various communication media for general information regarding avoiding ship strikes and specific information regarding North Atlantic right whale sighting locations. These include NOAA weather radio, USCG NAVTEX broadcasts, and Notices to Mariners. Commercial mariners calling on United States ports should view the most recent version of the NOAA/USCG produced training CD titled "A Prudent Mariner's Guide to Right Whale Protection" (contact the NMFS Southeast Region, Protected Resources Division for more information regarding the CD).
4. Injured, dead, or entangled right whales should be immediately reported to the USCG via VHF Channel 16.

F. Injured or Dead Protected Species Reporting

Vessel crews shall report sightings of any injured or dead protected species immediately, regardless of whether the injury or death is caused by your vessel.

Report marine mammals to the Southeast U.S. Stranding Hotline: 877-433-8299

Report sea turtles to the NMFS Southeast Regional Office: 727-824-5312

If the injury or death of a marine mammal was caused by a collision with your vessel, responsible parties shall remain available to assist the respective salvage and stranding network as needed. NMFS' Southeast Regional Office shall be immediately notified of the strike by email (takereport.nmfsser@noaa.gov) using the attached vessel strike reporting form.

For additional information, please contact the Protected Resources Division at:

NOAA Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701-5505
Tel: 727-824-5312
http://sero.nmfs.noaa.gov

G. Line and Cable Conditions

The following BMPs shall be followed to prevent entanglement in any lines or cables used, or siltation barriers used, in any construction area to avoid the potential for entanglement of protected species.

1. Siltation barriers shall not be made of any materials in which a protected species can become entangled (e.g., monofilament), shall be properly secured, and shall be regularly monitored to avoid protected species entrapment.
2. Siltation barriers may not block protected species entry or exit points from habitat without prior agreement from NMFS' Protected Resources Division, St. Petersburg, Florida.
3. Any lines or other equipment that have the potential to become a source of entanglement for sea turtles or smalltooth sawfish shall only be deployed as long as necessary to complete the task and then shall be removed from the site.
4. Any lines or other equipment that have the potential to become a source of entanglement for protected species shall be kept as taut as possible to prevent entanglement; however, a certain amount of slack is necessary to account for currents, tides, and other factors.
5. If entanglement appears likely, the operator shall remove the source as quickly as possible or take in the slack.
6. If temporary buoys need to be placed, materials such as heavy chains or cables shall be used instead of void material that could enable entanglement.
7. Lines with mandated modifications, such as knotless and nonfloating material, shall be used on construction vessels.
8. Any collision with or injury to a protected species must be reported immediately to NMFS' Protected Resources Division (727-824-5312), FWC Law Enforcement (850-488-6251), and the local authorized sea turtle or marine mammal stranding/rescue organization, as appropriate.

H. Marine Debris Reduction and Elimination Conditions

1. Marine debris training consistent with MMS NTL 2007-G03 Marine Trash and Debris Awareness and Elimination (http://www.gomr.mms.gov/homepg/regulate/regs/ntls/2007NTLs/07-g03.pdf) is required for all personnel working on the project.
2. All vessel crew members and contractors are responsible for ensuring that no debris inadvertently enters the water, thus reducing the chances of entanglement and eliminating pollution to marine habitats.
3. Discharge or disposal of garbage and other solid debris from vessels shall be prohibited, consistent with MMS (30 CFR 250.300) and the USCG. Discharge of plastics shall be strictly prohibited and shall never be authorized; this includes ashes from burned plastics. All plastics shall be returned to shore and shall be tracked. No food or garbage shall be discharged; all waste shall be offloaded onshore for proper disposal.
4. No wildlife shall be fed or purposely attracted to the vessel and no fishing is allowed.
5. A waste management plan shall be developed and implemented as part of the port operations manual.

I. Water Quality Conditions

1. Trenching and burial of the gas transmission pipeline shall be performed using a pipeline plow, to the maximum extent practicable. The towed plow trenching and burial technology was selected primarily because it does not fluidize bottom sediments. Therefore, it causes minimal impacts from sediment resuspension in comparison to other more conventional trenching and burial technologies (e.g., clamshell dredging).
2. The duration of construction shall be minimized to minimize impacts on marine resources by using the most efficient and effective construction equipment and methods available.
3. Turbidity curtains or other methods to reduce turbidity shall be used for pipeline installation under the Skyway Bridge, in Outstanding Florida Waters, and during HDD.
4. Filtered seawater shall be used for the hydrotesting. An environmentally benign dye would be added to the flooding and test water. A biocide, oxygen scavengers, and a corrosion inhibitor would be added to the water; however, the water would be treated prior to discharge.
5. Hydrostatic test water for the offshore pipe will be discharged in offshore waters.
6. Fresh water for the onshore pipe will be discharged on land using industry-standard filtering procedures prior to release.
7. The gasification system on the SRVs is a closed system, requiring no intake of water for vaporizing LNG. To cool generators, 9.5 MGD of intake water will be required. Discharge will be no greater than 50 °F (10 °C) above ambient temperature.
8. Thermal discharge of SRV cooling water shall meet USEPA's criterion of less than or equal to 1.8 °F (1 °C) above ambient at the edge of the 100-m mixing zone.
9. No discharges shall be made from the SRVs (i.e., bilge water, sanitary wastes, grey water).
10. Desalination freshwater-generation systems shall be turned off while vessels are moored; therefore, no chlorine or hypersaline wastewater would be discharged.
11. On the SRVs, gutter bars shall be placed around equipment where oil leaks could occur, (e.g., mooring winches, cranes). Rain water from these utility areas shall be drained to a bilge holding tank. No rain water from the utility areas shall be discharged overboard while at the buoy.
12. During the regasification operation, the SRVs shall not discharge any ballast water.
13. Spill response plan and emergency response plans shall be implemented.
14. Vessels shall be in compliance with MARPOL Annex I, Annex IV, and USCG regulations.

4.11.5 USFWS Recommended Mitigation and Monitoring Measures

1. The service recommends that a light management plan be implemented during the construction phase of the Port Dolphin LLC liquefied natural gas deepwater port. The service requests to review this plan prior to the commencement of this project.
2. The development of an Eastern indigo snake protection/education plan for all construction personnel to follow. The plan would be provided to the USFWS for review and approval at least 30 days prior to any clearing activities. Informational signs should be posted throughout the construction site to contain the following information:
   - Description of the Eastern indigo snake, its habits, and protection under Federal Law
   - Instructions not to injure, harm, harass, or kill this species

- Directions to cease clearing activities and allow the Eastern indigo snake sufficient time to move away from the site on its own before resuming clearing
- Telephone numbers of pertinent agencies to be contacted if a dead Eastern indigo snake is encountered. The dead specimen should be thoroughly soaked in water, and then frozen.

3. If not currently authorized through an Individual Take Statement met in association with a Biological Opinion, only an individual who has been either authorized by a section 10(a) (1) (A) permit issued by the USFWS, or designated as an agent of the State of Florida by the FWC for such activities, is permitted to come in contact with or relocate an Eastern indigo snake.
4. An Eastern indigo snake monitoring report must be submitted to the appropriate Florida Field Office within 60 days of the conclusion of clearing phases. The report should be submitted whether or not Eastern indigo snakes are observed. The report should contain the following information:
   - Any sightings of Eastern indigo snakes
   - Other obligations required by the FWC, as stipulated in the permit.
5. The Service recommends the Applicant use as a minimum the *Standard Manatee Conditions for in-Water Work (2005 revision)*.

4.11.6 MMS Recommended Mitigation and Monitoring Measures

1. MMS Notice to Lessees and Operators (NTL) No. 2004-G05, *Biologically Sensitive Areas of the Gulf of Mexico*. This NTL provides and consolidates guidance for the avoidance and protection of biologically sensitive features and areas (i.e., topographic features, pinnacles, live bottoms (low-relief features), and other potentially sensitive biological features) when conducting Outer Continental Shelf (OCS) operations in water depths less than 400 meters (1,312 feet) in the GOM. This NTL supersedes and replaces NTL No. 98-12, Implementation of Consistent Biological Stipulation Measures in the Central and Western GOM, effective August 10, 1998, and NTL No. 99-G16, Live-Bottom Surveys and Reports, effective July 8, 1999. For guidance on avoiding biologically sensitive areas in water depths 400 meters (1,312 feet) or greater, refer to NTL No. 2000-G20, Deepwater Chemosynthetic Communities, effective December 6, 2000.
2. MMS NTL No. 2005-G07, *Well Records Submittal*, as well as through its other published guidelines, including NTL No. 2008-G05, *Shallow Hazards Program*. MMS has issued regulations at 30 CFR 250.194, 250(b)(15), 250.203(o), 250.204(b)(8)(v)(a), 250.204(s), and 250.1007(a)(5) that require preparation of an archeological resources report based primarily on the assessment of data obtained from the remote sensing survey. These NTLs work to describe the survey parameters, reports, analyses, and mitigation that will ensure that cultural resources are protected.
3. MMS NTL No. 2007-G03, *Marine Trash and Debris Awareness and Elimination*. The discharge and disposal of garbage and other solid debris from vessels by lessees is prohibited and designed to mitigate impacts of marine debris. The discharge of plastics is strictly prohibited and therefore never authorized and all plastics must be returned to shore. These prohibitions on the discharge and disposal of garbage and other solid debris from vessels would be incorporated as enforceable conditions into the DWPA license. The USCG enforces MARPOL and the Deepwater Port License and fines or penalties could be assessed where laws and regulations are violated.
4. MMS NTL NO. 2007-G04, *Vessel Strike and Avoidance and Injured/Dead Protected Species Reporting*. MMS has issued regulations in 30 CFR 250.103 and 30 CFR 250.282 to update the guidelines to implement monitoring programs to minimize the risk of vessel strikes to protected

species and report observations of injured or dead protected species Designed to mitigate impacts on nonthreatened and nonendangered marine mammals. Any vessel strike of a nonthreatened and nonendangered marine mammal would be considered a "take" under both the MMPA and ESA.

5. MMS NTL No. 2007-G14, Pipeline Risers Subject to the Platform Verification Program. MMS has issued under 30 CFR 250.910(b) (1) (i) and (2) (i), pipeline risers connected to floating platforms are subject to the platform verification program as associated structures. The Minerals Management Service (MMS) Gulf of Mexico OCS Region (GOMR) has determined that new pipeline risers are subject to a separate verification process that necessitates the use of an independent Certified Verification Agent (CVA) specifically for the pipeline riser. These pipeline risers are a critical component of any floating platform proposal and must meet stringent requirements for design, fabrication, and installation.

6. *MMS NTL No. 2007-G20, Coastal Zone Management Program Requirements for OCS Right-of-way Pipeline Applications. MMS* issued guidelines pursuant to 30 CFR 250.101(a) and 30 CFR 250.103 and in accordance with 15 CFR 930.53(d) to provide notice and assistance regarding compliance with the Coastal Zone Management Act (CZMA) Federal consistency regulations. The guidelines are intended to ensure that any required Federal license or permit activity affecting any coastal use or resource is conducted in a manner consistent with approved coastal zone management programs (CZMP).

7. MMS recommends the Applicant conduct an as-built survey of the constructed pipeline and submit the survey to the USCG and Maritime Administration and other agencies as appropriate after construction is completed.

5. Public Safety

5.1 Introduction

The transportation, handling, storage, and processing of LNG and transportation of associated natural gas require strict controls to minimize potential risks and interruptions of gas supplies. This section provides an overview of issues that would affect the safe and reliable operation of Port Dolphin. This section is limited to design, engineering, and operational components of Port Dolphin infrastructure that directly or indirectly have the potential to impact public safety. Reliability of overseas LNG supplies and shipping is outside the scope of the EIS.

The Applicant has proposed Port Dolphin as an uninterrupted source of natural gas operating 24 hours a day, 365 days a year. If the Maritime Administration approves the License, the USCG would review and approve all design, engineering, operations, safety, security, and personnel qualification requirements by USCG prior to installation and at-sea construction of Port Dolphin. USCG's review would include a thorough evaluation of the Applicant's measures to manage safety risks. Relevant standards applicable to offshore and onshore LNG facilities also would be applied to Port Dolphin.

5.2 LNG Hazards

5.2.1 Physical Properties

LNG is approximately 95 percent methane (natural gas) in liquid form. When the gas is cooled to minus 162 °C (minus 260 °F), it decreases in volume and becomes a clear and odorless liquid. LNG is transported and stored at near atmospheric pressures. As the liquid vaporizes and expands to form a gas, a pressure slightly above atmospheric pressure is maintained. This elevated pressure precludes air from entering the storage container.

LNG has several physical properties that are of interest including the following:

1. LNG is not toxic but can act as an asphyxiant by displacing air.
2. When initially released, cold LNG vapor remains heavier than air until it warms up and becomes buoyant at minus 71 ºC (160 °F).
3. Natural gas at normal temperature is lighter than air.
4. When mixed with air, natural gas is flammable within the range of 5 to 15 percent concentration of methane.
5. Natural gas has the highest auto-ignition temperature compared to other fuels (e.g., liquefied petroleum gas, gasoline, and diesel).

When spilled on water, a physical phenomenon not involving combustion, called a rapid phase transition (RPT), can occur as the LNG rapidly transitions from its liquid phase to its gas phase.

Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic but is classified as a simple asphyxiant, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death.

Methane has an ignition temperature of 538 ºC (1,000 °F) and is flammable at concentrations between 5 and 15 percent in air. Experience and testing indicate that unconfined natural gas vapor clouds do not

explode. As the degree of confinement and congestion in the area surrounding the leak increases, the potential to explode rather than to flash also increases (Lees 1996). In all cases, LNG vapors must be within the flammable range, and an ignition source must be available to result in a fire (Juckett 2002). In the absence of an ignition source, a potentially flammable plume would migrate from the LNG leak source until the leak is isolated or the LNG supply is exhausted and the air dilutes the concentration of natural gas to below the lower flammability limit (LFL). Due to the physical properties of natural gas, the gas cloud would quickly become buoyant. However, as described in **Section 5.2.4**, a flammable concentration of methane gas in a vapor cloud within an unconfined space in the presence of an ignition source would not explode.

Regardless of the cause, the formation of a methane/air mixture and its movement depends on the quantity and rate of the spill, whether it is on land or water, the atmospheric stability, the wind direction and velocity, and the temperature of the atmosphere and water.

The following five major hazard conditions associated with LNG could have significant impacts over wide areas:

- Thermal radiation (flux) hazards
- Pool fires
- Flammable vapor clouds
- Cryogenic hazards
- Rapid phase transition.

5.2.2 Thermal Radiation (Flux) Hazards

Thermal radiation (flux) hazards can result from ignition of an LNG pool or ignition of a flammable LNG vapor cloud. Thermal radiation is the heat that is felt from the source. Hazards to humans include burns ranging from first- to third-degree burns and can result in moderate to severe injury or possible death. The degree of thermal radiation hazard depends on a number of factors, including distance from the thermal radiation source, exposure time, and shielding via personal protective equipment or structures. Other thermal- (fire-) related hazards to humans include smoke inhalation and asphyxiation due to lack of oxygen.

Hazards to vessels and equipment are also possible due to thermal radiation. Literature reviewed indicates that thermal flux levels of 37.5 kilowatts per square meter (kW/m^2) can cause damage to steel tanks and process equipment. Thermal radiation hazards could result from LNG pool fires or ignition of an LNG vapor cloud, which are discussed below. **Section 5.4** provides additional details regarding thermal radiation hazards and impact distances associated with pool fires and flammable vapor clouds.

5.2.3 Pool Fires

Any rapid release of an LNG onto water from any of the SRVs could result in a pool fire if there is an ignition source. In the event of a release of LNG, the LNG would float on top of the water and a pool would form. Heat from the seawater would warm the LNG pool and release vapors of natural gas. A pool fire could occur in cases where methane rising from the surface of the pool combines with the proper mixture of oxygen (see **Section 5.2.4**) and then comes in contact with an ignition source. A large pool fire scenario is likely to be the highest risk in terms of a thermal hazard radius. Most intentional events are expected to provide an ignition source so that a pool fire occurs, and therefore formation of a large un-ignited vapor cloud is unlikely.

5.2.4 Flammable Vapor Clouds

When LNG is spilled and exposed to the atmosphere, it would absorb heat from the seawater and ambient air, forming a heavy, cold cloud that can be visible due to condensed moisture in the air. Because of the material's density and the turbulence created by the rapid boiling, an LNG spill would spread and vaporize rapidly. The initial cold air and LNG gas mixture is not buoyant in air between minus 162 and minus 108 ºC (minus 260 and minus 162 °F). In the natural gas cloud, the amount of gas mixing with air would not be uniform, and pockets of the flammable gas/air mixture might exist in regions of the cloud that are generally outside the flammability limits of methane (USCG and MARAD 2003). If this flammable plume encounters an ignition source, a fire would flash back to the source of the spill, causing potentially serious burns to individuals within the flammable concentration zone. Due to the high probability that an ignition source would be present, sustained development and dispersion of a flammable vapor cloud is less likely to occur.

Thermal radiation (e.g., the heat that is felt when standing in front of a fire) is the primary mechanism of heat transfer from the burning methane to an individual or structure (USCG and MARAD 2003). When LNG initially vaporizes from its liquid to its gaseous state, the methane concentration is high, resulting in insufficient oxygen levels to support combustion. When the concentration of methane decreases to 15 percent of the vapor/air mixture (15 percent methane, 85 percent air), the methane will burn if ignited. This is the upper flammability limit (UFL). As the vapor continues to mix with more of the surrounding air, its concentration continues to decrease. When the mixture is diluted to concentrations below 5 percent methane (5 percent methane, 95 percent air) it becomes too lean to burn; this is known as the LFL. When an unconfined cloud containing a natural gas/air mixture burns in the open, the flame generally spreads from the ignition source back over the surface of the LNG vapor cloud.

The flame's rate of spread is only a few miles per hour. This flame speed is too slow to generate an explosion. Instead, the flame would burn back to the source, and the primary concern would be the radiant heat generated from the fire, and the flames themselves. For LNG to cause an explosion, the vapor cloud must be confined. Large-scale field tests determined that releases of methane into the open air or onto water will not explode if ignited. Any methane that does not burn after being diluted below its LFL will dissipate into the atmosphere.

5.2.5 Cryogenic Hazards

As a cryogenic liquid, LNG quickly cools the materials it contacts and causes extreme thermal stress in materials not specifically designed for ultra-cold conditions. These thermal stresses can cause brittleness or loss of tensile strength, and possible fracture of common materials of construction (FERC 2003). Regarding worker safety, potential hazards include exposure to low-temperature LNG and asphyxiation by concentrated vapors. The low temperature is sufficient to rapidly cause the equivalent of frostbite or, if enough of the body surface is exposed, death via freezing of the tissue. The timeframe for these potential impacts is limited. Even though the LNG vapor cloud is not toxic, the cloud might displace enough air to make the atmosphere unsafe for humans to breathe. This represents a hazard to the personnel close to the release, especially if there is some confinement that traps the vapor and allows the concentration to build up in the area.

5.2.6 Rapid Phase Transition

RPT occurs when LNG comes in direct contact with warmer water. In some cases, the rapid uncontrolled expansion of LNG as it changes phase from a liquid to a gas could result in an explosion caused by the physical energy released during the rapid expansion of the liquid to gas (Lees 1996). Since 1981, the Society of Petroleum Engineers has sponsored several projects to investigate and develop a methodology

for producing quantified estimates of the risk associated with RPTs. Progress from this work is reported monthly in the *Journal of Petroleum Technology*. The hazard zones extending from an RPT would not be as large as either a vapor cloud or pool fire hazard zone. RPT accidents are probably the lowest concern of the three mentioned here (Havens 2003).

5.3 Evaluation of Public Safety

During the initial public scoping meetings for Port Dolphin, USCG received various comments requesting that a hazard study be completed to identify the risks and consequences associated with the Port Dolphin Project. Per the Deepwater Port regulations 33 CFR 148.105 (y), a project-specific independent risk assessment (IRA) was conducted. Further details of the IRA can be found in **Section 5.4**. The Final IRA is included as **Appendix J** of this EIS.

5.3.1 Safety Review Criteria

The safety review criteria used to complete the IRA were provided by USCG with guidance from Sandia National Laboratories (Sandia). In completing the IRA for USCG, Acutech, Inc., identified credible accidental and intentional scenario hazards, incorporated site-specific conditions, reviewed direct impacts on the public, and identified the bounding case (worst credible impact). The IRA reported resulting pool fire thermal radiation hazard distances and vapor dispersion hazard distances to the LFL for an unignited vapor cloud, based on modeling performed for bounding accidental and intentional release scenarios. The process and considerations involved in modeling and developing the IRA are summarized below.

5.3.1.1 Credible Range of Release Scenarios

The evaluation of public safety must include an objective analysis of the potential impact of Port Dolphin to public safety and property. During development of the IRA, a wide range of potential scenarios were considered involving both accidental and intentional release hazards. Input in determining the potential hazards was obtained from a number of qualified Federal, state, and local experts during a 2-day hazards identification (HAZID) workshop conducted on August 1 and 2, 2007, at the USCG Prevention Office in Tampa, Florida. Participants included representatives from USCG CG-5225, USCG Sector, USCG Pollution, and USCG Security; the U.S. Maritime Administration; Joint Terrorism Task Force (JTTF) (FBI); the Cooperative Vessel Traffic Service; Florida Department of Law Enforcement; Florida Department of Environmental Protection; Florida Fish and Wildlife Commission; Agency of Bay Management; Tampa Police Department; industry/Port Security; Port Manatee Authority and the local emergency planning committee; and the Applicant. The meeting was facilitated by Acutech. The risk analysis process is shown in the IRA.

The HAZID process identified potential accidental and intentional release scenarios. Eleven potential accidental release cases were developed for consideration. In addition, intentional release scenarios were reviewed and analyzed. From the identified hazards, four release cases were identified and chosen to bracket the worst credible range of potential accidental and intentional LNG release scenarios on which to base the public safety evaluation. Further details regarding the identified hazards on which the IRA was based are provided in **Section 5.4**.

5.3.1.2 Site-Specific Input Data

Site-specific input data used in completing the risk assessment included a description of Port Dolphin; design information; proposed alternative locations; sizes of the SRVs; operating conditions for the offloading, storage, and regasification processes; meteorological data; and marine traffic data for the

Project area. Additional vessel traffic data from a number of sources were reviewed as part of the IRA for vessels transiting the vicinity of Port Dolphin.

5.3.1.3 Direct Impact on the Public

The purpose of the public safety evaluation and IRA is to review Port Dolphin's potential safety and security impacts on the public and property in the subject deepwater port area. The IRA considered potential direct impacts on humans and property from a potential worst-case release of LNG from Port Dolphin. Indirect impacts on the public and property (e.g., economic impacts resulting from an LNG release) are not included in the public safety evaluation.

5.3.1.4 Bounding Case (Worst Credible Impact)

The public safety evaluation and IRA process represents a deterministic assessment of the worst credible release scenarios representing maximum expected impacts from accidental and intentional events. What resulted from the evaluation were a representative set of scenarios and identification of the most significant potential and credible impacts (bounding cases) that could be used to access the public risks associated with construction and operation of Port Dolphin.

5.3.2 Sandia National Laboratory Guidelines

In 2004, the DOE commissioned Sandia to develop a risk-based analysis approach to assess and quantify potential hazards and consequences of an LNG spill from an LNG Carrier (LNGC). Sandia utilized previously completed studies and conducted its own studies to determine the hazards of an LNG spill. Sandia also developed risk management strategies to minimize the likelihood of an incident. The 2004 Sandia report (Sandia 2004) is typically used as the industry standard and benchmark on which to base Project-specific risk assessment studies.

The IRA followed the baseline guidance for accidental and intentional breach models of LNGC inner hulls provided in SAND2004-6258 (Sandia 2004).

Acutech worked directly with Sandia and USCG to apply site-specific conditions and parameters for the Port Dolphin IRA process. Due to Port Dolphin's offshore location, Sandia collision data were extrapolated to account for larger ocean-going vessels with higher potential vessel energy that could occur in the vicinity of Port Dolphin.

With respect to potential intentional threats, Sandia guidance suggested that the threat, breach, spill, and hazard analyses should be conducted on a site-specific basis (Sandia 2004). Acutech, in conjunction with Sandia and USCG, utilized site-specific conditions and scenarios to assess the threat and consequence of intentional LNG incidents.

Because of the increasing size and capacity of many new LNGCs, at the request of the DOE, Sandia conducted detailed breach analysis for large LNGCs ranging up to 265,000 cubic meters (m^3) (9,358,387 ft^3). Based on the analyses for emerging LNG tanker designs up to 265,000 m^3 (9,358,387 ft^3), the range of breach sizes calculated for credible intentional scenarios appropriate for near-shore operations, where there is waterway surveillance, monitoring and control, ranged between 2 to 12 m^2 (22 to 129 ft^2). For offshore operations, where there is less control and surveillance of ship operations, credible intentional scenarios can be larger and the calculated breach sizes can range from 5 to 16 m^2 (54 to 172 ft^2), with the most likely or nominal intentional breaching scenario resulting in an LNG cargo tank breach of approximately 12 m^2 (129 ft^2) (Sandia 2008). Sandia, in their 2008 report, (Sandia 2008), concludes that the worst-case scenario to public safety and property for these large LNGCs would be

within 700 m (2,297 ft) of a spill, with minor damages as far reaching as 2,000 m (6,562 ft). Therefore, Sandia concludes that there is minimal risk to public safety and property even from a large LNGC spill given the locations of the proposed facilities.

5.3.3 Government Accountability Office Study

A study was conducted by the Government Accountability Office (GAO) to describe the results of recent studies on the consequences of an LNG spill, and to identify areas of agreement and disagreement among experts regarding the consequences of a terrorist attack on an LNG tanker. The GAO published its report in February 2007, and it is summarized as follows:

- The primary hazard to the public is heat hazard from a fire. Explosions are unlikely, and hazards like cryogenic effects and asphyxiation do not pose a danger to the public.
- Heat hazard baseline distances from the heat hazard zones using Sandia's guidelines are either appropriate or conservative.
- Surface emissive power of LNG fires will be lower for large fires because oxygen in the middle of the fire would lead to more smoke production, which would block some of the heat from the fire.
- Cascading failure events are not likely to greatly increase (by more than 20 to 30 percent) the overall fire size or heat hazard ranges.
- Sandia's conclusion that consequence studies should be used to support comprehensive, risk-based management and planning approaches for identifying, presenting, and mitigating hazards from potential spills is appropriate.
- The priorities for research that are funded by Congress include large-scale experiments on water; the potential for cascading failures of multiple tanks; and improved techniques especially related to inshore ports.

In December 2007, the GAO released a second report on the potential terrorism threat in the United States to "energy commodity tankers" including LNGCs (GAO 2007b). The report identifies three issues to be addressed to ensure effective response efforts especially related to onshore ports:

- Spill response plans and anti-terrorism and security plans should be coordinated at the regional level and the facility level
- Ports need to develop plans to address economic issues if there is a terrorist event, such as prioritizing vessel movements
- Adequate response resources are needed to respond to an attack.

USCG has considered these challenges as they apply to the Project and would not authorize operation of the Port unless issues are adequately addressed. USCG will continue to address these issues during finalization of the Operations Manual and will reassess these issues during operation of the Port, if the Project is licensed.

5.3.4 Impacts on Public Safety and Property

The potential impacts on public safety and property from a deepwater port, LNG vessels, and process equipment are described on the following page. Potential impacts from marine shipping and the pipelines are described in **Sections 5.5** and **5.6**, respectively.

5.3.4.1 Deepwater Port

At present, the Gulf Gateway Energy Bridge project, which commenced operations in 2005, and the Northeast Gateway Deepwater Port in Massachusetts Bay, which commenced operations in 2008, are the only operating offshore deepwater ports in the United States at this time. A review of available information indicates that no incidents have been recorded regarding impacts on public safety and property associated with these deepwater port facilities; most available information is focused on land-based facilities. Guidance documents for building offshore LNG storage and regasification terminals have recently been produced by the Classification Societies (American Bureau of Shipping, Bureau Veritas, Det Norske Veritas, and Lloyds Register). The review of available information indicates that only seven incidents have been documented over approximately the past 75 years with one or more (worker or public) fatalities associated directly with operations at land-based LNG facilities: (1) Skikda, Algeria, January 2004; (2) Bontang, Indonesia, 1983; (3) Maryland, United States, 1979; (4) Arzew, Algeria, 1977; (5) Texas, United States, 1973; (6) Raunheim, Germany, 1966; and (7) Ohio, United States, 1944. Brief descriptions of these incidents are included in **Appendix K.**

5.3.4.2 LNG Vessels

According to the IRA, approximately 100,000 LNGC voyages have taken place, covering more than 235 million miles while loaded, with no major accidents, safety problems, recorded fatalities to vessel crew or the general public, or recorded fires on deck or within cargo areas. Over the life of the industry, 16 cargo transfer incidents have resulted in limited LNG spills with some damage. These spills have resulted in some damage to the carrier, but no LNG fires have occurred (Sandia 2004). The most significant damage resulting from LNG leakage involved a deck or plating fracture from cryogenic embrittlement (CH-IV International 2004). An additional 11 incidents involved a vessel collision, a vessel running aground, or vessel fracture due to high seas deflection stresses (see **Appendix K**). However, none of these 11 incidents resulted in the spill of LNG (CH-IV International 2004).

As of January 2009, the world's LNG fleet is composed of 298 active LNGCs, with another 79 LNG vessels on order (Colton 2009a, 2009b). The LNG capacities of these active ships range from 1,100 m^3 to 216,200 m^3(38,846 to 7,635,031 ft^3). Currently, all of these LNGCs operate (or intend to operate) under a foreign flag with foreign crews and must have a Letter of Compliance inspection from USCG to verify compliance with international safety standards. There is a requirement for all foreign LNG flag ships to have the ability to communicate in English (USCG and MARAD 2003).

The LNG containment system in the SRVs proposed for Port Dolphin would be able to withstand any potential degree of "sloshing" during transportation and unloading resulting from partially loaded tanks. The integrity of the reinforced insulation boxes, structural reinforcement of the cargo inner hull, and strengthened cargo pump towers have been verified by testing. In addition, they have been approved by appropriate third-party engineering certification companies. For maximum ship maneuvering capability, each SRV would be equipped with bow and stern thrusters, and a maneuvering assistance and positioning system that provides automatic heading and direction of the thrusters and main propulsion. This system controls the SRV's position within approximately 10 meters (33 feet) during buoy retrieval operations. All SRVs would be assisted by a dedicated tug during docking activities.

Port Dolphin's SRVs would be designed to reduce the potential for accidental events during the transport of the LNG or any other maritime operation. Similarly, the SRVs have been designed to reduce potential accidents during the regasification process. Final design for the SRVs and their operating systems would be subjected to all of the tests and verifications necessary to certify the engineering integrity of the ship and its systems, in accordance with all international standards for LNG vessel operation on the high seas. The cargo tanks for all SRVs would have "double containment" cryogenic liquid barriers that include a

complete inner tank within a complete outer tank, and would be designed to withstand the LNG temperatures. The design would adhere to standards established in the IMO Maritime Safety Committee Resolution 59(67), International Code for Construction and Equipment of Ships Carrying Liquefied Gasses in Bulk (IGC Code). The inter-barrier space of the double barrier containment system would be continually purged with nitrogen, and the outlet flow would be monitored by gas detectors. In the unlikely event of a primary containment system leak, the leak would be detected immediately and appropriate corrective measures would be initiated. Any pressure increases would be vented through one of the vent stacks on the upper trunk deck of the SRV. The secondary barrier of the double containment system would prevent any LNG leakage. Once the offloading operation is complete, nitrogen would be injected into the inter-barrier space until it is purged of natural gas. The cargo tank would be purged with inert gas slowly warmed to ambient temperature. The inert gas then would be purged using fresh air, making the cargo tank safe for entry by personnel who would identify and repair the leak. All internal piping for LNG and water would meet or exceed all applicable standards for structural integrity, temperature, and corrosion resistance.

In addition to the double-containment cargo tanks, the SRVs would have two carbon steel inner and outer hulls. The design provides for liquid-tight barriers between the LNG and a failure scenario involving mechanical penetration of the tank initiated externally. In such cases, all four barriers would need to be breached before LNG could be released from the tank. In the event of a catastrophic failure of the inner barriers, LNG could come into contact with the hull material, which is not designed for cryogenic temperatures and would be expected to fail. However, the most common failure scenario for the inner barriers tends to be the development of porosity or cracks; this tends to cause a gradual increase over time in the amount of gas leaking into the inter-barrier space, which is monitored for gas leakage. Thus, any leak into the inter-barrier space would be readily identified.

5.3.4.3 Marine Safety

In December 2002, at the urging of USCG, the United Nation's IMO Maritime Safety Committee developed amendments to the 1974 International Convention for Safety of Life at Sea (SOLAS) intended to enhance maritime security. The new International Ship and Port Facility Security (ISPS) Code was also adopted to provide a standardized, consistent framework for evaluating risk, enabling governments to offset changes in threat with changes in vulnerability for ship and port facilities. The implementation schedule of both the SOLAS amendments and the ISPS Code was July 1, 2004.

On a national front, the U.S. Congress enacted the Maritime Transportation Security Act (MTSA) in November 2002, which was designed to protect U.S. ports and waterways from a terrorist attack by requiring area maritime security committees and security plans for facilities and vessels that might be involved in a transportation security incident. In response to the terrorist attacks on September 11, 2001, USCG reaffirmed its Maritime Homeland Security mission and its lead role, in coordination with other Federal, state, and local agencies; owners and operators of vessels and marine facilities; and other entities with interests in the U.S. Marine Transportation System (MTS), to detect, deter, disrupt, and respond to attacks by terrorist organizations against U.S. territory, population, vessels, facilities, and critical maritime infrastructure.

Accordingly, USCG developed maritime security rules that require owners and operators of certain facilities in U.S. ports, and certain vessels operating in U.S. waters, to conduct a Facility/Vessel Security Assessment (FSA), name a Facility/Vessel Security Officer (FSO), and develop and implement a Facility/Vessel Security Plan (FSP). In addition, USCG, in conjunction with local stakeholders, prepared a site-specific IRA which will form the basis of development of operational and security procedures in the deepwater port operations manual. If a License is issued, USCG would require that Port Dolphin facilities and SRVs develop assessments and plans to ensure consistency with MTSA requirements.

5.4 Deepwater Port Risk Assessment

In response to the Application filed with the USCG and the Maritime Administration for Port Dolphin, the potential risks to the public from the Project, based on a large-scale release of LNG, were reviewed and an IRA was prepared (see **Appendix J**).

The USCG Office of Operating and Environmental Standards, Deepwater Port Standards Division (CG-5225) directed the scope and content of the IRA. The Applicant did not influence the technical direction of the work performed for the IRA and was not allowed to review the work before it was released to the public.

5.4.1 Purpose and Objectives

The purpose of the IRA was to develop a stand-alone technical report on the potential risks to the public from the proposed Project based on a large-scale release of LNG. The primary objective of the IRA was to assess impacts on the public and property not associated with the proposed deepwater Port from an event that compromised LNG containment. The secondary objective of the IRA was to qualitatively analyze the process safety hazards if they might cascade beyond the identified maximum credible breach scenarios.

The IRA consisted of a systems-level risk assessment that considered operations related to the transfer, storage, and regasification of the Project. The IRA did not evaluate risks associated with natural gas releases from the subsea pipelines. Information regarding safety of the offshore pipelines is provided in **Section 5.6**.

5.4.2 Technical Approach

The IRA risk analysis process involved the following six steps:

1. *Deepwater Port area characterization*—the deepwater Port application was reviewed, and additional data, as required, were gathered and analyzed about the proposed Port environment.
2. *HAZID process*—input was received from various stakeholders to identify accidental and intentional scenarios that could potentially compromise the LNG tanks.
3. *Scenario development*—the HAZID scenarios were further analyzed to determine credible scenarios.
4. *Vessel frequency collision analysis*—the types of vessels and frequency of potential collision were analyzed.
5. *Consequences analysis*—the impacts of the bounding cases (i.e., largest credible scenario) were analyzed using computational fluid dynamics modeling.
6. *Results and conclusions*—the analysis results were addressed and presented.

The conclusions of the IRA are presented as hazard zones for thermal radiation due to pool fire, and vapor cloud dispersion for the accidental and intentional release scenarios evaluated. Since the hazard zones are based on the breach size, release volumes, and weather conditions, the estimated size of the hazard zones would not be influenced by the size or configuration of the Safety Zones or area to be avoided (ATBA), or whether Port Dolphin is at the proposed location or at an alternative location. Thus, the size of each of the hazard zones depicted in the IRA would be identical, independent of the proposed and alternative locations as described in this EIS. While the IRA considered potential impacts on the public and

property, it did not attempt to predict the number of potential fatalities or injuries from these events. Also, the study was done without considering any mitigation measures that would be implemented to reduce the risk of accidental or intentional release of LNG from the proposed Project; therefore, the study provides evaluation of bounding cases. The risk management approaches are likely to reduce both the potential for and hazards of accidental and intentional events.

5.4.3 Deepwater Port Potential Impact

As described in **Section 5.3.1.1**, potential accidental and intentional release scenarios were selected to bind the credible range of potential accidental and intentional LNG release scenarios on which to base the public safety evaluation. Further details regarding the identified hazards on which the IRA was based are provided in **Appendix J.**

5.4.3.1 Accidental Scenarios

The HAZID identified 11 potential accidental release scenarios that have the potential to result in a release of LNG. The scenarios included vessel collision, shipboard mechanical system failure, fire, LNG release at process equipment, severe weather, structural failure of the LNG SRV, grounding, natural phenomena, mooring system failure, dropped objects, aviation accident, and buoy entanglement.

Collisions. Although no reported marine accidents resulting in a breach of LNG containment have ever been documented during the history of maritime transportation, marine collision scenarios were included for further consideration. The expected breach size on the inner hull of an LNG SRV from a vessel collision scenario is represented in Section 5.3 of the IRA (see **Appendix J**). Deepwater Port groundings were ruled out as not being likely due to its offshore location.

Process Related. In addition to the accidental marine collision and intentional attack scenarios considered in the IRA, several other types of events are possible aboard these vessels that could result in significant LNG spills. Process-related releases could occur because of the substantial topside processing equipment on SRVs for regasification of LNG and distribution of natural gas from the buoys to the subsea piping. These scenarios involve accidental equipment failures, human errors, or external events that could result in a release of LNG or natural gas, leading to fires, explosions, or other serious shipboard events.

LNG regasification vessels are designed to carry cryogenic gases and follow more stringent IMO regulations that govern their construction and operation, including fire and gas detection systems, emergency shutdowns, and fire and vapor suppression systems. These regulated safety features significantly reduce the likelihood of an accidental LNG release at the proposed deepwater Port. Additionally, these safety features would mitigate any release, regardless of its cause.

The process-related scenarios identified in the HAZID study were not analyzed in the IRA. These types of releases were determined to have smaller potential release sizes (e.g., the potential hole size, inventory available for release, and duration of release) and a lower potential to escalate (due to the safety and emergency shutdown systems) as compared to other accidental and intentional cases for which a detailed examination of the consequences was performed. The lower likelihood for catastrophic accidental events is based on the regulations covering LNG vessels, the safety record of the LNG industry (both onshore and transportation), and the associated safety features onboard LNG regasification vessels. Therefore, while process releases are credible scenarios, they do not represent the bounding consequence case for accidental or intentional events. USCG would require that, if a License is issued, a condition be added to the Record of Decision (ROD) associated with this EIS requiring further work in HAZID and risk management of process-related scenarios for development of the Operations Manual and the FSP. These

activities would take place along with other post-licensing activities, including design, operation, and security reviews and approvals.

Hurricanes. A review of potential sea state and weather conditions, mooring and connection operating conditions for the deepwater port facility, mitigation, procedural safeguards, and recent test case data for Excelerate Energy's Deepwater Port facility off Louisiana during the 2005 hurricane season indicated that weather-related events also would not be a credible binding case. The IRA reports there were 302 storms that gained tropical storm strength during the 2000 Atlantic Basin hurricane season. These storms are defined as having maximum sustained winds no greater than 61 kilometers per hour (38 miles per hour). A tropical storm becomes a hurricane (e.g., a 100-year extra tropical storm) when winds reach 119 kilometers per hours (74 miles per hour). The Applicant would stop regasification and send-out operations well in advance of any tropical hurricane that might endanger the vessel (IRA). Since the SRVs would evacuate Port Dolphin and the surrounding area in the event of severe weather, weather-related hazards therefore were not considered further.

Intentional Scenarios. The HAZID team also reviewed a number of intentional release scenarios. Sandia worked closely with intelligence agencies to identify site-specific credible incidents that would bind the likely potential consequences of an LNG release. Due to the sensitive nature of this information, details of the analysis are not provided. The IRA did conclude, however, that the intentional release scenarios were not considered highly likely to occur due to multiple countermeasures that include MTSA requirements, USCG operational requirements, and operational procedures and programs proposed by the Applicant. Final countermeasures, as determined by USCG, would be included in the Operations Manual.

5.4.3.2 Summary of IRA Findings

There are four potential consequences of an LNG release over water: pool fire, vapor cloud, vapor cloud flash fire and no event. The thermal radiation zones from pool fires and the flammable vapor cloud dispersion that defines the extent of a flash fire each have the potential to impact the public surrounding the Port. Therefore, thermal radiation distances from vapor pool fires, and vapor cloud dispersion are developed below.

5.4.3.3 LNG Release Scenarios

From the original potential and accidental release scenarios evaluated in the HAZID screening process, the IRA identified four credible LNG release scenarios for further evaluation. Heat flux calculations from pool fires and flammable vapor cloud dispersion calculations were outlined for both membrane and Moss LNG-type carriers. However, release scenarios were not considered highly likely to occur, due to multiple countermeasures that include MTSA requirements, USCG operational requirements, and operational procedures and programs proposed by the Applicant. The IRA defines and analyzes only the bounding intentional and vessel collision scenarios. Therefore, the intentional scenarios with the largest thermal radiation and flammable vapor dispersion results and the vessel collision scenario are presented below.

1. Intentional attack leading to a 16-m^2 (172 ft^2) breach in a single SRV tank.
2. Intentional attack leading to a 12-m^2 (129 ft^2) breach in two SRV tanks.
3. Intentional attack leading to a 12-m^2 (129 ft^2) breach in three SRV tanks (cascading damage).
4. Vessel collision leading to a 22-m^2 (237 ft^2) breach in a single LNGC tank.

5.4.3.4 Thermal Radiation Zones from Pool Fires

Thermal radiation hazard distances from a pool fire were estimated by the following two heat flux levels:

- **37.5 kW/m^2:** At this range, damage to process equipment and storage tanks for unprotected exposures, based on average 10-minute exposure duration, as well as immediate fatalities
- **5kW/m^2:** Permissible level for emergency operations lasting several minutes with appropriate clothing based on an average 10-minute exposure duration, and onset of second degree burns based on average 40-second exposed duration.

The pool fire thermal hazard distance analysis was performed by comparing four models: the standard solid flame model (Standard model [constant τ][1]), the two-zone solid flame model (FERC)[2], the three-zone solid flame model (Raj)[3], and LNGFIRE3.[4] The range of thermal radiation hazard distances predicted by the different models (including a sensitivity analysis of key parameters of the pool fire models) for the four binding case release scenarios evaluated in the IRA are listed in **Table 5.4-1,** and shown in **Figure 5.4-1**. These distances are measured from the center of the LNG pool. The maximum credible pool fire distance predicted by the IRA analysis resulted in an estimated distance of 4,680 m (15,354 ft) with a heat flux > 5kW/m^2.

Table 5.4-1. Maximum Thermal Radiation Zones for Binding Case Scenarios

Scenario	Scenario 5 Intentional	Scenario 6 Intentional	Scenario 7 Intentional Cascading	Scenario 8 Vessel Collision
Breach Size	16 m^2	12 m^2	12 m^2	22 m^2
Number of Tanks	1	2	3	1
Tank Capacity	54,362 m^3	108,724 m^3	163,086 m^3	54,362 m^3
Projected Release Quantity	48,330 m^3	96,660 m^3	144,990 m^3	48,330 m^3
Pool Diameter	840 m	1,060 m	1,260 m	840 m
Heat Flux > 37.5 kW/m^2	1,390 m	1,710 m	1,990 m	1,390 m
Heat Flux >5 kW/m^2	3,140 m	3,960 m	4,680 m	3,140 m

Note: Data in **Table 5.4-1** are identical to Table 8-1 of the IRA

5.4.3.5 Flammable Vapor Cloud Dispersion

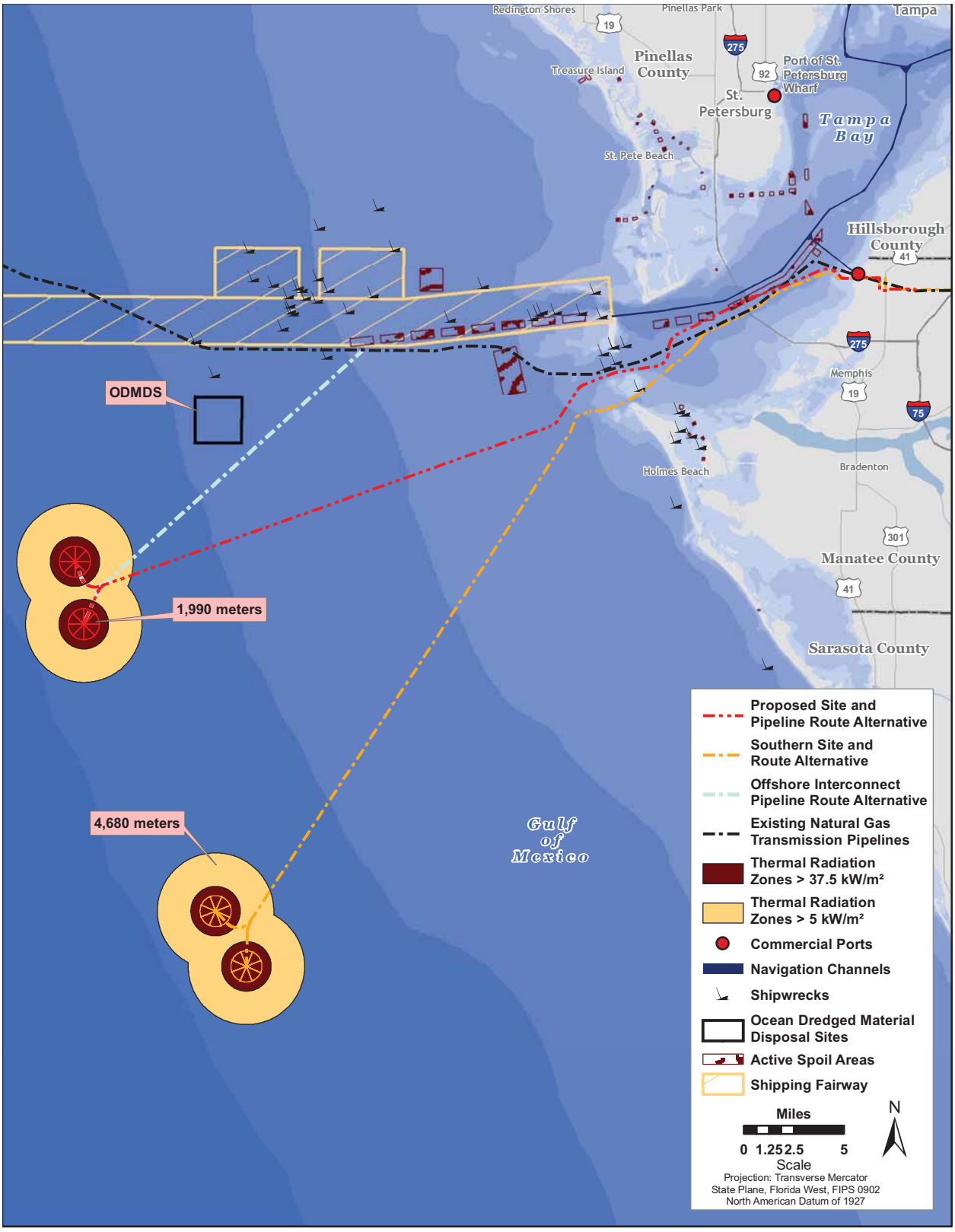
The vapor cloud dispersion hazard distance was determined as the maximum downwind distance to the LFL. The flammable vapor cloud dispersion simulations were performed using Fluent, a commercial Computational Fluid Dynamics (CFD) code. Fluent was validated for this study by comparison with experimental LNG vapor dispersion data from the Burro tests (see **Appendix J**).

[1] Sandia National Laboratories, "Guidance on risk analysis and safety implications of a large liquefied natural gas (LNG) spill over water", SAND2004-6258, (2005).

[2] FERC, "Notice of availability of detailed computations for the consequence assessment methods for incidents involving releases from liquefied natural gas carriers", Docket No. A04-6-000, June 29, 2004.

[3] Raj, P.K., "Large hydrocarbon fuel pool fires: Physical characteristics and thermal emission variations with height," Journal of Hazardous Materials, 140, pp. 280-292, (2007).

[4] "LNGFIRE3: A Thermal Radiation Model for LNG Fires," Topical Report GRI-04/0032.



Source of Proposed Pipeline: ConShelf 2009. Source of Southern Pipeline: ConShelf 2007. Source of Offshore Interconnect Alternative: e²M, Inc. 2008. Source of Thermal Radiation Zones: e²M, Inc. 2009.

Figure 5.4-1. Thermal Radiation Distances for Binding Case Scenarios

The maximum credible flammable vapor cloud distance to the LFL predicted by the IRA analysis also occurred with Intentional Scenario and resulted in a distance of 6,095 m (19,997 ft). Summary results for four scenarios are provided in **Table 5.4-2,** and shown in **Figure 5.4-2**.

Table 5.4-2. Maximum Credible Vapor Cloud Dispersion Distances for Binding Case Scenarios

Scenario	Scenario 5 Intentional	Scenario 6 Intentional	Scenario 7 Intentional Cascading	Scenario 8 Vessel Collision
Breach Size, m^2	16 m^2	12 m^2	12 m^2	22 m^2
Number of Tanks	1	2	3	1
Distance to LFL from the center of the LNG pool (meters)	4,980 m	6,095 m	Immediate ignition, no vapor cloud hazard	4,980 m

Note: Data in **Table 5.4-2** are identical to Table 8-2 of the IRA.
The results are based on worst combination of meteorological conditions (e.g., wind speed, water temperature) which would result in maximum hazard distances. It should be noted that higher wind speeds do not necessarily result in greater vapor plume distances.

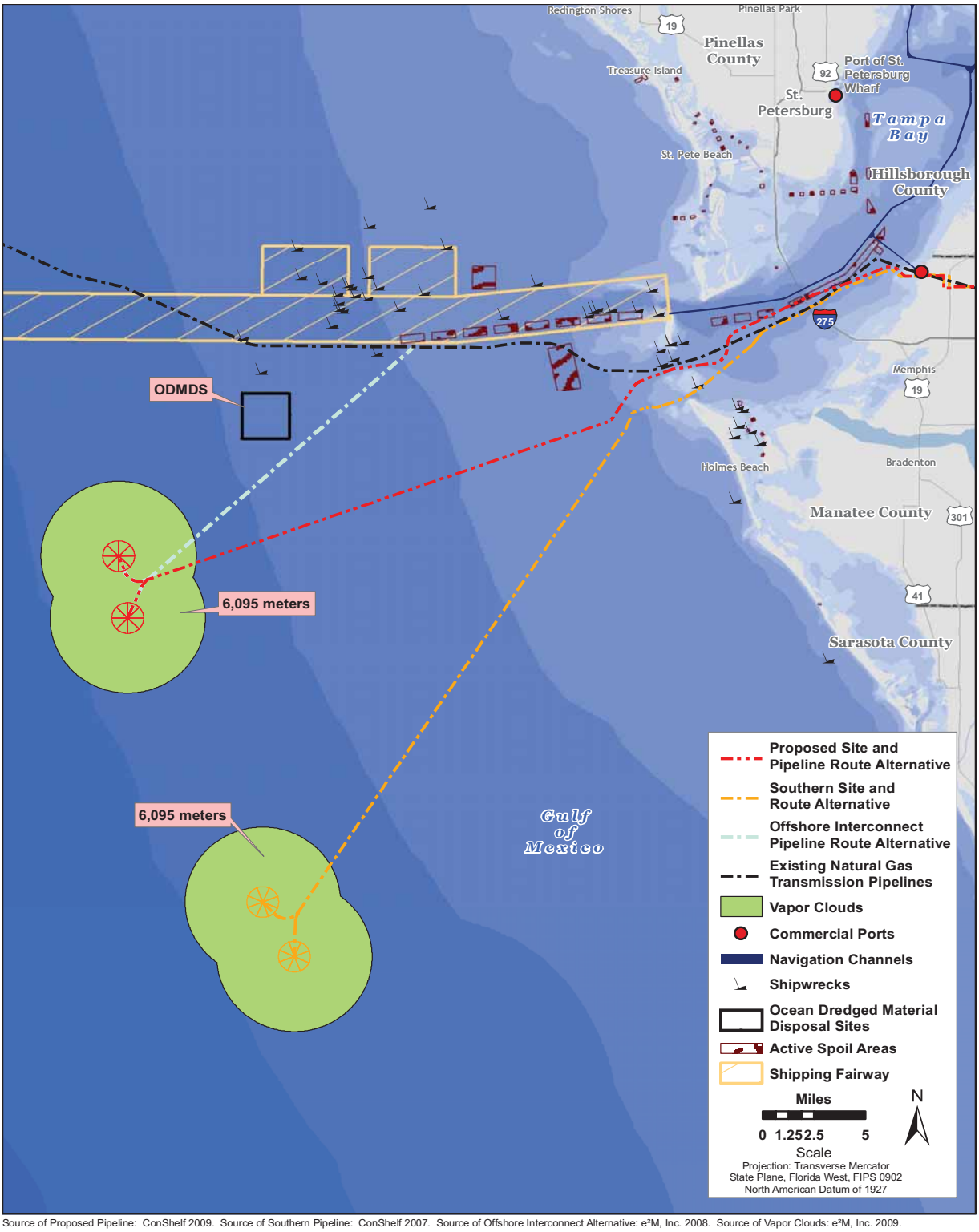
As discussed in **Appendix J**, the IRA models indicate there would be no direct impacts on public safety associated with a maximum modeled LNG release scenario at the extreme range of an unignited flammable LNG vapor/methane plume (distance to LFL). None of the thermal radiation zones from Scenarios 2 or 3 would extend to an adjacent buoy, shipping channels or the shore. See **Figure 8-2** of the IRA for overlay of the thermal radiation and flammable vapor cloud dispersion consequence results on the Port.

5.4.4 Risk Prevention and Minimization Strategies

In addition to the general risk preventions and minimization strategies discussed below, detailed prevention and mitigation strategies for both accidental and intentional release scenarios would be developed in a coordinated effort between USCG (CG-5225 and the Sector), local law enforcement officials, and the Applicant in the Operations Manual and FSP, if the Maritime Administration License is approved. Process design and operational reviews and approvals also would increase safety by further preventing or minimizing potential risks. Although ongoing, much of this activity is completed in the post-licensing phase of the application.

Safety and security criteria for vessel and port operations were used in evaluating the Port's location and would be critical components of the Port's design and operating procedures. For approval by USCG, the offshore location for Port Dolphin must be conducive to safety by minimizing any potential risks while simultaneously allowing for adequate security. The Port would be a minimum of 45 km (28 mi) from shore, and there are no existing offshore structures proximal to the proposed Port.

Federal regulations require all LNG vessels to provide a 96-hour advanced notice of arrival to USCG prior to entering any U.S. port. Information about the vessel and its voyage, including its port of origin, cargo on board, crewmembers, passengers, status of essential equipment, and special security information, must be provided with the notice of arrival. All persons would be screened by the National Vessel Movement Center prior to the vessel's entry. Complete details concerning the USCG's notice of arrival requirements can be found in 33 CFR Part 160.



Source of Proposed Pipeline: ConShelf 2009. Source of Southern Pipeline: ConShelf 2007. Source of Offshore Interconnect Alternative: e²M, Inc. 2008. Source of Vapor Clouds: e²M, Inc. 2009.

Figure 5.4-2. Vapor Pool Distances for Binding Case Scenarios

USCG may routinely complete facility inspections, shipboard safety and security examinations, vessel escorts, and cargo monitors while a vessel is in U.S. waters or at a facility discharging its LNG cargo. A detailed Emergency Response Plan would be part of the Operations Manual and Facility Security Plan that would require the approval of the USCG during the post-licensing phase prior to beginning of operations, if the Maritime Administration License is approved.

Under Maritime Transportation Security Act (MSTA) of 2002 and International Ship and Port Security (ISPS) regulations, shipping companies, vessels, and facilities are required to have a security officer and a comprehensive security plan to conduct their operations. Port Dolphin would be required to develop an FSP approved by USCG in accordance with Federal regulations. Similarly, SRVs would have a vessel security officer on board to oversee security measures. A vessel security plan would be required as well. This plan would necessitate USCG review and approval prior to entry into the Port. Both the facility and the vessel would require specific and detailed contingency procedures to be developed within their security plans. Implementation of these procedures would be required to enhance safety and security; and to protect the vessels, their cargo, and the marine environment.

5.5 Marine Safety

5.5.1 Marine Safety Standards

In accordance with 33 CFR Part 150, the licensee of the deepwater Port could not operate the Port without prior USCG approval of the Operations Manual. If the Maritime Administration License is granted to the Port Operator it would require that the Operations Manual address the requirements of the DWPA and provide detailed specifications and procedures for all aspects of Port operations and infrastructure. The Operations Manual would address security, emergency response, public and personal safety, protection of the environment, navigation, vessel movement, materials handling, and personnel qualifications. The Operations Manual would be required to address Port requirements for calling vessels, approaches, Safety Zones, port infrastructure, and pipelines.

If Port Dolphin is approved and commences operations, USCG would conduct regular inspections to ensure that the Operations Manual is being properly implemented. In addition, USCG would review the Operations Manual from time to time, and propose or require amendments as necessary to meet the intentions of the appropriate regulations and address potential changes in conditions.

Marine safety would be enhanced, in part, by navigation aid systems, fire and gas detection systems, emergency shutdown systems, and communication systems.

5.5.1.1 Navigation Aid Systems

The SRVs would be equipped with all appropriate navigational aid, light, and sound systems required for moored or berthed vessels in accordance with Convention on the International Regulations for Preventing Collisions At Sea, 1972, commonly referred to as the 72 COLREGS and implemented by 331 CFR 81. The navigation aid system would include obstruction lights, sound signals, radar beacon, and a separate independent battery charger and battery system. The navigation obstruction lights would be Class A lights with an 8-km (5-mi) range. The sound signals would be fog horns with a 3.2-km (2-mi) range, as required by 33 CFR 149.585. The radar beacon (RACON) would be capable of receiving signals from vessel radars and transmitting responding signals. An Automated Identification Information System (AIS) would transmit the name and position of the SRV.

5.5.1.2 Fire and Gas Detection System

The SRVs would have a fire and gas (F&G) detection system with triple modular redundancy (TMR). This system has both audible and visual alarms. The deluge systems would automatically be activated in the case of rate-of-rise heat detection or ultraviolet/infrared (UV/IR) detection.

The F&G system would have both zoned and specific-point detection for the presence of flammable gas, fire, smoke, or LNG spills above and below deck. The F&G system also would include line-monitored manual stations at strategic locations above and below deck. The F&G system inputs would include combustible gas detectors for open process areas that incorporate sensors using infrared absorption technology. Combustible gas detectors for enclosed spaces that incorporate sensors using catalytic bead-type sensors also would be used. Low-temperature, resistance thermal device (RTD)-type detectors would be used to monitor cryogenic spills.

Thermal detectors would be used to monitor fires in below-deck and open-process areas (fusible plug or RTD). The F&G system would also include UV/IR-type flame detectors for equipment handling combustible gas. Smoke detectors and break-glass-type manual alarm stations would be located throughout the vessel.

The F&G system would use one out of three Programmable Logic Controllers (PLCs) to take preprogrammed actions when F&G is detected. The PLC would be of the same type used for the ESD system, with the same TMR requirements.

5.5.1.3 Emergency Shutdown System

The Emergency Shutdown System (ESD) system would provide an effective sequence of operations that would lead the regasification process to a safe condition upon the occurrence of hazardous events. The ESD system would consist of a fault-tolerant, failsafe, and self-testing system. The system includes an ESD system workstation in the control room and controller and marshalling cabinets at other strategic locations on the vessel. A dedicated, hardwired ESD system control and alarm panel would be mounted on the console in the control room.

Three levels of shutdown would be considered:

- Level 1–total deepwater port shutdown
- Level 2–process area shutdown
- Level 3–local or individual packaged equipment shutdown.

Shutdown Levels 1 and 2 would be performed through the ESD system and activated through emergency push buttons in the control room or in the remote stations. Level 3 would be activated by abnormal process conditions or cascaded from Level 2 shutdown. A Level 3 shutdown would be performed through the distributed control system, package unit control systems, or the ESD system. The ESD system is currently a conceptual design. USCG would require that the Applicant submit an Operations Manual for approval by USCG and other appropriate authorities as a condition of the License, if issued. The Operations Manual would include detailed ESD procedures, shutdown instructions, and implementation scenarios.

5.5.1.4 Communications Systems

Communication systems on the SRVs would provide voice, alarm, and data communications. These systems would enable communication among SRVs underway or moored at the Port, multiple onshore

systems, the public telephone network, vessels, aircraft, the USCG Sector, and supporting personnel during evacuation and lifesaving activities in the event of an emergency situation. The vessels communications system also would include a microwave radio communication system and satellite communications system. A public address and alarm (PA&A) system, telephones, LAN, and defense communications system (DCS)/ESD data connections would be installed. An anti-collision radar system also would be included as part of Port Dolphin operations equipment. The LNG and support vessels would be equipped with marine and aeronautical radio systems, emergency and rescue radio systems, and a two-way land transportation radio system.

The two-way land transportation radio system would operate in the 811- to 860-megahertz band. Strategic locations would be equipped with an ultra-high frequency radio, very high frequency marine radio, and PA&A speakers. Each escape, SRV, and support craft would be equipped with an emergency position-indicating rescue beacon, search and rescue transponder, and a marine portable radio.

5.5.2 Navigational Safety Measures

5.5.2.1 Safety Zone

Surface Requirements. Under the DWPA implementing regulations, the USCG is authorized to establish a permanent mandatory Safety Zone around deepwater ports whether a vessel is present or not. The Safety Zone would extend approximately 850 m (2,789 feet) from the center of each buoy and encompass approximately 561 acres. This is a result of maintaining 500 m (1,641 feet) from the moored LNGC (maximum of approximately 350 m [1,148 feet] length) as it weathervanes (rotates) around the buoy. All unauthorized vessels would be prohibited from anchoring or transiting the proposed Safety Zone at any time. The USCG would have the primary jurisdiction for the Safety Zone.

5.5.2.2 No Anchoring Area and Area to be Avoided

If a License is issued, the USCG may designate a mandatory NAA and ATBA to further facilitate Port operations, safety, and security. These restrictions would extend beyond the buoy anchor that encompasses an approximate 1,500-m (4,922-feet) radius around each of the buoys. The NAA for the pipeline would encompass approximately 200 m (656 feet) along the centerline of the pipeline.

In general, the ATBA, NAA and Safety Zones around each buoy would be established at all times, and together would form a "barbell" shape where the ends of the barbell would encompass the Safety Zone around each buoy, and the ATBA would form the middle of the barbell extending between the two circular zones. SRV traffic would be coordinated by Port personnel. The actual size of the ATBA that would be requested of IMO would be determined through the advice and consent of USCG. The ATBA would appear on subsequent editions of the nautical charts. The ATBA is meant to discourage vessel traffic and is normally recommendatory. The Safety Zone, ATBA and NAA areas are shown in **Figure 2.3-10.**

5.5.3 LNG Vessel Support

5.5.3.1 Vessel Safety and Collision

To avoid vessel collisions, a continuous security watch would be maintained at strategic locations on the SRVs while underway and moored at a buoy. An average of approximately 50 SRVs would annually call on Port Dolphin. It is anticipated that the SRVs would approach Port Dolphin from the south and leave Port Dolphin heading back south. The vessels would follow prescribed routing procedures developed by USCG when arriving and leaving the Port to avoid collisions and to avoid or minimize other potential

impacts. Weather conditions, specifically current and wind direction, would influence all decisions on the mooring buoy approach and exit.

During operations, there would be dedicated tugs stationed at onshore facilities. These tugs would meet every inbound SRV and provide as-needed support for pushing, maneuvering, or towing while SRVs approach or exit the buoy. Due to their size and relatively low speeds, these support vessels would not have the vessel energy required to breach the hull of an SRV. The proposed support vessel traffic would be required to operate at all times under USCG rules and regulations, including any special operating regulations established for the Safety Zones and the ATBA.

5.5.3.2 Mooring and Berthing

The mooring buoy system proposed by the Applicant would allow SRVs to moor or berth at any time of the day or night, depending on weather conditions; however, final approval related to buoy mooring procedures would be made as part of USCG's review and approval of the proposed Port Dolphin Operations Manual.

It is anticipated that the complete cycle for each SRV would average 5 days and range between approximately 4 to 8 days, including buoy capture, hookup, offloading, and disconnect. SRVs would not be refueled while at Port Dolphin or enter any other U.S. port facility to refuel.

Estimates of the wave conditions that would limit Port Dolphin operations were based on experience at existing offshore mooring buoy systems (see **Section 2.1.3**). A mooring monitoring system would be provided for real-time monitoring of all mooring cables and to provide warning of excessive or dangerous loads. The monitoring system would enable the Port operator and the Mooring Master to maintain safe and effective mooring tension and to provide vessel drift warnings. The mooring monitoring system would be integrated into the vessel's bridge operations.

Prior to departure, the Vessel or Mooring Master would make a security announcement to warn any and all vessels in the area that the SRV would soon depart. As the SRV prepares to exit Port Dolphin, the Vessel Master would evaluate weather conditions and identify the safest procedures and route for exiting the area.

Modern technology and vessel operating procedures combine to make commercial shipping very safe. The chance of a collision between an SRV and another vessel or structure is very unlikely. All practical and appropriate engineering and procedural means to minimize the chance of a collision or navigation accident associated with SRVs and support vessels would be developed, approved, and implemented with consideration of all applicable regulations and guidelines.

USCG has requirements for indicating the location of fixed structures on nautical charts and for lights, sound-producing devices, and radar reflectors to mark fixed structures and moored objects to help minimize the risk of collisions. In addition, the USCG's Local Notice to Mariners (monthly editions and weekly supplements) informs users of the offshore waters of western Florida about the addition or removal of locations of Aids to Navigation (ATONs) and defense operations involving temporary moorings.

The proposed Project vessels would follow prescribed routing procedures, as defined in the USCG-approved Operations Manual, when arriving and leaving Port Dolphin to avoid collisions and to minimize other potential impacts.

5.5.3.3 Extreme Weather

The area of the proposed and alternative location for Port Dolphin is subject to hurricanes and other tropical storms that can substantially influence regional currents, storm surges, and winds. Tropical storms (hurricanes) and extra-tropical storms (migratory cyclones and cold fronts) were evaluated for severe weather along the SRV transit and at the Port. Although the vessel at the buoy would be designed to withstand a 100-year storm, based on the analysis, a maximum wind speed of 23.9 m/s (78.4 feet per second), a wave height of 7.88 m (25.9 ft), and surface current speed of 72 cm/s (2.36 feet per second) were established as design criteria. Design specification for fixed equipment (e.g., STL buoys, anchors and chains, landing pad, PLEMs), risers were developed based on conservative safety factors for these extreme weather conditions (Port Dolphin 2007i).

If threatened by severe weather, any vessel at the Port would depart the Port in accordance with the requirements specified by USCG and in accordance with the USCG-approved Operations Manual. **Section 2.3.5** presents additional information on the parameters associated with the operations of Port Dolphin and weather and sea state conditions.

USCG would specify that the Applicant submit an Operations Manual and Facility Security Plan for approval by USCG and other appropriate authorities as a condition of the Maritime Administration License, if issued. The Operations Manual would include detailed SRV operating instructions for planned and unplanned Port closure scenarios. In addition, Port Dolphin would be required to have a plan in the USCG-approved Operations Manual to make decisions regarding hurricane evaluation and response criteria for specific weather conditions that require partial or total evacuation.

5.6 Pipeline Safety

5.6.1 Offshore Pipeline Safety Standards

Natural gas pipelines must be designed, constructed, operated, and maintained in accordance with the USDOT Minimum Federal Safety Standards (49 Part CFR 192 et seq.) and MMS requirements (30 CFR Part 250). The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. The regulations also specify material selection and qualification; integrity management; operator qualification; and pipeline protection from internal, external, and atmospheric corrosion.

Most of the pipeline associated with Port Dolphin would be offshore, and would be designed, constructed, and operated to meet or exceed the conditions of all applicable and appropriate regulations and guidelines as a condition of the Maritime Administration License, if approved. Pipe wall thickness and shutoff valve spacing would comply with applicable regulations and guidelines. Hydrostatic testing of the pipeline and risers would be performed in accordance with all applicable and appropriate regulations and guidelines. A cathodic protection system using sacrificial anodes would be installed to protect the pipeline from external corrosion.

Applicable regulations might require an approved Operation and Maintenance Plan that includes the following provisions:

- Employees would be trained and qualified to operate and maintain the pipeline system in accordance with all applicable and appropriate regulations and guidance.
- Operating procedures would address routine and emergency tasks as well as abnormal operating conditions.

- Periodic in-house refresher training classes would be required for operation and maintenance personnel to remain qualified in the performance of covered tasks and to respond properly to abnormal operating conditions and emergencies.
- Annual testing and inspection of pressure-limiting devices and ESD systems would be performed.
- The energy content and temperature of natural gas discharging into pipeline systems would be controlled in accordance with pipeline regulations.
- Inspections and flyovers of pipeline routes would be conducted at specified time intervals in accordance with the applicable and appropriate regulations and guidance.
- Development of corrosion control and integrity management plans.

The Maritime Administration License, if approved, would include appropriate conditions to ensure that design, construction, and operating requirements are incorporated for Port Dolphin, and that appropriate construction and operations training is developed and implemented.

5.6.2 Offshore Pipeline Incident Data

The data presented in **Table 5.6-1** provides a gas pipeline incident summary specific to offshore pipelines. On April 17, 2006, MMS published the Final Rule for Incident Reporting in the *Federal Register* (71 FR 19640-46) that revised the agency's incident reporting requirements. The new Incident Reporting Rule more clearly defines which incidents must be reported, broadens the scope to include incidents that have the potential to be serious, and requires the reporting of standard information for both oral and written reports. The goal of this final rule is to ensure consistent incident reporting and the collection of more reliable incident information.

Table 5.6-1. Offshore Natural Gas Pipeline Incident Summary

Incidents	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
GOM	7	13	2	7	7	11	8	9	8	6	0
Pacific	0	0	0	1	0	0	1	0	0	0	0
Total	**7**	**13**	**2**	**8**	**7**	**11**	**9**	**9**	**8**	**6**	**0**

Source: MMS 2009b

Note: Last Updated February 26, 2009

It should be noted that external corrosion is generally not considered a problem for offshore pipelines. The sacrificial anode system has been shown to provide successful lifetime protection against external corrosion (MMS 2000).

5.6.3 Offshore Third-Party Hazards

Offshore and onshore pipelines must be designed, constructed, operated, and maintained in accordance with applicable sections of 30 CFR Part 250, Subpart J and 49 CFR Part 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. Part 192 specifies material selection and qualification; minimum design requirements; and protection from internal, external, and atmospheric corrosion. Damage from outside forces poses the greatest threat to pipeline safety. MMS requires subsea pipelines to be constructed and operated with specifications that minimize these outside forces. It is doubtful that subsea pipelines would pose a significant hazard to public safety or natural gas supply reliability.

During offshore operations, there is a remote possibility that the pipelines could be impacted, resulting in a loss of natural gas. The proposed deepwater Port connection is designed with check valves at interconnects and would shut down in the event of an emergency. It is unlikely that a resultant fire would occur or cause significant damage, due to the need for an ignition source and because of the limited amount of fuel available to feed the fire. In the event of a collision and fire, Port Dolphin would commence ESD and evacuation procedures. Any fire that occurs would be confined to the general vicinity of the release and would be of limited duration (i.e., self-limited). The fire would have limited impact on the environment and, due to the lack of surrounding man-made features, would have a minimal impact on other facilities.

A rupture near the interconnection would result in a loss of natural gas from the pipeline. However, any significant damage would be unlikely from this type of event because natural gas would bubble to the surface and dissipate. A fire could develop above the water surface if a vessel in the area provides an ignition source. As in the case of the vessel collision scenario, Scenario 4, the resultant fire would be of short duration and would have limited impact on the environment.

The ATBA and NAA also would be designed to limit risk of damage to all Project and non-Project vessels. By restricting access within these areas, it is unlikely that an anchor or fishing net would snag the submerged proposed Project components.

5.6.4 Mitigation Measures

The Applicant would comply with all applicable laws and regulations designed to promote safety and security of Port Dolphin. The following requirements would enhance safety at Port Dolphin:

- Pursuant to the regulations of the DWPA, USCG is authorized to establish temporary and permanent mandatory Safety Zone around deepwater ports. In addition, an ATBA and NAA would be established at the request of the USCG to the IMO. The deepwater port license application does not, by itself, constitute such applications for these zones and areas.
- The Applicant would include in its Operations Manual specific requirements describing the staffing and procedures for vessel traffic management, including procedures for monitoring and communicating with vessels in the vicinity of the proposed deepwater Port.
- The Applicant would include in its Operations Manual specific procedures based on regulations for communicating with vessels and controlling vessel movements within the Safety Zones.
- The Applicant would include in its Operations Manual specific instructions requiring Port Dolphin personnel to broadcast an emergency call on appropriate frequencies of any release or potential release of LNG cargo from Port Dolphin.

5.7 Onshore Pipeline Safety

5.7.1 Onshore Natural Gas Pipeline Segment

By definition all components and equipment of a deepwater port are seaward of the high-water mark (33 U.S.C. 1502.9). The onshore segment of the proposed new natural gas pipeline from the high-tide line to the connection with onshore facilities would be subject to permitting by FERC. Through agreement with the USCG, FERC will rely on this EIS to satisfy the NEPA documentation required for their permit evaluation. While pipeline segments within coastal waters (to 4.8 km [3 mi] offshore) would not be subject to FERC permitting, the USCG would, where appropriate, adopt FERC guidance as the baseline for assessment of safety and reliability for the natural gas pipeline segment within coastal waters.

The transportation of natural gas by pipeline in proximity to the public involves some risk in the event of an accident and subsequent release of gas. The greatest hazard is a fire or explosion following a major pipeline rupture.

5.7.2 Safety Standards

The USDOT is mandated to provide pipeline safety under 49 U.S.C. 601. The Office of Pipeline Safety (OPS) within the Pipeline and Hazardous Material Safety Administration (PHMSA) administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards that set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. PHMSA ensures that people and the environment are protected from the risk of pipeline incidents. This work is shared with state agency partners and others at the Federal, state, and local level. Section 5(a) of the Natural Gas Pipeline Safety Act provides for a state agency to assume all aspects of the safety program for intrastate facilities by adopting and enforcing the Federal standards, while section 5(b) permits a state agency that does not qualify under section 5(a) to perform certain inspection and monitoring functions. A state may also act as a USDOT agent to inspect interstate facilities within its boundaries; however, the USDOT is responsible for enforcement action. The majority of the states have either 5(a) certifications or 5(b) agreements, while nine states act as interstate agents. The USDOT pipeline standards are published in 49 CFR Parts 190–199. 49 CFR Part 192 specifically addresses natural gas pipeline safety issues.

Under a Memorandum of Understanding (MOU) on Natural Gas Transportation Facilities (Memorandum) dated January 15, 1993, between the USDOT and FERC, the USDOT has the exclusive authority to promulgate Federal safety standards used in the transportation of natural gas. Section 157.14(a)(9)(vi) of FERC's regulations require that an applicant certify that it would design, install, inspect, test, construct, operate, replace, and maintain the facility for which a certificate is requested in accordance with Federal safety standards and plans for maintenance and inspection, or shall certify that it has been granted a waiver of the requirements of the safety standards by the USDOT in accordance with section 3(e) of the Natural Gas Pipeline Safety Act. FERC accepts this certification and does not impose additional safety standards other than the USDOT standards. If FERC becomes aware of an existing or potential safety problem, there is a provision in the MOU to promptly alert the USDOT. The MOU also provides for referring complaints and inquiries made by state and local governments and the general public involving safety matters related to pipelines under FERC's jurisdiction. FERC also participates as a member of the USDOT's Technical Pipeline Safety Standards Committee which determines if proposed safety regulations are reasonable, feasible, and practicable.

The pipeline and aboveground facilities associated with the proposed Port (see **Section 2.3**) in Port Manatee and Manatee County, Florida, must be designed, constructed, operated, and maintained in accordance with the USDOT Minimum Federal Safety Standards in 49 CFR Part 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. 49 CFR Part 192 specifies material selection and qualification; minimum design requirements; and protection from internal, external, and atmospheric corrosion.

49 CFR Part 192 also defines area classifications, based on population density in the vicinity of the pipeline, and specifies more rigorous safety requirements for populated areas. The area classification is an area that extends 201 m (220 yards) on either side of the centerline of any continuous 1.6-km (1-mi) length of pipeline. The four area classifications are defined as follows:

- *Class 1:* Location with 10 or fewer buildings intended for human occupancy

- *Class 2:* Location with more than 10 but less than 46 buildings intended for human occupancy
- *Class 3:* Location with 46 or more buildings intended for human occupancy or where the pipeline lies within 91 m (100 yards) of any building, or a small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12-month period
- *Class 4:* Location where buildings with four or more stories above ground are prevalent.

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. Pipelines constructed on land in Class 1 locations must be installed with a minimum depth of cover of 30 inches normal soil and 18 inches in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock. The proposed pipeline exceeds the minimum Class 1 requirements and would be installed with a minimum of 36 inches of cover in normal soil (Port Dolphin 2008b).

All pipelines installed in navigable rivers, streams, and harbors must have a minimum cover of 122 cm (48 inches) in soil or 61 cm (24 inches) in consolidated rock. Offshore pipelines constructed in less than 3.7 m (12 feet) of water, as measured from the mean low tide, must have a minimum cover of 91 cm (36 inches) in soil and 46 cm (18 inches) in consolidated rock. Area classifications 2, 3, and 4, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 91 cm (36 inches) in normal soil and 61 cm (24 inches) in consolidated rock. Offshore pipelines constructed in 3.7 to 61 m (12 to 200 feet) of water, as measured from the mean low tide, must be installed so that the top of the pipe is below the natural bottom unless the pipeline is protected by some other means such as a heavy concrete coating.

Class locations also specify the maximum distance to a sectionalizing block valve (e.g., 16 km [10.0 mi] in Class 1, 12 km [7.5 mi] in Class 2, 6.4 km [4.0 mi] in Class 3, and 4 km [2.5 mi] in Class 4). Pipe wall thickness and pipeline design pressures, hydrostatic test pressures, maximum allowable operating pressure, inspection and testing of welds and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas. Preliminary class locations for the proposed Port have been developed based on the relationship of the pipeline centerline to other nearby structures and man-made features.

If a subsequent increase in population density adjacent to the ROW indicates a change in class location for the pipeline, Port Dolphin would reduce the maximum allowable operating pressure or replace the segment with pipe of sufficient grade and wall thickness, if required, to comply with USDOT regulations for the new class location.

In 2002, Congress passed an act to strengthen the nation's pipeline safety laws. The Pipeline Safety Improvement Act of 2002 (HR 3609) was passed by Congress on November 15, 2002, and signed into law by the President in December 2002. No later than December 17, 2004, gas transmission operators were required to develop and follow a written integrity management program that contains all the elements described in 49 CFR 192.911 and addresses the risks on each covered transmission pipeline segment. Specifically, the law established an integrity management program which applies to all high consequence areas (HCAs). The USDOT (68 FR 69778, 69 FR 18228, and 69 FR 29903) defines HCAs as they relate to the different class zones, potential impact circles, or areas containing an identified site as defined in section 192.903 of the USDOT regulations.

OPS published a series of rules from August 6, 2002, to May 26, 2004 (69 FR 29903), that defines HCAs where a gas pipeline accident could do considerable harm to people and their property and requires an integrity management program to minimize the potential for an accident. This definition satisfies, in part,

the Congressional mandate in 49 U.S.C. 60109 for OPS to prescribe standards that establish criteria for identifying each gas pipeline facility in a high-density population area.

The HCAs can be defined in one of two ways. In the first method an HCA includes the following:

- Current Class 3 and Class 4 locations
- Any area in Class 1 or Class 2 where the potential impact radius[5] is greater than 660 feet and there are 20 or more buildings intended for human occupancy within the potential impact circle[6]
- Any area in Class 1 or Class 2 where the potential impact circle includes an identified site[7]
- In the second method an HCA includes any area within a potential impact circle which contains 20 or more buildings intended for human occupancy, or an identified site.

Once a pipeline operator has determined the HCAs on its pipeline, it must apply the elements of its integrity management program to those segments of the pipeline within HCAs. The USDOT regulations specify the requirements for the integrity management plan at section 192.911. The Applicant has not identified any HCAs along the proposed pipeline route.

The pipeline integrity management rule for HCAs requires inspection of the entire pipeline in HCAs every 7 years.

49 CFR Part 192 prescribes the minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these activities. Under 49 CFR 192.615, each pipeline operator must also establish an emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency. Key elements of the plan include procedures for the following:

- Receiving, identifying, and classifying emergency events, gas leakage, fires, explosions, and natural disasters
- Establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response
- Emergency shutdown of system and safe restoration of service
- Making personnel, equipment, tools, and materials available at the scene of an emergency
- Protecting people first and then property, and making them safe from actual or potential hazards.

49 CFR Part 192 requires that each operator must establish and maintain liaison with appropriate fire, police, and public officials to learn the resources and responsibilities of each organization that might respond to a natural gas pipeline emergency, and to coordinate mutual assistance. The operator must also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials. The Applicant would provide the appropriate training to local emergency service personnel

[5] The potential impact radius is calculated as the product of 0.69 and the square root of the maximum allowable operating pressure (MAOP) of the pipeline in psi multiplied by the pipeline diameter in inches.

[6] The potential impact circle is a circle of radius equal to the potential impact radius.

[7] An identified site is an outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period; a building that is occupied by 20 or more persons on at least 5 days a week for any 10 weeks in any 12-month period; or a facility that is occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

before the pipeline is placed in service. No additional specialized local fire protection equipment would be required to handle pipeline emergencies.

5.7.3 Pipeline Accident Data

Since February 9, 1970, 49 CFR Part 191 has required all operators of transmission and gathering systems to notify the USDOT of any reportable incident and to submit a report on Form F7100.2 within 20 days. Reportable incidents are defined as any leaks that cause the following:

- A death or personal injury requiring hospitalization
- Any segment of transmission line to be taken out of service
- Gas ignition
- Damage to the property of the operator, or others, or both, estimated at a total of $5,000 or more
- Immediate repair on a transmission line to be required
- Occurred while testing with gas or another medium
- Is significant in the judgment of the operator, even though it does not meet the above criteria.

The USDOT changed reporting requirements after June 1984 to reduce the amount of data collected. Since that date, operators must only report incidents that involve property damage of more than $50,000, injury, death, release of gas, or that are otherwise considered significant by the operator. **Table 5.7-1** presents a summary of incident data for the 1970 to 2005 period. The service incident data summarized in **Table 5.7-1** include pipeline failures of all magnitudes with widely varying consequences. Approximately two-thirds of the incidents were classified as leaks, and the remaining third was classified as ruptures, implying a more serious failure.

Table 5.7-1. Onshore Natural Gas Service Incidents by Cause

Incidents per 1,000 miles of Pipeline (percentage)		
Cause	**1970–1984**	**1986–2005**
Outside force	0.70 (53.8)	0.10 (38.5)
Corrosion	0.22 (16.9)	0.06 (23.1)
Construction or material defect	0.27 (20.8)	0.04 (15.4)
Other	0.11 (8.5)	0.06 (23.1)
Total	**1.30**	**0.26**

Source: FERC 2008

The 14.5-year period from 1970 through June 1984, which provides a larger universe of data and more basic report information than subsequent years, has been subject to detailed analysis, as discussed in the following section (Jones et al. 1986).

During the 14.5-year period, 5,862 service incidents were reported over the more than 300,000 total miles of natural gas transmission and gathering systems nationwide. Service incidents, defined as failures that occur during pipeline operation, have remained fairly constant over this period with no clear upward or downward trend in annual totals. In addition, 2,013 test failures were reported. Correction of test failures removed defects from the pipeline before operation.

The dominant incident cause was outside forces, constituting 53.8 percent of all service incidents. Outside forces incidents result from the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geologic hazards; weather effects such as

winds, storms, and thermal strains; and willful damage. **Table 5.7-2** shows where human error was responsible for approximately 75 percent of incidents caused by outside forces during this time. Since April 1982, operators have been required to participate in "One Call" public utility programs in populated areas to minimize unauthorized excavation activities in the vicinity of pipelines. The "One Call" program is a service used by public utilities and some private sector companies (e.g., oil pipelines and cable television) to provide preconstruction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts. The 1986 through 2005 data show that the portion of incidents caused by outside forces has decreased to 38.5 percent.

Table 5.7-2. Incidents by Outside Forces (1970 to 1984)

Cause	Percent
Equipment operated by outside party	67.1
Equipment operated by or for an operator	7.3
Earth movement	13.3
Weather	10.8
Other	1.5

Source: OPS 2008

The frequency of service incidents is strongly dependent on pipeline age. While pipelines installed since 1950 exhibit a fairly constant level of service incident frequency, pipelines installed before that time have a significantly higher rate, partially due to corrosion. Older pipelines have a higher frequency of corrosion incidents, since corrosion is a time-dependent process. Further, new pipe generally uses more advanced coatings and cathodic protection to reduce corrosion potential.

Older pipelines have a higher frequency of outside forces incidents partly because their location might be less well-known and less well-marked than newer lines. In addition, the older pipelines contain a disproportionate number of smaller diameter pipelines, which have a greater rate of outside forces incidents. Small diameter pipelines are more easily crushed or broken by mechanical equipment or earth movements.

Table 5.7-3 clearly demonstrates the effectiveness of corrosion control in reducing the incidence of failures caused by external corrosion. The use of both an external protective coating and a cathodic protection system, required on all pipelines installed after July 1971, significantly reduces the rate of failure compared to just coated or cathodically protected pipe. The data show that bare, cathodically protected pipe actually has a higher corrosion rate than unprotected pipe. This anomaly reflects the retrofitting of cathodic protection to actively corroding spots on pipes.

Table 5.7-3. External Corrosion by Level of Control (1970 to 1984)

Corrosion Control	Incidents per 1,000 miles per year
Unprotected pipe	0.42
Cathodic protection only	0.97
Coated only	0.40
Coated and cathodic protection	0.11

Source: OPS 2003

The pipelines included in the data set in **Table 5.7-3** vary widely in terms of age, pipe diameter, and level of corrosion control. Each variable influences the incident frequency that might be expected for a specific segment of pipeline. **Table 5.7-4** indicates that downward trend in pipeline-related incidences over the past 20 years. The average annual fatalities that occurred on natural gas transmission and gathering lines from 1970 to 2005 have reduced by almost half. Fatalities between 1970 and June 1984 have been separated into employees and nonemployees, to better identify a fatality rate experienced by the general public. Of the nationwide average of 5.0, fatalities among the public averaged 2.6 per year over this period. The simplified reporting requirements in effect after June 1984 do not differentiate between employees and nonemployees. However, the data show that the total annual average for the period 1984 through 2005 decreased to 3.6 fatalities per year. Subtracting two major offshore incidents in 1989, which do not reflect the risk to the onshore public, yields a total annual rate of 2.8 fatalities per year for this period.

Table 5.7-4. Average Annual Fatalities at Natural Gas Transmission and Gathering Systems

Year	Employees	Nonemployees	Total
1970–June 1984 [a]	2.4	2.6	5.0
1985–2005 [a]	–	–	3.6
1985–2005 [a]	–	–	2.8 [b]

Sources: USDOT 2005, Jones et al. 1986

Notes:

a Employee/nonemployee breakdown not available after June 1984.

b. Without 18 offshore fatalities occurring in 1989—11 fatalities resulted from a fishing vessel striking an offshore pipeline and 7 fatalities resulted from explosion on an offshore production platform.

The nationwide totals of accidental fatalities from various man-made and natural hazards are listed in **Table 5.7-5** to provide a relative measure of the industrywide safety of natural gas pipelines. Direct comparisons between accident categories should be made cautiously, however, because individual exposures to hazards are not uniform among all categories. Nevertheless, the average 2.6 public fatalities per year is relatively small considering the more than 480,000 km (300,000 mi) of transmission and gathering lines in service nationwide. Furthermore, the fatality rate is approximately two orders of magnitude (100 times) lower than the fatalities from natural hazards such as lightning, tornados, floods, and earthquakes.

The available data show that natural gas pipelines continue to be a safe, reliable means of energy transportation. Based on approximately 480,000 km (300,000 mi) in service, the rate of public fatalities for the nationwide mix of transmission and gathering lines in service is 0.01 per year per 1,600 km (1,000 mi) of pipeline. Using this rate and based on the proposed 6.4 km (4 mi) of onshore natural gas pipeline and proposed lifespan of 30 years, the Port is not expected to result in a public fatality from an onshore pipeline accident.

Table 5.7-5. Nationwide Accidental Deaths

Type of Accident	Fatalities
Motor Vehicles	43,649
Falls	14,985
Poisoning	9,510
Fires and Burns	3,791
Drowning	3,488
Suffocation by ingested object (1985–1993 average)	3,206
Natural gas transmission pipeline (1994–2003 average) [a]	181
Hazardous liquid pipeline (1994–2003 average) [b]	27
Nonemployees only (1970–1984 average)	2.6
All Accidents	**90,523**

Source: Census Bureau 2000 (unless otherwise noted below)

Notes:

a. USDOT 2005

b. Jones et al. 1986

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6. Cumulative and Other Impacts

6.1 Introduction

CEQ defines cumulative impacts as the "impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts can also result from individually minor but collectively significant actions taking place over a period of time within a geographic area.

Port Dolphin would include the construction and operation of two natural gas unloading buoys, two 36-inch flow lines to transfer the natural gas to the transmission line, and the transmission line from the flow lines to the onshore connections in Manatee County, Florida. SRVs would transport LNG to the unloading buoys and vaporize LNG into natural gas for distribution. The Port Dolphin Project would result in water quality, geological resources, biological, air quality, and noise quality impacts on the west coast of Florida, 45 km (28 mi) southwest of Tampa Bay. There would also be socioeconomic, recreational, and transportation impacts.

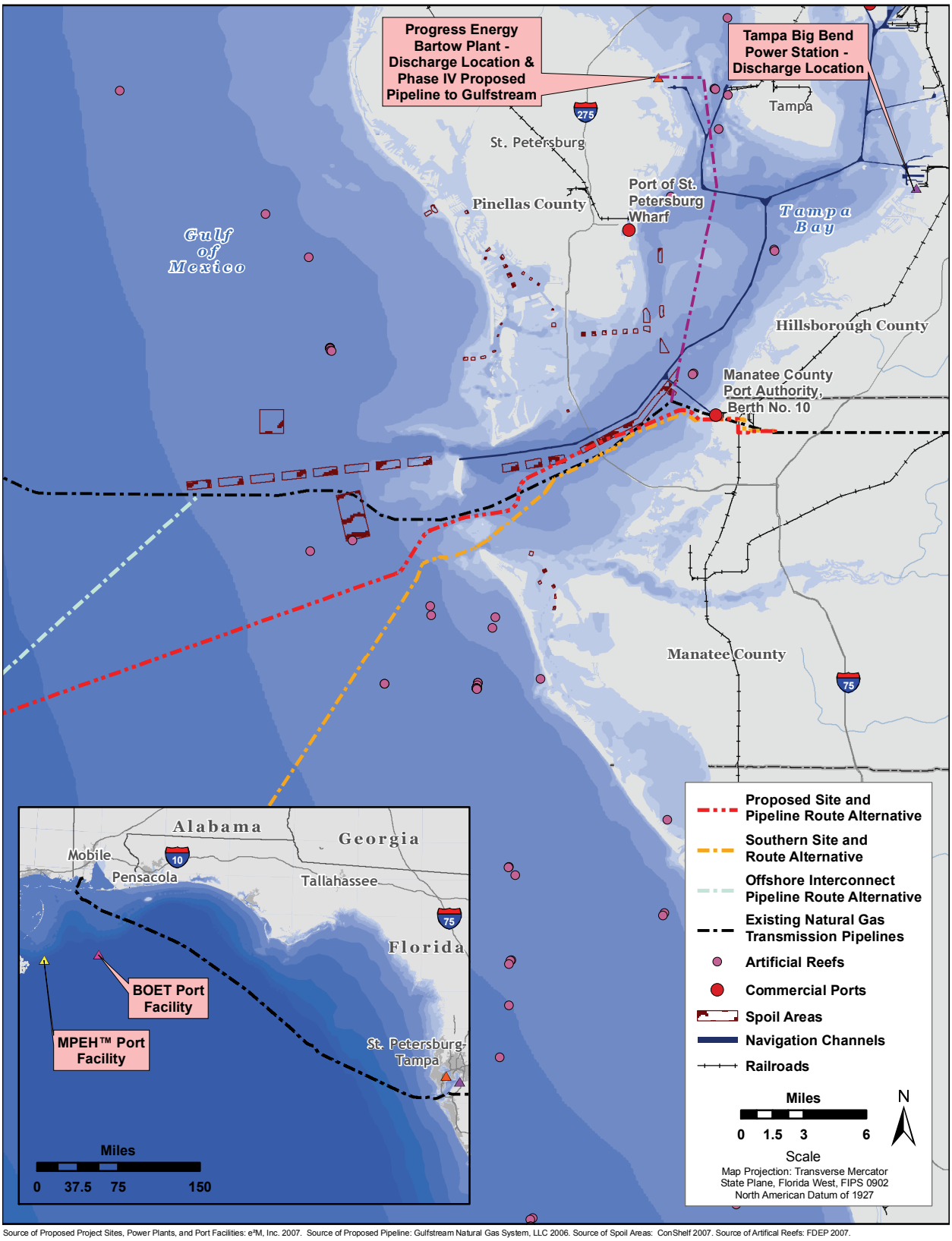
This cumulative impacts analysis summarizes expected environmental effects from the combined impacts of past, current, and reasonably foreseeable future projects within the geographic study area. The geographic study area used for the cumulative impacts analysis of the Port Dolphin project is characterized by three geographical boundaries: Tampa Bay, the west coast of Florida, and the northeastern GOM. **Figure 6.1-1** shows the current and future projects identified for Tampa Bay, the west coast of Florida, and the northeastern GOM. The northeastern GOM boundary was chosen so that the cumulative impacts analysis would include two similar deepwater port projects (see **Table 6.2-1**). Projects and programs considered for this analysis were identified through consultation with local governments, state and Federal agencies, company news releases, and published media reports. Projects with similar impacts were identified and generally include offshore, nearshore, or onshore commercial and resource agency activities. In Tampa Bay, west coast of Florida, and the northeastern GOM, projects with similar impacts generally include nearshore and deepwater port construction, offshore mineral and oil leases in the OCS, resource agency operations, and onshore residential and commercial development.

6.1.1 Framework for Assessing Cumulative Impacts

The cumulative impacts analysis focuses on the resource rather than the planned action and considers impacts that take place in both space and time. For the purposes of assessing the potential cumulative effects on natural resources and activities in the marine environment for this and other projects, both within and outside the Project area, the timeline for the construction and operation of the Port Dolphin project was taken into consideration. The timeframe for the Port Dolphin project is estimated at 25 years, with construction activities scheduled to start in August 2010 and be complete in June 2011. Offshore pipeline construction would be scheduled to take 9 or 10 months. Installation of the STL subsea system is scheduled to take 3 to 4 months. Onshore pipeline construction is expected to take 5 months, and interconnections with the existing pipelines would take an additional 2 to 3 months (Port Dolphin 2007a).

The general approach taken for cumulative impacts analysis in this EIS is as follows:

- Define other past, present, and reasonably foreseeable activities that could impact resources within the ROI of Port Dolphin (see **Section 6.2**)
- Assess whether impacts from Port Dolphin overlap impacts (in time and space) from other activities, potentially creating cumulative impacts



Source of Proposed Project Sites, Power Plants, and Port Facilities: e²M, Inc. 2007. Source of Proposed Pipeline: Gulfstream Natural Gas System, LLC 2006. Source of Spoil Areas: ConShelf 2007. Source of Artifical Reefs: FDEP 2007.

Figure 6.1-1. Present and Proposed Projects in Tampa Bay and the Northeastern Gulf of Mexico

- Total the impacts from Port Dolphin with other similar impacts, if impacts are additive and if quantitative information is available, or make a qualitative assessment of total impacts
- Estimate Port Dolphin's incremental contribution to total (cumulative) impacts (as a percentage of total, if quantitative)
- Assign an impact duration (short- or long-term) and an impact descriptor (minor, moderate, or major) to Port Dolphin's contributions to cumulative impacts and discuss whether an impact is adverse or beneficial to the resource
- Review mitigation measures identified throughout **Section 4.11** (BMPs, Mitigation and Minimization Measures, and Monitoring) for their effectiveness in reducing cumulative impacts and identify further mitigation measures designed to specifically reduce cumulative impacts, where possible.

6.1.2 Organization of Cumulative Impacts Chapter

Section 6.2 discusses the past, present, and reasonably foreseeable cumulative actions, as defined by CEQ. These are organized by type of projects (e.g., LNG projects, pipeline projects). **Section 6.3** includes the cumulative impacts analysis related to past, present, and reasonably foreseeable actions for those resources that would be adversely impacted by the construction and operations of Port Dolphin. Cumulative impacts on resources are summarized in **Table 6.3-1**. **Section 6.4** presents unavoidable impacts for each resource area and **Section 6.5** introduces the irreversible and irretrievable commitment of resources. The relationship between short-term uses and long-term productivity is discussed in **Section 6.6**.

6.2 Past, Present, and Reasonably Foreseeable Cumulative Actions

6.2.1 LNG Projects

LNG projects that could contribute to cumulative impacts within the geographical study area are discussed in this section. There are five operational LNG terminals in the United States. Two of these operational terminals are located in the GOM. Lake Charles LNG terminal is in Louisiana, and is licensed through FERC. The Gulf Gateway Energy Bridge is an offshore LNG terminal in West Cameron Block 603 of the GOM. In addition to these constructed and operational LNG terminals, licenses have also been approved by the Maritime Administrator for Port Pelican deepwater port, the Gulf Landing deepwater port, and the MPEH™ deepwater port. MPEH™ would be located in Main Pass Block 299, off the coast of Louisiana. The sponsors of the MPEH™ project are currently seeking external financing. Port Pelican and Gulf Landing have been indefinitely delayed by the applicants. A new proposal for a deepwater port LNG terminal in the GOM is anticipated in the summer of 2009. If approved and constructed, the Bienville Offshore Energy Terminal (BOET) would be located in Main Pass Block 258 off the shore of Alabama. The original BOET application was withdrawn in October 2008 while the applicant revised the design utilizing a closed-loop regasification system. The FERC has also approved two additional onshore LNG terminals in the Pascagoula, Mississippi, area.

The projects that could include impacts cumulative to Port Dolphin are presented in **Figure 6.1-1** and **Table 6.2-1**. The USCG and Maritime Administration have also received informal inquiries concerning application procedures for other deepwater ports for natural gas; however, this evaluation would include those deepwater port applications of which the USCG is aware[1].

[1] The USCG declines to speculate on where additional deepwater ports for natural gas might be located, what technologies they might employ, or whether inquiries that have been made to date will, in fact, result in license applications.

Table 6.2-1. Existing and Proposed LNG Terminals Within the Geographic Study Area

Project	Project Type	Project Location	Permitting Status	Distance from Port Dolphin (estimated)
Lake Charles, LA	Onshore LNG Terminal 2.1 bcfd	Lake Charles, LA	Operational	637 mi
Bayou Cassotte Energy, LLC, MS	Onshore LNG Terminal 1.3 bcfd	Pascagoula, MS	Approved by FERC	380 mi
Gulf LNG Clean Energy, LLC, MS	Onshore ONG Terminal 1.5 bcfd	Pascagoula, MS	Approved by FERC	380 mi
BOET LNG (TORP)	Deepwater Port 1.4 bcfd submerged turret loading system	GOM, Main Pass Block 258	Application withdrawn on October 9, 2008	319 mi
MPEH™	Deepwater Port 1.0 bcfsd, reuse of existing platforms plus new platforms	GOM, Main Pass Block 299	Application approved January 3, 2007	362 mi

Sources: FERC 2008a; MARAD 2008a, 2008b; USDOT 2007

Impacts on the GOM and Florida as a whole are also assessed where appropriate. All proposed LNG facilities were considered, but only those relevant to the resource in question were addressed in the cumulative impacts assessment. Facilities west of the Mississippi River were considered outside of the range of influence for assessment of cumulative impacts; therefore, LNG facilities west of the Mississippi are not considered to have cumulative impacts on the Proposed Project. Using these criteria and the geographic location of ports east or west of the Mississippi River discharge plume, the assessment of cumulative impacts associated with the Port Dolphin project would include the MPEH™ and BOET project proposed for the northeastern GOM. Both the Bayou Cassote Energy and the Gulf Clean Energy terminals are more than 600 km (375 mi) northwest of the Port Dolphin terminal in coastal waters. Due to the distance between the terminals, current movement between coastal and Federal waters, and meteorology, it would be rare that impacts between Port Dolphin and the two Pascagoula terminals would ever overlap. Therefore, the following LNG terminals will be considered when evaluating cumulative impacts.

- MPEH^{TM} would be approximately 25.7 km (16 mi) southeast of the coast of Louisiana in Main Pass Block 299 in a water depth of approximately 64 m (210 feet). MPEH^{TM} would provide a peak capacity of 1.0 bcfd. MPEH^{TM}'s major components would include four existing platforms, two new platforms, five natural gas takeaway pipelines, and natural gas liquids pipeline. The proposed natural gas pipelines would connect to the interstate pipeline system off- and onshore. The natural gas liquids pipeline fractionating facility is located in Venice, Louisiana.
- BOET would be approximately 101 km (63 mi) south of Fort Morgan, Alabama, in Main Pass Block 258 in a water depth of approximately 130 m (425 feet). BOET would provide a peak capacity of 1.4 bcfd of natural gas. BOET's major components would include a support platform, two HiLoad LNG regasification units to receive and regasify LNG and parking systems for the HiLoad units, and four offshore gas pipelines totaling 39.8 km (22.7 mi) long. The interconnect pipelines would connect with existing natural gas pipelines on the OCS.

Table 6.2-2 shows the time and spatial comparison of the proposed GOM deepwater ports to assess whether impacts from Port Dolphin overlap impacts (in time and space) from activities at these LNG terminals.

Table 6.2-2. Time and Spatial Comparison of the Proposed GOM Deepwater Ports

Deepwater Port	Construction Period	Operation Period	Distance Direction to Port Dolphin	Distance Direction to MPEH™	Distance Direction to BOET	Distance Offshore Miles	Depth of Water Feet
Port Dolphin	11 months	Estimated to begin mid 2011, lasting for 20 years	---	363 mi SW	319 mi SW	28 [a]	100
MPEH™	48 months	Estimated to begin 2011, lasting for 30 years [a]	363 mi NE	---	48 mi W	16 [a]	210 [a]
BOET	7 months	Estimated to begin 2013, lasting for 25 years [b]	319 mi NE	48 mi E	---	63 [c]	425 [c]

Sources: a. USCG and MARAD 2006, b. LNG Unlimited 2009, c. USCG and MARAD 2005

6.2.2 Pipeline Projects

In 2001, Gulfstream Natural Gas System LLC completed a 419-mi-long, 36-inch-diameter offshore pipeline between Mobile Bay, Alabama, and Tampa Bay, Florida. The Gulfstream EIS estimated that the pipeline would cross approximately 28.7 miles of live-bottom area and 3.5 miles of forested wetlands when constructed (FERC 2001b). The Florida Gas Transmission Company Bayside Lateral EIS estimated short-term adverse impacts from construction on forestlands to be 26.3 acres, and long-term adverse impacts on forestlands to be 10.6 acres during the operation of the pipeline (FERC 2001a). Gulfstream is currently proposing to construct approximately 18 mi of 20-inch offshore pipeline from a proposed underwater hot tap with the existing Gulfstream pipeline in the Hillsborough County waters of Tampa Bay and connecting to the existing Progress Energy Bartow Power Plant on the eastern shore of St. Petersburg, Florida, in Pinellas County (USEPA 2006).

There are two proposed onshore pipeline projects that could have an added impact along with the onshore portion of the Proposed Action. The St. Petersburg Relay Replacement Project and the Phase VII Expansion Project are both located in the same geographical area as the onshore portion of the proposed Port Dolphin pipeline and interconnection facilities. These projects, in combination with the Proposed Action, could have a cumulative impact on resources. **Table 6.2-3** outlines the proposed natural gas pipelines in Florida that could have direct and indirect cumulative impacts on resources in the geographical area of cumulative impact.

There are several additional operational pipelines in the Tampa Bay area of Florida. There are three operating pipelines in Manatee County, Florida. These pipelines are operated by FPL, FTG, and Williams Transco (PHMSA 2007). Six pipelines, operated by Bayside Power Plant, Central Florida Pipeline Corporation, FGT, Tampa Bay Pipeline Company, Tampa Pipeline Limited Partnership, and William Gas Pipeline Transco, are operated in Hillsborough County. Two pipelines, operated by FGT and Florida Power Corporation are operated in Pinellas County (PHMSA 2007). **Table 6.2-4** outlines

operational pipelines in Tampa Bay, Florida. Construction of Port Dolphin could be additive to the operation and maintenance of these pipelines.

Table 6.2-3. Proposed Pipeline Projects in Tampa Bay Area, Florida

Project Name	Company	Activity Description
Phase VII Expansion Project	Florida Gas Transmission Company	Request for permission and authorization to construct, own, and operate certain pipeline facilities and additional compression to enable FGT to provide firm transportation services
St. Petersburg Relay Replacement Project	Florida Gas Transmission Company	FGT proposes to replace about 6.6 miles of its St. Petersburg 12-inch-diameter lateral pipeline in east-central Pinellas County, Florida

Source: USEPA 2006

Table 6.2-4. Operational Pipelines in the Tampa Bay Area, Florida

Project Name	Company	Activity Description
Gulfstream Pipeline	Gulfstream LLC	Proposal to construct approximately 18 mi of 20-inch offshore pipeline from a proposed underwater hot tap with the existing Gulfstream pipeline in the Hillsborough County waters of Tampa Bay and connecting to the existing Progress Energy Bartow Power Plant on the eastern shore of St. Petersburg, Florida, in Pinellas County.
Cypress Pipeline Project	Southern Natural Gas Company	Proposal to construct about 165 miles of mainline pipeline in Chatham, Effingham, Bryan, Liberty, Long, McIntosh, Glynn, Camden, and Charlton counties, Georgia; and Nassau, Duval, and Clay counties, Florida, about 10 miles of pipeline loop in Chatham and Effingham counties, Georgia; and three new compressor stations in Liberty County and Glynn County, Georgia, and Nassau County, Florida.
Florida Natural Gas Storage Project	Floridian Natural Gas Storage Company, LLC	The project would consist of a natural gas storage facility in Martin County, Florida, north of Indiantown, Florida, and two approximately 4-mile-long natural gas pipelines, extending northwest from the facility to interconnect with the existing interstate pipeline systems of Florida Gas Transmission and Gulfstream Natural Gas System, LLC.
Inglis Hydropower Project	Inglis Hydropower, LLC	The project would be located on the Withlacoochee River, in Levy County, Florida.
Martin Connector	Gulfstream Natural Gas System, L.L.C.	Proposal to construct a 4.98-mile-long pipeline in Martin County, Florida.
Phase III Pipeline Project	Gulfstream Natural Gas System, L.L.C.	Gulfstream proposes to construct, own, and operate a 34.3-mile segment of 30-inch gas pipeline extending from its existing Station 712 in Martin County, Florida, to a newly constructed station that would connect to the proposed FPL gas turbine West County Energy Center in Palm Beach County, Florida.

Project Name	Company	Activity Description
Phase VII Expansion Project	Florida Gas Transmission Company	Application to expand existing pipeline facilities between Jacksonville and Tampa, Florida. The expansion would consist primarily of 32 miles of looping pipeline and modifying compression at two existing compressor stations. This expansion is planned to transport new volumes of gas to be delivered into Florida by the Cypress Pipeline Project (PF05-7-000).
SR 91 Pipeline Relocation Project	Florida Gas Transmission Company	Approval to abandon certain mainline pipeline and to construct, modify, and operate mainline pipeline, valves, and ancillary facilities to replace a portion of mainline on the FGT East Leg to accommodate a widening project of State Road 91 in Broward County, Florida.
SR 91 Widening Project	Florida Gas Transmission Company	Proposal to replace/relocate about 13 miles of pipeline to resolve possible conflicts resulting from the widening of State Route 91 in Broward County, Florida.
Turkey Point Project	Florida Gas Transmission Company	Application to construct a new compressor station on an existing lateral on the grounds of the Turkey Point Power Plant in Miami-Dade County, Florida.

Source: USEPA 2006

6.2.3 Electrical Power Transmission Line Projects

There are two electrical power transmission line projects scheduled for completion in 2011 that could have an added impact along with the onshore portion of the Proposed Action. Power transmission lines are linear projects that can have similar impacts as pipeline projects due to the necessity of a corridor ROW and associated disturbances. **Table 6.2-5** outlines the proposed electric power transmission line projects in the project vicinity that could have direct and indirect cumulative impacts on resources in the geographical area of cumulative impact. The proposed corridors for the BobWhite-Manatee Line and the Lake Agnes-Gifford Line are approximately 10 miles and 70 miles, respectively, from the onshore portion of the Proposed Action.

Table 6.2-5. Proposed Electric Transmission Line Projects in Tampa Bay Area, Florida

Project Name	Company	Activity Description
BobWhite-Manatee 230-kV Line	Florida Power and Light	Proposed 25.5-mile-long line to connect the Manatee Energy Center near Parrish in Manatee County to a proposed new substation east of I-75 in Sarasota County. Approved by FDEP in November 2008.
Lake Agnes-Gifford 230kV Line	Progress Energy/Tampa Electric	Proposed 27.5-mile-line connecting Tampa Electric's existing Lake Agnes substation in Polk County to Progress Energy's planned Gifford Substation in Orange County. Siting Board hearing scheduled January 2009.

Source: FDEP 2008a

6.2.4 Sand Resources

6.2.4.1 Dredging

Dredging operations include sediment and gravel harvesting; pipeline installation; canal installation, maintenance, and modifications; harbor installation and maintenance; and stream channelization. The USACE dredges millions of cubic meters of material a year. Materials from maintenance dredging are primarily disposed on existing dredged-material disposal banks and in dredged-material disposal areas in Federal and state waters. Some dredge-material can be used in a beneficial manner such as wetland restoration projects, beach nourishment projects, and industrial and commercial development. Dredged material disposal results in temporarily increased turbidity and resuspension and can release sediment contaminants into coastal waters (MMS 2007). There are several dredged-material disposal areas in the vicinity of the Port Dolphin Project area.

Currently, dredging to maintain the Tampa Bay's channels generates about a million cubic yards of material each year. Much of the sediment dredged during maintenance activities is deposited on two man-made spoil islands in Hillsborough Bay. Eventually these spoils would reach capacity and alternatives would be necessary to accommodate the nearly 30 million cubic yards that would be created through the year 2030. Options for increasing the capacity of these islands are being studied. USACE is also evaluating the need for additional passing and turning lanes, anchorage areas, creation of a loop channel, and several other navigational safety improvements to accommodate increased maritime commerce in Tampa Bay (TBEP 2006). A comprehensive maintenance and expansion-dredging program is underway at Port Manatee. The Port of St. Petersburg has been approved to initiate studies to widen and deepen the Port basin and approach channel. The Port of Tampa has recently completed the widening of a portion of Sparkman Channel to support larger cruise ship traffic (FSTEDC 2007).

6.2.4.2 Beach Nourishment Projects

Beach nourishment projects on the west coast of Florida are currently occurring in Pinellas County (i.e., Longboat Key and Egmont Key), Manatee County, Sarasota County, Charlotte County, and Lee County (TBW 2007). **Figure 6.2-1** shows existing and potential sand resources in the area used for beach nourishment projects. The existing and potential sand resources in the area would be used primarily by Longboat Key and Anna Maria Island. Beach nourishment projects within these two towns occur on varying time scales. Longboat Key's last major nourishment projects occurred in 1993, 1997, and 2006 and the average volume of sand was 1,529,100 m^3 (2,000,000 y^3). According to Longboat Key's beach management plan the next major nourishment is scheduled for 2014. Anna Maria Island conducted beach nourishment projects in 1993, 2002, and 2006. The average volume of sand used for each of Anna Maria Island's projects was 1,150,000 m^3 (1,500,000 y^3). The Applicant has rerouted the pipeline to avoid mapped and active sand resources to the extent applicable. The volume of sand restricted by the proposed pipeline represent 0.06 percent of all mapped potential sand resource areas, and completely avoids Borrow Area IX and the High Volume Sand Shoal Area. This represents a minute proportion of sand and impacts to the potential sand resource would be expected to be minor, long-term and adverse.

6.2.5 Oil and Gas Leasing/Mineral Leasing

There are no active oil and gas platforms near the location proposed for the Port Dolphin project. On December 20, 2006, President Bush signed into law the Gulf of Mexico Energy Security Act (GOMESA), which makes available two new areas in the GOM for leasing (the Lease Sale 224 and the "181 South" Areas). One oil and gas lease sale, within an area previously known as the "181 Area," is scheduled for

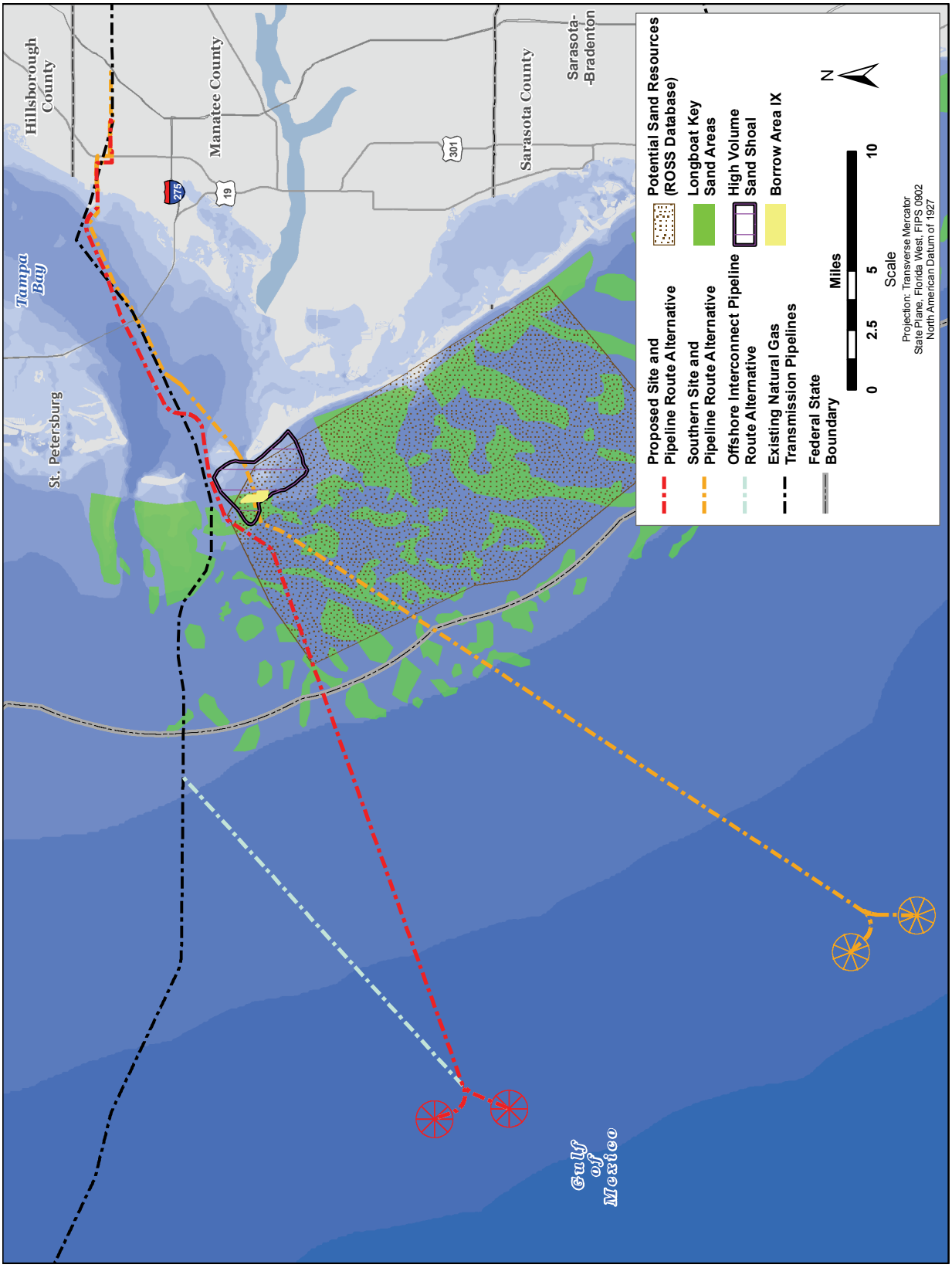


Figure 6.2-1. Existing and Potential Sand Resources in Tampa Bay, Florida

the Eastern Planning Area. Lease Sale 224 offered all blocks in the proposed lease sale area that could contain economically recoverable oil and gas via one lease sale, as authorized under GOMESA. Lease Sale 224 was held on March 19, 2008, in New Orleans, Louisiana. The MMS received 58 bids from six companies on 36 tracts, resulting in $64,713,213 in high bids. This oil and gas lease sale falls within the boundaries of this cumulative impact assessment.

The MMS prepared and disseminated to the public the Gulf of Mexico OCS Oil and Gas Lease Sale 224: Eastern Planning Area, Final Supplemental Environmental Impact Statement (EIS) (MMS 2007). The GOMESA also establishes a moratorium on leasing, preleasing, and other activities in the following areas until June 30, 2022:

- The area within 201.17 km (125 mi) of the State of Florida in the MMS Eastern Planning Area
- The 181 Area in the MMS Central Planning Area that is within 160.93 km (100 mi) of the State of Florida
- The area east of the Military Mission Line.

In April 2007, the MMS prepared an EIS entitled *Gulf of Mexico OCS Oil and Gas Lease Sales: 2007–2012* (MMS 2007). The EIS evaluated five lease sales in the Western Planning Area and six lease sales in the Central Planning Area that are expected to occur through 2012. Its discussions take into account a wide variety of activities that flow from OCS leases: exploration, pipeline and platform construction, emplacement and removal, oil and gas production operations including use of the support vessels and helicopters, and ship transit and anchoring. The eastern portion of the Central Planning area falls within the boundary for this cumulative impacts assessment. Additionally, many of the activities associated with the lease sales could result in indirect or direct cumulative impacts with the Proposed Action.

The MMS EIS for oil and gas lease sales includes offshore scenario information related to OCS Program activities in the GOM for the years 2007 to 2046. The MMS estimates that as of September 2006 there were 3,350 active offshore platforms. Presently and over the next 20 years, in comparison to other structure-based activities in the OCS (and based on known applications for future deepwater ports), there would be a substantially smaller number of LNG terminals in the GOM. In addition, adding these deepwater ports to the inventory of offshore facilities, would not affect the MMS estimates of GOM-wide activities. The Louisiana Offshore Oil Port (LOOP), permitted in 1977, was the first deepwater port and remains the only crude oil deepwater port. The LOOP is approximately 18 miles south of Leeville and Grand Isle, Louisiana, in 110 feet of water. Ultra-large crude carriers and very large crude carriers transport crude oil from around the world to the LOOP, where it is offloaded and piped to Fourchon, Louisiana, then to Clovelly Terminal.

6.2.6 Cooling Water Withdrawals and Discharges

Two projects in the Tampa Bay area would impact cooling water withdrawals and discharges. Tampa Electric's Big Bend Power Station withdraws and discharges 1.4 billion gallons per day of seawater from Tampa Bay. The Tampa Bay Seawater Desalination Plant, the largest water desalination plant in North America, works in conjunction with the Big Bend Power Station. It is designed to "catch" approximately 44 MGD of warm seawater and separate it into drinking water and concentrated seawater (TBW 2008). The plant returns the concentrated seawater to Big Bend's cooling water stream where it is mixed with approximately 1.4 billion gallons of cooling water from Big Bend to be diluted at a concentration of 70 to 1. The water is discharged at a salinity that is 1.0 to 1.5 percent higher than ambient Tampa Bay water (within Tampa Bay's normal, seasonal fluctuation). The Tampa Bay Seawater Desalination Plant is an integral part of the Tampa Bay region's drinking water supply. The plant began producing water in March 2003 and operated intermittently through May 2005, supplying nearly 5 billion gallons of fresh

drinking water to the regional system. Remediation construction was completed in spring 2007. The plant is now fully operational, providing 25 MGD of fresh drinking water daily (TBW 2008). Progress Energy's upgrade of the Bartow Plant is now 90 percent complete, and could also result in cooling water withdrawal and discharge from Tampa Bay (Progress Energy 2008). The plant began producing water in March 2003 and operated intermittently through May 2005, supplying nearly 5 billion gallons of fresh drinking water to the regional system. The desalination plant is off-line while deficiencies in the design and construction of the pretreatment and intake processes, and the reverse osmosis and intake processes, are being fixed. No expansion of the generating capacity at the Big Bend Power Station is proposed (MMS 2007).

Progress Energy's proposal to repower the Bartow Station Power Plant could also result in cooling water withdrawal and discharge from Tampa Bay. The repowering of Bartow Station in Pinellas County entails the addition of a natural gas-fired simple cycle unit and a natural gas-fired combined cycle unit, with total generating capacity of 1,475 megawatts (FDEP 2008c). Water withdrawal numbers are unknown at this time.

6.2.7 Area Fisheries Restrictions

The GMFMC is one of eight regional fishery management councils established by the MSFCMA, for the purpose of managing fisheries in the EEZ of the GOM. The GMFMC has developed seven FMPs that manage 55 species of fish and invertebrates plus the coral complex (see **Section 3.2.9**). Overfishing is occurring on four reef fish species: red snapper, greater amberjack, gag, and gray triggerfish. Overfishing occurs when more fish are being taken from a stock than the fish population can replace through reproduction or immigration from other populations. A species is declared overfished when the population size is below a certain level determined by scientists to be healthy (TBEP 2006, GMFMC 2004). The red snapper stock is in the seventh year of a 31-year rebuilding schedule (NMFS 2008). The greater amberjack stock is projected to be rebuilt in 2010 (GMFMC 2008). The rebuilding schedule for the gag stock is undefined (NMFS 2008). The gray triggerfish stock is projected to be rebuilt in 2017 (GMFMC 2008). In order for these stocks to recover, mortality needs to be reduced (NMFS 2008).

Other activities that could result in impacts on fisheries resources and EFH include overfishing, habitat degradation caused by commercial and recreational fishing, and a general degradation of water quality. Specific activities in Tampa Bay that have an adverse impact on fisheries resources include project installation, cooling water intakes and discharges, other effluent discharge, loss of trash and debris from vessels, vessel traffic, shipping, commercial and recreational fishing, and seawater intake for cooling and warming purposes.

The GMFMC has established two gear-restricted areas to protect species managed under the Reef Fish FMP. The Reef Fish Stressed Area was originally established by the GMFMC to help rebuild overfished reef fish. The Reef Fish Stressed Area is that part of the GOM EEZ shoreward of a rhumb line (a line crossing all meridians at the same angle, i.e. a path of constant bearing) (50 CFR 622.34). The use of fish traps, roller trawls (e.g., rock hopper trawl), and powerheads (e.g., a spear gun shaft with a fire arm ammunition replacing the spearhead) is prohibited in this part of the EEZ to reduce fishing pressure on snapper and grouper species. The Reef Fish Longline/Buoy Gear area was established by the GMFMC to protect the larger red snapper spawning population. The use of long lines and buoy gear are prohibited inshore of 20 fathoms in Florida and inshore of 50 fathoms for the remainder of the GOM (see **Section 3.2.3.3** and **Figure 3.2-1**) (GMFMC 2004).

The FWC, Division of Marine Fisheries (DMF) is the state agency for managing commercial and recreational marine fisheries in Florida. The DMF's Bureau of Marine Fisheries Management administers a state artificial reef program to provide financial and technical assistance to coastal local governments,

nonprofit corporations, and state universities to develop artificial reefs and to monitor and evaluate these reefs. Under the program, reefs have been constructed with one or more of the following intended objectives: (1) enhance private recreational and charter fishing and diving opportunities; (2) provide a socioeconomic benefit to local coastal communities; (3) increase reef fish habitat; (4) reduce user conflicts; (5) facilitate reef-related research; and, (6) while accomplishing objectives 1 to 5, do no harm to fishery resources, EFH, or human health. Other reef-building objectives undertaken in Florida but outside this agency include mitigation or restoration reefs to replace hard-bottom habitat lost through such activities as beach renourishment (MMS 2007).

6.2.8 Onshore Residential and Commercial Construction

The Taylor Woodrow Community of Artisan Lakes, LLC, has plans to develop the Artisan Lakes Community in Manatee County, Florida. This area would be adjacent to the FPL and Gulfstream easements. Construction of the community could overlap with construction of the onshore pipeline causing additional impacts on transportation and community infrastructure**.**

The population in Tampa Bay is expected to grow approximately 19 percent by the year 2015 (TBEP 2006). Population increases and development in the Tampa Bay region are related to the major shipping centers and the associated commercial and recreational activities (USEPA 2006). The effects of the population growth, development, and other commercial and recreational activities (such as commercial and recreational fishing) could result in direct and indirect coastal and offshore cumulative impacts with the Proposed Action.

6.3 Overview of Cumulative Impacts Analysis

This section will evaluate resource-specific impacts related to the past, present, and reasonably foreseeable actions discussed in **Section 6.2**. Only those actions that are in addition to the construction or operation impacts associated with Port Dolphin project are considered. **Table 6.3-1** summarizes potential cumulative impacts on resources from the Proposed Action when combined with other past, present, and future activities. The cumulative impacts analysis is discussed in more detail in the following sections.

6.3.1 Water Quality

Incremental contribution to cumulative impacts on water quality from past and ongoing actions in Tampa Bay would be expected from: vessel operations, industrial discharges, dredged material placement, sand harvesting, pipeline construction, sewage, agriculture runoff, and historic and current fishing activities. Foreseeable future actions would include additional natural gas pipelines and offshore pipelines, as well as population growth and coastal development in the Tampa Bay area. Foreseeable future port and pipeline installation activities that would occur within the construction and operation timeline of Port Dolphin would combine with other past and ongoing discharges to Tampa Bay waters to produce minor, short-term adverse incremental contribution to cumulative impacts on water quality. Although the BOET and MPEH™ deepwater LNG ports may be constructed and operated during the same timeframe as Port Dolphin, no overlap of impacts from construction or operation are anticipated due to the spatial separation between the ports (see **Table 6.2-2**). During the installation of the Port and offshore pipeline, construction and support vessels would traverse coastal and marine waters creating discharges from bilge waters, treated sanitary wastes, and engine cooling waters. All discharges would comply with applicable Federal and state water quality standards (see **Section 3.1.3.3**). No release of free oil would occur. Anchoring of construction vessels and pipeline jetting and plowing activities would create turbidity in the water column resulting in sediment displacement. The contribution to cumulative impacts on water

Table 6.3-1. Summary of Cumulative Impacts by Resource Areas

	Resource	Past Actions	Current Actions	Proposed Action and Alternatives	Foreseeable Future Actions
Water Quality	Vessel operations, agricultural runoff, and industrial and cooling water discharges have impacted Tampa Bay and GOM water quality.	Vessel operations, agricultural runoff, and industrial and cooling water discharges impact Tampa Bay and GOM water quality.	Port and pipeline installation, cooling water discharges, pipeline integrity testing, SRVs. Cumulative impacts for the alternatives are similar.	Oil and gas production, vessels, onshore cooling water intake and discharges, dredging. MPEH™ and BOET in northeastern GOM. Potential for additional LNG Terminals. Future offshore pipelines. Population growth and coastal development in Tampa Bay area.	Current and future activities would impact Tampa Bay, coastal, and marine waters. LNG terminals would have minor, short- and long-term adverse incremental contribution to cumulative impacts on water quality.
Biological Resources	Vessel operations, onshore cooling water and industrial discharges, dredging and channelization, and offshore vessel discharges resulting in degraded historic habitat of sensitive and common wildlife species and degraded water quality for sensitive species. Stresses to GOM fisheries may also have occurred as a result of overfishing of certain species.	Vessel operations, onshore cooling water, and discharges continue to impact biological resources and wildlife habitat.	Port and pipeline installation, cooling and ballast water intake, cooling water discharges, pipeline integrity testing, SRVs. Cumulative impacts for the alternatives are similar, with the exception of marine protected resources and benthic resources where the Offshore Interconnection with the Gulfstream Pipeline Alternative would have a lesser contribution to cumulative impacts due to lesser disturbance of the ocean bottom.	Vessel operations, onshore cooling water intake and discharges, dredging, and fishing. Potential for additional LNG Terminals. Population growth and coastal development in Tampa Bay area.	Current and future activities would have short- and long-term minor adverse cumulative impacts on wildlife and threatened and endangered species as a result of temporary noise disturbances.

	Resource	Past Actions	Current Actions	Proposed Action and Alternatives	Foreseeable Future Actions
Cultural Resources	Any past land disturbance activity could have resulted in destruction of unknown artifacts.	Current land disturbance activities not likely to destroy artifacts due to the protections afforded by NHPA compliance.	None anticipated through mitigation by avoidance.	Future land disturbance activities not likely to destroy artifacts due to the protections afforded by NHPA compliance.	None anticipated through mitigation by avoidance.
Geological Resources	Installation of pipelines and structures on the OCS. Dredging of shipping channels. Beach nourishment projects.	Oil and gas production, installation of pipelines and structures on the OCS. Dredging of shipping channels. Beach nourishment projects.	Installation of pipelines and structures. Cumulative impacts for the Southern Site and Pipeline Alternative would be greater than the Proposed Alternative, but lesser for the Offshore Interconnection with the Gulfstream Pipeline Alternative.	Oil and gas production, installation of pipelines and structures on the OCS. Dredging of shipping channels. Beach nourishment projects.	Current and future activities would have long-term minor adverse cumulative impacts on undisturbed soils for onshore pipeline construction. Short- and long-term minor cumulative impacts on geological resources would occur as a result of installing the port and offshore pipeline.
Marine Areas and Land Use	Oil and gas production activities and shipping on the OCS. Pipeline and ancillary facility construction in Florida.	Oil and gas production activities and shipping on the OCS. Pipeline and ancillary facility construction in Florida.	Long-term change in land use along the onshore ROW. Consistent land use in the OCS. Cumulative impacts for the alternatives are similar.	Proposed onshore pipelines in counties surrounding Tampa Bay. Population growth and coastal development in Tampa Bay area.	Population growth and coastal development. Construction of onshore pipelines; minor localized cumulative effects. Cumulative impacts on the OCS would be short-term minor adverse.

	Resource	Past Actions	Current Actions	Proposed Action and Alternatives	Foreseeable Future Actions
Recreation and Aesthetics	Transient commercial and recreational vessels became temporary visual interruptions.	Transient commercial and recreational vessels are temporary visual interruptions.	Constant static visual interruption at fixed points up to 2 miles. Cumulative impacts for the alternatives are similar.	Future residential development in the area might be affected by permanent clearing of onshore pipeline ROW.	Cumulative impacts on visual resources would be long-term, minor, direct and adverse
Air Quality	Emissions from offshore activities, cargo and other vessels degraded regional air quality. Power plants, factories, vehicles, and other onshore emissions sources degraded regional air quality.	Existing emissions sources continue to adversely affect regional air quality.	SRVs, support vessels, and Port equipment would have small contribution to emissions and small adverse impact on air quality. Cumulative impacts for the alternatives are similar.	Population growth and coastal development such as factories will lead to more vehicles and more demand for electrical power (but future sources will be cleaner).	Current activities would be the dominant source of emissions. Port construction and pipe-laying activities would cause minor, short-term localized impacts on air quality for the duration of construction activity.
Noise	Ships and oil and gas production became dominant offshore noise sources. Development, cars, and helicopters became dominant onshore noise sources.	Ships and oil and gas production are dominant offshore noise sources. Development, cars, and helicopters are dominant onshore noise sources.	Short-term noise from construction activities; additional noise from increased traffic and offshore operations. Cumulative impacts for the alternatives are similar.	Ships and oil and gas production would continue to be dominant offshore noise sources. Development, cars, and helicopters would be dominant onshore noise sources.	Current activities would be the dominant noise source. Cumulative impacts would be short-term, minor adverse.

	Resource	Past Actions	Current Actions	Proposed Action and Alternatives	Foreseeable Future Actions
Socioeconomics and Environmental Justice	Oil and gas development along the Gulf Coast and the OCS. Development of local economic bases.	Oil and gas development, LNG import terminals, shipping ports, and fishing industries support of local economies.	Minor contribution to local construction, and oil and gas support industries. Cumulative impacts for the alternatives are similar.	Existing industries would support local economies.	Minor stimulation of local economies from construction activities. Localized, minor environmental justice impacts from creation of pipeline ROWs.
Navigation and Transportation	Cargo vessels, fishing ships, and oil and gas platforms and service vessels travel the GOM.	Cargo vessels, fishing ships, and oil and gas platforms and service vessels travel the GOM.	LNGCs and service vessels would add to ship traffic in GOM. Cumulative impacts for the alternatives are similar.	MPEH™ and BOET would also add LNGCs and service vessels to ship traffic in GOM.	Due to geographic distances and use of different shipping channels, potential for cumulative impacts are minor.

quality from the Proposed Action and the Northern and Southern Site Route Alternatives would be similar in nature, but less than the Proposed Action because it is shorter in length. The Offshore Interconnection with the Gulfstream Pipeline Alternative would have a lesser contribution to cumulative impacts due to the shorter offshore pipeline distance, approximately 24 miles less than the Proposed Alternative, and the smaller construction footprint for the 3,000-foot-wide corridor, approximately 10,000 acres less than the Proposed Alternative (see **Table 2.1-5**).

Water quality impacts from dredged material disposal events result from the small amount of sediment that remains in the water column after a disposal event. In general, the material is rapidly diluted and dispersed and is not discernable after a period of 2 to 3 hours following the disposal event. The small amount of dredged material that remains in the water column can result in temporary impacts from reduced light penetration through the water column which would reduce photosynthesis. The dredged material might also result in the possible release of nutrients or contaminants from the sediments during the descent phase. Reduction of light penetration is usually short in duration (on the order of hours). Nutrient and other contaminant releases from the descending dredged materials generally exhibit no toxicity to sensitive marine organisms. The incremental addition of nutrients or contaminants from dredged materials relative to other sources such as rivers, wastewater treatment facilities, and nonpoint sources, is small and inseparable from ambient conditions. The intermittent nature of the disposal operations, the short time period that material stays in the water column, and rapid dilution and settling further limit any potential effects (USACE 2005).

The Port Dolphin SRVs would withdraw approximately 9.5 MGD of seawater for engine and condensate cooling water and discharge up to 9.5 MGD of cooling water and firewater. The cooling water discharged would have an elevated temperature relative to the ambient temperature of the seawater. Water quality impacts from cooling water withdrawals and discharges would comply with applicable Federal and state water quality standards. The cumulative impacts of current and future activities would affect coastal and marine waters. LNG terminals would have small incremental increase of impacts on water quality.

During operation activities, anchor chains and flexible riser would scour the seafloor resulting in localized, temporary increases in turbidity in the vicinity of disturbed areas. These disturbances would occur periodically during the entire 25-year lifespan of the project and would be cumulative to other anchoring impacts form recreational and commercial vessel anchoring in the area. Also, SRV operations would intake ambient seawater for ballast and cooling activities of the SRVs. Port Dolphin would be separated far enough away from both the MPEH™ and BOET terminals so as to not cause cumulative heating effects on the water temperature from normal vessel water intake and discharge operations. SRVs and support vessels would combine with other ongoing activities in Tampa Bay to produce a minor incremental contribution to cumulative impacts on marine and coastal water quality. The SRVs would not produce new types of impacts on marine or coastal water quality than other vessels in the Federal waters outside of Tampa Bay; however, SRVs would add to existing adverse impacts on water quality in the Tampa Bay vicinity. Support vessels would produce only long-term, direct, adverse incremental contribution to cumulative impacts on marine water quality from normal discharges.

Based upon the information above, the proposed project would have a minor, short-term incremental contribution to cumulative impacts on water quality in the Tampa Bay area. If the water quality mitigations presented in **Section 4.11** (e.g., the use of a pipeline plow and turbidity curtains) are implemented and prove effective, cumulative impacts can be further reduced.

6.3.2 Biological Resources

Cumulative impacts on biological resources from past and ongoing actions in Tampa Bay and the offshore Project area would be expected from vessel operations, onshore and offshore cooling water and industrial discharges, dredging and channelization, and offshore vessel discharges which continue to impact biological resources and wildlife habitat. Foreseeable future actions that could contribute to cumulative biological impacts include oil and gas production, vessels, onshore cooling water intake and discharges, dredging, the MPEH™ and BOET projects in northeastern GOM, and the potential for additional LNG Terminals, future offshore and onshore pipelines, and population growth and coastal development in the Tampa Bay area.

Marine Protected Areas. Construction and operation of Port Dolphin, BOET, MPEH™, and other activities such as the pipeline projects listed in **Section 6.2.2** in the northeastern GOM and Tampa Bay could result in a short-term and long-term, minor to moderate adverse, incremental contribution to cumulative impacts on MPAs within the Project area. MPAs in the coastal and offshore vicinity of the Tampa Bay and in Tampa Bay include four state-designated and managed APs, three offshore NWRs, two FFMZs, and critical habitat for the Florida manatee and piping plover. Cumulative impacts on the living resources that utilize these areas are discussed in detail in subsequent sections.

In general, cumulative impacts on the physical resources in MPAs are limited by the small amount of project activity that occurs within MPA boundaries. For example, since none of the proposed deepwater ports are within MPAs, cumulative impacts as a result of operation of the deepwater ports would be limited to increased vessel traffic and noise impacts. Cumulative increases in operational vessel traffic and noise would be moderate compared to ambient conditions in these areas. Cumulative impacts in the Terra Ceia AP would be associated with pipeline installation (i.e., increased seafloor disturbance, turbidity, vessel traffic, and noise). Construction-related impacts would be temporary in duration and localized in scope to the edges of the AP.

Activities that occur regularly within the ROI, but that are not part of the Proposed Action, have considerable potential to adversely impact Florida manatee critical habitat. These activities include dredging, dredged material disposal, phosphate water disposal, channelization, and land uses t cause persistent sediment disturbance and turbidity. Additionally, nonpoint pollution sources such as agricultural, industrial, and storm water runoff would have long-term, adverse impacts on critical habitat components such as water quality, and can degrade seagrass beds inhabited by manatees. The small-scale temporary nature of impacts associated with the Proposed Action would not be expected to measurably increase cumulative impacts on critical habitat for the manatee in Florida. The contribution to the cumulative impacts on MPAs of the Northern and Southern Site Route Alternatives would be similar to that of the Proposed Action. The Offshore Interconnection with the Gulfstream Pipeline Alternative would have a lesser contribution to cumulative impacts due to fewer disturbances of the ocean bottom for the shorter offshore pipeline distance, a difference of 38.8 km (24 mi) to 60.8 km (38 mi).

Based upon the information above, the proposed project would have a short-term and long-term, minor to moderate adverse, incremental contribution to cumulative impacts on MPAs in the Tampa Bay area. If the water quality mitigations presented in **Section 4.11** (e.g., the use of a pipeline plow and turbidity curtains) are implemented and prove effective, cumulative impacts can be further reduced.

Threatened and Endangered Marine Mammals. This cumulative analysis considers the effects related to the Proposed Action along with impacts of other commercial, military, recreational, offshore, and coastal activities that might occur and adversely affect populations of marine mammals in the same general area of the Proposed Action.

ESA-listed marine mammals occurring in the Proposed Action Area (manatee and rare occurrences of the right whale and humpback whale) face threats from a multitude of man-made and natural sources including recreational and commercial fisheries, oil and gas exploration/development activities, military operations, vessel traffic, ecotourism, habitat degradation, ensonification, pollution, toxic algal blooms, disease, predators, and climate change. Threats to threatened and endangered marine mammals are outlined in recovery plans and status reviews drafted by NMFS and USWFS.

Harassment, injury to, or death of any ESA-listed marine mammal species would be considered a "take" under the ESA. Biological significance of any mortality would depend, in part, on the size and reproductive rates of affected stocks, as well as the number, age, and size of animals affected. For ESA-listed species, "takes" are of particular concern, because of depleted status of those species. For example, the USFWS has consistently concluded in Section 7 Biological Opinion, pursuant to the ESA, that the "take" of a single manatee would "jeopardize the continued existence" of the species (USFWS 2000). As noted earlier, the only other ESA-listed marine mammals that might occur rarely in Florida coastal waters of the GOM are the North Atlantic right whale and humpback whale. NOAA Stock Assessment Reports list potential biological removal rates (PBR; maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population) of 1 individual for the North Atlantic right whale and 1.1 individuals for the humpback whale (Waring et al. 2008). With the proposed mitigation measures, no serious injury or mortality of ESA-listed marine mammals is expected for the Port Dolphin project.

The incremental contribution of impacts from Port Dolphin, in conjunction with other similar activities in the GOM, would result from an increase in noise, increased risk of collisions with vessels, increase in marine debris, and impacts on water quality. OCS activities in the GOM that could impact ESA-listed marine mammal species include degrading water quality via routine discharges; increasing vessel strikes due to increased vessel traffic; generating noise from platforms, drill ships, helicopters and vessels, seismic surveys, and removal of structures by vessels; inadvertent spills during construction and decommissioning; sodium hypochlorite spills during operation; spill emergency response activities; discharging debris from offshore service and support vessels and OCS structures. Activities that might occur or are proposed in the GOM that could contribute to cumulative impacts include installation and operation of LNG regasificiation facilities.

The increase in ambient noise is a concern for ESA-listed marine mammal species. Increased vessel traffic and operations associated with Port Dolphin would overlap with noise generated by other vessels, thus contributing to this concern. Noise produced by service vessels and the construction, operation, and removal of drill rigs might cause physiological stress and make animals more susceptible to disease or predation, as well as disrupt their normal activities.

There were 120,915 recreational vessels and 2,677 commercial vessels registered in Manatee, Hillsborough, and Pinellas counties in 2007 (FHSMV 2006). Total service vessel trips for OCS activities are expected to be between 6 to 9 million trips in the GOM for the years 2007 to 2046 (MMS 2007). This would equate to an average of 150,000 to 225,000 service vessel trips per year. No comparable numbers specifically for the northeastern GOM are available. In comparison, 938 service vessel trips per year are expected during operation of the Port Dolphin project. Construction and decommissioning would require approximately 1,600 and 154 total trips, respectively.

The increase in vessel activity in inshore and offshore GOM waters due to LNG operations could increase the occurrence of collisions between marine mammals and vessels, potentially resulting in increased injury or death. Manatees are most often found in shallow coastal waters, including bays with seagrass beds. Rare occurrences further from shore are documented for the GOM. Major threats to the manatee, right whale, and humpback whale include vessel strikes related to recreational and commercial boating

activities that occur in both nearshore and offshore waters. Indirect effects from increased vessel traffic include increased wave action due to vessel wakes and scarring of seagrass beds by propellers (EPC 2007). Seagrasses are important foraging areas for the manatee. Wakes affect seagrass beds by the increase of wave action which could play a role in the decline of longshore sandbars that help protect seagrasses (Lewis 2002), as well as increased turbidity that, as noted earlier, reduces light availability and, therefore, seagrass production.

Cumulative impacts associated with additional LNG facilities and other activities could result in an increase in marine debris. Ingestion of or entanglement in marine debris, particularly plastic items lost from SRVs and service vessels, could result in marine mammal injury or death. However, the prohibition of discharge or disposal of garbage and other solid debris from vessels by lessees and operators by the MMS (30 CFR 250.300) and the USCG (MARPOL, Annex V, P.L. 100-220 [101 Statute 1458]) (33 CFR Part 151) is expected to minimize cumulative impacts of marine debris.

Cumulative impacts associated with additional LNG facilities and other activities would result in an increased risk of an oil spill. Although unlikely, oil spills and oil-spill response activities are potential threats that might cause marine mammal deaths. Contact with or consumption of oil and oil-contaminated prey (including seagrasses) might seriously affect marine mammals. The Port Operations Manuals from all approved deepwater ports include detailed engineering and procedural conditions necessary to minimize the potential occurrence of spills and minimize potential impacts from spills that might occur.

Overall, construction and operation of the offshore components of Port Dolphin combined with two other operating or proposed LNG deepwater ports in northeastern GOM and other OCS activities could result in minor, adverse cumulative impacts on marine mammals for the Proposed Alternative and the other alternatives analyzed. It is anticipated that the contribution to cumulative impacts of the other alternatives analyzed would be similar to those of the Proposed Alternative discussed above. The mitigation measures discussed in **Section 4.11** for marine mammal vessel strike, noise disturbance, and entanglement, and similar mitigation measures proposed at the other LNG facilities, are expected to minimize cumulative impacts on marine mammals. The incremental contribution of Port Dolphin to these cumulative impacts would be minor compared to the existing levels of commercial, recreational, fishing, military, and oil and gas exploration/development activities in the GOM.

Threatened and Endangered Sea Turtles. Construction and operation of the offshore components of Port Dolphin combined with two other operating or proposed LNG deepwater ports in northeastern GOM and other OCS activities could result in a minor, adverse incremental contribution to cumulative impacts on sea turtles. Cumulative impacts on federally listed sea turtles would primarily result from increased vessel traffic, noise, marine debris, and accidental spills and would be the same for all Port Dolphin alternatives analyzed. These impacts could create chronic sublethal effects (e.g., stress) that could cause persistent physiological or behavioral changes, such as the avoidance of impacted areas. This could cause declines in survival or productivity and result in either acute or gradual population reduction. Any harassment of, injury to, or mortality of a sea turtle would be considered a "take" under the ESA.

ESA-listed sea turtles occurring in the Proposed Action area face threats from a multitude of man-made and natural sources. Sources include recreational and commercial fisheries, military operations, vessel traffic, ecotourism, habitat degradation, ensonification, pollution, beach lighting, disease, predators, and climate change. Threats to threatened and endangered sea turtles are outlined in recovery plans and status reviews drafted by NMFS and USWFS as described below.

The increase in vessel activity in inshore and offshore GOM waters could increase the occurrence of collisions between sea turtles and vessels, potentially resulting in increased injury or death. Major threats to sea turtles include vessel strikes related to recreational and commercial boating activities that occur in

both nearshore and offshore waters. Indirect effects from increased vessel traffic include increased wave action due to vessel wakes and scarring of seagrass beds by propellers (EPC 2007). Seagrasses are important foraging areas for the green turtle. Wakes affect seagrass beds by the increase of wave action which could play a role in the decline of longshore sandbars that help protect seagrasses (Lewis 2002), as well as increased turbidity that, as noted earlier, reduces light availability and, therefore, seagrass production.

Cumulative impacts associated with additional LNG facilities and other activities could result in an increase in noise. Noise produced by construction vessels, service vessels, SRVs and the construction, operation, and removal of drill rigs might cause physiological stress and make animals more susceptible to disease or predation, as well as disrupt their normal activities. Adverse effects resulting from construction of the three proposed ports in the northeastern GOM are expected to be temporary. Therefore, cumulative effects would be minor. Operation of the Port would result in a moderate increase in vessel traffic and therefore a moderate increase in noise.

Cumulative impacts associated with additional LNG facilities and other activities could result in an increase in marine debris. Ingestion of or entanglement in marine debris, particularly plastic items lost from SRVs and service vessels, could result in sea turtle injury or death. However, the prohibition of discharge or disposal of garbage and other solid debris from vessels by lessees and operators by the MMS (30 CFR 250.300) and the USCG (MARPOL, Annex V, P.L. 100-220 [101 Statute 1458]) (33 CFR Part 151) is expected to minimize cumulative impacts of marine debris. Discharge of plastics is strictly prohibited and is therefore never authorized; this includes ashes from burned plastics. All plastics must be tracked and returned to shore.

Cumulative impacts associated with additional LNG facilities and other activities would result in an increased risk of an oil spill. Although unlikely, oil spills and oil-spill response activities are potential threats that might cause sea turtle deaths. Contact with or consumption of oil and oil-contaminated prey might seriously affect sea turtles, and sea turtles have been seriously harmed by oil spills in the past. The Port Operations Manuals from all approved deepwater ports include detailed engineering and procedural conditions necessary to minimize the potential occurrence of spills and minimize potential impacts from spills that might occur.

Overall, the mitigation measures discussed in **Section 4.11** for sea turtle vessel strike and entanglement, and similar mitigation measures proposed at the other LNG facilities, are expected to minimize cumulative impacts on sea turtles. The incremental contribution of Port Dolphin to these cumulative impacts would be minor adverse compared to the existing levels of commercial, recreational, fishing, oil and gas exploration/development, and military activities in the GOM.

Threatened and Endangered Fish Species. Construction of the deepwater port when combined with other proposed LNG deepwater ports in the northeastern GOM and other OCS activities could result in a minor adverse incremental contribution to cumulative impacts on the smalltooth sawfish and Gulf sturgeon. Short-term, minor to moderate, direct, adverse impacts on smalltooth sawfish and Gulf sturgeon would result from the seafloor disturbance, turbidity, and noise associated with the proposed construction of Port Dolphin and would be the same for all Port Dolphin alternatives analyzed. Reasons for the decline of smalltooth sawfish include catch in commercial and recreational fisheries, habitat loss and degradation, entanglement in marine debris, injury from saw removal, pollution, and disturbance of natural behavior by divers and other marine activities (NMFS 2006). Threats to Gulf sturgeon include exploitation, incidental catch in shrimp and gillnet harvest, and habitat reduction and degradation (e.g., dams, contamination, and navigation activities such as dam construction, and dredging) (USFWS and GSMFC 1995).

The mitigation measures discussed in **Section 4.11** for smalltooth sawfish strike and entanglement, and similar mitigation measures proposed at the other LNG facilities, are expected to minimize cumulative impacts on threatened and endangered fish species. Overall, Port Dolphin would have a minor incremental contribution on cumulative impacts of these two fish species.

Threatened and Endangered Coastal and Marine Birds. Construction and operation of the offshore components of Port Dolphin combined with two other operating or proposed LNG deepwater ports in the northeastern GOM and other OCS activities could result in a minor, adverse incremental contribution to cumulative impacts on coastal and marine birds. Cumulative effects would result from a minor increase in vessel traffic, noise, marine debris, and offshore lighting and would be the same for all Port Dolphin alternatives analyzed. Considering the narrow coastal ranges of the federally listed piping plover, wood stork, and roseate tern; and state-listed snowy plover and least tern, these species are not likely to appear in the vicinity of the proposed LNG facilities. Additionally, mitigation measures proposed in **Section 4.11**, and similar mitigation measures proposed at the other deepwater ports, are expected to minimize cumulative impacts on coastal and marine birds.

Benthic Resources. Construction and operation of offshore components of the Port Dolphin Deepwater Port in combination with up to two other deepwater ports in the northeastern GOM and other OCS activities could result in cumulative effects on benthic resources. Past projects, such as the Gulfstream pipeline, were constructed through approximately 28.7 miles of live-bottom area (FERC 2001). Other projects that could have short-term and long-term cumulative impacts on benthic resources off the west coast of Florida include other pipeline installation projects, dredging, beach nourishment projects, other oil and gas leasing/mineral leasing projects, and other commercial and recreational activities, such as boating and fishing, that could disturb the seafloor. Construction, operation, and decommissioning of the proposed ports could have both a short- and long-term, adverse incremental contribution to cumulative impacts on benthic organisms and habitat. Short- and long-term minor, adverse benthic impacts would result from placement of structures and processes that disturb bottom habitat. Short-term impacts would be associated with construction and demolition of port infrastructure and disturbance of soft substrate. Long-term impacts would be associated with placement of the STL buoy, concrete mattresses, and disturbance of hard-bottom habitat. All proposed deepwater ports would be designed, constructed, and operated in accordance with established, applicable, and appropriate regulations, permit conditions, and industry guidelines to minimize or avoid benthic impacts. Impact areas for each viable port proposal and the cumulative areas are presented in **Table 6.3-2**. When compared to the nearly uniform benthic habitat type available in the northern GOM (approximately 186 million acres—based on half of the area of the GOM), the 5,886 acres of short-term and 81 acres of long-term impacts associated with three deepwater ports in the northeastern GOM are minor. However, cumulative impacts on hard and live-bottom habitat would be more severe because this type of habitat is less common and recovery of this type of habitat would take longer. Port Dolphin is the only deepwater port in the northeastern GOM that is expected to impact hard and live bottom. It is also the only deepwater port proposed for the west coast of Florida where hard- and live-bottom habitat, like limestone outcroppings, is more likely. The contribution to cumulative impacts on benthic resources is expected to be less for the Offshore Interconnection with the Gulfstream Pipeline Alternative due to the shorter pipeline construction and the smaller construction footprint (see **Table 2.1-5**).

Construction of the pipeline in Tampa Bay in combination with other pipeline projects in the Tampa Bay (see **Table 6.2-4**), dredging, and other commercial and recreational activities such as boating and fishing could have short-term and long-term, adverse cumulative impact on benthic resources in Tampa Bay. Construction and operation of the proposed pipeline could have both a short- and long-term, adverse incremental contribution to cumulative impacts on benthic organisms and habitat. Short- and long-term minor benthic impacts would result from placement of structures and processes that disturb bottom

Table 6.3-2. Benthic Impact Areas for Proposed and Existing Deepwater Ports in the Northeastern GOM

LNG Facility	Temporary Impacts - Pipeline Installation and Other (Acres)	Long-Term Impacts - Infrastructure (Acres)
Port Dolphin	9272	Less than 1
MPEH™[a]	4,515	6
BOET[b]	1,137	9
Total Northeastern GOM	**5,886**	**81**

Sources: a. USCG and MARAD 2006, b. USCG and MARAD 2007d

habitat. Short-term impacts would be associated with the disturbance of soft sediments. Long-term impacts would be associated with placement of concrete mattresses and disturbance of hard and live-bottom habitat. Long-term cumulative impacts on benthic resources in Tampa Bay are expected to be moderate, based on the number of pipeline projects proposed in Tampa Bay and the characteristics of the benthic habitat in Tampa Bay. Additionally, mitigation measures proposed in **Section 4.11** (e.g., additional geophysical surveys to identify avoidance zones), and similar mitigation measures proposed at the other deepwater ports, are expected to minimize cumulative impacts on benthic resources.

Nonthreatened and Nonendangered Marine Mammals. This cumulative analysis considers the effects related to the Proposed Action and the alternatives along with impacts of other commercial, military, recreational, offshore, and coastal activities that might occur and adversely affect populations of marine mammals in the same general area of the Proposed Action. Dolphins occurring in the Proposed Action Area (e.g., bottlenose, Atlantic spotted, and rough-toothed dolphins) face threats from a multitude of man-made and natural sources including recreational and commercial fisheries, oil and gas exploration/development activities, military operations, vessel traffic, ecotourism, habitat degradation, ensonification, pollution, toxic algal blooms, disease, predators, and climate change.

Harassment, injury to, or death of any marine mammal species would be considered a "take" under the MMPA. Biological significance of any mortality would depend, in part, on the size and reproductive rates of affected stocks, as well as the number, age, and size of animals affected. NOAA Stock Assessment Reports list potential biological removal rates (PBR; maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population) (Waring et al. 2008). With the proposed mitigation measures, no serious injury or mortality of marine mammals is expected for the Port Dolphin project.

The incremental contribution of impacts from Port Dolphin, in conjunction with other similar activities in the GOM, would result from an increase in noise, increased risk of collisions with vessels, increase in marine debris, and impacts on water quality. OCS activities in the GOM that could impact marine mammal species include degrading water quality via routine discharges; increasing vessel strikes due to increased vessel traffic; generating noise from platforms, drill ships, helicopters and vessels, seismic surveys, and removal of structures by vessels; inadvertent spills during construction and decommissioning; sodium hypochlorite spills during operation; spill emergency response activities; and discharging debris from offshore service and support vessels and OCS structures. Activities that might occur or are proposed in the GOM that could contribute to cumulative impacts include installation and operation of LNG regasificiation facilities.

The increase in ambient noise is a concern for marine mammal species. Increased vessel traffic and operations associated with Port Dolphin would overlap with noise generated by other vessels, thus contributing to this concern. Noise produced by service vessels and the construction, operation, and removal of drill rigs might cause physiological stress and make animals more susceptible to disease or predation, as well as disrupt their normal activities.

The increase in vessel activity in inshore and offshore GOM waters could increase the occurrence of collisions between marine mammals and vessels, potentially resulting in increased injury or death. Indirect effects from increased vessel traffic include increased wave action due to vessel wakes and scarring of seagrass beds by propellers (EPC 2007). Seagrasses are important fish nursery habitat areas. Wakes affect seagrass beds by the increase of wave action which can play a role in the decline of longshore sandbars that help protect seagrasses (Lewis 2002), as well as increased turbidity that, as noted earlier, reduces light availability and, therefore, seagrass production.

Cumulative impacts associated with additional LNG facilities and other activities could result in an increase in marine debris. Ingestion of or entanglement in marine debris, particularly plastic items lost from SRVs and service vessels, could result in marine mammal injury or death. However, the prohibition of discharge or disposal of garbage and other solid debris from vessels by lessees and operators by the MMS (30 CFR 250.300) and the USCG (MARPOL, Annex V, P.L. 100-220 [101 Statute 1458]) (33 CFR Part 151) is expected to minimize cumulative impacts of marine debris.

Cumulative impacts associated with additional LNG facilities and other activities would result in an increased risk of an oil spill. Although unlikely, oil spills and oil-spill response activities are potential threats that might cause marine mammal deaths. Contact with or consumption of oil and oil-contaminated prey (including seagrasses) might seriously affect marine mammals. The Port Operations Manuals from all approved deepwater ports include detailed engineering and procedural conditions necessary to minimize the potential occurrence of spills and minimize potential impacts from spills that might occur.

Overall, construction and operation of the offshore components of Port Dolphin combined with two other operating or proposed LNG deepwater ports in northeastern GOM and other OCS activities could result in a minor, adverse incremental contribution to cumulative impacts on nonthreatened and nonendangered marine mammals for the Proposed Alternative and the other alternatives analyzed. The mitigation measures discussed in **Section 4.11** for marine mammal vessel strike, acoustic disturbance, and entanglement, and similar mitigation measures proposed at the other LNG facilities, are expected to minimize cumulative impacts on marine mammals. Overall, the incremental contribution of Port Dolphin to these cumulative impacts would be minor compared to the existing levels of commercial, recreational, fishing, military, and oil and gas exploration and development activities in the GOM.

Nonthreatened and Nonendangered Coastal and Marine Birds. Construction and operation of Port Dolphin, BOET, MPEH™, and other activities in the northeastern GOM could result in cumulative impacts on coastal and marine birds. There is a potential for short-term, minor, adverse cumulative impacts on occur on coastal and marine birds as a result of temporary noise disturbances and lighting associated with pipeline construction activities. Increases in noise disturbances and lighting could disrupt foraging, breeding, and migration, or even cause persistent behavioral changes, such as the avoidance of these important areas. The incremental contribution of the Proposed Action to noise and lighting in the area would be negligible compared to the level of disturbance that already occurs there. Any displaced birds should return to the area after the pipeline is installed. Overall the impact of Port Dolphin on coastal and marine birds would be short-term and minor when compared to the commercial, recreational, and industrial activity in the northeastern GOM, Tampa Bay, and the west coast of Florida. The incremental contribution to cumulative impacts of the other alternatives analyzed would be similar to that of the Proposed Alternative. Additionally, mitigation measures proposed in **Section 4.11**, and similar mitigation

measures proposed at the other deepwater ports, are expected to minimize cumulative impacts on coastal and marine birds.

Plankton. Construction and operation of the Port Dolphin, MPEH™, and BOET deepwater ports and other activities in the northeastern GOM, such as seawater to cool diesel engines aboard ships and general water degradation, could result in cumulative effects on plankton including phytoplankton, zooplankton (holoplankton), and meroplankton (fish and invertebrate eggs and larvae).

Vessels powered by engines require intake of seawater to cool the engines. Most engine designs circulate seawater through engine coolers in a once-through process. Advanced cooling systems use intermediate loops to restrict direct contact of seawater and do not circulate cooling water directly. The overall impact from this seawater intake on impingement or entrainment of plankton is not known.

The cumulative impact on zooplankton can be estimated based on zooplankton densities in the area and a combined seawater intake of 151 MGD (see **Table 6.3-3**). The daily impact on zooplankton was estimated based on the wet weight of the standing crop of zooplankton on the western Florida shelf ranging from 0.031 to 0.2 mg/m^3 (2.6 x 10-7 to 1.7 x 10-6 pounds/gallon) and a total seawater intake of 151 MGD (Okey and Mahmoudi 2002). Seawater use by the deepwater ports would, therefore, remove approximately 14,235 to 93,440 pounds of zooplankton each year. Limitations of this analysis are based on the fact that the distribution and abundance of zooplankton is spatially variable and patchy and the gear used to collect zooplankton might have been too large to collect smaller zooplankton which could be important to total biomass.

Table 6.3-3. Average Egg and Larval Density Comparison for the Proposed GOM Deepwater Ports

Deepwater Port	Daily Seawater Intake (Million Gallons/Day)	Average Annual Seawater Intake (Billion Gallons/Year)	Distance Offshore (mi)	Depth of Water (feet)	Average Egg Density per Million Gallons of Seawater	Average Larval Density per Million Gallons of Seawater
Port Dolphin	24	8.8	28	100	3,400	12,000
MPEH™ [a]	0	0	16	210	8,200	11,000
BOET [b]	127	49.6	50	425	3,500	9,100
Total Estimated Annual Warming Water Intake in the Northeastern GOM from 3 LNG Terminals: 58.4 billion gallons per year						

Sources: a. USCG and MARAD 2006, b. USCG and MARAD 2007d

Laboratory and field studies of marine organisms indicate that the average efficiency of energy transfer from one trophic level on the food web to the next trophic level is about 10 percent. In other words, only 10 percent of the energy available at one trophic level is passed on to the next (Sumich 1988). Therefore, a loss of 14,235 to 93,440 pounds of zooplankton each year would result in the total annual loss of approximately 1,423 to 9,344 pounds of small planktivorous fish biomass and approximately 142 to 934 pounds of large piscivorous fish biomass. This represents a minor loss compared to the total amount of biomass available in the GOM.

A long-term, minor adverse, incremental contribution to cumulative impacts on zooplankton would result from the cooling water withdrawals and warming water discharges associated with the deepwater ports. An increase in temperature could result in adverse impacts on zooplankton in the discharge plume.

Additionally, the plankton community is dynamic and greatly affected by the circulatory patterns in the GOM. Based on these dynamics, impacts on plankton would be minor.

The impacts of the seawater intake on ichthyoplankton are described and quantified for the Port in **Section 4.11** and in **Appendix G.** The number of eggs and larvae potentially entrained in a year is adjusted forward in time to resemble a fishery yield or harvest and is referred to as annual equivalent yield. The annual equivalent yield was used as a base for a reasonable comparison. The annual equivalent yield (for red drum and red snapper) associated with two proposed deepwater ports and the percentage of the average annual Florida west coast landings (1990 to 2006) that this equivalent yield represents are presented in **Table 6.3-4**. Gulf menhaden was not quantitatively assessed for the proposed Project. It is likely that Gulf menhaden would be entrained by seawater intake associated with the proposed Port. Egg and larval entrainment is likely to be less than entrainment of Spanish sardines. Data collected by Houde et al. (1979) indicate that *Brevoortia* spp. (the genus that includes Gulf menhaden) occurred at depths of less than 30 m (98 feet) and that *Brevoortia* spp. were less common than any of the other clupeids (e.g., Spanish sardines), suggesting that concentrations of menhaden are relatively low in the eastern GOM.

Table 6.3-4. Average Annual Equivalent Yield Estimate Comparison for Northeastern GOM Deepwater Ports

Deepwater Port	Gulf Menhaden	Red Drum	Red Snapper
Port Dolphin	NA	14	45
MPEH™ [a]	0	0	0
BOET [b]	94,581	654	174
Total Northeastern GOM	**94,581**	668	219

Sources: a. USCG and MARAD 2006, b. USCG and MARAD 2007d

Notes: NA = Not Assessed. Gulf menhaden were not quantitatively assessed for Port Dolphin.

As stated in **Section 4.2.1.11.1**, bay anchovy, red drum, and red snapper are 3 of 217 species that have been sampled at the Project area in the SEAMAP data. Note, that with respect to the USCG/Maritime Administration standard methodology used to assess impacts of a LNG deepwater port on ichthyoplankton, these species are not necessarily representative of all ichthyoplankton that occurs in the Project area, but representative of commercially and ecologically important species that occur at the Project area. These species have life history information available that can be used to estimate impacts of the seawater intake associated with deepwater ports (see **Section 4.2.1.11.1**). Estimated impacts on these species are expected to be representative of impacts on other ecologically and commercially important species that occur in the Project area. Equivalent yield was only estimated consistently for red drum and red snapper for all three deepwater ports in the northeastern GOM. As it is not a commercial species, equivalent yield was not estimated for bay anchovies; therefore, it is not included in this portion of the cumulative impact analysis.

MPEH™ does not contribute to cumulative impacts on ichthyoplankton of the deepwater ports on the northeastern GOM. For the Proposed Action and the other alternatives, Port Dolphin would contribute approximately 2 percent of the cumulative impact of the two deepwater ports on red drum and 20 percent of the cumulative impact two deepwater ports on red snapper. Therefore, BOET would contribute approximately 98 percent of the cumulative impact of the two deepwater ports on red drum and 80 percent of the cumulative impact of the two deepwater ports on red snapper. However, the data limitations discussed in **Section 4.2.1.11.1** and **Appendix G** also apply to this cumulative impact

assessment. Cumulative impacts on other species would occur as well. These impacts are expected to be within the range of the cumulative impacts for the species described.

The incremental contribution of seawater intake associated with the proposed project could have long-term impacts on fisheries stocks. However, as stated above the incremental contribution of the Port Dolphin Proposed Alternative and the other alternatives analyzed is less than the contribution of BOET (as described above).

Fisheries Resources. Construction and operation of the Port Dolphin and BOET deepwater ports and other activities in the northeastern GOM could result in cumulative impacts on red drum and red snapper fisheries, as well as other fisheries resources and EFH. Note that MPEH™ does not contribute to cumulative impacts on ichthyoplankton of the deepwater ports on the northeastern GOM. **Tables 6.3-5** through **6.3-7** provide an estimate of the possible loss of red snapper and red drum due to the Port Dolphin and BOET deepwater ports. These tables compare estimated annual equivalent yield to fishery harvest of red drum and red snapper to average total landing (commercial and recreational) from 1990 through 2006 for the GOM, northeastern GOM, and the west coast of Florida, respectively. In all cases, annual equivalent yield estimates of the two proposed deepwater ports account for less than 1 percent of the average 1990 through 2006. Additionally, the contribution of Port Dolphin would be a much smaller impact, as the impact of Port Dolphin is only expected to be a fraction of the impact of BOET, based on the seawater intake. The contribution to cumulative impacts of construction and operation of Port Dolphin would be similar for all alternatives analyzed.

Table 6.3-5. Annual Cumulative Equivalent Yield Estimates Based Compared as Percentages of 1990 to 2006 GOM Landings

Species	Equivalent Yield (lb)	GOM Landings (lb)	Equivalent Yield as a Percent of Landings
Red Drum	668	10,530,135	0.01
Red Snapper	219	7,411,312	0.00

Sources: a. USCG and MARAD 2006, b. USCG and MARAD 2007d

Table 6.3-6. Annual Cumulative Equivalent Yield Estimates Based Compared as Percentages of 1990 to 2006 Northeastern GOM Landings

Species	Equivalent Yield (lb)	Northeastern GOM Landings (lb)	Equivalent Yield as a Percent of Landings
Red Drum	668	2,281,436	0.03
Red Snapper	219	1,296,070	0.02

Sources: a. USCG and MARAD 2006, b. USCG and MARAD 2007d

Table 6.3-7. Annual Cumulative Equivalent Yield Estimates Based Compared as Percentages of 1990 to 2006 Florida West Coast Landings

Species	Equivalent Yield (lb)	Florida West Coast Landings (lb)	Equivalent Yield as a Percent of Landings
Red Drum	668	1,296,070	0.05
Red Snapper	219	1,802,225	0.01

Sources: a. USCG and MARAD 2006, b. USCG and MARAD 2007d

Based on the Monitoring, Prevention, and Mitigation Plan that would be required by the Maritime Administration for each deepwater port license issued, mitigations would be required to address identifiable impacts above baseline conditions. This would further reduce cumulative impacts associated with deepwater ports. Specifically, the Maritime Administration has made a commitment to review monitoring data within 3 years of the start of operations and require the Applicant to develop mitigation measures if the monitoring indicates that impacts are greater than baseline conditions.

It is difficult to measure the extent of historical and current impacts related to fishing, but the MSA calls for direct actions to stop or reverse the continued loss of fish habitats. Toward this end, the GMFMC manages fishery resources off the west coast of Florida and other GOM states through FMPs (discussed in **Section 3.2.9**). As described in **Section 6.2.7** red snapper, greater amberjack, gag grouper, and gray triggerfish are overfished. In order for these stocks to recover, mortality needs to be reduced (NMFS 2008). BOET and Port Dolphin would contribute to the total mortality of these species; however, the contribution of the deepwater ports on the mortality of these species would be minor compared to the impact of fishing, and could not have an affect the rebuilding plans (described in **Section 6.2.7**) for these species.

Minor short- and long-term indirect adverse impacts on demersal (i.e., bottom-dwelling) fish and benthic shellfish would occur as a result of seafloor disturbance caused during construction of the three deepwater port projects in the northeastern GOM. Impacts from Port Dolphin are discussed in **Section 4.2.1.13**. Other projects that could have short-term and long-term cumulative impact on demersal fish and benthic shellfish off the west coast of Florida and in Tampa Bay include other pipeline projects, dredging, beach nourishment projects, other oil and gas leasing/mineral leasing projects, and other commercial and recreational activities such as boating and fishing.

Other activities that could result in cumulative impacts on fisheries resources and EFH include overfishing, habitat degradation caused by commercial and recreational fishing, and a general degradation of water quality. Specific activities in Tampa Bay that have an adverse impact on fisheries resources include Project installation, cooling water intakes and discharges, other effluent discharge, loss of trash and debris from vessels, vessel traffic, shipping, commercial and recreational fishing, and seawater intake for cooling and warming purposes. Overall the impact of Port Dolphin on fisheries and EFH would be minor when compared to the commercial, recreational, and industrial activity in the northeastern GOM, Tampa Bay, and the west coast of Florida.

Terrestrial Resources. Cumulative impacts on the Project area are expected to be minimal and short-term. Past impacts on the area include the development of Port Manatee, which is still in operation today (MCPA 2008) and the Piney Point Phosphate Plant. The Piney Point mine was historically a producer of phosphate fertilizer for agriculture. Production has ceased at the plant. The wet process phosphoric acid production plant was first licensed by the Florida Bureau of Radiation Control for the processing and disposal of technically enhanced concentrations of naturally occurring radioactive materials (TENORM) in 1989. TENORM occurs as radium scale (radium 226) in pipes and process equipment, and in the associated process-area soils. The Florida Bureau of Mine Reclamation administers a permit for the operation and closure of the phosphogypsum stack and the onsite repository for the mine spoils. The phosphogypsum stack also serves as the repository for TENORM-contaminated equipment and soils. Piney Point Phosphates, Inc., went into bankruptcy and receivership in 2001. The Florida Bureau of Mine Reclamation has managed the site and the closure of the gypsum stack since that time. HRK Holdings, LLC, who is now participating in the final closure, purchased the site (NRC 2008). Additionally, current commercial land use classifications along the pipeline route include Urban and Built-Built Up (Residential High Density: High Density Under Construction; Commercial and Services: Mixed Commercial and Services; Industrial: Mineral Processing; Agriculture: Tree Crops-Abandoned Groves) and Transportation, Communications, and Utilities (Transportation: Railroads, Roads and

Highways; Port Facilities; Oil, Water or Gas Transmission Lines; and Utilities: Electric Power Transmission Lines). These land use classifications account for approximately 84 percent or 25 of 30 acres that is crossed by the Port Dolphin onshore pipeline route.

Wetland losses in the United States have resulted from draining, dredging, filling, leveling, and flooding for urban, agricultural, and residential development. Between the 1780s and the 1980s, Florida lost more than 46 percent of its wetlands. However, the rate of wetland loss in Florida was curtailed, with a 0.2 percent wetland loss from the 1980s to the 1990s (Caffey and Schexnayder 2003). In 2001, the Gulfstream Pipeline Project EIS estimated that the construction would occur within 3.5 miles of forested wetlands (FERC 2001). Construction and operation of the proposed pipeline are expected to result in up to 5.13 acres of temporary wetland impacts and 7.94 acres of permanent wetland impacts in Florida. The onshore portion of the proposed Port Dolphin pipeline corridor would cross 11 individual sections of wetlands, including open water, scrub-shrub, emergent, and forested wetlands totaling approximately 13.07 acres. Following construction, the disturbed wetland sections would be restored, revegetated, and monitored in accordance with a site-specific restoration plan. Port Dolphin's permanent operation of the pipeline would prevent trees and some larger shrubs from reestablishing directly over or adjacent to the pipeline. This would not result in a net loss of wetlands, but rather a conversion to emergent or smaller shrub type.

The primary cumulative impact of constructing the Port Dolphin onshore segment would be from simultaneous ground-disturbing activities and removal of vegetative cover. Cumulative impacts would be similar for the Proposed Alternative and the other alternatives analyzed. While the area is currently disturbed, some forested wetlands would be converted to emergent or smaller shrub type. This would result in an incremental contribution to an overall loss of forested wetlands in Florida that are caused by draining, dredging, filling, leveling, and flooding for urban, agricultural, and residential development. Associated with the cumulative losses of forested wetlands in Florida are associated impacts on wildlife and threatened and endangered species, the only affected species would be the American kestrel. One of the primary threats to American kestrel is habitat destruction (Scott 2004). Therefore, the Proposed Action would result in an incremental contribution to cumulative impacts on American kestrel. However, because only a small area of forested wetlands would be converted, the incremental contribution of the Proposed Action would be negligible.

There is a potential for a short-term minor adverse incremental contribution to cumulative impacts on wildlife and threatened and endangered species as a result of temporary noise disturbances associated with pipeline construction activities. As indicated above, land use in the area of the onshore pipeline route is primarily industrial. Any displaced wildlife should recolonize the area after the Project area is revegetated. Additionally, mitigation measures proposed in **Section 4.11** (e.g., terrestrial pipeline and facilities BMPs), and similar mitigation measures proposed at the other deepwater ports, are expected to minimize cumulative impacts on coastal and marine birds.

6.3.3 Cultural Resources

Cumulative impacts on cultural resources from past actions in Tampa Bay and the Project area would be expected from land disturbance actions that might have resulted in possible destruction of unknown artifacts. Very minor current or future adverse cumulative impacts on cultural resources are foreseen because of the identification and recordation of historic and cultural resources undertaken by Federal agencies in compliance with NHPA. Because of the chance of unintentional damage to cultural resources inherent with any ground disturbance project, the impacts of foreseeable future actions cannot be dismissed. Cumulative impacts from the Port Dolphin project on archeologically sensitive areas should be eliminated by mitigation through avoidance during construction. The cumulative impacts would be the same for all alternatives analyzed.

Offshore Components. Disturbance of the seafloor in the offshore APE in Florida has the potential to cause major, long-term, adverse, impacts on historic shipwrecks that represent archeological sites. Identification and evaluation of archeological sites within the APE would be required prior to any construction. The proposed Project system would be constructed to avoid impacts on submerged archeological sites that are listed in or eligible for listing in the NRHP. An Unanticipated Discoveries Plan is presented in **Appendix I**, designed to protect offshore cultural resources during construction. Implementation of the plan is necessary to avoid adverse direct, indirect, or cumulative impacts on historic properties.

Offshore cultural resource surveys conducted prior to application for the deepwater Port employed remote sensing equipment to conduct detailed magnetic and sonar surveys of all areas potentially affected during construction. These cultural resource surveys are expected to be highly effective at identifying possible historic shipwrecks and prehistoric/historic archeological sites within the area surveyed. Potential high probability areas for containing prehistoric archeological resources and remote sensing targets representing possible historic shipwreck remains were identified for avoidance, and avoidance during construction should eliminate adverse impacts on these archeologically sensitive areas. If avoidance efforts are successful, there would be no adverse direct, indirect, or cumulative impacts on historic properties listed or eligible for listing on the NRHP from any of the route alternatives. Operation and decommissioning of the proposed Port Dolphin LNG system have little potential for cumulative impacts on cultural resources.

Onshore Components. Onshore surveys employed archival research, pedestrian reconnaissance, and systematic shovel testing to locate archeological sites and historic structures within or adjacent to the proposed pipeline construction corridor. These cultural resources surveys were effective at identifying possible prehistoric/historic archeological sites, and historic structures within the area surveyed. An archeological survey of any unsurveyed areas is required prior to construction. Survey, however, does not ensure 100 percent coverage, so an Unanticipated Discovery Plan helps protect unidentified onshore cultural resources during construction (see **Appendix I**). Implementation of the plan would be necessary to avoid adverse direct, indirect, or cumulative impacts on historic properties. Finally, the Applicant would support the USCG in all required consultations with the FDHR and interested federally recognized Native American tribes by providing the results of the archeological survey conducted in support of this application and any anticipated impacts on resources of traditional, religious, or cultural significance to consulted tribes.

The footprint for the proposed interconnection station and the valve station have been surveyed with negative results for archeological sites, and lie at a sufficient distance (greater than one-half mile) from the closest historic structure (8MA1324) to avoid impacts on the viewshed or setting of that structure.

6.3.4 Geological Resources

Cumulative impacts on geological resources from past, current, and foreseeable future actions in Tampa Bay and the Project area would be expected from oil and gas production, installation of pipelines and structures on the OCS, dredging of shipping channels, and beach nourishment projects. The GOM and Tampa Bay have been and are currently disturbed by fishing and dredging activities. Initial sonar surveys have been conducted for the Proposed Site and Route Alternative and the Southern Site and Route Alternative disturbance areas. Results indicate there are 18.03 acres (7.29 hectares) of hard bottom that would require the use of concrete mattresses along the seafloor. In these areas the pipeline would be placed on top of the hard bottom. No blasting or excavation would be conducted to place and cover the transmission line so impacts on the hard bottom would be expected to be minimal. In addition, potential impacts on hard bottom resulting from chain sweep associated with anchoring of installation barges would be minimized as a result of the development of an anchoring plan with procedures to minimize

impacts on hard bottom such as the use of midline buoys. Therefore, no cumulative impacts on geology associated with the hard-bottom resources would be expected to occur when compared with ongoing or reasonably foreseeable future offshore projects. Installation of the ports and gas transmission line in soft-bottom areas would be expected to result in short-term minor, direct impacts on sediments resulting from excavation and other disturbance during Port construction and pipeline installation. The proposed pipeline would pass through two potential sand sources identified by the Town of Longboat Key for a distance of approximately 2.26 km (1.4 mi). In addition, the proposed pipeline would pass through approximately 11.64 km (7.23 mi) of ROSS-identified potential sand source area. Based on analysis conducted in **Sections 3.4.3** and **4.4.1**, the proposed pipeline route including the 200-foot buffer on each side of the pipeline would restrict approximately 383 acres (155 hectares) for use in beach nourishment. This area comprises 0.06 percent of the 615,464 acres of the Long Boat Key, ROSS, High Volume Sand Shoal, and Borrow Area IX mapped potential sand resource areas. Elimination of the sand resource area that occurs within the new proposed alignment would be expected to result in a minor long-term impact on available sand resources. The incremental impact from installation of the ports and offshore pipeline when combined with other ongoing or reasonably foreseeable future offshore projects as presented in **Table 6.2-3** would be expected to result in a short- and long-term minor incremental contribution to cumulative impacts on geological resources.

Because of the longer pipeline distance of the Southern Site and Pipeline Route Alternative, the contribution to cumulative impacts would be somewhat greater than the Proposed Alternative. Likewise, the Offshore Interconnection with the Gulfstream Pipeline Alternative would contribute less to cumulative impacts on geological resources in the Project area due to the shorter pipeline construction and the smaller construction footprint (see **Table 2.1-5**).

Long-term, minor, direct, and adverse impacts on onshore geology and soils would be expected as a result of constructing the onshore pipeline, Port Manatee valve station, and Gulfstream and TECO Interconnection Station. Impacts on natural geologic resources would be long-term, minor, direct and adverse where HDD is used to install the pipeline and where an open cut trench method is used for the remainder of the pipeline. The HDD technique would be used to avoid coastal mangroves. Impacts on natural geologic resources would occur as a result of drilling to install the pipe under the mangroves. The drilling would occur over a short distance so impacts would be expected to be minor. The incremental impact on natural geologic resources when combined with other ongoing or reasonably foreseeable future onshore projects as presented in **Table 6.2-3** would be expected to result in short- and long-term minor cumulative impacts.

Impacts on soils would be expected as a result of potential erosion and sedimentation associated with pipeline installation and construction of the Port Manatee valve station, and Gulfstream and TECO Interconnection Station. Implementation of BMPs would minimize the potential for adverse impacts on soils resulting from erosion and subsequent sedimentation. Following pipeline installation, the disturbed soils would be restabilized with native vegetation and monitored to ensure stabilization. Increased erosion to onshore wetlands from vessel traffic from the proposed Project would be negligible to minor. The incremental impact on soils resulting from erosion and sedimentation when combined with other ongoing or reasonably foreseeable future onshore projects as presented in **Table 6.2-3** would be expected to result in short-term minor cumulative impacts because all projects would be expected to implement erosion and sedimentation BMPs.

Impacts on previously undisturbed soils would be expected to be minor because the onshore pipeline alignment and locations for the Port Manatee valve station, and Gulfstream Interconnection Station occur in areas previously disturbed by pipeline placement, agriculture, and urbanization. The impacts on previously undisturbed soils when combined with other ongoing or reasonably foreseeable future onshore

projects as presented in **Table 6.2-3** would be expected to result in long-term minor adverse cumulative effects.

6.3.5 Marine Areas and Land Use

Cumulative impacts on marine areas and land use from past and current actions in Tampa Bay and the Project area would be expected from oil and gas production activities and shipping on the OCS, and pipeline and ancillary facility construction. Cumulative impacts from future foreseeable actions would be expected from proposed onshore pipelines in the counties surrounding Tampa Bay, and from population growth and coastal development in the Tampa Bay area. Construction and operation of Port Dolphin would not add to cumulative impacts on shipping lanes, ocean dredged disposal areas, or coastal resources such as mangroves and seagrass beds. The pipeline and Port locations would be constructed on hard-bottom areas resulting in the permanent change of hard-bottom substance on the seafloor. The construction and operation of onshore aboveground facilities would disturb 13.07 acres of wetlands. The cumulative impact of the Port Dolphin construction and operation activities for all alternatives analyzed, along with other foreseeable actions in Federal waters, Tampa Bay, and Manatee County, Florida, would be expected to be minor adverse. Additionally, mitigation measures proposed in **Section 4.11**, and similar mitigation measures proposed at the other deepwater ports, are expected to minimize cumulative impacts on marine areas and land use.

6.3.6 Recreation and Aesthetics

Cumulative impacts on recreation and aesthetics from past and current actions in Tampa Bay and the Project area would be expected from temporary visual interruptions caused by transient commercial and recreational vessels. Cumulative aesthetic impacts on future residential development can be expected from clearing of onshore pipeline ROWs. The Tampa Bay area is busy with port activities from Eglin AFB, Port Manatee, Port St. Petersburg, and Port Tampa. Boat sizes range from small recreational boats to large commercial cruise boats, to loud freight carrier boats. Additional supply vessels and staff vessels traveling to and from the offshore port site are not expected to adversely impact visual resources at the port. Since the LNGCs would be similar to other commercial traffic that frequents the area, cumulative impacts from the Proposed Alternative and the other alternatives analyzed are expected to be dominated by existing activities with increases from Port Dolphin. See **Section 4.10** for a complete discussion of transportation impacts from shipping traffic.

During construction, recreational boaters in the construction area would be impacted by the noise and visual congestion of the construction of the pipeline. Construction vessels would be more visible and audible as boaters approach the project site. Visual and audible impacts from construction would result in negative aesthetic impacts on offshore recreationalists. Impacts would be moderate and short-term. Operation of the MPEH™, BOET, and onshore support services could have minor, short-term, adverse impacts on local recreational infrastructure, if they were to be built. These impacts could result from introduction of new workers and their families into coastal communities. It is anticipated that affected resources would adapt to prevent any long-term, adverse impacts. It is anticipated that operation of Port Dolphin would interact with current vessel activities to produce a long-term, minor, indirect, adverse, incremental contribution to cumulative impacts on recreational resources.

6.3.7 Air Quality

Cumulative impacts on air quality from past and present actions would be expected from offshore emissions from cargo and other vessels and onshore emissions sources from power plants and vehicles. Foreseeable future actions that are anticipated to contribute to cumulative impacts include population growth and coastal development, such as factories, which will eventually lead to more demand on

electrical power. The construction and operation of the three LNG import terminals within the cumulative geographical area of Port Dolphin (MPEH™ and BOET) and the associated pipelines are expected to contribute to minor, adverse cumulative impacts on air quality. Dispersion modeling results indicate that Port Dolphin impacts are small and decrease rapidly with distance from the buoys. The MPEH™ and BOET terminals are more than 400 km (250 mi) west of Port Dolphin, and minor impacts of air emissions from those facilities in the vicinity of Port Dolphin are expected. Since the Proposed Site and the Southern Site are only 20 miles apart, the cumulative impacts of either alternative with the MPEH™ and BOET terminals are anticipated to be minor adverse.

Two power plant expansion projects in the Tampa Bay region (i.e., Big Bend Station and Bartow Station) were noted in **Section 6.2.6**. The expansion at Big Bend Station in Hillsborough County pertains to cooling water discharge from the desalination plant. No expansion of power generating capacity at Big Bend Station has been proposed. Air emissions from this facility have been reduced in recent years as a result of installing new emissions control systems (FDEP 2008b). The repowering of Bartow Station in Pinellas County entailed the addition of a natural gas-fired simple cycle unit and a natural gas-fired combined cycle unit, with total generating capacity of 1,475 megawatts. As part of the repowering project, three residual oil-fueled electric generating units were shut down, achieving a contemporaneous net reduction in emissions of NO_x, SO_2, and particulate matter. The only criteria pollutants with potential emission increases were CO and VOC. Dispersion modeling analysis demonstrated that the predicted air quality impacts of the repowering project for CO were below the Class II Significant Impact Levels (FDEP 2008c). Predicted onshore impacts from Port Dolphin are small, and any cumulative impacts of the Port Dolphin alternatives with either of these projects are expected to be minor. Additionally, mitigation measures proposed in **Section 4.11**, such as shutting off machinery and equipment when not in use, and similar mitigation measures proposed at the other deepwater ports, are expected to minimize cumulative impacts on air quality.

6.3.8 Noise

Cumulative impacts on noise from past, present, and foreseeable future actions would be expected from ships and oil and gas production as dominant offshore noise sources, and land development, cars, and helicopters as dominant onshore noise sources. The construction of the proposed Port Dolphin, MPEH™, and BOET ports would each have short-term, minor adverse impacts on the airborne and underwater noise environments. Temporary increases in the ambient noise level would result from construction vessels and activities and would have impacts on recreational boaters and fishers operating in the vicinity of the construction areas. Temporary increases in the underwater noise levels would result from construction activities and increased traffic from construction vessels. Since Port Dolphin and MPEH™ are scheduled to begin in 2011, their construction schedules would coincide. However, MPEH™ would be built 363 miles from Port Dolphin. In addition, the construction vessels would follow different routes; vessels traveling to MPEH™ would depart from Louisiana, while vessels traveling to Port Dolphin would depart from Florida. Consequently, it is not anticipated that construction impacts from proposed LNG terminals would overlap. Proposed pipeline and electric transmission projects in the Tampa Bay area were also considered. Given the distance between the proposed pipeline and the other pipeline and transmission project, construction noise impacts are not anticipated.

Noise generated during operation of the proposed Port Dolphin, MPEH™, and BOET ports, including noise generated from SRVs, support vessel, and pilot vessels, would have a long-term, minor adverse incremental contribution to cumulative impacts on biological resources, boaters, and fishers in the vicinity. Ambient operational noise from the three ports would include regasification and offloading operations. The distance of the ports from onshore (human) noise receptors would reduce the potential for cumulative impacts on these areas. However, increased service and pilot vessel traffic would result in long-term, minor, direct, adverse impacts on these areas. Underwater operational noise from the Port

Dolphin project would include the use of thrusters to position the SRVs over the buoys and propeller cavitations while the vessel is in transit in the area. LNG regasification, natural gas offloading, and other normal vessel operations would also add to the underwater noise.

Noise from the construction and operation of Port Dolphin and from SRV traffic would add incrementally to the ambient acoustical environment in the vicinity of the Port and shipping lanes. Underwater noise impacts from ships can travel for 30 to 50 miles, although higher frequencies fade at shorter ranges (Gaul 2007). Since the existing and proposed LNG terminals within the geographic study area are farther than 50 miles away from the proposed site, it is not anticipated there would be cumulative noise impacts from LNG vessel traffic. However, the Egmont Channel, which is a shipping fairway into Tampa Bay, is adjacent to the proposed route and alternatives. During the construction phase of Port Dolphin, approximately 1,830 vessel trips would occur over an 11-month period. During the operation of Port Dolphin, there would be an increase of approximately 938 annual vessel trips in and out of Tampa Bay. Comparatively, there were about 228 vessel trips at Port Manatee and 1,858 vessel trips at Tampa Bay in 2007. Consequently, noise from Port Dolphin vessel traffic would add to the cumulative underwater noise along the proposed route and to ambient airborne noise environment within the Port Manatee and Tampa Bay region. While operations at Port Dolphin would have a long-term increase in incremental noise effects for the alternatives analyzed, each vessel would only have temporary impacts for the duration of the vessel transit and docking. Mitigation measures proposed in **Section 4.11**, such as the use of mufflers and shielding where feasible, and similar mitigation measures proposed at the other deepwater ports, are expected to minimize cumulative impacts on noise.

6.3.9 Socioeconomics and Environmental Justice

Cumulative impacts on socioeconomics and environmental justice from past, current, and reasonably foreseeable future actions in Tampa Bay and the Project area would be expected from oil and gas development, LNG import terminals, both onshore and offshore, shipping ports, and fishing industries, all of which would support local economies. Construction of Port Dolphin would employ between 50 and 100 local workers for approximately 4 months. Fabrication activities associated with the Port Dolphin project would be performed outside the United States and therefore would have no beneficial or adverse cumulative impacts. Relative to existing economic activities associated with other industries in the GOM, cumulative impacts on employment and local economic conditions from Port Dolphin would be minor, short-term, and beneficial. Since construction of the proposed Port and pipeline route would have short-term, beneficial, minor, direct impacts on local employment, there would be no disproportionately high and adverse impacts on low-income or minority populations. Cumulative impacts on socioeconomics and environmental justice from Port Dolphin construction activities are expected to be similar for all alternatives.

If the Southern Site and Pipeline Route were constructed, the total impacts on socioeconomic resources would be increased and the construction jobs and income related to construction activities would also be increased. The impact would be extremely small, as the increased length is 4 miles of additional pipeline.

Operation of Port Dolphin would have the potential to affect socioeconomic resources through increased employment, and purchase of goods and services. As discussed in **Section 2.3.5**, all functional activities would be performed onboard the SRVs. Therefore, it is estimated that operation of the Project would employ full-time administrative workers directly or through support contractors. Port Dolphin would require additional workers for the onshore portion at Port Manatee. In the event that labor forces for Port Dolphin were based in the same coastal economic area, short-term, minor, direct adverse and beneficial cumulative impacts might be expected from job growth and increased demand for goods and services. Since the combined cumulative workforce is small, it is assumed that the economy would adjust relatively quickly to the Port Dolphin project and other Tampa Bay onshore and offshore projects within the Port

Dolphin construction and operation time period, and that the additional employment, tax base, and expenditures for goods and services would result in a minor, long-term, beneficial incremental contribution to cumulative impacts on the regional economy.

There are many factors that influence catch by a commercial or recreational fishers in any given year. Some of these factors are weather, fluctuations in fish populations from natural causes (e.g., hurricanes, red tide, and hypoxia), economic conditions, and man-made incidents such as oil spills. Although the magnitude of these factors could be significant in any given year, the most influential determinant of catch volumes is state and Federal regulation. Existing fishing levels would not be impacted by operation of the deepwater ports.

Additional minor direct impacts would occur to vessels operating offshore in the GOM and Tampa Bay, including commercial fishing vessels. The size of the ATBAs relative to the open offshore waters of the GOM and Tampa Bay would require those vessels to make only minor alterations to their productive route, if any at all, to avoid the ATBAs. The possibility for shipping delays would have a slight adverse impact. SRVs would dock at the offshore port site. They would not be required to enter into the shipping lanes of Tampa Bay and St. Petersburg. Therefore, there would be no cumulative impact on the commercial shipping within Tampa Bay itself.

6.3.10 Navigation and Transportation

Cumulative impacts on navigation and transportation from past and present actions would be expected from the operation of oceangoing ships, commercial and recreational fishing, recreational boating including commercial fishing, and other vessels in the GOM. Cumulative impacts from foreseeable future actions would be expected from the additional LNGCs and service vessel traffic from deepwater ports like BOET. Construction of Port Dolphin would increase the number of construction and service vessels operating for a short timeframe (11 months). Operations would require service vessels for maintenance and SRV resupply which could result in increased risks of collisions or other mishaps.

Construction and operation of MPEH™ and BOET would also increase the number of LNGCs operating in the GOM, but service vessels would likely come from different places since MPEH™ and BOET are closer to Louisiana than Florida. Overall, the incremental contribution of Port Dolphin to the cumulative impacts on navigation and safety would be minor compared to the existing levels of commercial, recreational, fishing, military, and oil and gas exploration and development traffic in the GOM.

6.3.11 Public Safety

Based on the Independent Risk Assessment (IRA) conducted by AcuTech (see **Appendix J**), the probability of an LNG release is very low. Furthermore, because of the Port's distance from the shoreline and shipping lanes, the impact of a release on public safety is characterized as minor. The most extreme credible modeling scenario presented in the IRA identified a potential maximum hazard radius of approximately 4,500 m (2.8 mi) around each buoy while occupied by an SRV.

Operation of any deepwater port in the GOM would, by default, increase overall LNG accident probability from the current levels, but there would be no cumulative contribution to the modeled extent or magnitude of any credible LNG accident scenario from the operation of Port Dolphin. By definition, increased risk probability would have a minor, long-term, adverse impact on public safety in the vicinity of the Port. Because the ports would not share any resources that could be impacted by a credible unintentional LNG release scenario, there would not be cumulative public safety impacts on any one resource.

While public safety concerns might have minor, long-term, adverse or beneficial impacts on the decisionmaking process of potential future proposals within the hazard area, there is no direct short-term or long-term adverse impact outside the hazard area modeled by AcuTech. Cumulative impacts on public safety are expected to be minor adverse for all alternatives analyzed. Additionally, safety and security mitigation measures proposed in **Section 4.11** through vessel design criteria, operational procedures, and the imposition of restricted areas, and similar mitigation measures proposed at the other deepwater ports, are expected to minimize cumulative impacts on public safety.

6.4 Unavoidable Impacts

Unavoidable impacts are those impacts that would result from the Proposed Action or any alternatives that cannot be mitigated. These impacts might be beneficial or adverse in nature, and be short- or long-term in duration.

6.4.1 Water Quality

Routine offshore operations would have unavoidable effects to varying degrees on the quality of the surrounding water if the proposed projects are implemented. Port construction and pipe-laying activities would cause minor, short-term localized impacts on turbidity of affected waters for the duration of activity periods. Cooling water discharge, in accordance with appropriate laws, would have a minor, long-term impact on water quality. Accidental spills from the proposed terminals, other OCS activities, and vessels would result in increases in pollutant levels in the water column. These impacts would generally be short-term, but minor or major, depending on the size of the spill. Vessel traffic would contribute to cumulative degradation of GOM waters through inputs of chronic oil leakage, treated sanitary and domestic waste, bilge water, and contaminants known to exist in ship paints. Construction of the onshore pipelines would result in short-term, minor adverse impacts on water quality with adherence to all BMPs, recommended mitigation measures, and applicable laws and regulations.

6.4.2 Biological Resources

Unavoidable effects on threatened and endangered marine mammals, including sea turtles, fish, and migratory birds could result from construction and operation of the proposed Port and pipeline, and vessel traffic. Marine animals would be affected by noise and disturbances associated with offshore activities. Losses to fishing resources could occur from placement of the proposed pipelines. These impacts would be minor and would not jeopardize the population. Localized populations of fish species would be expected to be impacted; however, these impacts are not expected to result in population-level effects. Construction of the onshore pipeline would have short-term, adverse impacts on vegetation. However, vegetation would be expected to quickly become reestablished. Modification of vegetation type would displace any wildlife species inhabiting the area, and would be considered a long-term, adverse impact. However, none of the species that would be impacted are protected.

6.4.3 Cultural Resources

Offshore Components. Construction of the proposed pipelines might result in the loss of unique or significant archeological information. MMS-required archeological surveys significantly lower the potential for the loss of resources by identifying potential archeological sites prior to construction, thereby making avoidance or mitigation of impacts possible. Offshore, in areas of high sedimentation rates, however, survey techniques might not be effective in identifying a potential resource. Any unanticipated impacts on cultural resources during the construction of subsea or onshore pipelines would be adverse, long-term, and cumulative.

The applicant has proposed potential measures for mitigating or minimizing impacts on cultural resources (see **Section 4.11.1**).

A stand-alone "Unanticipated Discoveries Plan – Cultural Resources, Port Dolphin LLC, Deepwater Port and Proposed 36-Inch Gas Pipeline, St. Petersburg Area Block 545 to Tampa Bay, Florida" has been developed by the applicants in accordance with Sections 106 and 110 of the NHPA, MMS guidelines, and the applicable statutes of the State of Florida concerning offshore cultural resources (see **Appendix I**). In the event of unanticipated discovery of cultural resources, Port Dolphin would follow the plan, which was submitted to the USCG in August 2007. All activity in the area of work would be halted immediately, and an avoidance zone of at least 1,000 feet for further work in that area would be established. Within 48 hours of the discovery, the Regional Supervisor, Leasing and Environment, and archaeologists at the MMS office in New Orleans, as well as the USCG and the appropriate Florida SHPO with the FDHR would be notified. Implementation of the plan is necessary to avoid adverse direct, indirect, or cumulative impacts on historic properties. The plan would become a part of any license issued.

Onshore Components. There would be no impact on cultural resources provided that an archeological survey of any unsurveyed portions of the route is performed prior to construction, and all identified historic properties are avoided with proper buffer distances.

6.4.4 Geological Resources

Unavoidable disturbance of surficial sediment or soils would occur during installation of the proposed Port and pipeline. Installation of the mooring lines and anchors would directly affect 0.56 acres (0.22 hectares) of sediment and 0.032 acres (0.012 hectares) of hard bottom. Construction of the offshore pipeline would disturb a total area of 40.87 acres (16.54 hectares) of seafloor, including 18.03 acres (7.29 hectares) of hard bottom. Approximately 45 acres (20 hectares) of soils would be temporarily impacted during the construction of the onshore segment of the pipeline.

6.4.5 Marine Areas and Land Use

Construction and operation of the Port and pipeline would have unavoidable impacts on hard-bottom habitat areas offshore. Under the DWPA implementing regulations, the USCG is authorized to establish a permanent mandatory Safety Zone. If a License is issued, the USCG may designate a mandatory NAA and recommendatory ATBA to further facilitate Port operations, safety, and security. Operation of the onshore pipeline and facilities in Manatee County, Florida, would permanently impact wetland resources, and limit construction within the permanent pipeline easement. Aboveground facilities would reduce industrial space available for future development.

6.4.6 Recreation and Aesthetics

Creation of a Safety Zone in the vicinity of the proposed Port would result in limited displacement of commercial and recreational fishing during the period the proposed deepwater Port would be licensed for operations. The minor, but long-term, effects on fishing would be unavoidable because of the need to ensure safety at the facilities.

6.4.7 Air Quality

Routine offshore operations would have minor unavoidable effects on air quality of the region surrounding the Port if the proposed projects are implemented. Port construction and pipe-laying activities would cause minor, short-term localized impacts on air quality for the duration of construction activity. Routine operation of the interconnection station would have insignificant effects on air quality;

operation of the emergency standby generator could cause significant temporary impacts in the immediate vicinity of the station. Construction of the interconnection station would also cause major, short-term, localized impacts on air quality. By making natural gas more available and more competitive with other fossil fuels, the project could have potentially beneficial impacts on regional air quality by reducing reliance on coal and oil, and the higher emissions associated with those fuels.

6.4.8 Noise

Effects on the marine noise environment, caused by construction of the proposed Port and pipeline, would be unavoidable. These noise sources would have minor, long-term cumulative impacts relative to existing and anticipated OCS activities. Construction of the onshore portion of the pipeline would have short-term, minor impacts from noise produced by construction equipment.

6.4.9 Socioeconomics and Environmental Justice

Construction of proposed Port facilities would have unavoidable, short-term, beneficial impacts on jobs, and indirectly on the purchase of goods and services. Operation of Port Dolphin would have long-term, beneficial impacts on jobs, and indirectly on the purchase of goods and services for the 25-year life of the project. Construction and operation of the onshore portion of the pipeline would have a beneficial impact on the local economy. Impacts would be both short- and long-term, but minor. Since construction of the proposed Port and pipeline route would have short-term, beneficial, minor, direct impacts on local employment, there would be no disproportionately high and adverse impacts on low-income or minority populations.

6.4.10 Navigation and Transportation

Construction and operation of the proposed Port would have unavoidable, short-term, minor, direct, and adverse impacts on offshore transportation. Construction of the onshore pipelines might have minor, short-term, localized impacts on transportation. Construction vehicles would cause congestion on roadways while transporting supplies and equipment. Transportation could also be temporarily detoured or stopped in areas where pipelines would cross roads.

6.4.11 Public Safety

The proposed LNG Deepwater Port operations would have an unavoidable long-term adverse effect on public safety within the hazard area. All related reliability and safety issues can be identified and avoided with development and implementation of appropriate risk management plans. There are potential unavoidable reliability and safety impacts inherent in any offshore activity due to unpredictable and unexpected acts of man and nature (e.g., accidents, terrorism, storms).

6.5 Irreversible and Irretrievable Commitment of Resources

An irreversible or irretrievable commitment of resources refers to impacts on or losses to resources that cannot be reversed or recovered, even after an activity has ended and facilities have been decommissioned. This differs from unavoidable impacts which might be short-term or long-term in nature. A commitment of resources is related to use or destruction of nonrenewable resources, and effects that loss would have on future generations. For example, if a species becomes extinct as a result of a Proposed Action, the loss is permanent. If prime farmland is converted to a residential or commercial development, there is permanent loss of agricultural productivity. Chronic, low-level pollution can injure and kill organisms at virtually all trophic levels. Mortality of individual organisms can be expected to occur, and possibly a reduction or even elimination of a few small or isolated populations. Construction

and operation of the Port involves the irreversible and irretrievable commitment of material resources and energy, land and wetland resources, and biological resources. The impacts on these resources would be permanent.

Material resources used for the proposed Port include building materials for new structures and other equipment. Steel might be recyclable after Port decommissioning. No supplies are considered scarce, and would not limit other unrelated construction activities in the region. Construction of the proposed Port would also require use of fossil fuels, a nonrenewable natural resource.

Construction and operation of the proposed Port would result in an irreversible or irretrievable loss of some biological resources. Irreversible impacts would include a conversion of limestone outcroppings to other hard materials, resulting in the loss of benthic fish habitat. The use of seawater as cooling and ballast water for LNG vaporization would also cause the irreversible or irretrievable loss of EFH. There would also be a permanent change inland use for the aboveground facilities onshore, along with the permanent ROW. Open trenching through wetland areas would permanently change the value of those wetland areas. Irreversible losses might also include the loss of various terrestrial organisms during pipeline construction, loss of marine animals in the unlikely event of an LNG spill, and loss of sea turtles or marine mammals due to ship strikes. Some normal and required operations, such as structure removal done in accordance with applicable laws and regulations, can result in the destruction of viable marine life. Although the possibility exists that individual marine mammals, marine turtles, birds, and fish can be injured or killed, there likely would not be a lasting effect on baseline populations.

Although the effect on archeological resources from constructing the proposed Port is expected to be low, any interaction between an impact-producing factor (e.g., placement of new structures and laying of a pipeline) and a significant historic shipwreck or prehistoric site could destroy information contained in site components and their spatial distribution. This could cause a permanent loss of potentially unique archeological data.

6.6 Relationship Between Short-Term Uses and Long-Term Productivity

Short-term refers to the total duration of installation and at-sea construction of the proposed Port, and offshore and onshore pipeline. Long-term refers to an indefinite period following decommissioning of the proposed Port, pipelines, and other associated facilities. According to MMS, the short-term uses of the environment, and the cumulative development of OCS oil and gas resources in the GOM are compatible with the maintenance of long-term productivity of the OCS. Unavoidable adverse impacts are anticipated to be primarily short-term and localized in nature (MMS 2002a).

Short-term project operational activities might result in chronic impacts over a longer period. Installation and eventual removal of new structures would cause minor, localized impacts in the short-term; impacts of site clearance and decommissioning might last longer because of minor elements that would be left in place. Short-term use might have long-term impacts on biologically sensitive offshore areas or archeological resources. Upon completion of DWPA licensed activities, the marine environment would generally be expected to remain at or return to its normal long-term productivity levels.

No long-term productivity or environmental gains are expected as a result of the DWPA development of the OCS. Benefits of the Proposed Action are expected to be principally those associated with an increase in supplies of natural gas for domestic consumption. While no reliable data exist to indicate long-term productivity losses as a result of use of the OCS, such losses are possible.

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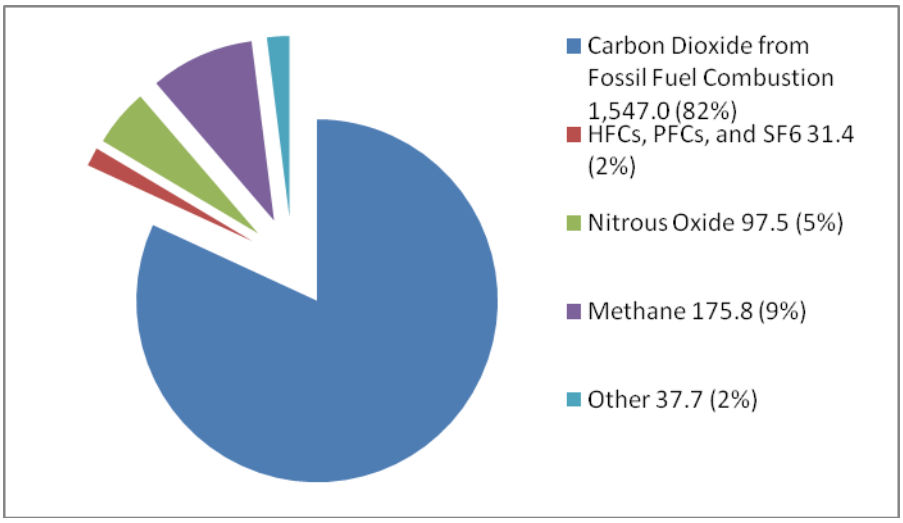
7. Greenhouse Gases

Many chemical compounds found in the Earth's atmosphere act as "greenhouse gases." These gases allow sunlight to enter the atmosphere freely. When sunlight strikes the Earth's surface, some of it is reflected back towards space as infrared radiation (heat). Greenhouse gases absorb this infrared radiation and trap the heat in the atmosphere. Without this natural greenhouse effect, temperatures on earth would be much lower.

An increase of greenhouse gas emissions (GHG) from anthropogenic (man-made) sources since the beginning of industrialization has been shown to correlate with an increase in global average temperature. This has led to concerns that the global climate is changing. The concern is that higher levels of GHGs in the atmosphere and the resultant increase in trapped heat results in the phenomenon of global warming.

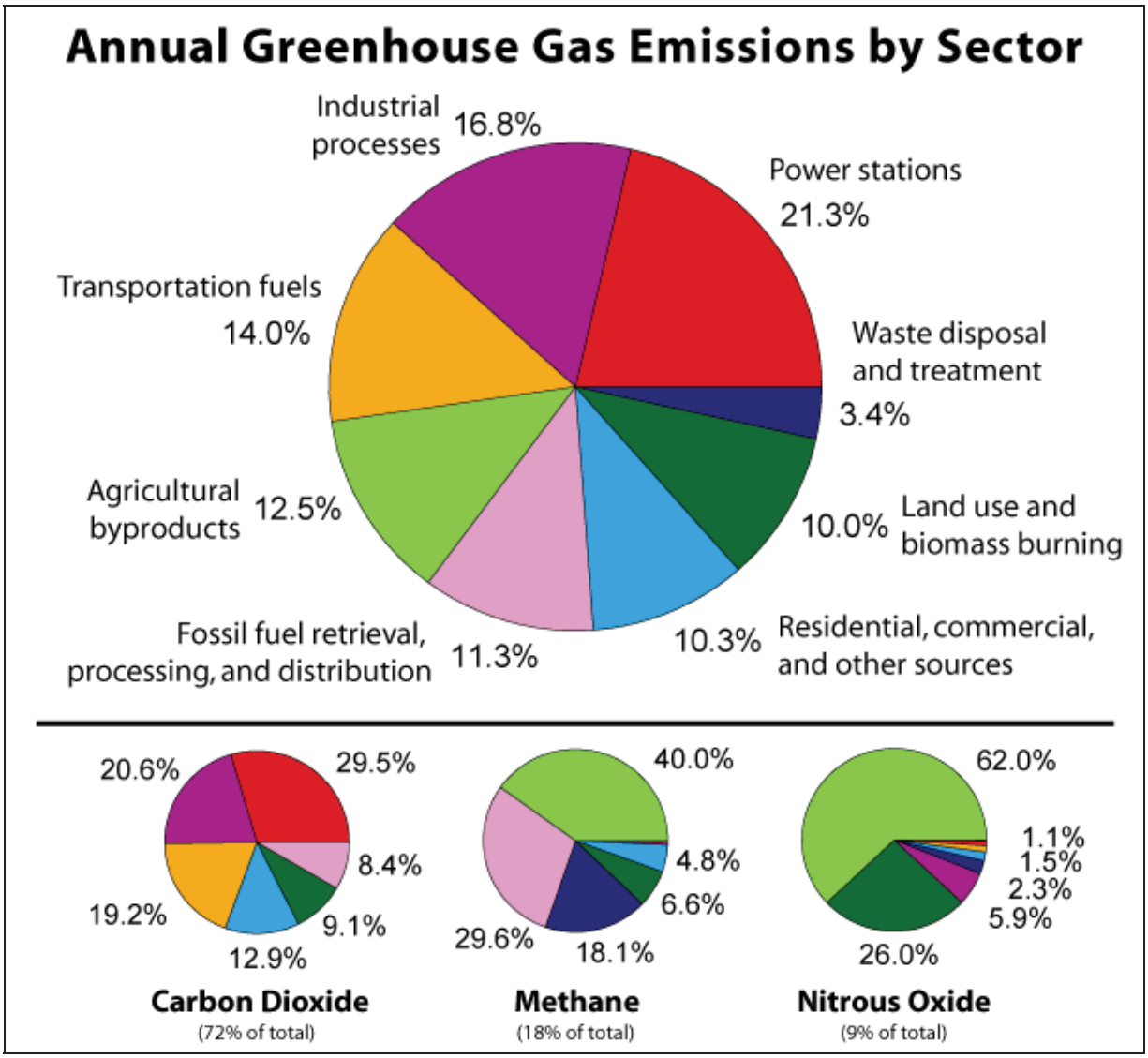
Many gases exhibit these "greenhouse" properties. The majority of greenhouse gases come mostly from natural sources including carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Human activity also contributes to GHG emissions and includes compounds that are not naturally emitted, such as halocarbons (compounds of carbon with fluorine, chlorine, bromine, or iodine) and sulfur hexafluoride (SF_6), and estimated emissions from the United States are shown in **Figure 7.0-1**. It is not possible to state that a specific gas causes a certain percentage of the greenhouse effect because the influences of the various gases are not additive.



Source: EIA 2003

Figure 7.0-1. Greenhouse Gas Emissions Sources

Figure 7.0-2 displays the annual GHG by sector in the United States. Since the USEPA has not promulgated an ambient standard or *de minimis* level for CO_2 emissions for Federal actions, there is no standard value to compare an action against in terms of meeting or violating the standard. The proposed Project would contribute directly to emissions of greenhouse gases from the combustion of fossil fuels for the transportation of the LNG to the Port site in the SRV, the combustion of natural gas for vaporization of the LNG and from generation of electric power used to power the vaporization and send-out of the vaporized natural gas.



Source: Rosmarino 2006

Figure 7.0-2. Annual Greenhouse Gas Emissions by Sector

The potential effects of a change in atmospheric concentration of greenhouse gases on global climate has been studied extensively and reported by the Intergovernmental Panel on Climate Change (IPCC). The IPCC has released a series of reports. The most recent is the Fourth Assessment Report (Forster et al. 2007). Since GHGs are emitted by every country and because the potential impacts of climate change would be felt worldwide, climate change is a global issue. IPCC reports have documented a wide range of potential impacts including sea level rise, changes in weather patterns, and changes in temperature and moisture distributions. These changes can then produce related changes in biological communities on land and in the oceans.

Studies were also conducted by the U.S. Global Change Research Program (USGCRP) focusing on the GOM (Ning et al. 2003). This integrated assessment of climate change on the GOM concluded that climate change could have a wide range of impacts from fisheries to coastal ecosystems due to changes in salinity and temperature and by habitat changes.

Greenhouse Gas Regulations and NEPA Requirements. Currently there are no climate change regulations controlling or requiring a permit for emissions of GHG. Other CAA requirements indirectly limit or prohibit emissions of some GHG. Use of halocarbons is regulated under Title VI of the CAA. NO_2 is regulated under Title I, and control of NO_2 indirectly reduces other nitrogen oxides compounds, including N_2O.

In April 2007, the U.S. Supreme Court declared that CO_2 and other greenhouse gases are air pollutants under the CAA. The Court declared that the USEPA therefore has the authority to regulate emissions of CO_2 and other greenhouse gases. However, EPA has not subjected GHGs to regulation under the Clean Air Act. In December 2007, the U.S. Congress required USEPA to promulgate a national GHG reporting regulation and create a GHG registry. Final rules are not due until 2009.

The overall goal of an EIS being prepared under NEPA is to take a hard look at environmental issues that are known or emerging regardless of whether rules have been promulgated to regulate the issue. Climate change and the emissions of GHG are in the forefront of environmental issues being examined around the world. The importance of examining the GHG and climate change issues in an EIS was recently stressed in a court ruling that emphasized the NEPA goal of taking a hard look at GHG and Climate Change issues in more depth to allow decisionmakers to include consideration of these issues in their decisions (U.S District Court of Appeals, Ninth District, Center for Biological Diversity v. National Highway Traffic Safety Administration, November 15, 2007).

Estimating Project GHG Air Emissions Inventory. Both USEPA and DOE have emissions factors for CO_2 and methane (CH_4). USEPA's factors are documented in different chapters of its AP 42 *Compilation of Air Pollutant Emission Factors* (USEPA 2000). DOE's factors are presented in "Technical Guidelines Voluntary Reporting of Greenhouse Gases (1605(b)) Program, January 2007." The CO_2 emissions based on USEPA and DOE factors are very close (within 10 percent difference). USEPA and DOE factors for CH_4 are quite different; the DOE factors are more industry-specific. Some of the DOE factors are cross-referenced to data published by IPCC. This indicates that DOE has also adopted a global approach for the greenhouse gas issue. Based on these considerations, DOE factors for CO_2 and CH_4 have been chosen for this analysis.

Project GHG. The United States currently receives about 3 percent of its natural gas from overseas via LNG tankers. Another 17 percent is imported from Canada through pipelines. The remaining 80 percent is produced domestically and is currently declining in overall production. It is anticipated that natural gas imports will rise to 30 percent of overall U.S. consumption by 2030. The Port would import a daily average of 800 MMscfd of natural gas or less than .0004 percent of U.S. consumption in 2005 (EIA 2007b) and 18.6 percent of current Florida natural gas consumption (Port Dolphin 2007b).

Construction emissions would be generated by onshore pipeline and interconnection construction, offshore pipeline construction, and construction of the STL buoys. Emissions sources include the following construction equipment: a pipelay/derrick barge, AHTS vessel, crew boat, diving barges, jack-up barge, pipe burial barge, dragline, pipe pull barge, and supply boat. Onshore pipeline construction would involve trenching and backfill equipment, pipe-handling equipment, welding equipment and generators, and supply and support vehicles. During the construction of the Port and pipeline, different tasks would require the use of a variety of vessels and each vessel would contribute to the total air emissions. The main sources of emissions during construction would be the diesel engines used onboard each vessel for propulsion and electricity generation. **Table 7.0-1** presents the total emissions of CO_2 and CH_4 from construction activities.

Table 7.0-1. Estimated Greenhouse Gas Emissions During Construction (Proposed Route)

Construction Phase	CO_2 Emissions (tons)	CH_4 Emissions (tons)
Offshore Pipeline	72,215	16.5
STL Buoys	8,085	1.8
Onshore construction	158	86.6
Total Construction	80,458	105

Emissions of CO_2 and CH_4 from operational activities include power generation and propulsion engines and vaporization steam boilers, support vessel emissions, and minor emissions associated with the onshore portions of the Project. **Table 7.0-2** summarizes the CO_2 and CH_4 emissions during routine operations. Combustion of natural gas in boilers and internal combustion engines is highly efficient; emissions of unburned methane are lower than emissions of CO_2 by more than a factor of 1,000.

Table 7.0-2. Operations Emissions of Greenhouse Gases

Operations Phase	CO_2 Emissions (tons/yr)	CH_4 Emissions (tons/yr)
Port	718,642	586
Onshore pipeline	25	< 0.01
SRV Transit	16,135	13
Total Operations	734,802	599

Decommissioning of the deepwater Port will generate CO_2 and CH_4 emissions from the vessels associated with this event; decommissioning of onshore equipment will include the release of residual natural gas (largely CH_4) from the pipeline. **Table 7.0-3** summarizes the emissions, including dive barges, equipment-removal vessels, trucks, and equipment to remove aboveground components onshore, and support vessels.

Table 7.0-3. Estimated Greenhouse Gas Emissions During Decommissioning (Proposed Route)

Decommissioning Phase	CO_2 Emissions (tons)	CH_4 Emissions (tons)
Offshore	2,538	0.6
Onshore	21	1299.7
Total Decommissioning	2,559	1300

Project GHG Emissions Compared to Florida Baseline, and United States Baseline. The FDEP estimated the state's GHG in a September 2007 report entitled "Preliminary Inventory of Florida Greenhouse Gas Emissions: 1990-2004." The results of the inventory are expressed in $MMTCO_2E$ for a number of economic sectors including the Energy sector. Estimated emissions of CO_2 from the State of Florida for 2004 were 258 million metric tons, and total Florida GHG emissions in 2004 were 289 $MMTCO_2E$. Therefore, the expected GHG emissions from operation of the Port, 0.9 $MMTCO_2E$, represent less than 1 percent of the existing GHG for Florida. Estimated national emissions of CO_2 for the U.S. were 5,957 million metric tons in 2004, and total GHG emissions were 7,133.5 $MMTCO_2E$. Approximately 83.5 percent of these emissions represent CO_2 emissions from combustion of fossil fuels (USDOE 2006).

No Action Alternative. As discussed in **Section 1.2**, natural gas used for power generation would displace other fuels, including coal and fuel oil, for generation. If the license is denied, then alternative sources of energy would replace the natural gas that would have been provided by the Project. The current fuel mix for power generation in the Tampa Bay area relies heavily on coal and fuel oil. If the natural gas is replaced by a fuel mix similar to the current fuel mix, then additional emissions of GHG would result. Natural gas is a preferred option for power generation when considering GHG and other pollutant emissions. **Table 7.0-4** compares fossil fuel emissions in pounds per billion Btu of Energy Input for natural gas, oil, and coal.

Table 7.0-4. Estimated Fossil Fuel Emissions (in pounds per billion Btu)

Pollutant	Natural Gas	Oil	Coal
Carbon Dioxide	117,000	164,000	208,000
Nitrogen Oxides	92	448	457

Assuming an average heat content of 1,020 Btu/scf for delivered natural gas and 7,600 Btu/KWh for electricity generation by natural gas, this is enough gas to generate approximately 39.2 million MWh per year. Comparison of the CO_2 emissions for equivalent electrical generation from the current fuel mix in the Tampa Bay area to emissions for the same power generation using natural gas shows that an additional 10.8 million metric tons per year would be emitted if the Project's natural gas were not available to generate electrical power (Port Dolphin 2008a).

Project Alternatives. The Southern Route Alternative for the pipeline is longer than the Proposed Route. Emissions during construction and decommissioning would therefore be greater for this alternative, compared to the Proposed Route. Emissions of CO_2 and CH_4 for pipeline construction would be about 12 percent higher for the Southern Route Alternative, compared to the Proposed Route. Similarly, the CH_4 release associated with decommissioning would be larger for the Southern Route Alternative.

The Offshore Interconnection Alternative for the pipeline is shorter than the Proposed Route. Emissions during pipeline construction and decommissioning would therefore be lower, compared to the Proposed Route. Emissions during construction of the offshore interconnect are expected to be higher, compared to the onshore interconnection station. On balance, total GHG emissions during construction of the pipeline plus interconnection could be higher, lower, or about the same as the Proposed Action. With no onshore interconnection station, GHG emissions during operation of the Port would be slightly lower for this alternative,

For the FSRU and AAV Alternative, more construction would be required at the Port for the FSRU than for the proposed action, leading to more GHG emissions. During operation of the Port, the AAV has potentially lower emissions for the vaporization of the LNG; however, any reduction in GHG emissions related to AAV is small, compared to the potential increase in mobile source emissions related to docking at the FSRU. Therefore, potential impacts from operation could be greater or less than the proposed action. For decommissioning, emissions to remove the FSRU are expected to exceed those associated with the Proposed Action.

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682 lbs net greenhouse gases prevented



5,220,360 BTUs energy not consumed

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Scoping Outreach

- Scoping Report for the Port Dolphin LNG Deepwater Port License Application EIS
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SCOPING REPORT

FOR THE
PORT DOLPHIN LNG
DEEPWATER PORT LICENSE APPLICATION
ENVIRONMENTAL IMPACT STATEMENT



COMMANDANT
UNITED STATES COAST GUARD
DEEPWATER PORTS STANDARDS DIVISION
(CG-3PSO-5)

AUGUST 2007

SCOPING REPORT

FOR THE
PORT DOLPHIN LNG
DEEPWATER PORT LICENSE APPLICATION
ENVIRONMENTAL IMPACT STATEMENT

Prepared for:

Commandant
United States Coast Guard
Deepwater Ports Standards Division (CG-3PSO-5)
Washington, DC 20593-0001

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AUGUST 2007

SCOPING REPORT

FOR THE PORT DOLPHIN LNG DEEPWATER PORT LICENSE APPLICATION ENVIRONMENTAL IMPACT STATEMENT

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1. Introduction

This report documents comments and recommendations gathered from the public scoping meeting and other outreach activities conducted by the Maritime Administration and the U.S. Coast Guard (USCG) on the Port Dolphin LNG Environmental Impact Statement (EIS).

Port Dolphin Energy LLC, proposes to own, construct, and operate a deepwater port, named Port Dolphin, in the Federal waters of the Outer Continental Shelf in the St. Petersburg (PB) blocks: PB545, PB589 and PB590, approximately 28 miles off the west coast of Florida to the southwest of Tampa Bay, in a water depth of approximately 100 feet. Port Dolphin would consist of a permanently moored unloading buoy system with two submersible buoys separated by a distance of approximately three miles. Each unloading buoy would be permanently secured to eight mooring lines, consisting of wire rope, chain, and buoyancy elements, each attached to anchor points on the seabed. Anchor points will most likely consist of driven piles. The buoys would be designed to moor a specialized type of LNG vessel called a Shuttle and Regasification Vessel (SRV) of between 145,000 and 217,000 cubic meter capacity.

SRV vessels are equipped to vaporize cryogenic LNG cargo to natural gas through an onboard closed loop vaporization system, and to odorize and meter gas for send-out by means of the unloading buoy to conventional subsea pipelines. The SRVs would moor to the unloading buoys which connect through the hull of the vessels to specially designed turrets that would enable the vessels to weathervane or rotate in response to prevailing wind, wave, and current directions. When the vessels are not present, the buoys would be submerged on a special landing pad on the seabed, 60–70 feet below the sea surface. Each unloading buoy would connect through a 16-inch flexible riser and a 36-inch flowline to a Y intersection and then a 36-inch pipeline approximately 42 miles in length that would connect onshore in Port Manatee, Manatee County, Florida.

The pipeline would connect with the Gulfstream Natural Gas System, LLC and Tampa Electric Company (TECO) System. The 36-inch gas transmission line would make landfall on Port Manatee property. From there, the transmission pipeline would proceed in a generally easterly direction to the first interconnection point with the Gulfstream system at 3.6-miles. The Gulfstream Interconnection Station would occupy an approximately two acre site. Up to approximately 80 percent of the natural gas or 800 million standard cubic feet per day (mmscfd) is expected to be delivered to the Gulfstream Pipeline. The remaining portion of the natural gas, up to approximately 360 mmscfd, would be transported by 14-inch line to the TECO interconnection station; located 2.1-miles east of the Gulfstream interconnect. Only SRVs will call on Port Dolphin. Offloading would require between 4–8 days and when empty the SRV would disconnect from the buoy and leave the port. Initially it is expected that Port Dolphin would be capable of a natural gas throughput of 400 mmscfd and would eventually be capable of 800 mmscfd with a peak capacity of 1200 mmscfd by having at least one SRV regasifying and discharging at all times. The system would be designed so that two SRVs can be moored simultaneously for continuous unloading of natural gas.

Port Dolphin Energy LLC is seeking Federal Energy Regulatory Commission (FERC) approval for the onshore pipelines concurrent with this deepwater port application. As required by FERC regulations, FERC will also maintain a docket for the FERC portion of the project. The docket numbers are CP07–191–000 and CP07–192–000. The filing may also be viewed on the Web at http://www.ferc.gov using the ‘‘eLibrary’’ link. Enter the docket number excluding the last three digits in the docket number field to access the document. For assistance, call (866) 208–3767 or TYY, (202) 502–8659. In addition, pipelines and structures such as the moorings may require permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act which are administered by the U.S. Army Corps of Engineers (USACE). Port Dolphin will also require permits from the Environmental Protection Agency (EPA) pursuant to the provisions of the Clean Air Act, as amended, and the Clean Water Act, as amended.

The new pipeline will be included in the National Environmental Policy Act (NEPA) review as part of the deepwater port application process. FERC, EPA, and the USACE among others, are cooperating agencies and will assist in the NEPA process as described in 40 CFR 1501.6; will be participating in the scoping meetings; and will incorporate the EIS into their permitting processes. Comments sent to the FERC docket, EPA or USACE will also be incorporated into the DOT docket and EIS to ensure consistency with the NEPA Process.

Construction of the deepwater port would be expected to take approximately 22 months with startup of commercial operations following construction, should a license be issued by the Maritime Administration. The deepwater port would be designed, constructed, and operated in accordance with applicable codes and standards.

An EIS as part of the National Environmental Policy Act (NEPA) process is being prepared to provide the public and the Maritime Administration/USCG decision-makers an assessment of the environmental impacts associated with the construction and operation of Port Dolphin. The EIS will evaluate the proposed construction and operation of the proposed Deepwater Port and associated actions. Completion of the EIS is expected by February 2008.

2. The NEPA Process and the EIS

NEPA requires Federal agencies to evaluate the potential environmental impacts of proposed projects and policies. The primary goal of NEPA is to provide sufficient information for the decision-maker(s) to make an informed decision. During the NEPA process, agencies consider issues ranging from air quality and biological impacts to cultural resources and socioeconomic impacts. USCG has determined that the most appropriate NEPA process for the Port Dolphin deepwater port license application is an EIS, which is the most detailed analysis prescribed by the Council on Environmental Quality (CEQ). Public involvement is a vital component of the NEPA for vesting the public in the decision-making process and allowing for full environmental disclosure. Guidance for implementing public involvement is codified in Title 40 Code of Federal Regulations (CFR) 1506.6, thereby ensuring that Federal agencies make a diligent effort to involve the public in preparing NEPA documents. The public involvement process for this proposed project is outlined in the following steps:

- ***Conduct Public Scoping.*** In this phase of the process, the USCG and the Maritime Administration will ask the public to provide feedback on the proposed project, potential environmental impacts, and analysis methods. Public scoping is critical for determining the issues to be discussed in the EIS and the methods for conducting the study. Outreach efforts will include a Notice of Intent (NOI) to prepare an EIS and announcements of public scoping meetings in the *Federal Register* and local newspapers.
- ***Prepare a Draft EIS (DEIS)***. The DEIS is the first version of the formal document. The DEIS will be distributed to the public libraries throughout the affected area; Federal, state, regional and local agencies; private citizens; and local organizations. The USCG and the Maritime Administration will hold public meetings to provide citizens an opportunity to make formal oral and written comments concerning the DEIS. Outreach efforts will include Notice of Availability (NOA) of the DEIS and announcement of public review meetings in the *Federal Register* and local newspapers. Resource experts will be present to answer questions, and the public will have this additional opportunity to enter comments and concerns into the official record.
- ***Prepare a Final EIS (FEIS)***. After the close of the comment period on the DEIS, e^2M will prepare the FEIS on behalf of USCG and the Maritime Administration to document the manner in which comments have been resolved. A NOA of the FEIS will appear in the *Federal Register* and local papers. The public will have 30 days to comment on the FEIS.
- ***Conduct a license hearing.*** A public hearing on the license application is mandated by the Deepwater Port Act and by USCG policy. Comments received at the Public Hearing will be addressed as appropriate in the preparation of the decision. Federal agencies and the Governor of Florida, the designated adjacent coastal state, have 45 days after the final public hearing to make their final comments on the application. The Secretary (as delegated to the Administrator of the Maritime Administration) has a subsequent 45 days to make a decision.

3. Purpose of Scoping

An important activity in EIS preparation is the description of what topics the environmental review will cover, known as the scope. The EIS scope is based on the nature of the proposed action and the issues to be evaluated. During the scoping process, the general public, potentially affected parties, various scientists and resource experts, and other governmental agencies are asked to help identify the issues to be evaluated and to help define the alternative actions to be considered in the EIS. To ensure that the most appropriate alternatives are selected from numerous options, the Maritime Administration and the USCG consider agency and public input essential to the EIS process. This report describes the scoping process used by USCG and the Maritime Administration to determine the issues to be evaluated and the scope of the EIS based on the public input.

4. Public Involvement Process

USCG and the Maritime Administration invited comments from the public to help determine the scope of the EIS by publishing a NOI in the *Federal Register* (72 FR 133) on July 12, 2007. The NOI provided background information on the Proposed Action, the EIS, a description of the scoping process, date and location for the public meeting, and a discussion of commenting alternatives. A copy of the NOI and the FERC Notice of Amendment are included in Appendix A of this Scoping Report.

An open house and a public meeting were held in conjunction with this scoping process in Palmetto, Florida (see Table 4.1). Advertisements to inform the public of the scoping meetings were posted in two major newspapers in the area where the meeting was held. The USCG also mailed a letter of invitation to the public scoping meeting to approximately 190 potentially interested parties including Federal, state and local agencies, elected officials, stakeholders, and individuals. The "Interested Party" letters included the NOI, a fact sheet outlining the Proposed Action and map illustrating the location of Port Dolphin and associated pipelines (Appendix B). The announcements and the advertisements both stated where and when the public scoping meeting was being held to obtain public input on the Proposed Action for Port Dolphin. Copies of newspaper advertisements are located in Appendix C.

Table 4.1. Open House and Public Meeting Information for the Port Dolphin Deepwater Port License Application

City, State	Location	Newspaper Advertisement	Stakeholder Attendance
Palmetto, FL	The Manatee Convention Center July 25, 2007	*Tampa Tribune* and *Bradenton Herald* (July 24 and 25, 2007)	23

An Open House was held before the public meeting. Representatives from the Maritime Administration, USCG, and other agencies were available to talk to public about the project. USCG supplied fact sheets to the public on various topics including the Deepwater Port Act, the NEPA Process, and directions for making comments on the Proposed Action. A complete copy of the fact sheets were distributed at the public scoping meetings are attached in Appendix D. Representatives from Port Dolphin Energy LLC were also available at the open house and provided an audio/video description of the project as well as handouts.

Examples of the registration cards and comment forms provided during the scoping process can be found in Appendix D. Comments received during the public meetings were noted and reviewed to help identify environmental issues that should be addressed in the EIS as well as those issues which do not warrant detailed evaluation. In addition to the comments provided at the public meetings, the public and other government agencies were invited to provide written comments at the meeting, by mail, hand delivery, fax, or by e-mail to either the Docket Management System or the Federal eRulemaking Portal. Although the comment period for public scoping ended on August 13, 2007, this scoping report includes public comments received to the date of this report. Appendix E includes all the comments that were received, as well as the public meeting transcript.

5. Public Scoping Results

5.1 Issues and Concerns

Four oral comments were received from stakeholders at the public meeting. In addition, a letter from the National Oceanic and Atmospheric Administration was received on August 9, 2007. Table 5-2 presents the comments received during the public scoping period.

Table 5.1. List of Comments During Scoping Meetings For the Port Dolphin Deepwater Port License Application

Theme	Comments
Economy	Supports the Port Dolphin project because it would provide diversity for LNG resources in Florida.
Siting Location	Requests that the pipelines will be collocated with existing (onshore and offshore) pipelines to reduce environmental and economic impacts to local residents.
Biological Impacts	Concerned with seawater intake and the resulting discharge affecting ichthyoplankton.
Biological Resources	Concerned with the impacts to essential fish habitat, marine fishery species, estuarine and marine habitats, and threatened and endangered species
Risk Management	Concerned that because of the proposed co-location of the pipelines, natural gas supply for the area could be interrupted in a natural or calculated disaster scenario.
General	Concerned with the cost of writing the EIS.

6. Next Steps

The Maritime Administration/USCG and their contractor (e²M, Inc.) are working with resource agencies and stakeholders to prepare a DEIS for review. The DEIS will incorporate those issues discussed during the public scoping meetings and comments made to the Department of Transportation (DOT) docket during the 30-day comment period.

Following the publication of the NOA in the *Federal Register* for the DEIS, there will be a 45-day comment period and another round of public meetings. The public meetings will allow the general public to interface with resource agencies and other stakeholder groups. Comments pertaining to the DEIS during that time will be reviewed and incorporated into the FEIS.

A final 30-day comment period and a final hearing will follow the *Federal Register* publication of the NOA for the FEIS. Public comments during this time will be considered by the Maritime Administration/USCG decision makers along with final comments by resource agencies. Following the public comment period, the Maritime Administration/USCG decision-makers will review all materials applicable to the Port Dolphin Deepwater Port Licensing Application and prepare a Record of Decision. Table 6.1 outlines the three phases of the EIS process that involve public participation.

Table 6.1. Public Input Process for the Port Dolphin Deepwater Port Licensing Project

Phase I ⇒	**Phase II ⇒**	**Phase III ⇒**	**Final**
Notice of Intent for an EIS	Notice of Availability of the Draft EIS	Public Hearing Notice for Final EIS	**Record of Decision**
↓	↓	↓	
Public Scoping Meetings	Public Meetings	Public Hearing	
↓	↓	↓	
30-day Comment Period	45-day Public Comment Period	30-day Public Comment Period	

7. List of Participants

The following persons participated in the open house and/or public meeting held in Palmetto, Florida on July 25, 2007.

7.1 Federal Agency Participants

Nathalie Jacque – USCG
Ray Martin – USCG
LCDR Brian Moore– USCG
Ed Morris – USCG
Mark Prescott – USCG
Patience Whitten – USCG
Chris Hanan – Maritime Administration
Dave Swearingen – FERC
Mark Sramek – NMFS
Mark Peterson – USACE

7.2 State and Local Participants

Ilsa Johansson – FDEP
Donna Kendall – FDEP
Charles Kovach – FDEP
Randy Runnels – FDEP
Debby Tucker – FDEP
Lisa Gregg – FWC
Mark Leiby – FWC

7.3 Individual/Group Participant

Glen Brooks
Chris Calvert
Don Chaney
Cody Driggers
Steven L. Fidler
Denise Greer
Geoff Hornby
Michael Jepson
Sara Kennedy
Jim Kimbrell
Joan Perry
Eric Raymond
Susan Redmond
Betsy Roberts
Sarah A. Schenk
John Seip
Mary E. Sheppard
Rand Snell
Marilyn Stasica
Jill Vanderpol
Kit Werremeyer
Daniel R. White

7.4 USCG Contractor Personnel

Don Beckham – e²M
George Greczmiel – e²M
Andrea Poole – e²M

7.5 Applicant Personnel

German Castro
Jeff Oetting
Kim Olsen
John Teter
Ragnar Wisloff

APPENDIX A

FEDERAL REGISTER NOTICE OF INTENT AND FERC NOTICE OF AMENDMENT

2. Statutory Basis

The Exchange believes that the proposed rule change is consistent with and furthers the objectives of Section 6(b)(5) of the Act,[9] in that it is designed to promote just and equitable principles of trade, to remove impediments to and perfect the mechanism of a free and open market and a national market system, and, in general, to protect investors and the public interest.

B. Self-Regulatory Organization's Statement on Burden on Competition

The Exchange does not believe that the proposed rule change will impose any burden on competition that is not necessary or appropriate in furtherance of the purposes of the Act.

C. Self-Regulatory Organization's Statement on Comments on the Proposed Rule Change Received From Members, Participants or Others

No written comments were solicited or received with respect to the proposed rule change.

III. Date of Effectiveness of the Proposed Rule Change and Timing for Commission Action

Because the forgoing rule change does not: (1) Significantly affect the protection of investors or the public interest; (2) impose any significant burden on competition; and (3) become operative for 30 days after the date of this filing, or such shorter time as the Commission may designate, it has become effective pursuant to Section 19(b)(3)(A) of the Act [10] and Rule 19b–4(f)(6) thereunder.[11]

A proposed rule change filed under 19b–4(f)(6) normally may not become operative prior to 30 days after the date of filing.[12] However, Rule 19b–4(f)(6)(iii) [13] permits the Commission to designate a shorter time if such action is consistent with the protection of investors and the public interest. The Exchange has requested that the Commission waive the 30-day operative delay. The Commission believes that waiving the 30-day operative delay is consistent with the protection of investors and the public interest because such waiver would permit position and exercise limits for options on IWM to continue at 500,000 option contracts for an approximately six-month pilot period. For this reason, the Commission designates the proposed rule change to be operative upon filing with the Commission.[14]

At any time within 60 days of the filing of such proposed rule change the Commission may summarily abrogate such rule change if it appears to the Commission that such action is necessary or appropriate in the public interest, for the protection of investors or otherwise in furtherance of the purposes of the Act.

IV. Solicitation of Comments

Interested persons are invited to submit written data, views, and arguments concerning the foregoing, including whether the proposed rule change is consistent with the Act. Comments may be submitted by any of the following methods:

Electronic Comments

- Use the Commission's Internet comment form (*http://www.sec.gov/rules/sro.shtml*); or
- Send an e-mail to *rule-comments@sec.gov*. Please include File Number SR–NYSEArca-2007–58 on the subject line.

Paper Comments

- Send paper comments in triplicate to Nancy M. Morris, Secretary, Securities and Exchange Commission, 100 F Street, NE., Washington, DC 20549–1090.

All submissions should refer to File Number SR–NYSEArca-2007–58. This file number should be included on the subject line if e-mail is used. To help the Commission process and review your comments more efficiently, please use only one method. The Commission will post all comments on the Commission's Internet Web site (*http://www.sec.gov/rules/sro.shtml*). Copies of the submission, all subsequent amendments, all written statements with respect to the proposed rule change that are filed with the Commission, and all written communications relating to the proposed rule change between the Commission and any person, other than those that may be withheld from the public in accordance with the provisions of 5 U.S.C. 552, will be available for inspection and copying in the Commission's Public Reference Room, 100 F Street, NE., Washington, DC 20549, on official business days between the hours of 10 a.m. and 3 p.m. Copies of the filing also will be available for inspection and copying at the principal office of NYSE Arca. All comments received will be posted without change; the Commission does not edit personal identifying information from submissions. You should submit only information that you wish to make available publicly. All submissions should refer to File Number SR–NYSEArca-2007–58 and should be submitted on or before August 2, 2007.

For the Commission, by the Division of Market Regulation, pursuant to delegated authority.[15]

Florence E. Harmon,

Deputy Secretary.

[FR Doc. E7–13506 Filed 7–11–07; 8:45 am]

BILLING CODE 8010–01–P

[9] 15 U.S.C. 78f(b)(5).

[10] 15 U.S.C. 78s(b)(3)(A).

[11] 17 CFR 240.19b–4(f)(6).

[12] 17 CFR 240.19b–4(f)(6)(iii). In addition, Rule 19b-4(f)(6)(iii) requires that a self-regulatory organization submit to the Commission written notice of its intent to file the proposed rule change, along with a brief description and text of the proposed rule change, at least five business days prior to the date of filing of the proposed rule change, or such shorter time as designated by the Commission. The Exchange has satisfied the five-day pre-filing notice requirement.

[13] *Id.*

[14] For the purposes only of waiving the 30-day operative delay, the Commission has considered the proposed rule's impact on efficiency, competition, and capital formation. *See* 15 U.S.C. 78c(f).

[15] 17 CFR 200.30–3(a)(12).

DEPARTMENT OF TRANSPORTATION

Maritime Administration

[USCG–2007–28532]

Port Dolphin Energy LLC, Port Dolphin Energy Liquefied Natural Gas Deepwater Port License Application

AGENCY: Maritime Administration, DOT.

ACTION: Notice of intent; notice of public meeting; request for comments.

SUMMARY: The Maritime Administration announces that the Coast Guard, in coordination with the Maritime Administration, will prepare an Environmental Impact Statement (EIS) as part of the environmental review of this license application. The application describes a project that would be located approximately 28 miles off the western coast of Florida, and approximately 42 miles from Port Manatee, Manatee County, Florida. Publication of this notice begins a scoping process that will help identify and determine the scope of environmental issues to be addressed in the EIS. This notice requests public participation in the scoping process and provides information on how to participate.

DATES: The public meeting in Palmetto, FL will be held on July 25, 2007. The public meeting will be held from 6 p.m. to 8 p.m. and will be preceded by an open house from 4:30 p.m. to 5:30 p.m. The public meeting may end later than the stated time, depending on the

number of persons wishing to speak. Material submitted in response to the request for comments must reach the Docket Management Facility by August 13, 2007.

ADDRESSES: Public open house and meeting: The Manatee Convention Center, Conference Center, One Haben Blvd., Palmetto, Florida 34221. (941) 722–3244.

Address docket submissions for USCG–2007–28532 to: Docket Management Facility, U.S. Department of Transportation, West Building, Ground Floor, Room W12–140, 1200 New Jersey Avenue, SE., Washington, DC 20590.

The Docket Management Facility accepts hand-delivered submissions, and makes docket contents available for public inspection and copying at this address, in room W12–140, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The Facility's telephone is 202–366–9329, its fax is 202–493–2251, and its Web site for electronic submissions or for electronic access to docket contents is *http://dms.dot.gov*.

FOR FURTHER INFORMATION CONTACT: Ray Martin, U.S. Coast Guard, telephone: 202–372–1449, e-mail: *raymond.w.martin@uscg.mil*, Lieutenant Commander Brian Moore, U.S. Coast Guard, telephone: 202–372–1442, e-mail: *brian.e.moore@uscg.mil*, or Chris Hanan, U.S. Maritime Administration, telephone: 202–366–1900, e-mail: *Christopher.Hanan@dot.gov*. If you have questions on viewing the docket, call Renee V. Wright, Program Manager, Docket Operations, telephone 202–493–0402.

SUPPLEMENTARY INFORMATION:

Public Meeting and Open House

We invite you to learn about the proposed deepwater port at an informational open house, and to comment at a public meeting on environmental issues related to the proposed deepwater port. Your comments will help us identify and refine the scope of the environmental issues to be addressed in the EIS.

In order to allow everyone a chance to speak at the public meeting, we may limit speaker time, or extend the meeting hours, or both. You must identify yourself, and any organization you represent, by name. Your remarks will be recorded or transcribed for inclusion in the public docket.

You may submit written material at the public meeting, either in place of or in addition to speaking. Written material must include your name and address, and will be included in the public docket.

Public docket materials will be made available to the public on the Docket Management Facility's Docket Management System (DMS). See "Request for Comments" for information about DMS and your rights under the Privacy Act.

Our public meeting location is wheelchair-accessible. If you plan to attend the open house or public meeting, and need special assistance such as sign language interpretation or other reasonable accommodation, please notify the Coast Guard (see **FOR FURTHER INFORMATION CONTACT**) at least 3 business days in advance. Include your contact information as well as information about your specific needs.

Request for Comments

We request public comments or other relevant information on environmental issues related to the proposed deepwater port. The public meeting is not the only opportunity you have to comment. In addition to or in place of attending a meeting, you can submit comments to the Docket Management Facility during the public comment period (see **DATES**). We will consider all comments and material received during the comment period.

Submissions should include:

- Docket number USCG–2007–28532.
- Your name and address.
- Your reasons for making each comment or for bringing information to our attention.

Submit comments or material using only one of the following methods:

- Electronic submission to DMS, *http://dms.dot.gov*.
- Fax, mail, or hand delivery to the Docket Management Facility (see **ADDRESSES**). Faxed or hand delivered submissions must be unbound, no larger than 8½ by 11 inches, and suitable for copying and electronic scanning. If you mail your submission and want to know when it reaches the Facility, include a stamped, self-addressed postcard or envelope.

Regardless of the method used for submitting comments or material, all submissions will be posted, without change, to the DMS website (*http://dms.dot.gov*), and will include any personal information you provide. Therefore, submitting this information makes it public. You may wish to read the Privacy Act notice that is available on the DMS website, or the Department of Transportation Privacy Act Statement that appeared in the Federal Register on April 11, 2000 (65 FR 19477).

You may view docket submissions at the Docket Management Facility (see **ADDRESSES**), or electronically on the DMS Web site.

Background

Information about deepwater ports, the statutes and regulations governing their licensing, and the receipt of the current application for the proposed Port Dolphin liquefied natural gas (LNG) deepwater port appeared in the Federal Register on June 25, 2007 (72 FR 34741). The "Summary of the Application" from that publication is reprinted below for your convenience.

Consideration of a deepwater port license application includes review of the proposed deepwater port's natural and human environmental impacts. The Coast Guard, in coordination with the Maritime Administration, is the lead agency for determining the scope of this review, and in this case has determined that review must include preparation of an EIS. This notice of intent is required by 40 CFR 1501.7, and briefly describes the proposed action and possible alternatives and the proposed scoping process. You can address any questions about the proposed action, the scoping process, or the EIS to the Coast Guard project manager identified in **FOR FURTHER INFORMATION CONTACT**.

Proposed Action and Alternatives

The proposed action requiring environmental review is the Federal licensing of the proposed deepwater port described in "Summary of the Application" below. The alternatives to licensing the proposed port are: (1) Licensing with conditions (including conditions designed to mitigate environmental impact), and (2) denying the application, which for purposes of environmental review is the "no-action" alternative.

Scoping Process

Public scoping is an early and open process for identifying and determining the scope of issues to be addressed in the EIS. Scoping begins with this notice, continues through the public comment period (see **DATES**), and ends when the Coast Guard has completed the following actions:

- Invites the participation of Federal, State, and local agencies, any affected Indian tribe, the applicant, and other interested persons;
- Determines the actions, alternatives, and impacts described in 40 CFR 1508.25;
- Identifies and eliminates, from detailed study, those issues that are not significant or that have been covered elsewhere;
- Allocates responsibility for preparing EIS components;

• Indicates any related environmental assessments or environmental impact statements that are not part of the EIS;

• Identifies other relevant environmental review and consultation requirements;

• Indicates the relationship between timing of the environmental review and other aspects of the application process; and

• At its discretion, exercises the options provided in 40 CFR 1501.7(b).

Once the scoping process is complete, the Coast Guard will prepare a draft EIS, and publish a **Federal Register** notice announcing its public availability. (If you want that notice to be sent to you, please contact the Coast Guard project manager identified in **FOR FURTHER INFORMATION CONTACT**). You will have an opportunity to review and comment on the draft EIS. The Coast Guard will consider those comments in the preparation of the final EIS. As with the draft EIS, the availability of the final EIS will be announced and an opportunity for review and comment will again be provided.

Summary of the Application

Port Dolphin Energy LLC, proposes to own, construct, and operate a deepwater port, named Port Dolphin, in the Federal waters of the Outer Continental Shelf in the St. Petersburg (PB) blocks: PB545, PB589 and PB590, approximately 28 miles off the west coast of Florida to the southwest of Tampa Bay, in a water depth of approximately 100 feet. Port Dolphin would consist of a permanently moored unloading buoy system with two submersible buoys separated by a distance of approximately three miles. Each unloading buoy would be permanently secured to eight mooring lines, consisting of wire rope, chain, and buoyancy elements, each attached to anchor points on the seabed. Anchor points will most likely consist of driven piles.

The buoys would be designed to moor a specialized type of LNG vessel called a Shuttle and Regasification Vessel (SRV) of between 145,000 and 217,000 cubic meter capacity. SRV vessels are equipped to vaporize cryogenic LNG cargo to natural gas through an onboard closed loop vaporization system, and to odorize and meter gas for send-out by means of the unloading buoy to conventional subsea pipelines. The SRVs would moor to the unloading buoys which connect through the hull of the vessels to specially designed turrets that would enable the vessels to weathervane or rotate in response to prevailing wind, wave, and current directions. When the vessels are not present, the buoys would be submerged on a special landing pad on the seabed, 60–70 feet below the sea surface.

Each unloading buoy would connect through a 16-inch flexible riser and a 36-inch flowline to a Y intersection and then a 36-inch pipeline approximately 42 miles in length that would connect onshore in Port Manatee, Manatee County, Florida. The pipeline would connect with the Gulfstream Natural Gas System, LLC and Tampa Electric Company (TECO) System.

The 36-inch gas transmission line would make landfall on Port Manatee property. From there, the transmission pipeline would proceed in a generally easterly direction to the first interconnection point with the Gulfstream system at 3.6-miles. The Gulfstream Interconnection Station would occupy an approximately two-acre site. Up to approximately 80 percent of the natural gas or 800 million standard cubic feet per day (mmscfd) is expected to be delivered to the Gulfstream Pipeline.

The remaining portion of the natural gas, up to approximately 360 mmscfd, would be transported by 14-inch line to the TECO interconnection station; located 2.1-miles east of the Gulfstream interconnect. Only shuttle and regasification vessels (SRVs) will call on Port Dolphin. Offloading would require between 4–8 days and when empty the SRV would disconnect from the buoy and leave the port.

Initially it is expected that Port Dolphin would be capable of a natural gas throughput of 400 mmscfd and would eventually be capable of 800 mmscfd with a peak capacity of 1200 mmscfd by having at least one SRV regasifying and discharging at all times. The system would be designed so that two SRVs can be moored simultaneously for continuous unloading of natural gas.

Port Dolphin Energy LLC is seeking Federal Energy Regulatory Commission (FERC) approval for the onshore pipelines concurrent with this deepwater port application. As required by FERC regulations, FERC will also maintain a docket for the FERC portion of the project. The docket numbers are CP07–191–000 and CP07–192–000. The filing may also be viewed on the Web at *http://www.ferc.gov* using the "eLibrary" link. Enter the docket number excluding the last three digits in the docket number field to access the document. For assistance, call (866) 208–3767 or TYY, (202) 502–8659.

In addition, pipelines and structures such as the moorings may require permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act which are administered by the U.S. Army Corps of Engineers (USACE).

Port Dolphin will also require permits from the Environmental Protection Agency (EPA) pursuant to the provisions of the Clean Air Act, as amended, and the Clean Water Act, as amended.

The new pipeline will be included in the National Environmental Policy Act (NEPA) review as part of the deepwater port application process. FERC, EPA, and the USACE among others, are cooperating agencies and will assist in the NEPA process as described in 40 CFR 1501.6; will be participating in the scoping meetings; and will incorporate the EIS into their permitting processes. Comments sent to the FERC docket, EPA or USACE will also be incorporated into the DOT docket and EIS to ensure consistency with the NEPA Process.

Construction of the deepwater port would be expected to take approximately 22 months with startup of commercial operations following construction, should a license be issued by the Maritime Administration. The deepwater port would be designed, constructed and operated in accordance with applicable codes and standards.

Privacy Act

The electronic form of all comments received into the DOT docket are available to any person and may be searched by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (Volume 65, Number 70; Pages 19477–78) or you may visit *http://dms.dot.gov.*

(Authority 49 CFR 1.66)

Dated: July 6, 2007.

By order of the Maritime Administrator.

Daron T. Threet,

Secretary, Maritime Administration.

[FR Doc. E7–13505 Filed 7–11–07; 8:45 am]

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UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

In the Matter of:	§	Docket Nos. CP07-191-001
	§	
Port Dolphin Energy LLC	§	

NOTICE OF FILING COMMENTS OF MANATEE COUNTY STAFF RE: AMENDED APPLICATION FILED BY PORT DOLPHIN ENERGY, LLC

In response to the Notice of Limited Scoping for the proposed Port Dolphin project and Request for Comments on Environmental Issues, Manatee County hereby gives Notice of Filing a copy of comments from the Environmental Manager of Manatee County, attached hereto as Exhibit A and made a part hereof by reference. The comments in Exhibit A are limited to the proposed on-shore pipeline and related facilities and are based upon a preliminary review of the Amended Application submitted within the limit period of time allowed for the comment period.

As an interested party in the above-captioned proceedings, Manatee County reserves its right to submit further comments and review as additional information is submitted by the applicant, Port Dolphin.

Respectfully submitted,

MANATEE COUNTY, FLORIDA

Sarah A. Schenk, Esq.
Assistant County Attorney
Manatee County Attorney's Office
1112 Manatee Avenue West - Suite 969
Bradenton, FL 34205
941-745-3750
sarah.schenk@mymanatee.org

March 4, 2008

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in these proceedings.

Dated at Bradenton, Florida this 4th day of March, 2008.

Sarah A. Schenk, Esq.

APPENDIX B

INTERESTED PARTY LETTER

U.S. Department of Homeland Security

United States Coast Guard

Commandant
United States Coast Guard

2100 Second Street, S.W.
Washington, DC 20593-0001
Staff Symbol: CG-3PSO-5
Phone: (202) 372-1440
Fax: (202) 372-1926
Email:mark.a.prescott@uscg.mil

16613
July 16, 2007

Dear Interested Party:

The U.S. Coast Guard (USCG) and the Maritime Administration announce their intent to prepare an Environmental Impact Statement (EIS) to assist in the evaluation of a deepwater port license application submitted by Port Dolphin Energy LLC (Port Dolphin). Port Dolphin proposes to own, construct, and operate the Port Dolphin Energy Liquefied Natural Gas (LNG) Deepwater Port located in the Gulf of Mexico approximately 28 miles offshore of Tampa Bay, Florida. A description of the proposed project is presented in Enclosure 1, and the Application may be viewed at the U.S. Department of Transportation (DOT) Docket Management System web page *http://dms.dot.gov* (Docket Number USCG-2007-28532).

The EIS will be prepared in accordance within the provisions of the Deepwater Port Act of 1974, as amended (33 United States Code [U.S.C.] 1501 *et seq.*); the National Environmental Policy Act (NEPA) (Section 102(2)(c)), as implemented by the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Parts 1500–1508); Department of Transportation (DOT) 5610.1C (*Procedures for Considering Environmental Impacts*); USCG Commandant Instruction M16475.1D (*National Environmental Policy Act Implementing Procedures and Policy for Considering Environmental Impacts*); and other appropriate and applicable regulations. The Maritime Administrator will use the EIS and other information to 1) to approve the application, 2) approve the application with conditions, or 3) deny the application. USCG and the Maritime Administration are now in the scoping period that precedes preparation of the EIS and invite public comments relating to the scope of the EIS. As part of the scoping process, we will hold an informational open house at the location listed below. The open house and public meeting are open to the public and all interested parties are encouraged to attend. Written and oral comments will be accepted at the public meeting as well as throughout the scoping process. The Notice of Intent, initiating the comment process, was published in the *Federal Register* on July 12, 2007 (72 FR 38116). Notices for the open house/public meeting will be published in the Tampa Tribune and Bradenton Herald during the week of July 22, 2007.

- The open house and public meeting will be held on July 25, 2007. Open House: 4:30 PM to 5:30 PM; Public Meeting 6:00 PM to 8:00 PM. These events will be held at: The Manatee Convention Center, Conference Center, One Haben Blvd., Palmetto, Florida 34221; 941-722-3244.

We encourage you to submit comments and related materials regarding this project. If you do so, please include your name and address, this notice reference number (USCG-2007-28532), and the reasons for each comment. You may submit your comments and materials by mail, hand delivery, fax, or electronic means to the Docket Management Facility. To make sure your comments and related materials are not entered more than once in the docket, please submit them by only one of the following means:

1. By Mail: Docket Management Facility (USCG-2007-28532), U.S. Department of Transportation, West Building, Ground Floor, Room W12-140, 1200 New Jersey Avenue, SE, Washington, DC 20590
2. By Personal Delivery: to the room and address listed above
3. By FAX: To the Docket Management Facility at (202) 493-2251.
4. Electronically: Through the Web Site for the Docket Management System at http://dms.dot.gov.

To ensure your comments are considered, we request that all comments be submitted by August 13, 2007. Comments and material received from the public will become part of the official record (or docket) and will be available for inspection or copying at the Docket Management Facility between 9:00 a.m. and 5:00 p.m., Monday through Friday, except Federal holidays. You may also view this information, including this notice and comments, on the Internet at *http://dms.dot.gov* (Docket Number USCG-2007-28532).

If you have questions about the proposed Port Dolphin Deepwater Port License Application EIS, you may contact Mr. Ray Martin, USCG, at (202) 372-1449 or Raymond.W.Martin@uscg.mil or Mr. Chris Hanan, Maritime Administration, at (202) 366-1900 or Christopher.Hanan@dot.gov. If you have questions about the NEPA process or about this EIS, please contact Ms. Patience Whitten at (202) 372-1453 or Patience.K.Whitten@uscg.mil.

Sincerely,

M.A. PRESCOTT
Chief, Deepwater Ports Standards Division
U.S. Coast Guard
By direction

H. KEITH LESNICK
Director, Office of Deepwater Port Licensing and Offshore Activities
U.S. Maritime Administration

Enclosures: 1. Proposed Port Dolphin Deepwater Port Terminal Fact Sheet
2. Project Area Map
3. Notice of Intent

Port Dolphin LNG Deepwater Port Environmental Impact Statement (USCG-2007-28532)

Proposed Action Fact Sheet

Introduction

In accordance with the Deepwater Port Act of 1974, as amended (the Act, 33 U.S. Code [U.S.C.] 1501 et seq.), the National Environmental Policy Act (NEPA) (Section 102(2)(c)), as implemented by the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508), and other applicable regulations, the USCG and the Maritime Administration intend to prepare an Environmental Impact Statement (EIS) to assist in evaluating the license application submitted by Port Dolphin Energy, L.L.C. for the proposed Port Dolphin deepwater port. NEPA requires Federal agencies to consider environmental impacts that may result from a proposed action, to inform the public of potential impacts and alternatives, and to facilitate public involvement in the assessment process. The EIS will describe in detail the nature and extent of the environmental impacts of the Proposed Action and alternatives and discuss appropriate mitigation measures for any adverse impacts. The EIS will include, among other matters, discussions of the purpose and need for the Proposed Action, a description of alternatives, a description of the affected environment, and an evaluation of the environmental impacts of the Proposed Action and alternatives. The U.S. Army Corps of Engineers (USACE) will use the EIS for their findings on the applicant's Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act permits. The U.S. Environmental Protection Agency (USEPA) will use the EIS findings on the applicant's NPDES permit application under the Section 402 of the Clean Water Act. The USEPA and USACE evaluations will be coordinated with and incorporated into the EIS prepared by USCG and the Maritime Administration.

Proposed Action

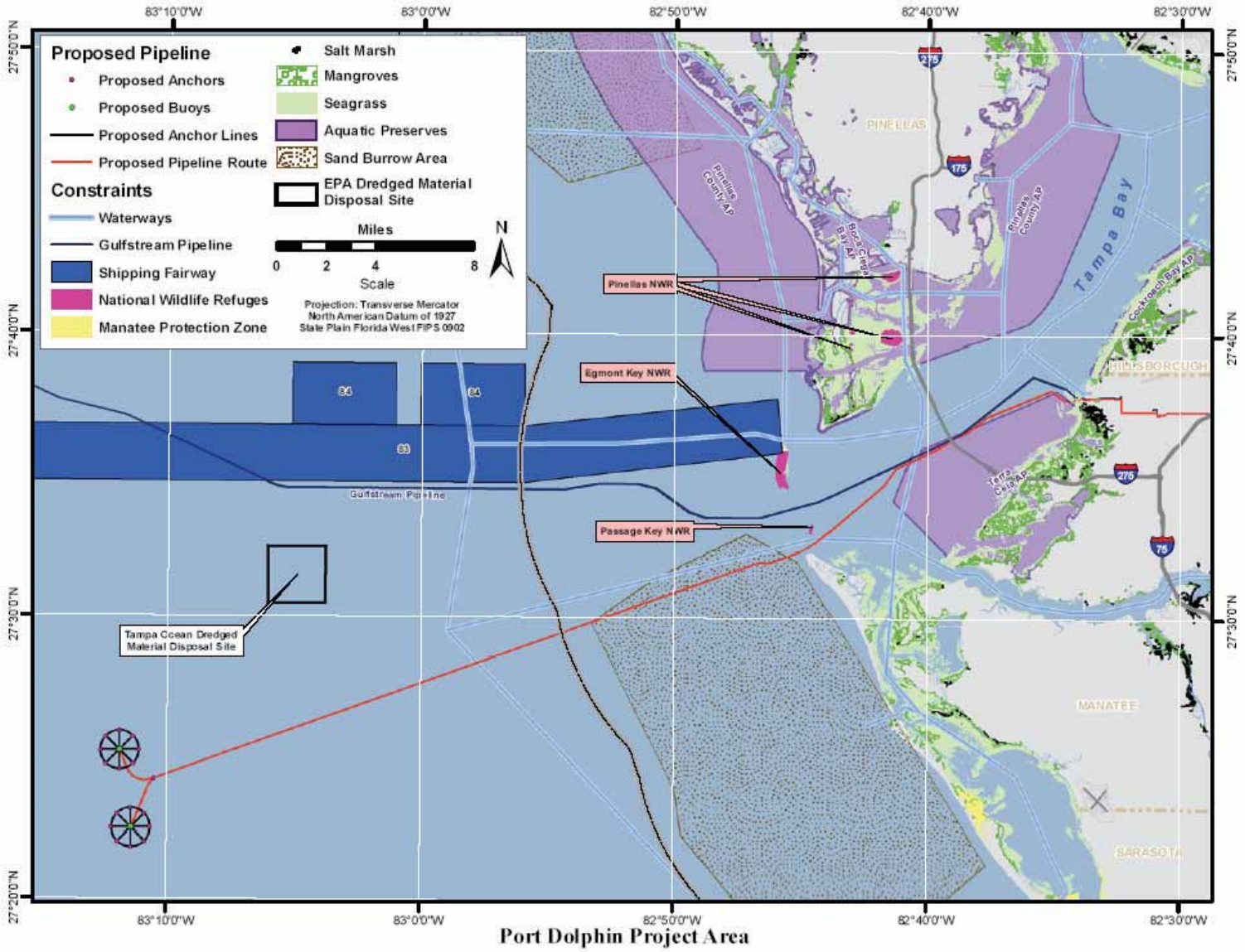
Port Dolphin Energy LLC, proposes to own, construct, and operate a deepwater port, named Port Dolphin, in the Federal waters of the Outer Continental Shelf in the St. Petersburg (PB) blocks: PB545, PB589 and PB590, approximately 28 miles off the west coast of Florida to the southwest of Tampa Bay, in a water depth of approximately 100 feet. Port Dolphin would consist of a permanently moored unloading buoy system with two submersible buoys separated by a distance of approximately three miles. The buoys would be designed to moor a specialized type of LNG vessel called a Shuttle and Regasification Vessel (SRV) of between 145,000 and 217,000 cubic meter capacity. SRV vessels are equipped to vaporize cryogenic LNG cargo to natural gas through an onboard closed loop vaporization system, and to odorize and meter gas for send-out by means of the unloading buoy to a 36-inch flowline to a Y intersection and then a 36-inch pipeline approximately 42 miles in length that would connect onshore in Port Manatee, Manatee County, Florida with the Gulfstream Natural Gas System, LLC and Tampa Electric Company (TECO) pipeline. The 36-inch gas transmission line will make landfall on Port Manatee property. When the vessels are not present, the buoys would be submerged on a special landing pad on the seabed, 60–70 feet below the sea surface.

Only shuttle and regasification vessels (SRVs) would call on Port Dolphin. Initially Port Dolphin would be capable of a natural gas throughput of 400 mmscfd and would eventually be capable of an average of 800 mmscfd with a peak capacity of 1200 mmscfd . Construction of Port Dolphin would be expected to take 22 months. The Port Dolphin deepwater port would be designed, constructed, and operated in accordance with applicable codes and standards and would have an expected operating life of approximately 20 years.

Alternatives

Consistent with NEPA, USCG and the Maritime Administration must also consider alternative means to construct and operate a deepwater port. USCG and the Maritime Administration review will extend to matters such as the specific location of the port, methods of port construction and platform layout, and technologies for storing and regasifying LNG. The applicant presented alternatives for consideration by USCG and the Maritime Administration, including:

- No action alternative whereby no facility is constructed.
- Non-gas alternatives including fossil fuel, renewables, nuclear, and other types of electric power generation.
- LNG system alternatives considering existing and proposed LNG import facilities.
- Pipeline system alternatives.
- Offshore technology alternatives considering available and contemplated technologies.
- Geographic alternatives evaluating sites along the west coast of Florida.
- The USCG has created public input tools to allow interested parties to submit comments, including suggested alternatives, for consideration by USCG and the Maritime Administration.



Port Dolphin Project Area

2. Statutory Basis

The Exchange believes that the proposed rule change is consistent with and furthers the objectives of Section 6(b)(5) of the Act,[9] in that it is designed to promote just and equitable principles of trade, to remove impediments to and perfect the mechanism of a free and open market and a national market system, and, in general, to protect investors and the public interest.

B. Self-Regulatory Organization's Statement on Burden on Competition

The Exchange does not believe that the proposed rule change will impose any burden on competition that is not necessary or appropriate in furtherance of the purposes of the Act.

C. Self-Regulatory Organization's Statement on Comments on the Proposed Rule Change Received From Members, Participants or Others

No written comments were solicited or received with respect to the proposed rule change.

III. Date of Effectiveness of the Proposed Rule Change and Timing for Commission Action

Because the forgoing rule change does not: (1) Significantly affect the protection of investors or the public interest; (2) impose any significant burden on competition; and (3) become operative for 30 days after the date of this filing, or such shorter time as the Commission may designate, it has become effective pursuant to Section 19(b)(3)(A) of the Act [10] and Rule 19b–4(f)(6) thereunder.[11]

A proposed rule change filed under 19b–4(f)(6) normally may not become operative prior to 30 days after the date of filing.[12] However, Rule 19b–4(f)(6)(iii) [13] permits the Commission to designate a shorter time if such action is consistent with the protection of investors and the public interest. The Exchange has requested that the Commission waive the 30-day operative delay. The Commission believes that waiving the 30-day operative delay is consistent with the protection of investors and the public interest because such waiver would permit position and exercise limits for options on IWM to continue at 500,000 option contracts for an approximately six-month pilot period. For this reason, the Commission designates the proposed rule change to be operative upon filing with the Commission.[14]

At any time within 60 days of the filing of such proposed rule change the Commission may summarily abrogate such rule change if it appears to the Commission that such action is necessary or appropriate in the public interest, for the protection of investors or otherwise in furtherance of the purposes of the Act.

IV. Solicitation of Comments

Interested persons are invited to submit written data, views, and arguments concerning the foregoing, including whether the proposed rule change is consistent with the Act. Comments may be submitted by any of the following methods:

Electronic Comments

- Use the Commission's Internet comment form (*http://www.sec.gov/rules/sro.shtml*); or
- Send an e-mail to *rule-comments@sec.gov*. Please include File Number SR–NYSEArca-2007–58 on the subject line.

Paper Comments

- Send paper comments in triplicate to Nancy M. Morris, Secretary, Securities and Exchange Commission, 100 F Street, NE., Washington, DC 20549–1090.

All submissions should refer to File Number SR–NYSEArca-2007–58. This file number should be included on the subject line if e-mail is used. To help the Commission process and review your comments more efficiently, please use only one method. The Commission will post all comments on the Commission's Internet Web site (*http://www.sec.gov/rules/sro.shtml*). Copies of the submission, all subsequent amendments, all written statements with respect to the proposed rule change that are filed with the Commission, and all written communications relating to the proposed rule change between the Commission and any person, other than those that may be withheld from the public in accordance with the provisions of 5 U.S.C. 552, will be available for inspection and copying in the Commission's Public Reference Room, 100 F Street, NE., Washington, DC 20549, on official business days between the hours of 10 a.m. and 3 p.m. Copies of the filing also will be available for inspection and copying at the principal office of NYSE Arca. All comments received will be posted without change; the Commission does not edit personal identifying information from submissions. You should submit only information that you wish to make available publicly. All submissions should refer to File Number SR–NYSEArca-2007–58 and should be submitted on or before August 2, 2007.

For the Commission, by the Division of Market Regulation, pursuant to delegated authority.[15]

Florence E. Harmon,

Deputy Secretary.

[FR Doc. E7–13506 Filed 7–11–07; 8:45 am]

BILLING CODE 8010–01–P

[9] 15 U.S.C. 78f(b)(5).

[10] 15 U.S.C. 78s(b)(3)(A).

[11] 17 CFR 240.19b–4(f)(6).

[12] 17 CFR 240.19b–4(f)(6)(iii). In addition, Rule 19b-4(f)(6)(iii) requires that a self-regulatory organization submit to the Commission written notice of its intent to file the proposed rule change, along with a brief description and text of the proposed rule change, at least five business days prior to the date of filing of the proposed rule change, or such shorter time as designated by the Commission. The Exchange has satisfied the five-day pre-filing notice requirement.

[13] *Id.*

[14] For the purposes only of waiving the 30-day operative delay, the Commission has considered the proposed rule's impact on efficiency, competition, and capital formation. *See* 15 U.S.C. 78c(f).

[15] 17 CFR 200.30–3(a)(12).

DEPARTMENT OF TRANSPORTATION

Maritime Administration

[USCG–2007–28532]

Port Dolphin Energy LLC, Port Dolphin Energy Liquefied Natural Gas Deepwater Port License Application

AGENCY: Maritime Administration, DOT.

ACTION: Notice of intent; notice of public meeting; request for comments.

SUMMARY: The Maritime Administration announces that the Coast Guard, in coordination with the Maritime Administration, will prepare an Environmental Impact Statement (EIS) as part of the environmental review of this license application. The application describes a project that would be located approximately 28 miles off the western coast of Florida, and approximately 42 miles from Port Manatee, Manatee County, Florida. Publication of this notice begins a scoping process that will help identify and determine the scope of environmental issues to be addressed in the EIS. This notice requests public participation in the scoping process and provides information on how to participate.

DATES: The public meeting in Palmetto, FL will be held on July 25, 2007. The public meeting will be held from 6 p.m. to 8 p.m. and will be preceded by an open house from 4:30 p.m. to 5:30 p.m. The public meeting may end later than the stated time, depending on the

number of persons wishing to speak. Material submitted in response to the request for comments must reach the Docket Management Facility by August 13, 2007.

ADDRESSES: Public open house and meeting: The Manatee Convention Center, Conference Center, One Haben Blvd., Palmetto, Florida 34221. (941) 722–3244.

Address docket submissions for USCG–2007–28532 to: Docket Management Facility, U.S. Department of Transportation, West Building, Ground Floor, Room W12–140, 1200 New Jersey Avenue, SE., Washington, DC 20590.

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FOR FURTHER INFORMATION CONTACT: Ray Martin, U.S. Coast Guard, telephone: 202–372–1449, e-mail: *raymond.w.martin@uscg.mil*, Lieutenant Commander Brian Moore, U.S. Coast Guard, telephone: 202–372–1442, e-mail: *brian.e.moore@uscg.mil*, or Chris Hanan, U.S. Maritime Administration, telephone: 202–366–1900, e-mail: *Christopher.Hanan@dot.gov*. If you have questions on viewing the docket, call Renee V. Wright, Program Manager, Docket Operations, telephone 202–493–0402.

SUPPLEMENTARY INFORMATION:

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Request for Comments

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- Docket number USCG–2007–28532.
- Your name and address.
- Your reasons for making each comment or for bringing information to our attention.

Submit comments or material using only one of the following methods:

- Electronic submission to DMS, *http://dms.dot.gov*.
- Fax, mail, or hand delivery to the Docket Management Facility (see **ADDRESSES**). Faxed or hand delivered submissions must be unbound, no larger than 8½ by 11 inches, and suitable for copying and electronic scanning. If you mail your submission and want to know when it reaches the Facility, include a stamped, self-addressed postcard or envelope.

Regardless of the method used for submitting comments or material, all submissions will be posted, without change, to the DMS website (*http://dms.dot.gov*), and will include any personal information you provide. Therefore, submitting this information makes it public. You may wish to read the Privacy Act notice that is available on the DMS website, or the Department of Transportation Privacy Act Statement that appeared in the Federal Register on April 11, 2000 (65 FR 19477).

You may view docket submissions at the Docket Management Facility (see **ADDRESSES**), or electronically on the DMS Web site.

Background

Information about deepwater ports, the statutes and regulations governing their licensing, and the receipt of the current application for the proposed Port Dolphin liquefied natural gas (LNG) deepwater port appeared in the Federal Register on June 25, 2007 (72 FR 34741). The "Summary of the Application" from that publication is reprinted below for your convenience.

Consideration of a deepwater port license application includes review of the proposed deepwater port's natural and human environmental impacts. The Coast Guard, in coordination with the Maritime Administration, is the lead agency for determining the scope of this review, and in this case has determined that review must include preparation of an EIS. This notice of intent is required by 40 CFR 1501.7, and briefly describes the proposed action and possible alternatives and the proposed scoping process. You can address any questions about the proposed action, the scoping process, or the EIS to the Coast Guard project manager identified in **FOR FURTHER INFORMATION CONTACT**.

Proposed Action and Alternatives

The proposed action requiring environmental review is the Federal licensing of the proposed deepwater port described in "Summary of the Application" below. The alternatives to licensing the proposed port are: (1) Licensing with conditions (including conditions designed to mitigate environmental impact), and (2) denying the application, which for purposes of environmental review is the "no-action" alternative.

Scoping Process

Public scoping is an early and open process for identifying and determining the scope of issues to be addressed in the EIS. Scoping begins with this notice, continues through the public comment period (see **DATES**), and ends when the Coast Guard has completed the following actions:

- Invites the participation of Federal, State, and local agencies, any affected Indian tribe, the applicant, and other interested persons;
- Determines the actions, alternatives, and impacts described in 40 CFR 1508.25;
- Identifies and eliminates, from detailed study, those issues that are not significant or that have been covered elsewhere;
- Allocates responsibility for preparing EIS components;

• Indicates any related environmental assessments or environmental impact statements that are not part of the EIS;

• Identifies other relevant environmental review and consultation requirements;

• Indicates the relationship between timing of the environmental review and other aspects of the application process; and

• At its discretion, exercises the options provided in 40 CFR 1501.7(b).

Once the scoping process is complete, the Coast Guard will prepare a draft EIS, and publish a **Federal Register** notice announcing its public availability. (If you want that notice to be sent to you, please contact the Coast Guard project manager identified in **FOR FURTHER INFORMATION CONTACT**). You will have an opportunity to review and comment on the draft EIS. The Coast Guard will consider those comments in the preparation of the final EIS. As with the draft EIS, the availability of the final EIS will be announced and an opportunity for review and comment will again be provided.

Summary of the Application

Port Dolphin Energy LLC, proposes to own, construct, and operate a deepwater port, named Port Dolphin, in the Federal waters of the Outer Continental Shelf in the St. Petersburg (PB) blocks: PB545, PB589 and PB590, approximately 28 miles off the west coast of Florida to the southwest of Tampa Bay, in a water depth of approximately 100 feet. Port Dolphin would consist of a permanently moored unloading buoy system with two submersible buoys separated by a distance of approximately three miles. Each unloading buoy would be permanently secured to eight mooring lines, consisting of wire rope, chain, and buoyancy elements, each attached to anchor points on the seabed. Anchor points will most likely consist of driven piles.

The buoys would be designed to moor a specialized type of LNG vessel called a Shuttle and Regasification Vessel (SRV) of between 145,000 and 217,000 cubic meter capacity. SRV vessels are equipped to vaporize cryogenic LNG cargo to natural gas through an onboard closed loop vaporization system, and to odorize and meter gas for send-out by means of the unloading buoy to conventional subsea pipelines. The SRVs would moor to the unloading buoys which connect through the hull of the vessels to specially designed turrets that would enable the vessels to weathervane or rotate in response to prevailing wind, wave, and current directions. When the vessels are not present, the buoys would be submerged on a special landing pad on the seabed, 60–70 feet below the sea surface.

Each unloading buoy would connect through a 16-inch flexible riser and a 36-inch flowline to a Y intersection and then a 36-inch pipeline approximately 42 miles in length that would connect onshore in Port Manatee, Manatee County, Florida. The pipeline would connect with the Gulfstream Natural Gas System, LLC and Tampa Electric Company (TECO) System.

The 36-inch gas transmission line would make landfall on Port Manatee property. From there, the transmission pipeline would proceed in a generally easterly direction to the first interconnection point with the Gulfstream system at 3.6-miles. The Gulfstream Interconnection Station would occupy an approximately two-acre site. Up to approximately 80 percent of the natural gas or 800 million standard cubic feet per day (mmscfd) is expected to be delivered to the Gulfstream Pipeline.

The remaining portion of the natural gas, up to approximately 360 mmscfd, would be transported by 14-inch line to the TECO interconnection station; located 2.1-miles east of the Gulfstream interconnect. Only shuttle and regasification vessels (SRVs) will call on Port Dolphin. Offloading would require between 4–8 days and when empty the SRV would disconnect from the buoy and leave the port.

Initially it is expected that Port Dolphin would be capable of a natural gas throughput of 400 mmscfd and would eventually be capable of 800 mmscfd with a peak capacity of 1200 mmscfd by having at least one SRV regasifying and discharging at all times. The system would be designed so that two SRVs can be moored simultaneously for continuous unloading of natural gas.

Port Dolphin Energy LLC is seeking Federal Energy Regulatory Commission (FERC) approval for the onshore pipelines concurrent with this deepwater port application. As required by FERC regulations, FERC will also maintain a docket for the FERC portion of the project. The docket numbers are CP07–191–000 and CP07–192–000. The filing may also be viewed on the Web at *http://www.ferc.gov* using the "eLibrary" link. Enter the docket number excluding the last three digits in the docket number field to access the document. For assistance, call (866) 208–3767 or TYY, (202) 502–8659.

In addition, pipelines and structures such as the moorings may require permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act which are administered by the U.S. Army Corps of Engineers (USACE).

Port Dolphin will also require permits from the Environmental Protection Agency (EPA) pursuant to the provisions of the Clean Air Act, as amended, and the Clean Water Act, as amended.

The new pipeline will be included in the National Environmental Policy Act (NEPA) review as part of the deepwater port application process. FERC, EPA, and the USACE among others, are cooperating agencies and will assist in the NEPA process as described in 40 CFR 1501.6; will be participating in the scoping meetings; and will incorporate the EIS into their permitting processes. Comments sent to the FERC docket, EPA or USACE will also be incorporated into the DOT docket and EIS to ensure consistency with the NEPA Process.

Construction of the deepwater port would be expected to take approximately 22 months with startup of commercial operations following construction, should a license be issued by the Maritime Administration. The deepwater port would be designed, constructed and operated in accordance with applicable codes and standards.

Privacy Act

The electronic form of all comments received into the DOT docket are available to any person and may be searched by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (Volume 65, Number 70; Pages 19477–78) or you may visit *http://dms.dot.gov.*

(Authority 49 CFR 1.66)

Dated: July 6, 2007.

By order of the Maritime Administrator.

Daron T. Threet,

Secretary, Maritime Administration.

[FR Doc. E7–13505 Filed 7–11–07; 8:45 am]

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APPENDIX C

NEWSPAPER ADS

THE TAMPA TRIBUNE

General Notices

PUBLIC NOTICE

Informational Open House and Public Meeting for the Port Dolphin LNG Deepwater Port License Application Environmental Impact Statement (EIS)

Tampa Bay, FL - The U.S. Coast Guard (USCG) and the Maritime Administration announce their intent to prepare an Environmental Impact Statement (EIS) to assist in the evaluation of an application for a license for the proposed Port Dolphin liquefied natural gas deepwater port. The Port would be constructed and operated in the Federal waters of the Outer Continental Shelf on St. Petersburg blocks - PB545, PB589, and PB590, approximately 28 miles west of Tampa Bay, FL in a water depth of approximately 100 feet. Port Dolphin would be capable of mooring up to two LNG carriers by means of a submerged unloading buoy system. The agencies are now in the scoping period that precedes preparation of the EIS, and invite public comment relating to concerns on the proposal or to the scope of the EIS.

As part of the scoping process, the USCG and the Maritime Administration will hold an informational open house and public Meeting on 25 July 2007 at The Manatee Convention Center, Conference Center, One Haben Blvd., Palmetto, Florida 34221, (941) 722-3244. The Open House will run from 4:30pm to 6:00pm. A Public Meeting will be after the informational open house, from 6:00 p.m. to 8:00 p.m. The events are open to the public and all interested parties are encouraged to attend.

Written and oral comments will be accepted at the Open House and Public Meeting. Comments may also be submitted to the Department of Transportation's Docket Management Facility. Comments and related material must reach the Docket Management Facility on or before August 13, 2007. To make sure your comments and related material are not entered more than once in the docket, please submit them by only one of the following means:

(1) By mail or Delivery to the Docket Management Facility (USCG-2007-28532), Department of Transportation Docket Management Facility, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue, SE, Washington, DC 20590. The Facility's telephone is 202-366-9329.

(3) By fax to the Docket Management Facility at (202) 493-2251.

(4) Electronically through the Web Site for the Docket Management System at http://dms.dot.gov.

Please give due regard to the continuing difficulties and delays associated with delivery of mail through the U.S. Postal Service to federal facilities. Comments and material received from the public, as well as the Environmental Impact Statement, will become part of this docket and will be available for inspection or copying at Room Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except for Federal holidays. You may also view this docket, including this notice and comments, on the Internet at http://dms.dot.gov.

If you have questions about the project or the meeting, you may contact Mr. Raymond Martin, USCG at (202) 372-1449 or Raymond.W.Martin@uscg.mil. If you have questions or comments

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Bradenton Herald
Published Daily
Bradenton, Manatee County, Florida

STATE OF FLORIDA
COUNTY OF MANATEE

Before the undersigned authority personally appeared Ashley Bunch, who, on oath, says that she is a Legal Advertising Representative of The Bradenton Herald, a daily newspaper published at Bradenton in Manatee County, Florida; that the attached copy of the advertisement, being a Legal Advertisement in the matter of **PUBLIC NOTICE-INFORMATIONAL** in the Court, was published in said newspaper in the issues of **July 25, 2007.**

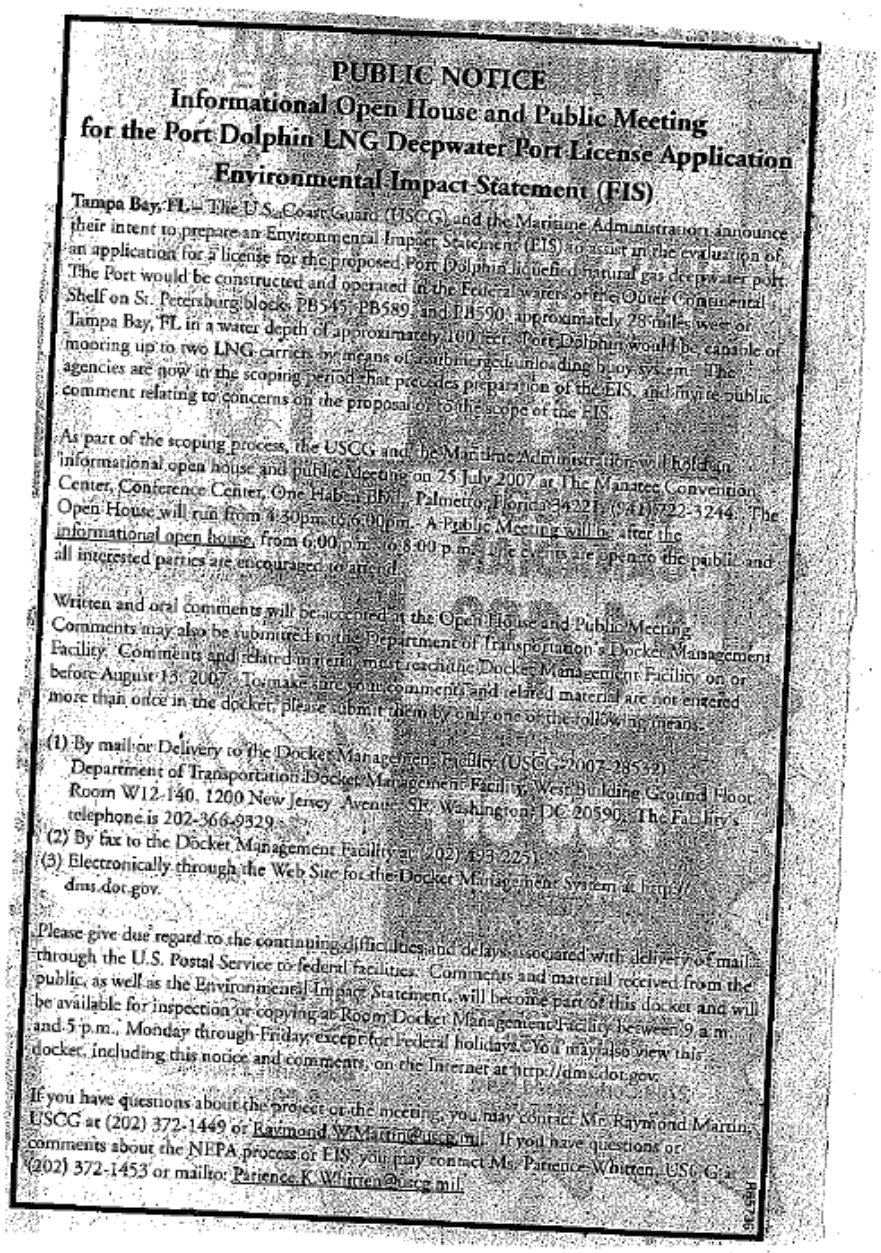
Affiant further says that the said publication is a newspaper published at Bradenton, in said Manatee County, Florida, and that the said newspaper has heretofore been continuously published in said Manatee County, Florida, each day and has been entered as second-class mail matter at the post office in Bradenton, in said Manatee County, Florida, for a period of 1 year next preceding the first publication of the attached copy of advertisement; and affiant further says that she has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

Ashley Bunch
(Signature of Affiant)

Sworn to and subscribed before me this
30th Day of July, 2007

DIANE S. BACRO
Notary Public
State of Florida
My comm. exp. 08-15-2007
Comm. No. DD 206531

Diane S. Bacro
SEAL & Notary Public
Personally Known X OR Produced Identification_____
Type of Identification Produced_____



PUBLIC NOTICE

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If you have questions about the project or the meeting, you may contact Mr. Raymond Martin, USCG at (202) 372-1449 or Raymond.W.Martin@uscg.mil. If you have questions or comments about the NEPA process or EIS, you may contact Ms. Patience Whitten, USCG at (202) 372-1453 or mailto: Patience.K.Whitten@uscg.mil.

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APPENDIX D

PUBLIC MEETING MATERIALS

Port Dolphin LNG Deepwater Port Environmental Impact Statement (USCG-2007-28532)

Proposed Action Fact Sheet

Introduction

In accordance with the Deepwater Port Act of 1974, as amended (the Act, 33 U.S. Code [U.S.C.] 1501 et seq.), the National Environmental Policy Act (NEPA) (Section 102(2)(c)), as implemented by the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508), and other applicable regulations, the USCG and the Maritime Administration intend to prepare an Environmental Impact Statement (EIS) to assist in evaluating the license application submitted by Port Dolphin Energy, L.L.C. for the proposed Port Dolphin deepwater port. NEPA requires Federal agencies to consider environmental impacts that may result from a proposed action, to inform the public of potential impacts and alternatives, and to facilitate public involvement in the assessment process. The EIS will describe in detail the nature and extent of the environmental impacts of the Proposed Action and alternatives and discuss appropriate mitigation measures for any adverse impacts. The EIS will include, among other matters, discussions of the purpose and need for the Proposed Action, a description of alternatives, a description of the affected environment, and an evaluation of the environmental impacts of the Proposed Action and alternatives. The U.S. Army Corps of Engineers (USACE) will use the EIS for their findings on the applicant's Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act permits. The U.S. Environmental Protection Agency (USEPA) will use the EIS findings on the applicant's NPDES permit application under the Section 402 of the Clean Water Act. The USEPA and USACE evaluations will be coordinated with and incorporated into the EIS prepared by USCG and the Maritime Administration.

Proposed Action

Port Dolphin Energy LLC, proposes to own, construct, and operate a deepwater port, named Port Dolphin, in the Federal waters of the Outer Continental Shelf in the St. Petersburg (PB) blocks: PB545, PB589 and PB590, approximately 28 miles off the west coast of Florida to the southwest of Tampa Bay, in a water depth of approximately 100 feet. Port Dolphin would consist of a permanently moored unloading buoy system with two submersible buoys separated by a distance of approximately three miles. The buoys would be designed to moor a specialized type of LNG vessel called a Shuttle and Regasification Vessel (SRV) of between 145,000 and 217,000 cubic meter capacity. SRV vessels are equipped to vaporize cryogenic LNG cargo to natural gas through an onboard closed loop vaporization system, and to odorize and meter gas for send-out by means of the unloading buoy to a 36-inch flowline to a Y intersection and then a 36-inch pipeline approximately 42 miles in length that would connect onshore in Port Manatee, Manatee County, Florida with the Gulfstream Natural Gas System, LLC and Tampa Electric Company (TECO) pipeline. The 36-inch gas transmission line will make landfall on Port Manatee property. When the vessels are not present, the buoys would be submerged on a special landing pad on the seabed, 60–70 feet below the sea surface.

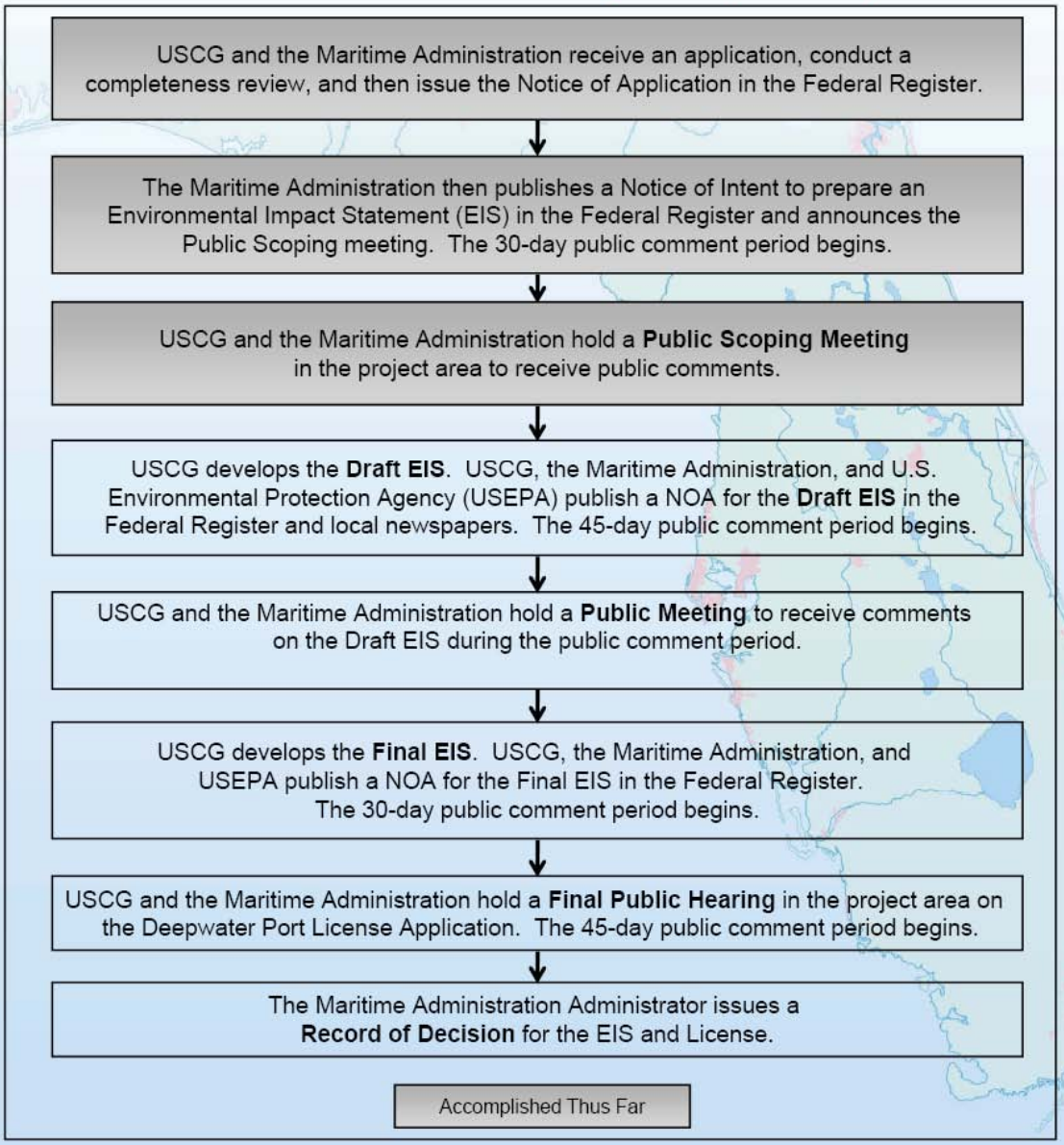
Only shuttle and regasification vessels (SRVs) would call on Port Dolphin. Initially Port Dolphin would be capable of a natural gas throughput of 400 mmscfd and would eventually be capable of an average of 800 mmscfd with a peak capacity of 1200 mmscfd . Construction of Port Dolphin would be expected to take 22 months. The Port Dolphin deepwater port would be designed, constructed, and operated in accordance with applicable codes and standards and would have an expected operating life of approximately 20 years.

Alternatives

Consistent with NEPA, USCG and the Maritime Administration must also consider alternative means to construct and operate a deepwater port. USCG and the Maritime Administration review will extend to matters such as the specific location of the port, methods of port construction and platform layout, and technologies for storing and regasifying LNG. The applicant presented alternatives for consideration by USCG and the Maritime Administration, including:

- No action alternative whereby no facility is constructed.
- Non-gas alternatives including fossil fuel, renewables, nuclear, and other types of electric power generation.
- LNG system alternatives considering existing and proposed LNG import facilities.
- Pipeline system alternatives.
- Offshore technology alternatives considering available and contemplated technologies.
- Geographic alternatives evaluating sites along the west coast of Florida.
- The USCG has created public input tools to allow interested parties to submit comments, including suggested alternatives, for consideration by USCG and the Maritime Administration.

Environmental Review Process For The National Environmental Policy Act (NEPA)



Environmental Impact Statement Review Topics

Typical Areas of Review

Air Quality Concerns

The Air Quality Review will evaluate the positive or negative impacts that emissions from construction and operation of the proposed deepwater port will have on air quality both locally and regionally.

Cultural/Historic Resource Concerns

This review generally includes a review of archaeological and cultural resources for onshore and offshore resources. Existing historical and cultural resources will be identified and preserved. An Unanticipated Discoveries Plan will be developed and followed during project construction.

Essential Fish Habitat Concerns

The EFH review will evaluate positive or negative impacts of construction and operation on fisheries and essential fish habitat, including threatened and endangered species and managed species important to commercial and recreational fishing.

Noise Concerns

A noise review will evaluate positive or negative impacts of construction and operation of the deepwater port on marine resources such as dolphins and manatees and on various land uses in the immediate area surrounding the onshore pipelines.

Socioeconomic Issues and Environmental Justice Concerns

Socioeconomic and Environmental Justices review will determine if construction and operation of the deepwater port will cause positive or negative impacts on local communities and services that they provide, such as schools, emergency services, and employment. It will also determine if these impacts will fall disproportionally on minority or low income populations.

Threatened and Endangered Species Concerns

A review of federally and state listed flora and fauna in the immediate areas of the deepwater port will be conducted to determine both positive or negative impacts to population and habitat.

Water Quality Concerns

A water quality review will evaluate positive or negative impacts of construction and operation on existing water quality parameters set forth by Federal, state, and local authorities.

Navigation and Transportation

A review of traffic patterns will evaluate positive or negative impacts of construction and operation of the deepwater port both on and offshore.

Land Use

A review of land use within the coastal zone and onshore will evaluate positive or negative impacts of construction and operation of the pipelines associated with the deepwater port. The review will determine if these impacts are consistent with Federal, state, and local planning authorities.

Liquefied Natural Gas (LNG) Fact Sheet

What is LNG?

LNG stands for liquefied natural gas. LNG is natural gas cooled to a temperature of approximately -260°F at atmospheric pressure at which point it condenses to a liquid. It is composed primarily of methane with small amounts of other liquefied petroleum gases. LNG is odorless, colorless, non-corrosive, and non-toxic. When LNG is regasified, the vapors are flammable only in concentrations of 5 to 15 percent natural gas when mixed with air. LNG is neither flammable nor explosive. Natural gas will not explode in an unconfined environment.

Natural gas can be imported to the U.S. from distant sources in the form of LNG. Because LNG occupies only a fraction of the volume of natural gas and takes up less space, it is more economical to transport across large distances and can be stored in larger quantities. Liquefying natural gas makes it feasible to transport natural gas by ship and store it in preparation for vaporization and delivery to markets.

Where does LNG Come From?

LNG supplies come primarily from locations where large gas discoveries have been made, such as Algeria, Indonesia, Trinidad, Nigeria, Malaysia, Qatar, Oman, and Australia. LNG is produced in Alaska as well. Typically, these locations are remote from areas of high natural gas demand.

How is LNG Transported?

LNG is transported in large, specially designed ships. These ships are double-hulled and have a cargo capacity of 138,000 cubic meters or more. These ships are fitted with a special cargo containment system inside the inner hull to maintain LNG at atmospheric pressure and -260°F. There are 167 ships currently in the LNG fleet and 60 or more are on order to meet anticipated future demand.

Is LNG Safe?

LNG has been handled safely for many years. The industry is not without incidents, but it has maintained an enviable safety record. Worldwide, there are approximately 17 LNG export (liquefaction) terminals, 40 import (regasification) terminals, and 167 LNG carriers, altogether handling approximately 120 million metric tons of LNG each year. There are currently about 200 storage facilities worldwide, some operating since the mid-60s. The U.S. has the largest number of LNG facilities in the world. There are 113 active LNG facilities across the U.S.

Deepwater Port Applications and the NEPA Process Fact Sheet

What is NEPA?

Congress passed the National Environmental Policy Act (NEPA) in 1969 to address concerns about environmental quality. NEPA establishes a national policy for attaining harmony between people and nature, for promoting efforts to eliminate damage to the environment, and for better understanding of ecological systems and natural resources. NEPA contains two major objectives:

1. ***To ensure that Federal agencies consider the potential environmental effects of proposed programs, projects, and actions before initiating them***
2. ***To inform the public and encourage and facilitate public involvement in Federal agency activities that affect the quality of the human environment***

Guidelines for Federal agencies to implement NEPA were established in regulations by the President's Council on Environmental Quality (CEQ) at 40 CFR 1500 -1508. The most detailed analysis prescribed by the CEQ regulations is the Environmental Impact Statement (EIS). An EIS is a detailed public document with the primary purpose of ensuring that requirements and goals of NEPA are incorporated into Federal programs and actions. An EIS is required to "provide a basis of consideration and inform decision-makers and the public of the reasonable alternatives."

Steps in the NEPA Process

NEPA requires Federal agencies to document potential environmental impacts of their proposed projects and policies. During the NEPA process, agencies consider issues ranging from air quality and biological impacts to cultural resources and socioeconomic impacts. The NEPA process for an EIS includes the following steps:

Conduct Public Scoping. In this phase of the project, the U.S. Coast Guard (USCG) and Maritime Administration ask the public to provide feedback on the proposed project, its potential environmental impacts, and analysis methods. Public scoping is critical for determining issues that will be discussed in the EIS and the way in which the study is conducted.

Prepare a Draft EIS. The Draft EIS is the first version of the formal document. A Notice of Availability (NOA) for the Draft EIS will be published in the *Federal Register*. The Draft EIS will be placed in public libraries throughout the affected area for public review. The Draft EIS will also be distributed to Federal, state, regional, and local agencies, private citizens, and local organizations. The USCG and the Maritime Administration will hold a public meeting to provide citizens an opportunity to make formal oral comments concerning the Draft EIS. Resource experts will be present to answer questions, and the public will have this additional opportunity to enter written and oral comments and concerns into the official record.

Prepare Final EIS. After the close of the comment period on the Draft EIS, USCG and the Maritime Administration will prepare a Final EIS to document the manner in which comments were considered. A NOA for the Final EIS will be published in the *Federal Register*.

Public Involvement

Methods for getting involved in the EIS process include submitting comments and attending public scoping meetings and public hearings. USCG and the Maritime Administration will notify the public of the times and places for these forums.

Agency Coordination

NEPA mandates that local, state, and Federal agencies within the affected areas be given the opportunity to comment on proposed actions. Other Federal agencies are asked to identify specific areas or issues that USCG and the Maritime Administration must address. The list of agencies contacted for agency coordination and their comments will be a part of the EIS.

Deepwater Port Act Requirements for Issuance of License to Own, Construct, and Operate a Deepwater Port

The Maritime Administration and U.S. Coast Guard (USCG) were jointly delegated responsibility by the Secretary of Transportation for processing deepwater port applications. The Secretary of Transportation has delegated to the Maritime Administrator the authority and responsibility to issue deepwater port licenses.

Maritime Administration, in consultation with the USCG, issues a Record of Decision (ROD) for each deepwater port license application. The ROD either approves, denies, or approves a license with conditions. The ROD is primarily based on the conditions for license issuance set forth in Section 1503 of the Deepwater Port Act of 1974, as amended (33 U.S.C. §§1501 et seq.) by the Maritime Transportation Security Act of 2002 (MTSA, Public Law 107-295).

Conditions for License Issuance Addressed in the Deepwater Port Act

1. The applicant must be financially responsible and able to meet the requirements of Section 1016 of the Oil Pollution Act of 1990 (33 U.S.C. §§2701 et seq.; 104 Stat 484). The applicant must be financially able to construct, own, and operate the deepwater port. The applicant also must provide a financial guarantee or bond sufficient to meet the cost for removal of components of the deepwater port upon termination or revocation of the license.
2. It must be determined that the applicant can and will comply with relevant laws, regulations, and license conditions. As part of this requirement the applicant must provide, in writing, its intended compliance with related laws, regulations, and conditions.
3. Construction and operation of the deepwater port must be in the national interest and consistent with national security and other national policy goals and objectives, including energy sufficiency and environmental quality.
4. The deepwater port should not unreasonably interfere with international navigation or other reasonable uses of the high seas as defined by treaty, convention, or customary international law.
5. In accordance with environmental review criteria, it must be determined that the applicant will construct and operate the deepwater port using best available technology to prevent or minimize adverse impacts on the marine environment.
6. The application must properly address all applicable provisions of the Clean Air Act, as amended, the Federal Water Pollution Control Act, as amended, and the Marine Protection, Research and Sanctuaries Act, as amended.
7. The Secretary of the Army, the Secretary of State, and the Secretary of Defense must convey their views on the adequacy of the application and its effect on programs within their respective jurisdictions.
8. The governor of the adjacent coastal State or States, pursuant to Section 1508 of the Deepwater Port Act, must approve the issuance of a deepwater port license. (Silence on this issue denotes approval.)
9. The adjacent coastal State to which the deepwater port is to be directly connected by pipeline must have an approved coastal zone management program pursuant to the Coastal Zone Management Act of 1972.

Deepwater Port Act and the Licensing Process Fact Sheet

What is the Deepwater Port Act?

The Deepwater Port Act (DWPA) of 1974, as amended, establishes a licensing system for ownership, construction, and operation of manmade structures beyond the U.S. territorial sea. The DWPA promotes the construction and operation of deepwater ports as a safe and effective means of importing oil and natural gas into the U.S. and transporting oil and natural gas from the Outer Continental Shelf, while minimizing tanker traffic and associated risks.

All deepwater ports must be licensed. The DWPA requires a license applicant to submit detailed plans for its facility to the Secretary of Transportation (the Secretary). The DWPA also requires the Secretary to designate an adjacent coastal state for consultation, and requires the consent of the governor of that state for license approval. The DWPA also mandates compliance with the National Environmental Policy Act (NEPA).

What is the Deepwater Port Licensing Process?

The Secretary has delegated the processing of deepwater port applications to the U.S. Coast Guard (USCG) and the Maritime Administration. The Secretary also delegated to Maritime Administration the authority to issue, transfer, amend, or reinstate a license for construction and operation of a deepwater port.

The DWPA license review process is driven by a series of legally mandated deadlines totaling a maximum of 356 calendar days from the date an application is approved. The DWPA mandates one NEPA process for all Federal agencies in the license application review process. Hence, there is a need to fully incorporate all necessary information and analysis to meet Federal (and state) environmental requirements in a single NEPA document. (The granting of the Federal or state permits or other authorities based on the NEPA analysis may occur at a later date. However, the NEPA process for the license application review must conclude that the proposal is substantially in compliance.)

USCG has a maximum of 21 calendar days from the date of application submittal to perform a completeness review. If determined complete, the USCG then has a maximum of 5 calendar days to publish a notice of application in the Federal Register.

The Federal Register notice triggers a maximum 240-day period in which to perform an application review, complete a NEPA process, and hold a final public hearing.

The DWPA requires at least one public hearing in each adjacent coastal state for each application. The final public hearing must occur no later than 240 days after publication of the Notice of Application in the Federal Register. The final public hearing then triggers a maximum 90-calendar day deadline for the Maritime Administrator to make a decision whether to grant, grant with conditions, or deny the application.

This 90-day period is divided into two 45-day periods. Federal agencies and the governor of the adjacent coastal state(s) have 45 days after the final public hearing to make their final comments on the application. The Maritime Administrator has a subsequent 45 days to issue a Record of Decision (ROD). There will be one ROD for both the EIS and the application.

All together, these various periods of time consume a total of 356 calendar days from the date a deepwater port license application is filed with the USCG.

Instructions for Submitting Written Comments

How Can I Submit Comments to the Federal Register?

To ensure that your comments are included as part of the environmental analysis, comments must be received in Washington, DC on or before August 28, 2007.

By Mail:

Docket Management Facility (USCG-2007-28532)
U.S. Department of Transportation
West Building, Ground Floor, Room W12-140
1200 New Jersey Avenue, SE
Washington, DC 20590

By Personal Delivery:

Room W12-140 on the Ground Floor of the West Building, 1200 New Jersey Ave, SE, Washington DC between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The telephone number is (202) 366-9329.

By FAX:

To the Docket Management Facility at (202) 493-2251.

Electronically:

Through the Web Site for the Docket Management System at http://dms.dot.gov.

The Docket Management Facility maintains the public docket for this notice. Comments will become part of this docket and will be available for inspection or copying in Room PL-401, located at 400 7th Street Southwest, Washington, DC 20590 between 9 a.m. and 5 p.m., Monday through Friday, except for Federal holidays. You may also view this docket, including this notice and comments, on the Internet at http://dms.dot.gov. Click on Simple Search and enter the docket number (28532).

If you choose to submit comments by mail or hand delivery, submit them in an unbound format, no larger than 8 ½ by 11 inches, and suitable for copying and electronic filing. If you submit comments by mail and would like to know if they reached the Facility, please enclose a stamped, self-addressed postcard or envelope. We will consider all comments and materials received during the comment period. (Note that delays in delivering packages to the Washington, DC-area is still being experienced due to security concerns, and that it may take longer than anticipated for mailed comments to reach the Department of Transportation.)

For Further Information:

If you have questions about the project, you may contact Mr. Ray Martin, U.S. Coast Guard, at (202) 372-1449, or Raymond.W.Martin@uscg.mil. If you have questions about the NEPA process or about the EIS, please contact Ms. Patience Whitten, U.S. Coast Guard, at (202) 372-1926, or Patience.K.Whitten@uscg.mil. For questions on viewing or submitting materials to the docket, contact Renee V. Wright, Program Manager, Docket Operations, at (202) 493-0402.

Public Scoping Meeting
Registration Card
for the
Port Dolphin Energy LLC Environmental Impact Statement (EIS)
Deepwater Port License Application

Date: ___/___/___

Name: _____

Mailing Address: _____
(Street)

_____
(City, State, Zip)

☐ I am an elected official.

☐ I represent a Federal, state, or local agency: _____
(Agency)

☐ I represent: _____
(Organization)

Title: _____

☐ I am a private citizen.

I would like to receive a copy of the Draft EIS.

☐ Hard Copy ☐ CD (electronic)

DATA REQUIRED BY THE PRIVACY ACT OF 1974

(5 U.S.C. 552A)

1. Authority:
23 U.S.C. Sections 557a, 557b, 597, 709a

2. Principal Purpose:
Information is used to compile mailing lists for sending brochures and other data concerning the project to those who might be interested.

3. Principal Purpose:
e. Information is forwarded to Federal, state, and local agencies, and Congressmen.
f. Information is used to compile mailing lists for other projects in which the person supplying the information might have an interest.
g. Information is compiled in a Record of Public Meeting and made available to the public.
h. Names of people and their comments during the public meeting are published in project reports.

4. Principal Purpose:
Effects of Individual Not Providing Information Voluntarily—Failure to provide the information requested would prevent delivery of documents and notification of further developments.

U.S. Coast Guard and the Maritime Administration

Port Dolphin LLC (USCG-2007-28532)

PUBLIC MEETING COMMENTS

Palmetto, FL

Comments can be: (1) left at the sign-in table or (2) mailed to the address below.

Please send one copy referenced to Docket No. (USCG-2007-28532) to the address below.

Docket Management Facility

U. S. Department of Transportation

West Building, Ground Floor, Room W12-140

1200 New Jersey Avenue, SE

Washington, DC 20590

The Facility's telephone is 202-366-9329.

COMMENTS: (*Please print; use and attach an additional sheet if necessary*)

Commentor's Name and Mailing Address (***Please Print***)

Date:

APPENDIX E

PUBLIC MEETING TRANSCRIPT AND WRITTEN COMMENTS

PORT DOLPHIN LNG DEEPWATER PORT

PUBLIC SCOPING MEETING

DATE TAKEN: Wednesday, July 25, 2007

TIME: 4:30 p.m.

PLACE: Manatee Convention Center
One Haben Boulevard
Palmetto, Florida

PRESENT:

DON BECKHAM - Engineering-Environmental Management
RAY MARTIN - U.S. Coast Guard
CHRIS HANAN - Maritime Administration
DAVE SWEARINGEN - Federal Energy Regulatory Commission
GARY LARSEN - Moderator

Patricia A. Pilarski, CSR
Executive Reporting Service
Bank of America Tower, Suite 400
One Progress Plaza, 200 Central Avenue
St. Petersburg, Florida 33701

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MR. MARTIN: We are going to get started. It's 6:00.

Good evening. My name is Ray Martin and I am the U.S. Coast Guard project manager for the Port Dolphin Project at U.S. Coast Guard Headquarters in Washington D.C. Also up here are Chris Hanan of the Maritime Administration; Dave Swearingen, the Federal Energy Regulatory Commission; Don Beckham of Engineering Environmental Management, environmental consultant for this project. Also in the audience is Mark Petersen of the U.S. Army Corp of Engineers. If you have any questions, he is available.

In a few minutes the other people up here will provide a shorter review of their responsibilities regarding the Port Dolphin Deepwater Port License application. But first I would like to give a brief background on this process.

November 2002 Congress passed a Maritime Transportation Security Act, which amended Deepwater Port Act by including the importation of natural gas. Prior to that it applied only to oil. Since the passage of the Act, the Coast Guard and the Maritime Administration have received 16 applications for natural gas deepwater ports.

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One of those applications was submitted on March 29, 2007, by Port Dolphin Energy, LLC. They proposed to own, construct and operate a natural gas deepwater port located, approximately, 28 miles off the western coast of Florida.

On June 25, 2007, the Coast Guard and the Maritime Administration published a notice in the Federal Register stating that the Port Dolphin application appeared to contain the required information to proceed. Since the project is closest to Florida it has been identified as an adjacent coastal state.

To issue a deepwater port license it must be found that the applicant is financially responsible, can and will comply with the applicable laws and regulations, and that the construction of the deepwater port is in the national interest.

As part of the overall licensing process the Maritime Transportation Security Act requires an environmental review. In this case an environmental impact statement or EIS must be prepared in accordance with the National Environmental Policy Act.

The fact that we are preparing an EIS was announced in the July 12, 2007, Federal Register.

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The EIS for Port Dolphin will describe the nature and extent of the environmental impacts of the proposed action, which is the construction and operation of Port Dolphin. EIS will also include, among other topics, the purpose and need of the proposed action, a description of the alternatives and a description of the affected environment.

The intent of this public scoping meeting is receive your input on these issues and any other issues you think should be considered.

I would like to emphasis, this meeting will not be your only opportunity to comment. Readily, comments on the type of scope, that is the type of issues that you would like analyzed and the EIS should be received by August 13, 2007. Once the draft EIS is completed, it will be announced in the Federal Register and made available for public review.

At least one public meeting will be held in Florida to receive public comments on the draft EIS. The meeting will probably be similar to this and will be announced in the Federal Register and local newspapers.

Separately from the EIS we will hold at least one public hearing in Florida to consider the Port

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Dolphin license application. The dates, locations and times will be announced in the Federal Register and local newspapers.

Now I would like to provide a brief overview of the Coast Guard's responsibility regarding the license application process. The Coast Guard and the Maritime Administration work together processing deepwater port applications. Although the administrator of the Maritime Administration will ultimately decide whether to approve, disapprove or approve with conditions a license for this proposed port, the Coast Guard will be the lead agency in developing the environmental analysis as one input for that decision.

In fulfilling our role as the lead agency for the development of the EIS, the Coast Guard must seek input from the public, as well as other state and federal agencies. The Coast Guard will also be responsible for the evaluation of proposed engineering design standards, the development of operations, wastewater management, Maritime safety and security requirements, in compliance with various laws and regulations for LNG carriers calling on the Port Dolphin Deepwater Port.

I want to make it clear that the Coast Guard

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is neither a proponent nor opponent of any deepwater port project. I also want to emphasis that only after the environmental review and license processes have been completed can there be any activity on the proposed project.

Now I am going to let Chris explain the responsibilities of his agency.

MR. HANAN: Good evening. As Ray said, my name is Chris Hanan and I am a member of the Maritime Administration Deepwater, Port Management Team.

On behalf of the Maritime Administrator I would like to thank all of you for attending this evening's scoping meeting for the Port Dolphin Energy Liquified Natural Gas Deepwater Port License application.

The Maritime Administration was delegated the authority and responsibility by the Secretary of Transportation to issue deepwater port licenses. With this long history of concern for safety and the environment we are pleased to work with the United States Coast Guard in processing deepwater port applications for the federal government.

As the deepwater port licensing authority, the Maritime Administration is keenly interested in the

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thorough environmental analysis of the Port Dolphin project and we are confident in the Coast Guard's leadership in this effort.

Sometime later this year or early next year at the end of the deepwater port application process the Maritime Administrator will have a decision to make, issue a deepwater port license, reject the deepwater port license, application or issue a deepwater port license subject to certain conditions. This decision to approve or disapprove the application will be reflected in the agency of the official record of decision document issued by the Maritime Administrator.

A favorable decision will be based upon the assurance that the applicant is financially responsible, the applicant is able to comply with applicable laws, regulations and license conditions. The deepwater port will operate in the national interest and consistent with national security, energy sufficiency and environmental quality of policy goals.

The deepwater port will not unreasonably interfere with international navigation. The deepwater port will be constructed and operate to prevent and minimize adverse impacts on the maritime

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environment.

The deepwater port will comply with national and environmental laws, an approved coastal and management program is in place; the secretaries of Army, state and defense were consulted and the effects of their programs considered. And, finally, the governor of the adjacent coastal states approves or has presumed to have approved the deepwater port.

We emphasize that these license requirements are stringent and completely enforceable. If a licensee violates the conditions of this license the Maritime Administration will suspend the license and/or operation of the facility until the conditions are sufficiently met.

We consider the environmental impact statement a major part of the application review process and we assure you that it will have a substantial bearing on the final licensing decision.

We appreciate your interest and encourage you to express your views and concerns to help shape the environmental analysis for the Port Dolphin Deepwater Port Project.

Finally we note, the recent amendment to the Deepwater Port Act of 1974, which allows the Maritime Administration to give priority processing

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to deepwater port applications that utilize U.S. flag vessels or U.S. officers and mariners of both foreign flag LNG vessels servicing our nation's ports.

Prior to issuing a license applicants will be required to provide information regarding the nationality of the flag state of vessels and the nationality of officers and crew that will service the deepwater ports. In keeping with this mandate the Maritime Administration has developed a U.S. crewing initiative in conjunction with the United States Merchant Marine Academy, State Maritime Academies, and labor based training facilities in an effort to expand and develop programs to train and employ U.S. citizens.

Ultimately it is the goal of the Maritime Administration to provide sufficient job opportunities for Americans while ensuring the safe and secure importation of LNG to our nation's shores.

Again, thank you for attending this evening's session and we look forward to receiving your comments and concerns.

MR. MARTIN: And now Dave Swearingen of the Federal Energy Regulatory Commission will describe

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his agency's responsibilities.
MR. SWEARINGEN: Thank you, Chris, Ray.
My name is Dave Swearingen. I am an environmental project manager with the Federal Regulatory Commission or FERC. And the FERC is going to be a cooperating agency for the production of the environmental impact statement because of the onshore pipeline. That particular piece of this overall project is under the FERC jurisdiction, the onshore pipeline.
The National Environmental Policy Act, or NEPA, requires that the FERC Commission take into consideration the environmental impacts associated with natural gas facilities under its jurisdiction. So the FERC will use this cooperation process to fulfill its NEPA obligations.
Now, the commission, the FERC Commission, is responsible for making a determination on whether to issue a certificate of public convenience and necessity to Port Dolphin. Now, the EIS prepared by the various agencies does not make that decision for the clerk. The EIS will be used to advise to the FERC Commission and to disclose to the public the environmental impact of constructing and operating the proposed project. The commission will consider

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the environmental information from the EIS, public comments, as well as a host of nonenvironmental issues such as engineering, markets, race, terrorists, finances and design and costs in making an informed decision on whether or not to approve the part of the project that is under the FERC jurisdiction.
Only after taking these environmental and nonenvironmental factors into consideration will the commission then make its final decision whether or not to approve Port Dolphin's proposed onshore pipeline.
Port Dolphin filed its FERC application for the onshore pipeline on April 25th of this year. Now, that application is part of the public record. So if you want more specific information about the onshore portion of this project you can get that from the FERC website. The FERC website is www.ferc, f-e-r-c, dot gov. And there is a link called eLibrary. And if you go to eLibrary and you type in the docket number. For the FERC portion, the docket number is CP07-191. You type that in and follow the prompts and you can pull up all of the information that is on the public record regarding the onshore portion of this project.

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So are there any questions regarding the FERC role in these proceedings?
Well, if not, I will turn things over to Don Beckham with E2M.
MR. BECKHAM: Thank you, Dave.
Good evening. My name is Don Beckham. I am with the Engineering Environmental Management, or E2M. We are the U.S. Coast Guard and the Maritime Administration's contractor for preparing the environmental impact statement for the proposed Port Dolphin LNG Deepwater Port. And I am the E2M's project manager for this project.
I wanted to provide an overview of the public participation process that is involved in preparing the EIS. E2M is a science-based environmental consulting firm experienced in EIS's and related studies. My team includes specialists in many resource areas covering all of the environmental sciences, including biologists, chemists, geologists and engineers.
We will be doing an independent evaluation of the environmental impacts of the proposed project and we will assist the Coast Guard in preparing the EIS to explain what the impacts would be.
Public involvement is a fundamental aspect of

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the NEPA process and the U.S. Coast Guard's environmental policies. We are now in an early stage of the EIS process at a step called scoping, in which we seek input from the public on the potential impacts and especially sources of information related to potential impacts. It is termed scoping because we are determining the scope of issues that should be included in the EIS.
The U.S. Coast Guard began the scoping process by publishing a notice of intent to prepare an environmental impact statement in the Federal Register, as Ray mentioned, on July 12th. A similar notice was published in the Tampa Tribune and the Bradenton Herald. The NOI was also mailed to, approximately, 150 state and federal agencies, individuals and groups that might have some interest in the project.
The notice of intent provided directions for making comments during the scoping process and announced the location and time of these public meetings.
Oral and written comments made today will be recorded and addressed in the draft EIS. In addition to providing comments tonight, you can also submit written comments to the docket over the

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Internet, by fax or by mail. For details on how you can submit those comments, they are in the NOI and they are also on this fax sheet that was in the open house portion on one of the boards and is available on the front table outside.

If you are making comments, please try to use only one of the methods that are available. You do not need to duplicate comments that you mail in by also sending them in over the Internet. If you send them in one time, they will be included in the docket.

As a minimum, an environmental analysis will be completed on the following topics in the EIS: geology, soils and sediments, water resources, wetlands, fisheries, wildlife, threatened and endangered species, socioeconomic impacts, transportation, cultural resources, marine biology, noise, recreation and esthetics and the liability and safety.

We will consider the environmental effects of construction, operation and decommissioning of the deepwater port. In addition, we will look at the cumulative impact of other foreseeable projects within the area of which we are aware. One of our responsibilities in preparing the EIS is to analyze

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a range of alternatives. We will consider alternative locations for the deepwater port and alternatives for the offshore and onshore pipeline routes.

We will look at alternative deepwater port concepts and alternative LNG technologies. We will also consider the no action alternative, or what would happen if the license is not granted and the project is not built, as mentioned earlier, the cumulative impacts of other projects in the same vicinity.

The next step in this process will be to prepare a draft EIS. To announce the availability of the EIS, the Maritime Administration will publish a notice of availability for the DEIS in the Federal Register and place ads in the local newspapers as we did with the announcement for this meeting.

When the DEIS is completed, copies will be sent to federal, state, regional and local agencies and local groups and individuals who have requested copies. Additional copies will be placed in local public libraries where the public may review them. The DEIS will also be available on the Department of Transportation docket system, via the Internet and you can request a copy from the Coast Guard.

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If you have not already done so -- and I know they were badgering you at the front table to do it -- please indicate on your registration card if you would like to receive a copy of the DEIS when it becomes available and we will ensure that you get a copy.

The U.S. Coast Guard and Maritime Administration will return to the Port Manatee area to hold a public meeting to provide citizens an opportunity to make formal oral comments concerning the draft EIS. Resource experts will be present to answer questions during the open house portion of the meeting and the public meeting will have this additional opportunity to enter comments and concerns into the official record.

After the close of the public comment period on the draft EIS we will assist the Coast Guard in preparing a final EIS, including an explanation of how comments were considered. On completion of the final EIS, though not part of the NEPA process, the U.S. Coast Guard and Maritime Administration will hold at least one public hearing in Florida to solicit comments on the final EIS and on the Port Dolphin license application.

Again, the dates, locations and times of the

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meeting will be announced in the Federal Register and local papers. When the EIS is finalized, the Maritime Administrator will use it as one of the inputs to its decision on whether to issue the license, not issue the license or issue it with specific conditions. There is another fax sheet that was on one of the boards and is available in the packets that include all of the fax sheets that were used that describe all of the additional requirements that go into the licensing decision.

Thank you very much for taking the time to come out this evening and we look forward to receiving your comments.

MR. MARTIN: Thanks, Don.

Gary Larsen will be the moderator for the remainder of this meeting and he will explain the process that will be used for taking comments.

MR. LARSEN: Good evening. My name is Gary Larsen. I am a local mediator and I will serve as your moderator tonight. My goal is just to help run the meeting and make sure everybody gets their chance to enter their comments on the record.

As you have now heard multiple times, decisions don't get made tonight. This is really the first opportunity for you to provide your public

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input into what will become the draft EIS that will then be subject to another meeting. It's not really a question-and-answer session and it's not meant to be necessarily an adversarial process.

One person we haven't mentioned is Patti, our court reporter. She is probably to me one of the most important people in the room because I want everybody to know that what you say will be transcribed and that transcription will then become part of the record that these entities consider when they make their decisions. So how loud someone speaks won't be as relevant as how clearly they speak, what they have to say.

The way we do this is, it's three minutes. I am going to do my best to hold people to three minutes. But I think right now we've got more time then we have speakers. So once we've done the three-minute drill, if those speakers, for instance, want to come back up because they feel there is something else they need to put in the record, we'll make that available to you. If anyone out there in the audience decides that, you know, I want to say something, I want to air something on the record, we'll make that opportunity available as well.

I am not aware of any public officials or

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agency officials being out in the audience because I would defer to them first. Correct me if I am wrong.

That having been said, one final note would be this: If you have something that you want physically to be part of the record, whether it's an article or a study or whatever, you can offer that to the court reporter as well and she will attach it to the record and it will become part of what you've had to say here this evening.

So pretty straightforward and we'll get started with it. I believe that Mr. White, Dan White is our first person that signed up. So if you are here sir, glad to hear from you.

MR. WHITE: Good evening. My name is Dan White and I work for Seminole Electric Cooperative, an elective cooperative up in Tampa, Florida, that it serves ten member distribution co-ops throughout the State of Florida. And I work -- I am a fuel supply coordinator for the company.

And I would just like to state that Seminole uses gas as a fuel and a gas fired natural gas facility that is interconnected with both the Gulf Stream and the Florida Gas Transmission Company, pipelines that are already here in the state.

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Seminole generally supports the development of additional infrastructure to facilitate the importation of liquified natural gas to meet the growing demand for natural gas in the Florida peninsula.

The addition of Port Dolphin natural gas supply into the Florida market area will provide Florida with much needed diversity and reliability of supply. This gas supply diversity and reliability should continue to support the ever growing electrical demand that we are seeing in the Florida reliability coordinating council here in the state. And that is what I have to say.

MR. LARSEN: And well within three minutes, Dan.

Rand Snell.

MR. SNELL: Hi. I am Rand Snell. I represent Reeder Farms and the Snell Family Limited Partnership of Southwest Florida. We manage and own 240 acres of property directly south of Port Manatee.

I am not here tonight to speak either for or against the proposed port and pipelines, offshore and onshore. I am here to raise a concern regarding the location of the pipeline as it transitions to

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the onshore portion.

We have an interest, obviously, as property owners in seeing that the pipelines onshore component is as much as possible colocated with the existing pipe lines to limit both the environmental impact and also the economic impact on landowners in the area. With respect to the offshore portion I encourage the company and regulators to look at the possibility of locating the pipeline where there is already disturbed area and there is a good pit of it near the port, as opposed to a more southerly location which could impact mangroves and other environmental impacts.

It's not clear to U.S. currently what the location extremity exactly will be. The maps are not scale sufficient to really determine that. So at this time we are reserving the option to protest potentially the location as it becomes better known. We definitely want to raise this with you now. Thank you.

MR. LARSEN: Thank you, Mr. Snell. I appreciate it.

I have a new name that has been handed to me. Chris Calvert.

MR. CALVERT: Thank you. I am Chris Calvert.

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Well, if you ask my wife she'll be the first to tell you, I am not the sharpest tool in the shed, but when I look at the room next door and look at the route, I am all in favor of LNG or any other supply of natural gas to Florida. I was here in 2004, 2005. The coal was wet and wouldn't burn. The barges couldn't get across the Atlantic. We have two supplies of natural gas.

What befuddles me is why we would put a third supply right on top of one of the others. It would seem to me that diversity would require U.S. to come in from a different direction so that we have an opportunity to at least have two out of three should some kind of disaster happen. If one of those pipelines -- one of the two pipelines that would be on top of each other had an incident, you might take them both out and then where are we. Just kind of wondering what we are thinking.

Thanks.

MR. LARSEN: Thank you, sir.

That is all of the speakers that I have that have written down that they would like to speak. But possibly someone out there in the audience having heard these stories would like to speak for themselves. And certainly that is what we are here

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for. So if anyone wants to speak, I will take the first one to raise their hand.

Well, I think the goal is to be available to all of U.S. at least to all of U.S. to be here until 8:00, should someone come in late to this public session.

MS. KENNEDY: I am Sharon Kennedy. I am with the Bradenton Herald and I have a question. I just want to know how much the environmental impact statement will cost.

MR. LARSEN: I can't answer that. I am just a moderator.

MR. MARTIN: I don't have an answer to that. I don't know what the total cost would be. As we told you earlier, the applicant pays the cost of the environmental impact statement.

MS. KENNEDY: You don't know how much it is?

MR. MARTIN: I would direct you to the applicant and they may have some estimates.

MR. LARSEN: Well, again, I don't want to make everybody have to sit around. Quite frankly, we are going to be here until 8:00. This is a public comment session. You know, so people have something to say, now is the time to say it and it's here to be recorded.

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MR. MARTIN: What we will do is, we'll adjourn and if someone else comes and wants to speak, we'll readjourn or whatever the term is. I forget. And then give them an opportunity to speak.

MR. LARSEN: If someone wants to speak, let U.S. know. We will reconvene this group and we'll more importantly reconvene the court reporter and make sure that those comments get on the record.

(Adjourn at 6:30 p.m. and reconvene at 7:00 p.m.)

MR. MARTIN: I am going to go ahead and reconvene and make sure nobody wants to speak. Is there anyone that would like to speak? If not, we are going to go ahead and adjourn and reconvene at 8:00. If there is any speakers then, we'll give them an opportunity. Thank you.

(Adjourn at 7:00 p.m. and reconvene at 8:00 p.m.)

MR. MARTIN: It's now 8:00 p.m. Do we have any speakers in the audience who would wish to make a comment?

We are now adjourned. This is the public meeting for Port Dolphin. Thank you.

(Meeting concluded at 8:00 p.m.)

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CERTIFICATE OF REPORTER

STATE OF FLORIDA)
COUNTY OF SARASOTA)

I, PATRICIA ANN PILARSKI, Registered Professional Reporter and Notary Public at Large in and for the State of Florida, certify that I was authorized to and did stenographically report the foregoing proceedings, and that the transcript is a true and complete record of my stenographic notes.

I further certify that I am not a relative, employee, attorney, or counsel of any of the parties, nor am I a relative or employee of any of the parties' attorney or counsel connected with the action, nor am I financially interested in this action.

Dated this 2nd day of August, 2007.

_____

PATRICIA A. PILARSKI, CSR

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Academy 9:12
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Docket Mgmt Facility (USCG)
2007-28532-48 487896
U.S. Dept of Transportation
West Building, Ground Floor
W12-140
1200 New Jersey Ave.,
Southeast,
Washington. D.C. 20590

DEPT OF TRANSPORTATION
DOCKETS

2007 SEP 25 A 10:12

Dear Sirs,

This letter is in regard to my firm objection to the proposed construction of Port Dolphin Energy, LLC deep sea port off of Tampa Bay.

The proposed pipeline would pass near "Bean Point", the northern tip of Anna Maria Island, Florida and could gravely effect the ecosystem with potential damaging impacts upon the shore.

I would appreciate a final resolve to this situation by demanding a further enviromental impact study with the results made public. This area has always been my families second home and we would hate to see it destroyed.

Thank you, Sharon Bolster

I would like to voice my opinion against your open loop system in the Gulf of Mexico. I would rather have no gas and a plentiful environment than to have your natural gas and no gulf of mexico. Dont be ignorant and say that your system will not harm the environment because it will. Find some other way to run your plant that doesnt destroy our environment and habitat.

Nathan Hunter
Baton Rouge, LA
CCA Member

the process. Among other things, intervenors have the right to receive copies of case-related Commission documents and filings by other intervenors. Likewise, each intervenor must send one electronic copy (using the Commission's eFiling system) or 14 paper copies of its filings to the Secretary of the Commission and must send a copy of its filings to all other parties on the Commission's service list for this proceeding.

If you want to become an intervenor you must file a motion to intervene according to Rule 214 of the Commission's Rules of Practice and Procedure (18 CFR 385.214) (see Appendix 2).[3] Only intervenors have the right to seek rehearing of the Commission's decision.

Affected landowners and parties with environmental concerns may be granted intervenor status upon showing good cause by stating that they have a clear and direct interest in this proceeding which would not be adequately represented by any other parties. You do not need intervenor status to have your environmental comments considered.

Additional Information

Additional information about the project is available from the Commission's Office of External Affairs, at 1–866–208–FERC or on the FERC Internet Web site (*http://www.ferc.gov*) using the "eLibrary" link. Click on the eLibrary link, then on "General Search" and enter the docket number excluding the last three digits in the Docket Number field. Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at *FercOnlineSupport@ferc.gov* or toll free at 1–866–208–3676, or for TTY, contact (202) 502–8659. The eLibrary link also provides access to the texts of formal documents issued by the Commission, such as orders, notices, and rulemakings.

In addition, the Commission now offers a free service called eSubscription which allows you to keep track of all formal issuances and submittals in specific dockets. This can reduce the amount of time you spend researching proceedings by automatically providing you with notification of these filings, document summaries and direct links to the documents. Go to *http://www.ferc.gov/esubscribenow.htm.*

Finally, public meetings or site visits will be posted on the Commission's calendar located at *http://www.ferc.gov/EventCalendar/EventsList.aspx* along with other related information.

Kimberly D. Bose,

Secretary.

[FR Doc. E8–1924 Filed 2–1–08; 8:45 am]

BILLING CODE 6717–01–P

[3] Interventions may also be filed electronically via the Internet in lieu of paper. See the previous discussion on filing comments electronically.

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket Nos. CP07–191–001]

Port Dolphin Energy LLC; Notice of Amendment

January 28, 2008.

Take notice that on January 18, 2008, Port Dolphin Energy LLC (Port Dolphin), 400 North Tampa Street, Suite 1050, Tampa, Florida 33602, filed in Docket No. CP07–191–001 to amend its application, pursuant to section 7(c) of the Natural Gas Act and Part 157, Subpart A of the Commission's regulations, filed April 25, 2007 in Docket No. CP07–191–000 in order to reroute its proposed pipeline. Specifically, Port Dolphin now proposes to: (1) To construct, install, own, operate, and maintain a single-use, 3.93-mile natural gas pipeline and related facilities necessary to provide transportation from the proposed Port Dolphin Project, a deepwater port offshore of Tampa Bay, Florida, to interconnections with Gulfstream Natural Gas System, L.L.C. (Gulfstream) and TECO Energy, Inc. (TECO), with applicable waivers. The application is on file with the Commission and open to public inspection. The filing may also be viewed on the Web at *http://www.ferc.gov* using the "eLibrary" link. Enter the docket number excluding the last three digits in the docket number field to access the document. For assistance, call (866) 208–3767 or TYY, (202) 502–8659.

The Port Dolphin Pipeline will be a proprietary, single-use pipeline which will be dedicated solely to transporting re-gasified LNG from the Port Dolphin Project with a capacity up to 1,200 million standard cubic feet per day (MMscf/d). Port Dolphin states that it will operate the Port Dolphin port as a proprietary LNG receiving and re-gasification facility pursuant to the Deepwater Port Act of 1974. Accordingly, Port Dolphin filed an application to construct and operate the offshore portions of the Port Dolphin project with the Maritimes Administration and the U.S. Coast Guard (USCG) on March 29, 2007, as amended on December 7, 2007.

The USCG will serve as the lead agency responsible for developing and issuing an Environmental Impact Statement (EIS) for both the deepwater port and the associated onshore pipeline and related facilities referenced in this Notice. The FERC will act as a cooperating agency in developing the EIS. The filing of the final EIS in the Commission's public record for this proceeding will serve to notify federal and state agencies of the timing for the completion of all necessary reviews, and the subsequent need to complete all federal authorizations within 90 days of the date of issuance of the final EIS.

Any questions regarding this application should be directed to German Castro, Port Dolphin Energy LLC, 400 North Tampa Street, Suite 1050, Tampa, Florida 33602, phone (813) 514–1398.

There are two ways to become involved in the Commission's review of this project. First, any person wishing to obtain legal status by becoming a party to the proceedings for this project should, on or before the comment date stated below, file with the Federal Energy Regulatory Commission, 888 First Street NE., Washington, DC 20426, a motion to intervene in accordance with the requirements of the Commission's Rules of Practice and Procedure (18 CFR 385.214 or 385.211) and the Regulations under the NGA (18 CFR 157.10). A person obtaining party status will be placed on the service list maintained by the Secretary of the Commission and will receive copies of all documents filed by the applicant and by all other parties. A party must submit 14 copies of filings made with the Commission and must mail a copy to the applicant and to every other party in the proceeding. Only parties to the proceeding can ask for court review of Commission orders in the proceeding.

However, a person does not have to intervene in order to have comments considered. The second way to participate is by filing with the Secretary of the Commission, as soon as possible, an original and two copies of comments in support of or in opposition to this project. The Commission will consider these comments in determining the appropriate action to be taken, but the filing of a comment alone will not serve to make the filer a party to the proceeding. The Commission's rules require that persons filing comments in opposition to the project provide copies of their protests only to the party or parties directly involved in the protest.

The Commission may issue a preliminary determination on non-environmental issues prior to the

completion of its review of the environmental aspects of the project. This preliminary determination typically considers such issues as the need for the project and its economic effect on existing customers of the applicant, on other pipelines in the area, and on landowners and communities. For example, the Commission considers the extent to which the applicant may need to exercise eminent domain to obtain rights-of-way for the proposed project and balances that against the non-environmental benefits to be provided by the project. Therefore, if a person has comments on community and landowner impacts from this proposal, it is important either to file comments or to intervene as early in the process as possible.

Persons who wish to comment only on the environmental review of this project should submit an original and two copies of their comments to the Secretary of the Commission. Environmental commenters will be placed on the Commission's environmental mailing list, will receive copies of the environmental documents, and will be notified of meetings associated with the Commission's environmental review process. Environmental commenters will not be required to serve copies of filed documents on all other parties. However, the non-party commenters will not receive copies of all documents filed by other parties or issued by the Commission (except for the mailing of environmental documents issued by the Commission) and will not have the right to seek court review of the Commission's final order.

The Commission strongly encourages electronic filings of comments, protests and interventions in lieu of paper using the "eFiling" link at *http://www.ferc.gov*. Persons unable to file electronically should submit an original and 14 copies of the protest or intervention to the Federal Energy Regulatory Commission, 888 First Street, NE., Washington, DC 20426.

This filing is accessible on-line at *http://www.ferc.gov*, using the "eLibrary" link and is available for review in the Commission's Public Reference Room in Washington, DC. There is an "eSubscription" link on the Web site that enables subscribers to receive e-mail notification when a document is added to a subscribed docket(s). For assistance with any FERC Online service, please e-mail *FERCOnlineSupport@ferc.gov*, or call (866) 208–3676 (toll free). For TTY, call (202) 502–8659.

Comment Date: February 19, 2008.

Kimberly D. Bose,

Secretary.

[FR Doc. E8–1929 Filed 2–1–08; 8:45 am]

BILLING CODE 6717–01–P

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket No. ER07–1199–001]

Airtricity Munnsville Wind Farm, LLC; Notice of Filing

January 28, 2008.

Take notice that on January 17, 2008, Airtricity Munnsville Wind Farm, LLC, tendered for filing revised market-based rate tariff sheets in response to a request for reformatting.

Any person desiring to intervene or to protest this filing must file in accordance with Rules 211 and 214 of the Commission's Rules of Practice and Procedure (18 CFR 385.211, 385.214). Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a notice of intervention or motion to intervene, as appropriate. Such notices, motions, or protests must be filed on or before the comment date. Anyone filing a motion to intervene or protest must serve a copy of that document on the Applicant and all the parties in this proceeding.

The Commission encourages electronic submission of protests and interventions in lieu of paper using the "eFiling" link at *http://www.ferc.gov*. Persons unable to file electronically should submit an original and 14 copies of the protest or intervention to the Federal Energy Regulatory Commission, 888 First Street, NE., Washington, DC 20426.

This filing is accessible on-line at *http://www.ferc.gov*, using the "eLibrary" link and is available for review in the Commission's Public Reference Room in Washington, DC. There is an "eSubscription" link on the web site that enables subscribers to receive email notification when a document is added to a subscribed docket(s). For assistance with any FERC Online service, please e-mail *FERCOnlineSupport@ferc.gov*, or call (866) 208–3676 (toll free). For TTY, call (202) 502–8659.

Comment Date: 5 p.m. Eastern Time on February 7, 2008.

Kimberly D. Bose,

Secretary.

[FR Doc. E8–1926 Filed 2–1–08; 8:45 am]

BILLING CODE 6717–01–P

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

Notice of Filing

January 28, 2008.

	Docket Nos.
Bangor Hydro-Electric Company	ER99–1522–004
Emera Energy Services, Inc	ER02–723–003
Emera Energy U.S. Subsidiary No. 1, Inc	ER04–359–002
Emera Energy U.S. Subsidiary No. 2, Inc	ER06–796–002
Emera Energy Services Subsidiary No. 1 LLC	ER07–553–001
Emera Energy Services Subsidiary No. 2 LLC	ER07–554–001
Emera Energy Services Subsidiary No. 3 LLC	ER07–555–001
Emera Energy Services Subsidiary No. 4 LLC	ER07–556–001
Emera Energy Services Subsidiary No. 5 LLC	ER07–557–001

Take notice that on January 17, 2008, the above-referenced proceedings, Emera Entities, submitted for filing, an Updated Market Power Analysis and revision to each of the market-based rate tariffs of their January 14, 2008 filing.

Any person desiring to intervene or to protest this filing must file in accordance with Rules 211 and 214 of the Commission's Rules of Practice and Procedure (18 CFR 385.211, 385.214). Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a notice of intervention or motion to intervene, as

Unofficial FERC-Generated PDF of 20080227-0021 Received by FERC OSEC 02/19/2008 in Docket#: CP07-191-001

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701

ORIGIN

February 12, 2008 F/SER46:MS/mt

2008 FEB 19 P 4:17
FILED

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE; Room 1A
Washington, D. C. 20426

Dear Ms. Bose:

Subject: Port Dolphin Energy LLC
Docket Number CP07-191-001
Notice of Limited Scoping for the Proposed Port Dolphin Project and Request for Comments on Environmental Issues

NOAA's National Marine Fisheries Service (NMFS), Southeast Region, Habitat Conservation Division, has received the Federal Energy Regulatory Commission's (FERC) February 4, 2008, scoping letter for the onshore pipeline and associated components of the subject project. FERC is assisting the United States Coast Guard in the preparation of an environmental impact statement that will discuss the anticipated environmental impacts of the onshore pipeline component of the Port Dolphin liquefied natural gas project in Manatee County, Florida. This action is to ensure FERC's compliance with the National Environmental Policy Act, and consultation requirements of the essential fish habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act)

We have reviewed the information contained in the FERC notice and determined that NMFS does not have any EFH conservation recommendations to offer. Should the project be revised to include activities that may adversely impact estuarine habitats of Tampa Bay, review of the project should be re-coordinated through our office.

Thank you for your efforts to comply with the EFH consultation provisions of the Magnuson-Stevens Act. Comments, questions or correspondence should be directed to Mark Sramek at the letterhead address, by telephone at (727) 824-5311, or e-mail at Mark.Sramek@noaa.gov.

Sincerely,

W. Mark Thompson

for Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

F/SER4

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Port Dolphin Energy LLC	)	**Docket No. CP07-191-001**

COMMENTS OF
FLORIDA POWER & LIGHT COMPANY

Pursuant to Rule 212 of the Federal Energy Regulatory Commission's ("Commission" or "FERC") Rules of Practice and Procedure, 18 C.F.R. § 385.212 (2007), and the *Notice of Amendment* issued by the Commission on January 28, 2008, Florida Power & Light Company ("FPL") hereby submits these comments in the above-captioned proceeding. In support, FPL states the following:

I.
BACKGROUND

On January 18, 2008, Port Dolphin Energy LLC ("Port Dolphin") submitted an amendment to its April 25, 2007 application for a certificate of public convenience and necessity in order to reroute its proposed pipeline ("Amended Application"). Specifically, Port Dolphin's Amended Application proposes to construct, install, own, operate, and maintain a single-use 3.93-mile natural gas pipeline and related facilities necessary to provide transportation from the proposed Port Dolphin Project, a deepwater port offshore of Tampa Bay, Florida, to interconnections with Gulfstream Natural Gas System, L.L.C. ("Gulfstream") and TECO Energy, Inc. ("TECO"). FPL initially intervened in these proceedings on May 30, 2007, submitted comments on August 7, 2007, and submitted an answer on September 6, 2007.

The revised route of the pipeline from Port Manatee to the Interconnection Station was described in the Amended Application, as follows:

The revised route would include a N-8 segment between Port Manatee and a FP&L property and an E-W segment between the same FP& L property and a proposed new Interconnection Station that would be located next to Gulfstream's pressure reduction station along Buckeye Road. The pipeline would continue south approximately 280 feet west of and parallel to CBX Railroad.

The pipeline would use a horizontal drill ("HDD") to cross under the existing FP&L tank farm, continue south past the FP&L tank farm for approximately 1,300 feet, and then turn east, where it would cross CSX Railroad. It would continue east across an FP&L property (named "Substation 41" [the "Buckeye Substation"] parcel by FP&L) and cross US 41. The pipeline would continue east back onto an FP&L property, along the south and east sides of an existing borrow pit. Once the pipeline reached the northeast corner of the FP&L property, it would turn east onto Buckeye Industrial Property.

The pipeline would continue east approximately 3,350 feet until reaching Bud Rhoden Road and then continue east onto Tami Bols property for approximately 3,700 feet along the north side of an existing borrow pit until reaching O'Nell Road. After crossing O'Nell Road, the pipeline would enter Gene Citrus property and would turn immediately north across the Gene Citrus facility entrance road and continue north approximately 230 feet, where it would cross both the FP&L existing ROW and Buckeye Road. Once across Buckeye Road, the pipeline would enter the Port Dolphin property, where the pipeline would be terminated at the Gulfstream/TECO Interconnection Station.[1]

FPL submits the following comments on the Amended Application.

II.
COMMENTS

As indicated in the initial comments in this proceeding, FPL generally supports the Port Dolphin project and the additional supplies of natural gas it will bring to Florida. In the initial comments, however, FPL raised certain concerns with Port Dolphin's request for a forty (40) foot easement within FPL's 170 foot transmission easement along the south side of the Buckeye Road ROW. Since that time, FPL has met numerous times with representatives of Port Dolphin to discuss both Port Dolphin's use of the Buckeye Road ROW and their plans to run the pipeline

1 Port Dolphin Energy LLC, "Amended Application of Port Dolphin Energy LLC for a Certificate of Public Convenience and Necessity," FERC Docket No. CP07-191-001 (January 18, 2008), p. 18.

along the south side of South Dock Road. Port Dolphin has been willing to work through various siting issues relating to the Buckeye Road ROW and is currently conducting appraisals of FPL-owned properties where easements will be necessary. Port Dolphin has also agreed to add appropriate language to the proposed easement documents and the parties are working through the drafts.

FPL expects that this level of cooperation will continue as we resolve the remaining routing issues with respect to the pipeline running along the south side of South Dock Road. First, FPL is concerned that there is not sufficient clearance on the south side of the South Dock Road past Reeder Road to site Port Dolphin's new 36-inch pipeline in conjunction with FPL's existing 30-inch oil pipeline and TECO's existing gas pipeline. Second, in the area where Port Dolphin's proposed 36-inch pipeline turns to the south towards the FPL oil terminal, FPL has requested that Port Dolphin move the southbound pipeline about 20 feet to the east toward the CSX railroad. This would allow sufficient space for FPL's existing 30-inch oil pipeline. Finally, FPL has requested that in areas where the Port Dolphin pipeline will cross under FPL's pipeline, the distance between the Port Dolphin pipeline and FPL's 30-inch and 16-inch pipelines should be increased to provide sufficient clearance, and the crossing should be made at a 90-degree angle. FPL has confidence that these issues can be resolved and will continue to work with Port Dolphin to ensure that the proposed route meets with the public convenience and necessity.

III.
CONCLUSION

WHEREFORE, for the reasons set forth above, FPL requests that the Commission allow the parties sufficient time to work through the siting issues outlined above prior to granting Port Dolphin a certificate of public convenience and necessity.

Respectfully submitted,

/s/ Sarah E. Tomalty
Sarah E. Tomalty
Senior Attorney
Florida Power & Light Company
801 Pennsylvania Ave., NW
Suite 220
Washington, DC 20004

Attorney for
Florida Power & Light Company

Date: February 19, 2008

CERTIFICATE OF SERVICE

Pursuant to Rule 2010 of the Commission's Rules of Practice and Procedure, I hereby certify that I have this day served a copy of the foregoing on all persons designated on the official service list compiled by the Secretary in these proceedings.

Dated at Washington, D.C. this 19th day of February 2008.

/s/ Sarah E. Tomalty
Sarah E. Tomalty

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Port Dolphin Energy LLC	)	**Docket No. CP07-191-001**

ENVIRONMENTAL SCOPING COMMENTS OF
GULFSTREAM NATURAL GAS SYSTEM, L.L.C.

Gulfstream Natural Gas System, L.L.C. (Gulfstream), pursuant to the Commission's February 4, 2008 "Notice of Limited Scoping for the Proposed Port Dolphin Project and Request for Comments on Environmental Issues," hereby submits these environmental scoping comments regarding the January 18, 2008 application of Port Dolphin Energy LLC ("Port Dolphin") under Section 7(c) of the Natural Gas Act, 15 U.S.C. § 717f(c), and Part 157 of the Commission's regulations, 18 C.F.R. Part 157, for a certificate of public convenience and necessity authorizing Port Dolphin to construct, install, own, operate, and maintain a single-use, natural gas pipeline and related facilities.

I. BACKGROUND

Port Dolphin proposes to construct and operate a deepwater LNG port approximately 28 miles offshore of Tampa Bay, Florida. According to Port Dolphin, the deepwater port will be utilized by Shuttle and Regasification Vessels ("SRVs"), which are ocean going vessels capable of transporting LNG from abroad and of regasifying cargo LNG prior to offloading and subsequent transportation by pipeline.

The two unloading buoys are proposed to be about 3.1 miles (5 km) apart, and once offloaded the natural gas is to feed via subsea flowlines into a subsea pipeline extending for approximately 47.2 miles to the shore at Port Manatee, Tampa Bay, Florida. Once it makes

landfall, Port Dolphin's proposed pipeline is to continue for an additional 3.93 miles over land. Port Dolphin seeks to interconnect with Gulfstream at a point in Manatee County, Florida downstream of Gulfstream's Station 420.

II. COMMENTS

Gulfstream previously submitted comments in a motion filed in Docket No. CP07-191-000 on May 30, 2007. In that pleading, Gulfstream raised several concerns including, among others, safety and environmental problems. Those comments were in the nature of a Protest to the Port Dolphin original proposal, and Gulfstream renewed and incorporated those comments in its February 19, 2008 intervention and protest in Docket No. CP07-191-001.[1] Gulfstream is still reviewing Port Dolphin's amended application in this proceeding as well as the amended filing Port Dolphin submitted recently with the U.S. Coast Guard under the Deep Water Port Act in Docket No. USCG-2007-28532. Gulfstream only has portions of the amendment to the Deep Water Port Act Application. Gulfstream is reviewing that information as well; but it has not yet had an opportunity to see the entirety of the amendment to the Deep Water Port Application. At this time, it is not clear to Gulfstream whether the amended applications reduce or exacerbate Gulfstream's safety and environmental concerns. What is clear is that the onshore route proposed by Port Dolphin will have a direct and potentially adverse impact on Gulfstream. Gulfstream sent a letter to Port Dolphin requesting an opportunity to meet to discuss aspects of the project that are of concern to Gulfstream.[2] As a result, a meeting between Gulfstream and Port Dolphin now has been scheduled for April 1, 2008. Consequently, Gulfstream reserves its

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[1] *See* Motion to Intervene and Protest of Gulfstream Natural Gas System, L.L.C. at Attach. A (Feb. 19, 2008).

[2] *See id.* at Attach. B.

right to supplement these environmental scoping comments as it further reviews the information in hand and as additional information becomes available to it.

Respectfully submitted,

/s/ Brian D. O'Neill

Brian D. O'Neill
Brett A. Snyder
Dewey & LeBoeuf LLP
1101 New York Avenue, NW
Suite 1100
Washington, DC 20005-4213

Counsel to
Gulfstream Natural Gas System, L.L.C.

Dated: March 5, 2008

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure.

Dated at Washington, D.C. this 5th day of March 2008.

/s/ Brett A. Snyder
Brett A. Snyder

DC 385531.1 14183 00001 3/5/2008 11:42am

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

In the Matter of:	§	Docket Nos. CP07-191-001
	§	
Port Dolphin Energy LLC	§	

NOTICE OF FILING COMMENTS OF MANATEE COUNTY STAFF RE: AMENDED APPLICATION FILED BY PORT DOLPHIN ENERGY, LLC

In response to the Notice of Limited Scoping for the proposed Port Dolphin project and Request for Comments on Environmental Issues, Manatee County hereby gives Notice of Filing a copy of comments from the Environmental Manager of Manatee County, attached hereto as Exhibit A and made a part hereof by reference. The comments in Exhibit A are limited to the proposed on-shore pipeline and related facilities and are based upon a preliminary review of the Amended Application submitted within the limit period of time allowed for the comment period.

As an interested party in the above-captioned proceedings, Manatee County reserves its right to submit further comments and review as additional information is submitted by the applicant, Port Dolphin.

Respectfully submitted,

MANATEE COUNTY, FLORIDA

Sarah A. Schenk, Esq.
Assistant County Attorney
Manatee County Attorney's Office
1112 Manatee Avenue West - Suite 969
Bradenton, FL 34205
941-745-3750
sarah.schenk@mymanatee.org

March 4, 2008

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in these proceedings.

Dated at Bradenton, Florida this 4th day of March, 2008.

Sarah A. Schenk, Esq.

MEMORANDUM

PLANNING DEPARTMENT
Natural Resources Division
1112 Manatee Ave. West
Bradenton, FL 34206

MANATEE COUNTY
FLORIDA

Phone: 941-749-3070
Fax: 941-749-3087
www.mymanatee.org

To: Sarah Schenk, Assistant County Attorney

From: Joel D. Christian, Environmental Manager

Date: March 3, 2008

Subject: **Amended Application for Certificate of Public Convenience and Necessity for the Port Dolphin; CAO File No.**

The Natural Resources Division has reviewed the above referenced application and offers the following comments:

1. The applicant should verify whether the preferred corridor traverses any existing Conservation Easements.

2. What activities are proposed within the Interconnection Station as identified on Figure 3-4. There appears to be wetlands within the northern portion of the station that have not been identified.

3. Are the anticipated wetland impacts within Port Manatee property consistent with the approved Port Manatee General Development Plan?

4. Why was wetland impact avoidance and minimization not considered as Evaluation Criteria for the route alternatives through Port Manatee? The preferred corridor will impact mangroves within the south conveyance ditch.

5. Alternative Corridor 1 appears to be the most desirable in regard to wetland impact avoidance. Are there any methods that can be utilized, such as HDD, if this option were chosen that minimize the risk of disturbing contaminated sites? Please further describe what type of stormwater control issues are of concern with Alternative Corridor 1.

6. It doesn't appear that the wetland impacts in the following locations within the preferred corridor were identified:
   - Stations 10500 to 10600
   - Stations 11300 to 11800

Please contact me at ext. 6206 should have any questions regarding these comments.

Cc via E-mail: Doug Means, Environmental Administrator, Planning Department
Carol Clarke, Director, Planning Department
Laurie Suess, Planning Manager, Planning Department

ATTACHMENT A

AMY STEIN * GWENDOLYN BROWN * JANE VON HAHMANN * RON GETMAN * DONNA HAYES * CAROL WHITMORE * JOE MCCLASH
District 1 *District 2* *District 3* *District 4* *District 5* *District 6* *District 7*

United States Department of the Interior

FISH AND WILDLIFE SERVICE
6620 Southpoint Drive, South
Suite 310
Jacksonville, Florida 32216-0912

IN REPLY REFER TO:

March 4, 2008

FWS Log No. 41910-08-TA-0194

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St. NE; Room 1A
Washington, D.C. 20426

Applicant: Port Dolphin Energy LLC
Project Name: Port Dolphin
County: Manatee County
FWS Environmental Review # 08/0114, dated 2/5/08
FERC No. CP07-191-001

Dear Ms. Bose:

The U.S. Fish and Wildlife Service (Service) provides the following scoping comments in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (ESA) and the National Environmental Policy Act (NEPA).

Port Dolphin Energy, LLC (Port Dolphin) amended its application with the Federal Energy Regulatory Commission (FERC) on January 18, 2008 for a proposed 3.93 mile onshore pipeline in Manatee County, Florida. A general location map for the pipeline was provided online with the FERC Notice of Limited Scoping. The pipeline extends from the high water mark in Manatee County to a new interconnection station where the pipeline would join with the interstate Gulfstream Natural Gas Pipeline and the intrastate TECO/Peoples Pipeline systems. The pipeline is associated with the Port Dolphin Liquefied Natural Gas Deepwater Port Project.

A number of federally-listed threatened and endangered species are known to occur in Manatee County and may occur in the project area. This includes the endangered wood stork, *Mycteria americana,* the threatened Florida scrub-jay, *Aphelocoma coeruluscens*, and the threatened Eastern indigo snake, *Dymarchon corais couperi.* The Service assumes that federally-listed species occur in ecological communities suitable for the species. If appropriate habitat exists for these species within the project impact area, we recommend that surveys be conducted to determine the presence or absence of listed species. Once completed, survey reports should be provided to the Service for review. Please note that we consider the core foraging area for the wood stork to be suitable wetlands within 15 miles of an active wood stork nesting colony. Nesting colony locations and core foraging areas are available on the Service's North Florida website, www.fws.gov/northflorida. Suitable foraging habitat is water that is relatively calm, uncluttered by dense thickets of aquatic vegetation, and having a water depth between two and

15 inches in depth. We suggest you consult our website for our survey methodologies for specific species. Please note that, in some cases, these methodologies may not be consistent with those of the Florida Fish and Wildlife Conservation Commission (FWC).
If you have any questions, please contact Ms. Linda Smith, of our St. Petersburg branch office, at (904)868-4044. Thank you for the opportunity to comment.

Sincerely,

David L. Hankla
Field Supervisor

Cc: BCPA (ERT)

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
10117 PRINCESS PALM DRIVE, SUITE 120
TAMPA, FLORIDA 33610

REPLY TO
ATTENTION OF

APR 0 7 2008

Tampa Regulatory Office

PUBLIC NOTICE

Permit Application No. SAJ-2007-1064(IP-MEP)

TO WHOM IT MAY CONCERN: This district has received an application for a Department of the Army permit pursuant to Section 404 of the Clean Water Act (33 U.S.C. §1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. §403) as described below:

APPLICANT: Port Dolphin Energy, LLC
400 N. Tampa St., Suite 1050
Tampa, Florida 33602

WATERWAY & LOCATION: The 42 mile project alignment extends from Port Manatee, Manatee County, to a proposed deep water port consisting of two permanent unloading buoy systems, located approximately 28 miles off the west coast of Florida in the Gulf of Mexico.

LATITUDE & LONGITUDE:
North Buoy: Latitude 27.4200° North/Longitude -83.1973° West
South Buoy: Latitude 27.3745° North/Longitude -83.1897° West

PROJECT PURPOSE:

Basic: Construct a deepwater port facility and pipeline.

Overall: Construct a deepwater port facility and pipeline to deliver liquefied natural gas to serve the growing demand for natural gas for residential, industrial, and electric generation within west-central Florida.

PROPOSED WORK: Port Dolphin Energy LLC, proposes to own, construct, and operate a deepwater port, named Port Dolphin, in the Federal waters of the Outer Continental Shelf in lease blocks designated by the Minerals Management Service as St. Petersburg (PB) blocks: PB545, PB589 and PB590. These blocks are approximately 28 miles off the west coast of Florida to the southwest of Tampa Bay. Port Dolphin would consist of a permanently moored unloading buoy system with two submersible

buoys separated by a distance of approximately 3 miles. The buoys would be designed to moor a specialized type of liquefied natural gas vessel called a Shuttle and Regasification Vessel (SRV) of between 145,000 and 217,000 cubic meter capacity. Natural gas would be delivered to shore from Port Dolphin via a proposed new 36-inch-diameter-pipeline, approximately 42 miles in length that would connect onshore in Manatee County, Florida with the Gulfstream Natural Gas System, LLC and Tampa Electric Company (TECO) Bayside pipeline. Initially, Port Dolphin would be capable of a natural gas throughput of 400 million standard cubic feet per day (mscfd) and would eventually be capable of an average of 800 mscfd with a peak capacity of 1200 mscfd.

EXISTING CONDITIONS:
The Applicant performed a benthic survey along a 25,500 foot by 12,000 foot site at the proposed buoy system array footprint and a 3,000-foot corridor along the proposed pipeline corridor. Approximately 33 percent of the proposed route was hard /live bottom habitat. Survey results indicate that the majority of hard-bottom areas were located offshore (outside of Tampa Bay) in water depths of 40 to 50 feet and water depths from 70 to 90 feet. In depths of 40 to 50 feet, communities were dominated by macroalgae, accounting for 34 to 68 percent of benthic cover. In deeper waters (> 100 feet) macroalgal abundance was less pronounced and emergent substrate was uncommon to rare. Smaller sporadic patches of paddle grass were observed in deeper offshore areas of the Proposed Site and Pipeline Route.

Soft bottom/sand was the dominant habitat type inshore (within Tampa Bay) with small areas of sporadic hard bottom scattered throughout the bay. Hard-bottom communities included octocorals, sponges, hydroids, bryozoans, and various other invertebrates. Fields of one species of tunicate was observed in Tampa Bay, but not offshore. Artificial substrate in the proposed site and pipeline route were areas of dredge spoil (colonized primarily by sponges, tunicates, macroalgae, and some octocorals) and an artificial reef created as mitigation for hard/live bottom for impacts associated with installation of the Gulfstream Pipeline. Artificial substrate, such as mitigation reefs, bridge rubble, miscellaneous debris, and an unidentified "dome" structure (possibly oceanographic equipment), was also observed in the pipeline route. Bridge rubble was colonized by octocorals, sponges, macroalgae, and other various invertebrates in the pipeline route. Only the area around the horizontal directional drill (HDD) exit of the inshore portion of the proposed pipeline route was surveyed for seagrasses. No seagrasses were observed. Approximately 1 percent of the area

surveyed for the inshore portion of the proposed route (195 acres) was seagrass habitat identified off Port Manatee. This area overlaps soft substrate/sand habitat. The benthic survey confirmed that turtle grass, manatee, shoal grass, widgeon grass, and star grass were present along the inshore portion of the Pipeline route in depths less than 7 feet and concentrated in shallow waters around Manbirdtree Island, south of Port Manatee.

The on-shore portion of the project falls within a 100-foot wide right-of-way, of which 30-feet would be retained as permanent right-of way. A total of 63.6 acres of land would be affected by pipeline construction. Of this, about 13.8 acres would be permanently impacted for operation. The majority (about 56 percent) of the land crossed by the pipeline is either classified as urban/industrial or as agricultural/rangeland. The remaining land comprises upland forest, wetland, and surface water (e.g. ponds, canals, and ditches).

ENDANGERED SPECIES: The U.S. Army Corps of Engineers (Corps) has determined the proposed project may affect, but is not likely to adversely affect the following threatened and endangered species or their designated critical habitats:

Common Name	Scientific Name	Status
Kemp's ridley sea turtle	*Lepidochelys kempii*	endangered
leatherback sea turtle	*Dermochelys coriacea*	endangered
hawksbill sea turtle	*Eretmochelys imbricata*	endangered
green sea turtle	*Chelonia mydas*	threatened
loggerhead sea turtle	*Caretta caretta*	threatened
sperm whale	*Physeter macrocephalus*	endangered
humpback whale	*Megaptera novaeangliae*	endangered
fin whale	*Balaenoptera physalus*	endangered
sei whale	*Balaenoptera borealis*	endangered
blue whale	*Balaenoptera musculus*	endangered
West Indian manatee	*Trichechus manatus*	endangered
smalltooth sawfish	*Pristis pectinata*	endangered
wood stork	*Mycteria americana*	endangered

The Corps will request Fish and Wildlife's and National Marine Fisheries Service's concurrence with this determination pursuant to Section 7 of the Endangered Species Act.

ESSENTIAL FISH HABITAT (EFH): This notice initiates consultation with the National Marine Fisheries Service on EFH as required by the Magnuson-Stevens Fishery Conservation and Management Act 1996. The proposal may impact multiple marine and estuarine habitats utilized by various life stages of shrimp, red drum, sea trout, and the snapper/grouper complex. Our initial determination is that the proposed action would have

a substantial adverse impact on EFH or federally managed fisheries in the Gulf of Mexico. Our final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the National Marine Fisheries Service.

NOTE: This public notice is being issued based on information furnished by the applicant. This information has not been verified. The jurisdictional line has not been verified by Corps personnel.

AUTHORIZATION FROM OTHER AGENCIES: Water Quality Certification is required from the Florida Department of Environmental Protection (FDEP).

The on-shore portion of the project is being reviewed under the National Environmental Policy Act (NEPA) by the Federal Energy Regulatory Commission (FERC), Docket No CP07-191-001.

The off-shore portion of the project is being reviewed under NEPA by the U.S. Coast Guard for a Deepwater Port License, DOT Docket No. USCG-2007-28532.

Comments regarding the application should be submitted in writing to the District Engineer at the above address within 21 days from the date of this notice.

If you have any questions concerning this application, you may contact Mark E. Peterson at the letterhead address, by electronic mail at Mark.E.Peterson@usace.army.mil, by fax at 813-769-7061, or by telephone at 813-769-7065.

The decision whether to issue or deny this permit application will be based on the information received from this public notice and the evaluation of the probable impact to the associated wetlands. This is based on an analysis of the applicant's avoidance and minimization efforts for the project, as well as the compensatory mitigation proposed.

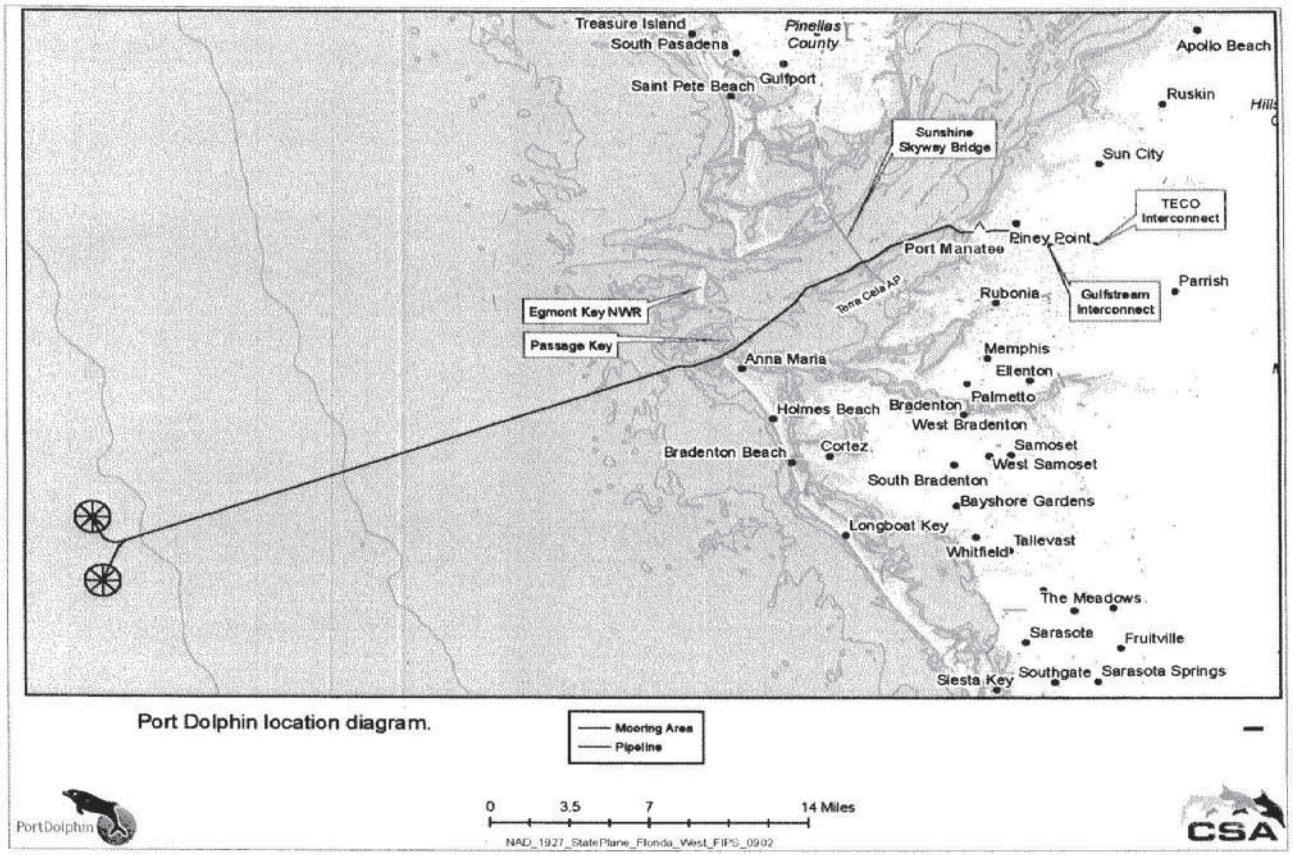

Figure 1. *Port Dolphin* location.

Application No. SAJ-2007-1064 (IP-MEP)
Applicant: Port Dolphin Energy, LLC
CESAJ-RD-ST
Date: 7-April-2008
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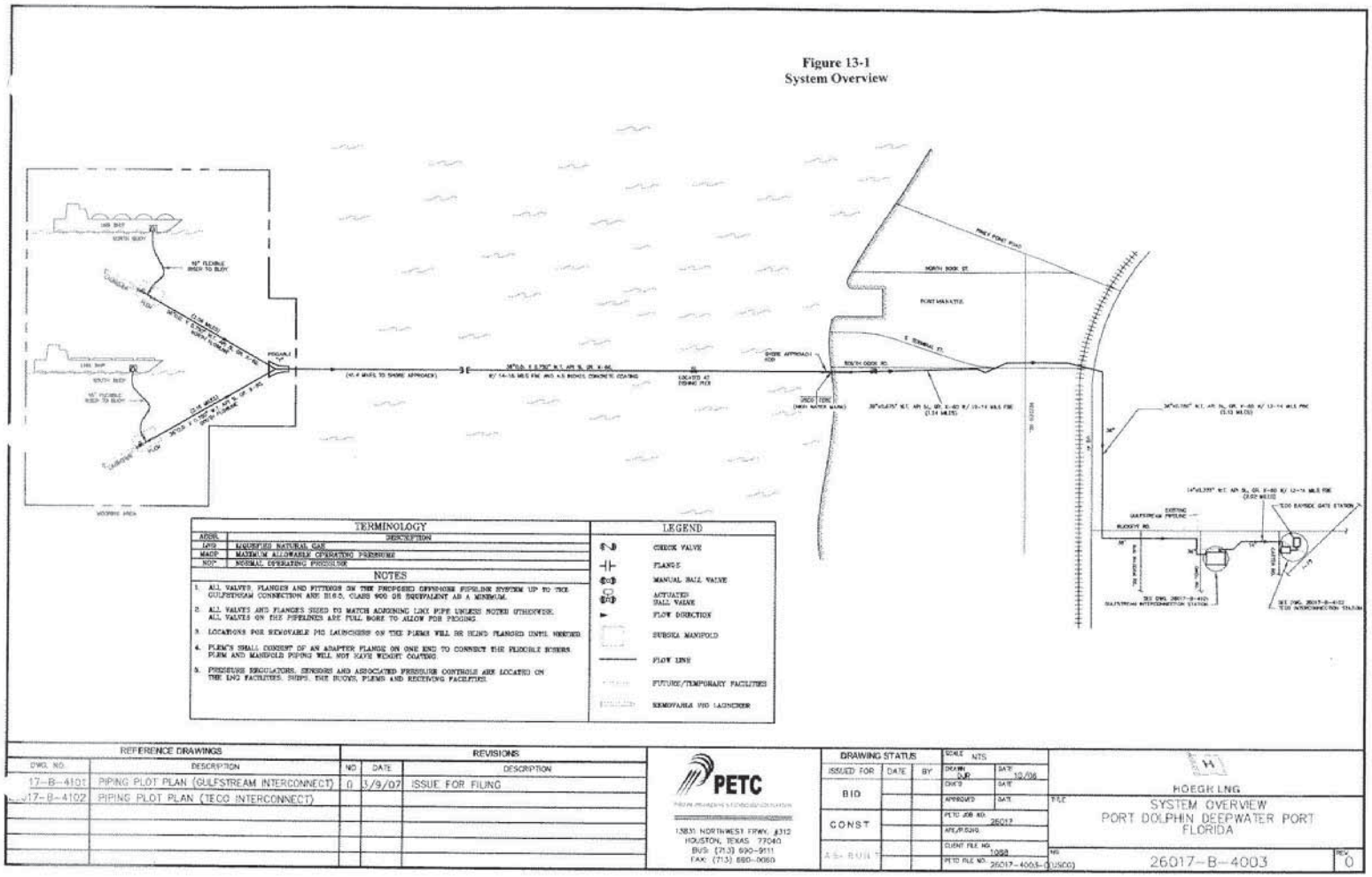
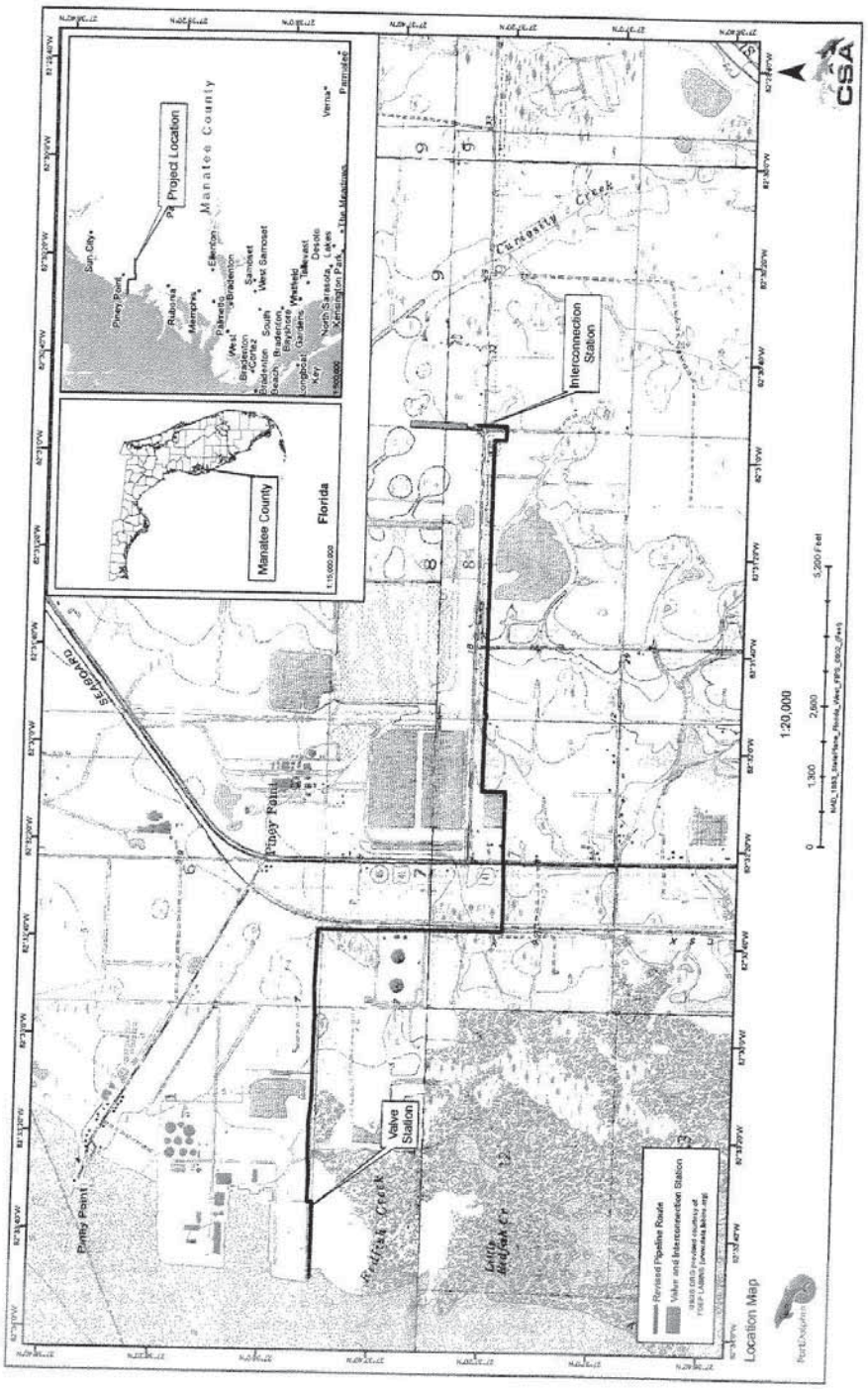
Figure 13-1
System Overview



Appendix 1



Application No. SAJ-2007-1064 (IP-MEP)
Applicant: Port Dolphin Energy, LLC
CESAJ-RD-ST
Date: 7-April-2008
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EVALUATION: The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits, which reasonably may be expected to accrue from the proposal, must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including cumulative impacts thereof; among these are conservation, economics, esthetics, general environmental concerns, wetlands, historical properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and in general, the needs and welfare of the people. Evaluation of the impact of the activity on the public interest will also include application of the guidelines promulgated by the Administrator, EPA, under authority of Section 404(b) of the Clean Water Act of the criteria established under authority of Section 102(a) of the Marine, Protection, Research, and Sanctuaries Act of 1972. A permit will be granted unless its issuance is found to be contrary to the public interest.

The US Army Corps of Engineers (Corps) is soliciting comments from the public; Federal, State, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition, or deny a permit for this proposal. To make or deny this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

COASTAL ZONE MANAGEMENT CONSISTENCY: In Florida, the State approval constitutes compliance with the approved Coastal Zone Management Plan. In Puerto Rico, a Coastal Zone Management Consistency Concurrence is required from the Puerto Rico Planning Board. In the Virgin Islands, the Department of Planning and Natural Resources permit constitutes compliance with approved Coastal Zone Management Plan.

REQUEST FOR PUBLIC HEARING: Any person may request a public hearing. The request must be submitted in writing to the District Engineer within the designated comment period of the notice and must state the specific reasons for requesting the public hearing.

David S. Hobbie
Regulatory Division

Apendix A
Port Dolphin Dear Interested Party Mailing List

Federal Agency Contacts

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Herndon, VA 20170-4817

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United States Coast Guard
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U.S. Army Corps of Engineers
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Tampa, FL 33610-8302

Libraries/Newspapers

Bradenton Herald
102 Manatee Avenue W
Bradenton, FL 34205-8810

The Tampa Tribune
PO Box 191
Tampa, FL 33601

Manatee County Public Library
1301 Barcarrota Blvd
Bradenton, FL 34205

John F. Germany Public Library
Headquarters Library-Tampa Bay
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Tampa, FL 33602

Main Library St. Petersburg
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St Petersburg, FL 33713

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The Honorable Bill Nelson
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Sam Gibbons Federal Court House
Tampa, FL 33602

The Honorable Bill Young
U.S. House of Representatives, Florida 10th District
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Private Citizens

Mr. Robert Arvedlund

Ms Ann Bennett

Mr. Chris Calvert

Mr. Don Chaney

Ms. Kathleen Dieffenbach

Ms. Bonnie Dilley

Mr. Geoff Hornby

Mr. James Locascio

Mr. Eugene Mixon

Mr. Eric Raymond

Ms. Susan Redmond

Mr. Tobias Rose

Ms. Mary E. Sheppard

Ms. Marilyn Stasica

Ms. Jill Vanderpol

Mr. Kit Werremeyer

Reporter

Ms. Sara Kennedy
Reporter
Bradenton Herald
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Bradenton, FL 34205

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Palmetto, FL 34221

C&D Fruit & Vegetable Co Inc.
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CSX Transportation Railroad
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Jacksonville, FL 32202-4423

Federal Port Corporation
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Sarasota, FL 34243-3271

Florida Power & Light Company
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Palmetto, FL 34220-0996

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Executive Director
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Mr. Jack Boatman
Florida Gas Transmission Gas Pipeline
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Executive Director
Florida Regional Councils Association
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Tallahassee, FL 32399-3000

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Port Captain
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Appendix B
Review of the Draft Environmental Impact Statement

- Review of the Draft EIS
- Port Dolphin Draft EIS Mailing List

APPENDIX B
REVIEW OF THE DRAFT EIS

INDEX OF COMMENTORS

All comments received on the Draft EIS are available electronically via the Federal Docket Management System (*www.regulations.gov*), Docket No. USCG-2007-28532. Hard copies of the comments can be acquired by contacting Mr. Ray Martin, (202) 372-1449, *Raymond.W.Martin@uscg.mil*.

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May 28, 2008

08.MN[illegible]0-005728

Commander Mark A. Prescott
Chief, Deepwater Ports Standards Division
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2100 Second Street, SW
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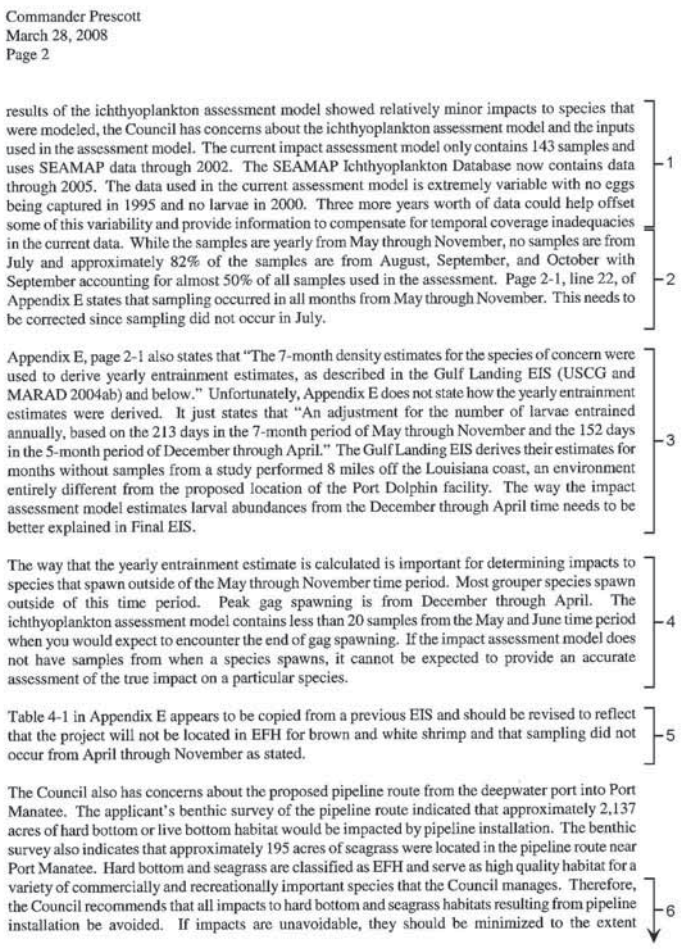
Dear Commander Prescott:

The Gulf of Mexico Fishery Management Council (Council) has reviewed the Draft Environmental Impact Statement (DEIS) for license application USCG–2006–28532 for the Port Dolphin Energy Liquefied Natural Gas Deepwater Port. Port Dolphin Energy, LLC proposes to construct a permanently moored unloading buoy system with two submersible buoys along with 42 miles of 36-inch diameter pipeline that would connect the deepwater port with the Gulfstream Natural Gas pipeline in Port Manatee, Florida. The deepwater port would be approximately 28 miles west of Tampa, Florida in 100 feet of water. The Council is concerned about potential impacts to essential fish habitat and associated fishery resources managed by the Council.

The Council is one of eight regional fishery management councils that were established by the Fishery Conservation and Management Act in 1976 (reauthorized as the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act [M-SFCMRA] in 2007). The Council prepares fishery management plans for fishery resources in the Exclusive Economic Zone of the Gulf of Mexico. Section 305 of the M-SFCMRA gives the Council the authority to comment and make recommendations on activities that would adversely affect essential fish habitat (EFH).

The project area has been designated as EFH for various life stages of red drum, gray snapper, stone crab, spiny lobster, pink shrimp, coral, red grouper, gag, black grouper, yellowfin grouper, vermilion snapper, lane snapper, greater amberjack, lesser amberjack, Spanish mackerel, king mackerel, and cobia. Categories of EFH include hard bottom, marine and estuarine water column, benthic sediments, and submerged aquatic vegetation. Detailed information on these EFH designations can be located in the Council's 2005 Generic Amendment Number 3 for Addressing Essential Fish Habitat Requirements, Habitat Areas of Particular Concern, and Adverse Effects of Fishing in the Fishery Management Plans of the Gulf of Mexico. In addition to being designated as EFH for managed species, the project area also provides nursery and forage habitats that support additional ecologically, commercially, and recreationally important marine fishery species. Some of these organisms serve as prey for species managed by the Council.

Port Dolphin would consist of a permanently moored unloading buoy system with two submersible buoys separated by a distance of approximately 3 miles. The buoys would be designed to moor a specialized type of liquefied natural gas (LNG) vessel called a Shuttle and Regasification Vessel (SRV). While at Port Dolphin, two SRVs would use approximately 23.66 million gallons of seawater per day for cooling SRV generators, LNG vaporization and vessel ballasting. While the



Commander Prescott
March 28, 2008
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results of the ichthyoplankton assessment model showed relatively minor impacts to species that were modeled, the Council has concerns about the ichthyoplankton assessment model and the inputs used in the assessment model. The current impact assessment model only contains 143 samples and uses SEAMAP data through 2002. The SEAMAP Ichthyoplankton Database now contains data through 2005. The data used in the current assessment model is extremely variable with no eggs being captured in 1995 and no larvae in 2000. Three more years worth of data could help offset some of this variability and provide information to compensate for temporal coverage inadequacies in the current data. While the samples are yearly from May through November, no samples are from July and approximately 82% of the samples are from August, September, and October with September accounting for almost 50% of all samples used in the assessment. Page 2-1, line 22, of Appendix E states that sampling occurred in all months from May through November. This needs to be corrected since sampling did not occur in July. 1 2

Appendix E, page 2-1 also states that "The 7-month density estimates for the species of concern were used to derive yearly entrainment estimates, as described in the Gulf Landing EIS (USCG and MARAD 2004ab) and below." Unfortunately, Appendix E does not state how the yearly entrainment estimates were derived. It just states that "An adjustment for the number of larvae entrained annually, based on the 213 days in the 7-month period of May through November and the 152 days in the 5-month period of December through April." The Gulf Landing EIS derives their estimates for months without samples from a study performed 8 miles off the Louisiana coast, an environment entirely different from the proposed location of the Port Dolphin facility. The way the impact assessment model estimates larval abundances from the December through April time needs to be better explained in Final EIS. 3

The way that the yearly entrainment estimate is calculated is important for determining impacts to species that spawn outside of the May through November time period. Most grouper species spawn outside of this time period. Peak gag spawning is from December through April. The ichthyoplankton assessment model contains less than 20 samples from the May and June time period when you would expect to encounter the end of gag spawning. If the impact assessment model does not have samples from when a species spawns, it cannot be expected to provide an accurate assessment of the true impact on a particular species. 4

Table 4-1 in Appendix E appears to be copied from a previous EIS and should be revised to reflect that the project will not be located in EFH for brown and white shrimp and that sampling did not occur from April through November as stated. 5

The Council also has concerns about the proposed pipeline route from the deepwater port into Port Manatee. The applicant's benthic survey of the pipeline route indicated that approximately 2,137 acres of hard bottom or live bottom habitat would be impacted by pipeline installation. The benthic survey also indicates that approximately 195 acres of seagrass were located in the pipeline route near Port Manatee. Hard bottom and seagrass are classified as EFH and serve as high quality habitat for a variety of commercially and recreationally important species that the Council manages. Therefore, the Council recommends that all impacts to hard bottom and seagrass habitats resulting from pipeline installation be avoided. If impacts are unavoidable, they should be minimized to the extent 6

1. However, if a license is issued USGC and the Maritime Administration would require the Applicant to develop a mitigation plan, which would include baseline monitoring prior to construction and monitoring after construction to validate the impact forecasts and initiate any necessary mitigation. In Section 4.11, a minimum of three years of monitoring to start immediately upon receiving a license, and to include at least one year prior to operation, is recommended.

2. Text revised per comment.

3. Text clarified per comment.

4. Text clarified and numbers explained per comment.

5. Text revised per comment.

6. Based on additional information provided by the Applicant's geotechnical surveys, estimated hard bottom impacts are shown in Table 4.2-13 and discussed in Section 4.2.1.6. According to the construction plans submitted by the Applicant, most hard bottom impacts will result from the pipeline being laid over the existing hardbottom features and covered with concrete mattresses. Section 4.11.1 discusses compensatory mitigation for hard bottom impacts.

Commander Prescott
March 28, 2008
Page 3

practicable and be fully mitigated. For unavoidable impacts, a compensatory mitigation plan for impacts to hard bottom marine habitats should include the following elements: 1) conceptual description of the overall mitigation plan; 2) quantification of anticipated hard/live bottom impact acreage versus proposed mitigation acreage and justification for the proposed mitigation acreage; 3) scientific criteria for determining mitigation success; 4) a project and mitigation implementation schedule; 5) targeted hard/live bottom climax communities expected in mitigation area(s), including their acreage and configurations; 6) materials and methods to be used to achieve the intended mitigation; 7) comprehensive 5-year monitoring and reporting schedules; and 8) contingency plans by which equivalent mitigation would be completed if the proposed mitigation fails. 6 7

The Council appreciates the opportunity to provide comments on the DEIS for the Port Dolphin Energy LNG Deepwater Port. If you have any questions regarding our comments, please do not hesitate to contact us.

Sincerely,

Thomas McIlwain by KD

Dr. Thomas McIlwain
Chairman

TM:JR:plk

C: Gulf Council
Technical Staff

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7. The applicant is consulting with USCG and the Maritime Administration to develop appropriate mitigation plans and additional geophysical surveys. Additionally, video mapping results from the Gulfstream Pipeline Project EIS (2001) are being compiled to augment the predicted benthic impacts, as appropriate. All available data will be used to specify mitigation type, extent, duration, and schedule.

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MAY 29 2008

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Re: Draft Environmental Impact Statement for the Port Dolphin LLC Deepwater Port License Application (Docket No. USCG-2007-28532)

Dear Mr. Prescott:

Thank you for providing the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) the opportunity to comment on the draft Environmental Impact Statement (DEIS) for the Port Dolphin, LLC Deepwater Port liquefied natural gas facility, dated April 2008 (docket number USCG-2007-28532). According to the DEIS, Port Dolphin, LLC is proposing to construct and operate a liquefied natural gas regasification facility in the Gulf of Mexico approximately 28 miles off the west coast of Florida, southwest of Tampa Bay.

These comments address issues related to the Magnuson-Stevens Fishery Conservation and Management Act (MSA), Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA) and the National Environmental Policy Act (NEPA). The enclosed comments and recommendations are intended to further the consultation processes of the ESA, satisfy our commenting requirements under the MSA, and ensure a full analysis is conducted under NEPA.

If there are questions on MSA issues, please contact Rusty Swafford at (409) 766-3699. For questions related to the ESA or MMPA, please contact Kyle Baker at (727) 551-5789.

Sincerely,

Phil Steele for

Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosure

ENCLOSURE – NOAA'S NATIONAL MARINE FISHERIES SERVICE
COMMENTS AND RECOMMENDATIONS
DRAFT ENVIRONMENTAL IMPACT STATEMENT
PORT DOLPHIN LLC, LIQUEFIED NATURAL GAS DEEPWATER PORT

Below, the National Marine Fisheries Service (NMFS) offers comments pursuant to its responsibilities under the National Environmental Policy Act, the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the Endangered Species Act (ESA), and the Marine Mammal Protection Act (MMPA). NMFS is using the Draft Environmental Impact Statement (DEIS) to: 1) provide comments for the improvement of the Final Environmental Impact Statement (FEIS), 2) to provide the United States Coast Guard (USCG) with Essential Fish Habitat (EFH) conservation recommendations, and 3) to make recommendations on additional information needed to further the ESA consultation.

NATIONAL ENVIRONMENTAL POLICY ACT

Federal agencies that have jurisdiction by law or special expertise with respect to any environmental impact resulting from an agency action are required to comment on draft environmental impact statements. *SEE* 40 C.F.R. §1503.2. NOAA maintains expertise and jurisdiction by law over the nation's marine resources and offers the following comments and recommendations on the DEIS for the Port Dolphin LLC, Deepwater Port (Port Dolphin). This document contains comments and recommendations from the National Oceanic and Atmospheric Administration's (NOAA) NMFS regarding the DEIS, dated April 2008, on the Port Dolphin License Application. These comments and recommendations are provided to the USCG and the Maritime Administration (MARAD) pursuant to the interagency Memorandum of Understanding Related to the Licensing of Deepwater Ports.

DESCRIPTION OF THE PROPOSED ACTION

Port Dolphin, LLC, proposes to construct and operate a liquefied natural gas (LNG) deepwater port facility located in the Gulf of Mexico, approximately 28 miles southwest of Tampa Bay, off Manatee County, Florida. Port Dolphin would consist of two, permanent mooring unloading buoys connected to a 36-inch diameter, 41-mile long gas transport pipeline constructed from the offshore port to landward portions of existing natural gas pipelines in Manatee County. The proposed mooring buoys would be sited approximately three miles apart in water depth of approximately 100 feet. The two mooring buoys would have eight mooring lines connected to eight pile-driven anchor points in the seafloor. Up to two shuttle and regasification vessels (SRV) would moor at Port Dolphin to offload regasified LNG between four to eight-day evolutions. When not connected to an SRV, the mooring buoys would be submerged 60 to 70 feet below the sea surface. A marker buoy and retrieval line would be used to locate and recover the buoy as an SRV arrives at the deepwater port. The unloading buoy would be retrieved from its submerged position and hoisted in through a moon-pool in the forward part of the SRV where it would be positioned in a receiving cone within the hull trunk. After the buoy is locked in position, unloading of regasified LNG would begin. The SRVs would be equipped to transport, store, vaporize, and meter natural gas. A closed-loop, glycol-

water heat transfer media would be used to vaporize the LNG. Natural gas flowlines from Port Dolphin would connect to a 36-inch diameter gas transmission line, which would interconnect with the existing Gulfstream Pipeline natural gas transmission line located approximately 46 miles east of the project site.

As proposed, Port Dolphin activities would require approximately 9.5 million gallons of seawater per day (MGD) for LNG regasification operations aboard each SRV. An additional 2.3 MGD of ballast seawater would also be required during SRV off-loading, requiring approximately 24 MGD for regasification activities aboard two SRVs. It is expected between 45 and 90 SRVs would utilize Port Dolphin for LNG vaporization annually, requiring some 540 million to 1.1 billion gallons of seawater annually. Deepwater port construction is expected to take 11 months to complete, with operations planned to commence in the second quarter of 2011.

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT (16 U. S. C. SS 1801 ET SEQ.)

Below are NMFS' recommendations regarding the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). For each of the issues discussed below, NMFS is available to assist USCG, MARAD, or the project applicant in identifying relevant studies and information sources that may assist in completing subsequent environmental impact statements (EIS).

ALTERNATIVE TECHNOLOGIES

The DEIS describes LNG vaporization alternatives available for use aboard SRVs at Port Dolphin. In summary, the applicant proposes the use of a closed-loop vaporization system, utilizing an intermediate water-glycol fluid to regasify LNG prior to offloading. The proposed Calypso LNG (Calypso) project off the east coast of Florida has proposed the use of a similar, closed-loop vaporization system aboard special regasification ships (SRS) moored at one of two buoys. The Calypso SRS include a system capable of vaporizing the LNG in a closed-loop system and cooling the electricity-generating engines. The Calypso SRS also include an open-loop mode used when LNG is not being vaporized, and a closed-loop mode not requiring any seawater intake. To further minimize ichthyoplankton impacts, NMFS recommends the final EIS include discussions and evaluations of entirely closed-loop LNG vaporization alternatives, which use a small portion of LNG to effectively heat and regasify LNG for offloading. Further, additional discussion is warranted why the SRS vaporization technology used for Calypso would not be available for Port Dolphin. We believe utilization of an entirely closed-loop regasification system would reduce necessary seawater consumption to 2.3 MGD for vessel ballasting, and eliminate ichthyoplankton impacts resulting from the consumption of 9.5 MGD per SRV. 1

RECOMMENDATIONS FOR INFORMATION NEEDS IN THE FINAL EIS

Based on our review of the DEIS, NMFS provides the following additional recommendations for improving the final EIS:

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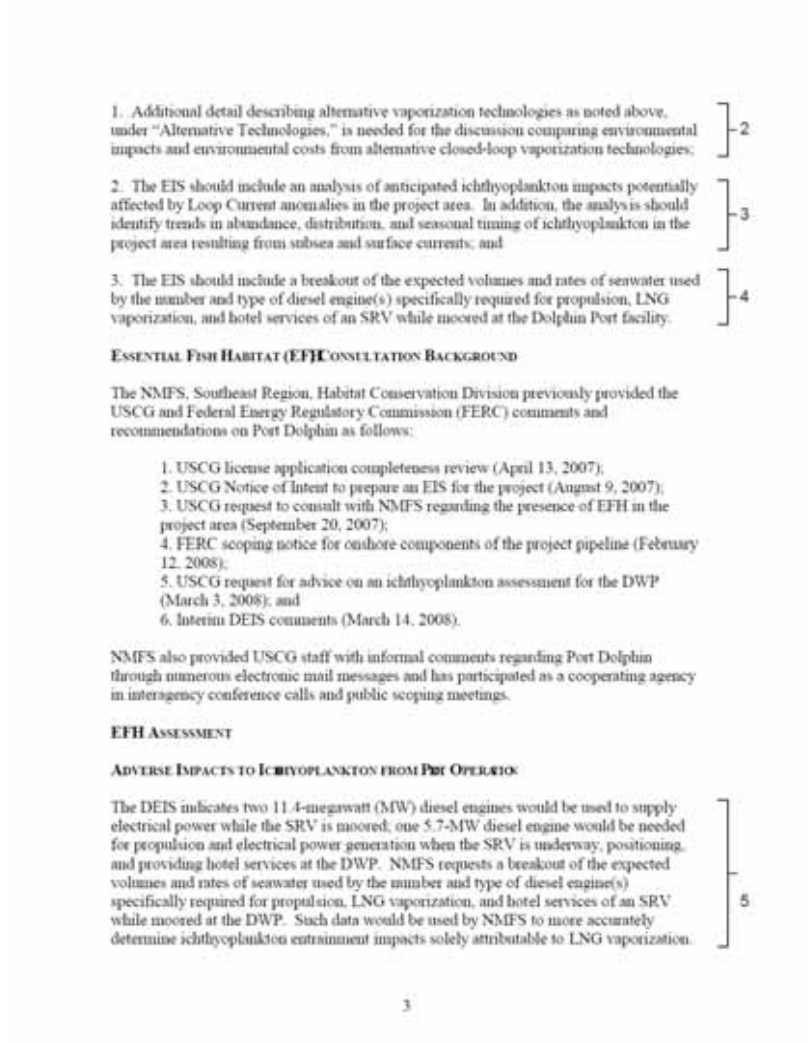
1. The closed-loop engine cooling system proposed for the Calypso project is discussed in the Alternatives Analysis, Section 2.1.7.4.



1. Additional detail describing alternative vaporization technologies as noted above, under "Alternative Technologies," is needed for the discussion comparing environmental impacts and environmental costs from alternative closed-loop vaporization technologies; 2

2. The EIS should include an analysis of anticipated ichthyoplankton impacts potentially affected by Loop Current anomalies in the project area. In addition, the analysis should identify trends in abundance, distribution, and seasonal timing of ichthyoplankton in the project area resulting from subsea and surface currents; and 3

3. The EIS should include a breakout of the expected volumes and rates of seawater used by the number and type of diesel engine(s) specifically required for propulsion, LNG vaporization, and hotel services of an SRV while moored at the Dolphin Port facility. 4

ESSENTIAL FISH HABITAT (EFH) CONSULTATION BACKGROUND

The NMFS, Southeast Region, Habitat Conservation Division previously provided the USCG and Federal Energy Regulatory Commission (FERC) comments and recommendations on Port Dolphin as follows:

1. USCG license application completeness review (April 13, 2007);
2. USCG Notice of Intent to prepare an EIS for the project (August 9, 2007);
3. USCG request to consult with NMFS regarding the presence of EFH in the project area (September 20, 2007);
4. FERC scoping notice for onshore components of the project pipeline (February 12, 2008);
5. USCG request for advice on an ichthyoplankton assessment for the DWP (March 3, 2008); and
6. Interim DEIS comments (March 14, 2008).

NMFS also provided USCG staff with informal comments regarding Port Dolphin through numerous electronic mail messages and has participated as a cooperating agency in interagency conference calls and public scoping meetings.

EFH ASSESSMENT

ADVERSE IMPACTS TO ICHTHYOPLANKTON FROM PORT OPERATION

The DEIS indicates two 11.4-megawatt (MW) diesel engines would be used to supply electrical power while the SRV is moored; one 5.7-MW diesel engine would be needed for propulsion and electrical power generation when the SRV is underway, positioning, and providing hotel services at the DWP. NMFS requests a breakout of the expected volumes and rates of seawater used by the number and type of diesel engine(s) specifically required for propulsion, LNG vaporization, and hotel services of an SRV while moored at the DWP. Such data would be used by NMFS to more accurately determine ichthyoplankton entrainment impacts solely attributable to LNG vaporization. 5

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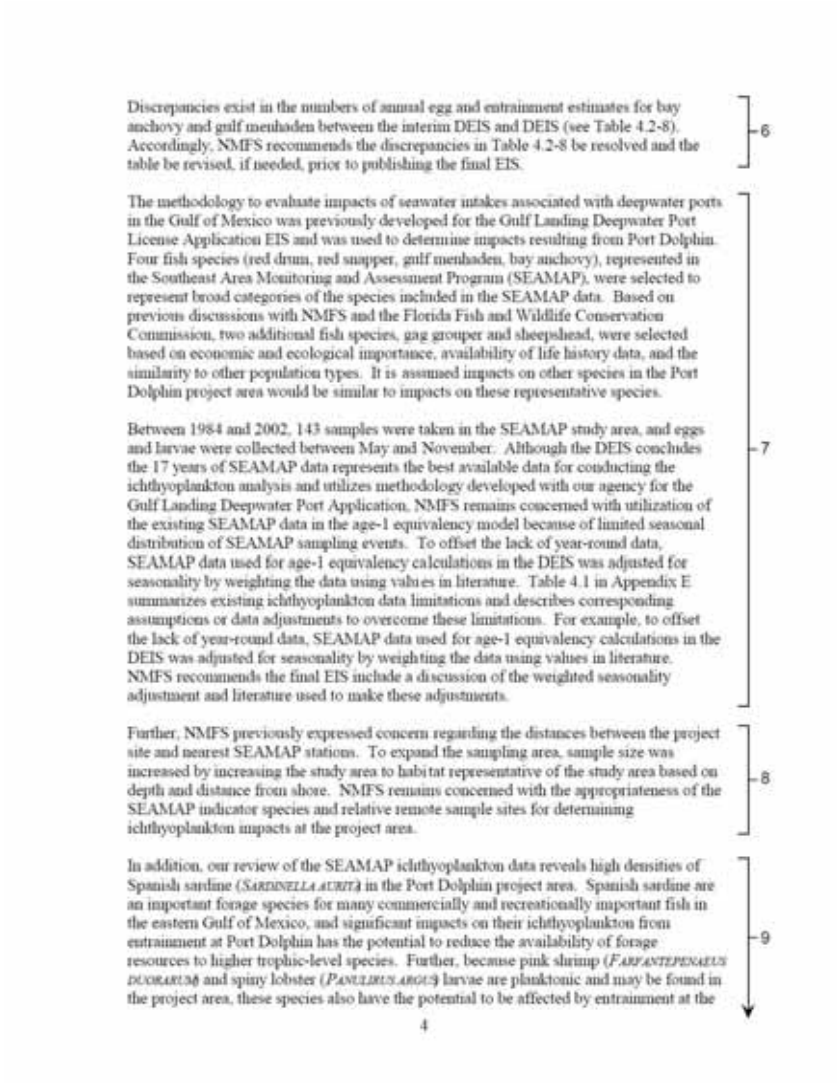
2. Alternative LNG vaporization technologies are discussed in Section 2.1.7 of the Final EIS.

3. Currently, there are no available data that would allow the impact assessment to account for Loop Current, surface and bottom currents to be factored in to the ichthyoplankton assessment. The Final EIS qualitatively describes the affect of the Loop Current and other currents on larval transport in Section 4.2.1.11. The current analysis takes into account general trends in abundance, distribution, and seasonal timing of ichthyoplankton in area.

4. A discussion of water uses, and the potential maximum volume of intake and discharge can be found in Section 2.3.4, Vaporization and Process Facilities. The maximum potential intake and discharge is analyzed in the EIS. Actual water intake during operations would be based on ambient temperatures and engine loads, therefore, there are an unlimited range of intake volumes and rates below this maximum value.

5. A discussion of water uses, and the potential maximum volume of intake and discharge can be found in Section 2.3.4, Vaporization and Process Facilities. The maximum potential intake and discharge is analyzed in the EIS. Actual water intake during operations would be based on ambient temperatures and engine loads, therefore, there are an unlimited range of intake volumes and rates below this maximum value.



Discrepancies exist in the numbers of annual egg and entrainment estimates for bay anchovy and gulf menhaden between the interim DEIS and DEIS (see Table 4.2-8). Accordingly, NMFS recommends the discrepancies in Table 4.2-8 be resolved and the table be revised, if needed, prior to publishing the final EIS. 6

The methodology to evaluate impacts of seawater intakes associated with deepwater ports in the Gulf of Mexico was previously developed for the Gulf Landing Deepwater Port License Application EIS and was used to determine impacts resulting from Port Dolphin. Four fish species (red drum, red snapper, gulf menhaden, bay anchovy), represented in the Southeast Area Monitoring and Assessment Program (SEAMAP), were selected to represent broad categories of the species included in the SEAMAP data. Based on previous discussions with NMFS and the Florida Fish and Wildlife Conservation Commission, two additional fish species, gag grouper and sheepshead, were selected based on economic and ecological importance, availability of life history data, and the similarity to other population types. It is assumed impacts on other species in the Port Dolphin project area would be similar to impacts on these representative species.

Between 1984 and 2002, 143 samples were taken in the SEAMAP study area, and eggs and larvae were collected between May and November. Although the DEIS concludes the 17 years of SEAMAP data represents the best available data for conducting the ichthyoplankton analysis and utilizes methodology developed with our agency for the Gulf Landing Deepwater Port Application, NMFS remains concerned with utilization of the existing SEAMAP data in the age-1 equivalency model because of limited seasonal distribution of SEAMAP sampling events. To offset the lack of year-round data, SEAMAP data used for age-1 equivalency calculations in the DEIS was adjusted for seasonality by weighting the data using values in literature. Table 4.1 in Appendix E summarizes existing ichthyoplankton data limitations and describes corresponding assumptions or data adjustments to overcome these limitations. For example, to offset the lack of year-round data, SEAMAP data used for age-1 equivalency calculations in the DEIS was adjusted for seasonality by weighting the data using values in literature. NMFS recommends the final EIS include a discussion of the weighted seasonality adjustment and literature used to make these adjustments. 7

Further, NMFS previously expressed concern regarding the distances between the project site and nearest SEAMAP stations. To expand the sampling area, sample size was increased by increasing the study area to habitat representative of the study area based on depth and distance from shore. NMFS remains concerned with the appropriateness of the SEAMAP indicator species and relative remote sample sites for determining ichthyoplankton impacts at the project area. 8

In addition, our review of the SEAMAP ichthyoplankton data reveals high densities of Spanish sardine (*SARDINELLA AURITA*) in the Port Dolphin project area. Spanish sardine are an important forage species for many commercially and recreationally important fish in the eastern Gulf of Mexico, and significant impacts on their ichthyoplankton from entrainment at Port Dolphin has the potential to reduce the availability of forage resources to higher trophic-level species. Further, because pink shrimp (*FARFANTEPENAEUS DUORARUM*) and spiny lobster (*PANULIRUS ARGUS*) larvae are planktonic and may be found in the project area, these species also have the potential to be affected by entrainment at the 9

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6. Table 4.2-8 was revised between the Interim Draft and the Draft EIS as discussion with NOAA NMFS led to changes in the analysis. The Final EIS includes Spanish Sardine (*Sardinella aurita*) with bay anchovy and gulf menhaden as described in response to Comment 9.

7. A discussion of the weighted seasonality adjustment and literature used to make these adjustments is presented in Section 4.1 of Appendix E.

8. SEAMAP data, although limited, remains the best available data for use in modeling potential impacts to ichthyoplankton. If a license is issued, USCG and the Maritime Administration would require the Applicant to develop a site specific monitoring plan consistent with other projects licensed in the GOM. These plans include pre- and post-construction monitoring to validate the ichthyoplankton impact forecasts and initiate any necessary mitigation.

9. Regarding Spanish sardines, we agree SEAMAP ichthyoplankton data reveals high densities of Spanish sardine (*Sardinella aurita*) in the Port Dolphin project area. Annual egg and larval entrainment estimates and lower and upper ranges of age-1 equivalents and equivalent yield for Spanish sardines has been included in the Final EIS. In the absence of life history data for Spanish sardines, Gulf menhaden and scaled sardines have been used as surrogate species (see Section 4.2.1.11).

   Regarding pink shrimp and spiny lobster, SEAMAP data does not include crustacean densities and no shrimp and larvae have been identified to develop annual egg and larval entrainment estimates for each of these species. The potential impacts on these species are described in the Final EIS qualitatively, as appropriate. However, a requirement for a Monitoring Program will be recommended for inclusion in the license, if issued, and the details of the program to be implemented prior to construction and during initial years of operation would be subject to review by NMFS. The details of such monitoring program remain to be designed in consultation with the FWC, NOAA/NMFS, and USEPA. This plan would help to determine impacts on pink shrimp and spiny lobster and to formulate mitigation if necessary.



project site. To determine anticipated losses on Spanish sardine, pink shrimp, and spiny lobster as a direct result of shipboard LNG vaporization, we recommend the final EIS include annual egg and larval entrainment estimates for each of these species, and lower and upper ranges of age-1 equivalents and equivalent yields for Spanish sardine, pink shrimp and spiny lobster. Annual equivalent yield estimates for pink shrimp and spiny lobster should be expressed as a percentage of total Florida west coast landings for these species. 9

The DEIS includes a discussion indicating eddies from the Loop Current in the Gulf of Mexico have the potential to transport deepwater fish larvae onto the Florida shelf. The applicant is conducting Loop Current modeling to assess what effect these phenomena may have on larval transport into the project area. The results of this modeling effort, when available, should be considered in the ichthyoplankton impact analysis for the final EIS. 10

In order to determine potential impacts on fishery resources and to fully assess ichthyoplankton impacts from the Port Dolphin project, NMFS continues to recommend additional data sources for zooplankton, egg, and larvae abundance and distribution be used in conjunction with SEAMAP data to complete the necessary age-1 equivalency models. We further recommend these additional data sources from existing fishery studies in the Gulf of Mexico be utilized in the development of an empirical transport model to be included in the final EIS. 11

ADVERSE IMPACTS TO EFH FROM PORT CONSTRUCTION

In reviewing Figure 3.2-3 depicting hardbottom habitats at the proposed mooring buoy sites, it appears the figure erroneously depicts the original mooring array anchor configuration. NMFS received a copy of the applicants' letter dated December 14, 2007, regarding "Deepwater Port Application Addendum – Project Design Changes and Corresponding Impacts –December 2007." Attached to that letter was an optimized buoy anchoring arrangement and associated tables indicating reduced acreages of benthic habitats affected by anchor sweep during routine SRV mooring operations.

In reviewing the Executive Summary and Section 4 of the DEIS, NMFS notes varying acreage values listed for anticipated impacts on benthic resources in the mooring array and pipeline areas. Specifically, the Executive Summary indicates approximately 300 acres of impacts on benthic impacts would occur from port and pipeline installation from the project. Further, Table 4.2-1 indicates approximately 8,786 acres of soft and hardbottom habitats would be affected from port construction activities. NMFS recommends the applicant's proposed December 2007 revised mooring array be selected as the preferred alternative and that the associated impact tables in the final EIS also be revised to reflect the reduced benthic resource impacts. 12

The two mooring buoys would have eight mooring lines connected to eight pile-driven anchor points in the seafloor. Approximately 30 acres of recurring, long-term impacts to benthic habitats would be caused by cable sweeping during SRV mooring activities. To avoid impacts to these habitats from cable sweep, NMFS recommends the use of mid-line buoys to reduce sweep impacts. 13

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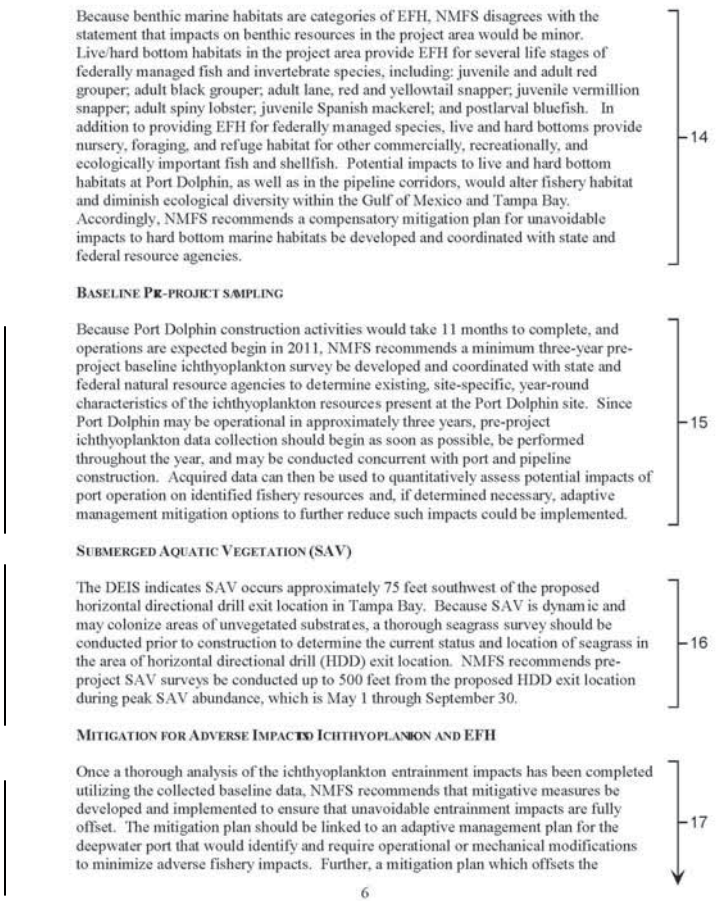
10. In June of 2008, the Applicant proposed the use of an Empirical Transport Model (ETM) to strengthen the Ichthyoplankton Assessment methodology currently used in the EIS. FWC did not think the ETM would be meaningful without preconstruction modeling to verify data from that model. If a license is issued, the USCG and the Maritime Administration would require the Applicant to develop a site specific monitoring plan consistent with other projects licensed in the GOM. The details of such monitoring program will be designed in consultation with the FWCC, NOAA/NMFS, and USEPA.

11. A literature review of available data for additional data sources for zooplankton, egg, and larvae abundance and distribution resulted in no additional information for zooplankton. Spanish sardines, sheepshead and grouper family information were available. Houde et. al 1979 was used for Gulf menhaden. These species were assessed in the Final EIS. See response to comment 10 regarding ETM.

12. The Applicant has altered their Proposed Action to include the revised mooring scheme discussed in the December 2008 addendum, and has altered the proposed pipeline route to balance Federal, state, and local concerns for various natural resources including benthic resource areas. The Proposed Action and alternatives are discussed in Section 2.1 and the discussion is carried throughout the EIS.

13. Mitigation and minimization measures are located in Section 4.11. The Applicant has committed to using mid-line buoys and other methods as appropriate to keep anchor lines taut during both construction and operation.



Because benthic marine habitats are categories of EFH, NMFS disagrees with the statement that impacts on benthic resources in the project area would be minor. Live/hard bottom habitats in the project area provide EFH for several life stages of federally managed fish and invertebrate species, including: juvenile and adult red grouper; adult black grouper; adult lane, red and yellowtail snapper; juvenile vermillion snapper; adult spiny lobster; juvenile Spanish mackerel; and postlarval bluefish. In addition to providing EFH for federally managed species, live and hard bottoms provide nursery, foraging, and refuge habitat for other commercially, recreationally, and ecologically important fish and shellfish. Potential impacts to live and hard bottom habitats at Port Dolphin, as well as in the pipeline corridors, would alter fishery habitat and diminish ecological diversity within the Gulf of Mexico and Tampa Bay. Accordingly, NMFS recommends a compensatory mitigation plan for unavoidable impacts to hard bottom marine habitats be developed and coordinated with state and federal resource agencies. 14

BASELINE PRE-PROJECT SAMPLING

Because Port Dolphin construction activities would take 11 months to complete, and operations are expected begin in 2011, NMFS recommends a minimum three-year pre-project baseline ichthyoplankton survey be developed and coordinated with state and federal natural resource agencies to determine existing, site-specific, year-round characteristics of the ichthyoplankton resources present at the Port Dolphin site. Since Port Dolphin may be operational in approximately three years, pre-project ichthyoplankton data collection should begin as soon as possible, be performed throughout the year, and may be conducted concurrent with port and pipeline construction. Acquired data can then be used to quantitatively assess potential impacts of port operation on identified fishery resources and, if determined necessary, adaptive management mitigation options to further reduce such impacts could be implemented. 15

SUBMERGED AQUATIC VEGETATION (SAV)

The DEIS indicates SAV occurs approximately 75 feet southwest of the proposed horizontal directional drill exit location in Tampa Bay. Because SAV is dynamic and may colonize areas of unvegetated substrates, a thorough seagrass survey should be conducted prior to construction to determine the current status and location of seagrass in the area of horizontal directional drill (HDD) exit location. NMFS recommends pre-project SAV surveys be conducted up to 500 feet from the proposed HDD exit location during peak SAV abundance, which is May 1 through September 30. 16

MITIGATION FOR ADVERSE IMPACTS TO ICHTHYOPLANKTON AND EFH

Once a thorough analysis of the ichthyoplankton entrainment impacts has been completed utilizing the collected baseline data, NMFS recommends that mitigative measures be developed and implemented to ensure that unavoidable entrainment impacts are fully offset. The mitigation plan should be linked to an adaptive management plan for the deepwater port that would identify and require operational or mechanical modifications to minimize adverse fishery impacts. Further, a mitigation plan which offsets the 17

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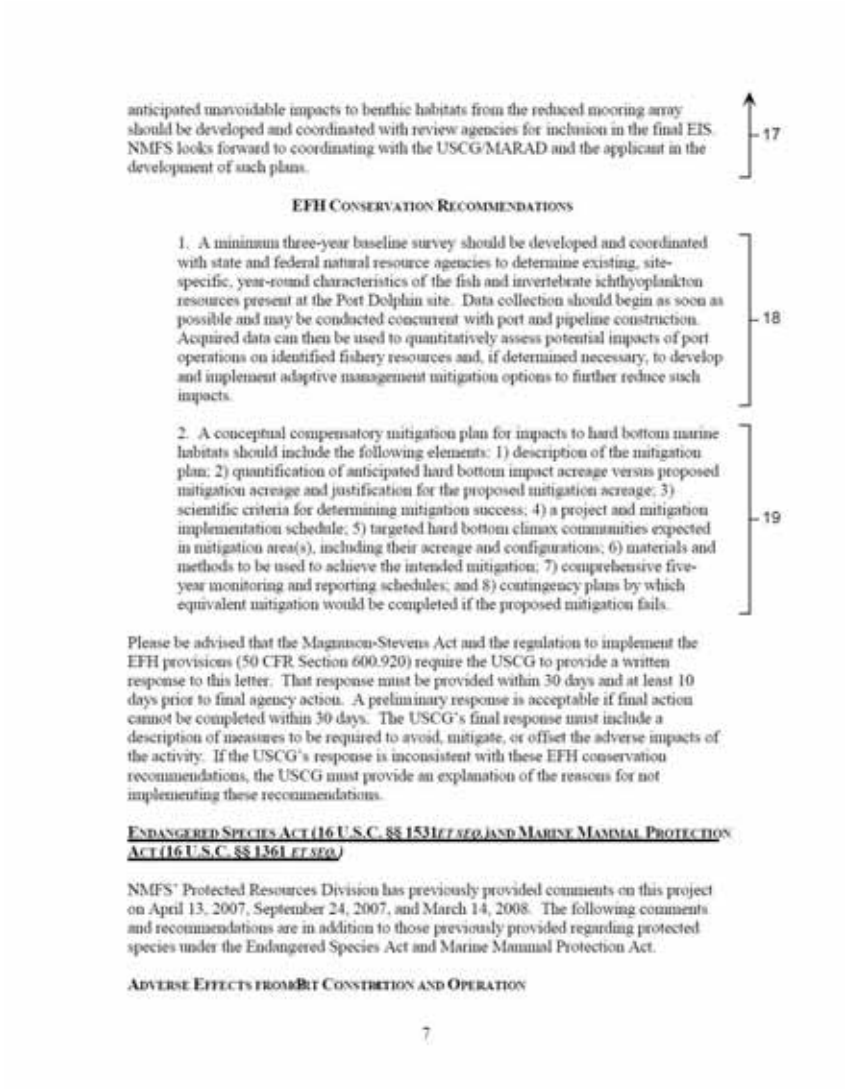
14. Geophysical and geotechnical data have been received and reviewed since the publication of the Draft EIS and incorporated in the Final EIS in Section 3.4. Impacts on benthic resources and EFH in Sections 4.2.1.6 and 4.2.1.12 respectively, have been revised from "minor" to "short-term and long-term, minor to moderate, direct and indirect." BMPs have been added to Section 4.11 regarding reduction of potential impacts and compensatory mitigation. Information has been gathered from the Gulfstream pipeline construction reports as applicable and added to those minimization discussions.

15. If a license is issued, Port Dolphin Energy LLC will be required to develop a Prevention, Monitoring, and Mitigation Plan to assess, minimize, and mitigate impacts on marine fisheries species (including ichthyoplankton) associated with port operations. The plan would be developed in consultation with NMFS and other cooperating agencies, as appropriate, and subject to approval by the Maritime Administrator. The requirements for this plan are contained in Appendix H of the Port Dolphin Deepwater Port License Application EIS.

16. Specific SAV surveys have been conducted to identify current areas where seagrass can be found. That information has been added to relevant discussions in the Final EIS in Section 3.2.5. In addition, the Applicant would conduct surveys just prior to construction to identify SAV that may have not been present during the original SAV surveys. A Mitigation Plan to compensate for unavoidable impacts on seagrasses and live- and hard- bottom habitats would be developed during the permitting process.

17. If a license is issued, USCG and the Maritime Administration would require the Applicant to develop a site specific monitoring plan consistent with other projects licensed in the GOM. These plans include pre and post construction monitoring to validate the ichthyoplankton impact forecasts and initiate any necessary mitigation.



anticipated unavoidable impacts to benthic habitats from the reduced mooring array should be developed and coordinated with review agencies for inclusion in the final EIS. NMFS looks forward to coordinating with the USCG/MARAD and the applicant in the development of such plans. 17

EFH Conservation Recommendations

1. A minimum three-year baseline survey should be developed and coordinated with state and federal natural resource agencies to determine existing, site-specific, year-round characteristics of the fish and invertebrate ichthyoplankton resources present at the Port Dolphin site. Data collection should begin as soon as possible and may be conducted concurrent with port and pipeline construction. Acquired data can then be used to quantitatively assess potential impacts of port operations on identified fishery resources and, if determined necessary, to develop and implement adaptive management mitigation options to further reduce such impacts. 18

2. A conceptual compensatory mitigation plan for impacts to hard bottom marine habitats should include the following elements: 1) description of the mitigation plan; 2) quantification of anticipated hard bottom impact acreage versus proposed mitigation acreage and justification for the proposed mitigation acreage; 3) scientific criteria for determining mitigation success; 4) a project and mitigation implementation schedule; 5) targeted hard bottom climax communities expected in mitigation area(s), including their acreage and configurations; 6) materials and methods to be used to achieve the intended mitigation; 7) comprehensive five-year monitoring and reporting schedules; and 8) contingency plans by which equivalent mitigation would be completed if the proposed mitigation fails. 19

Please be advised that the Magnuson-Stevens Act and the regulation to implement the EFH provisions (50 CFR Section 600.920) require the USCG to provide a written response to this letter. That response must be provided within 30 days and at least 10 days prior to final agency action. A preliminary response is acceptable if final action cannot be completed within 30 days. The USCG's final response must include a description of measures to be required to avoid, mitigate, or offset the adverse impacts of the activity. If the USCG's response is inconsistent with these EFH conservation recommendations, the USCG must provide an explanation of the reasons for not implementing these recommendations.

Endangered Species Act (16 U.S.C. §§ 1531 *et seq.*) and Marine Mammal Protection Act (16 U.S.C. §§ 1361 *et seq.*)

NMFS' Protected Resources Division has previously provided comments on this project on April 13, 2007, September 24, 2007, and March 14, 2008. The following comments and recommendations are in addition to those previously provided regarding protected species under the Endangered Species Act and Marine Mammal Protection Act.

Adverse Effects from Pile Construction and Operation

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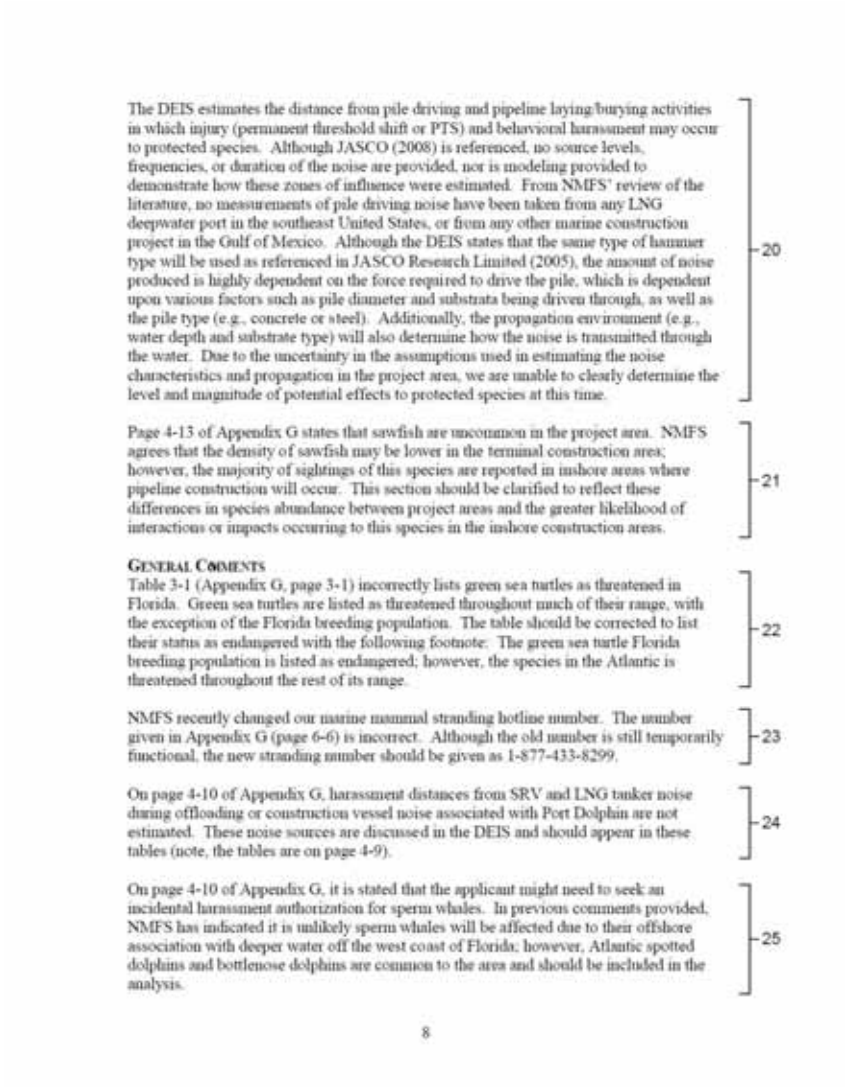
18. If a license is issued, Port Dolphin Energy LLC will be required to conduct site-specific, year-round surveying to collect data on existing fish and invertebrate ichthyoplankton populations. If a license is issued, data collection would begin as soon as a license is issued, and continue for a minimum of three years, one of which must be completed prior to the start of operations. Surveying shall be developed and coordinated with state and Federal natural resource agencies.

    Requiring Port Dolphin Energy LLC to acquire a minimum of three years of baseline survey data prior to operations is inconsistent with the intent of the Memorandum of Understanding (MOU) on Deepwater Port Licensing of May 20, 2004 signed by the participating agencies. The MOU is based on National Energy Policy and Presidential Executive Order (EO) 13212 issued on May 18, 2001. EO 13212 requires that executive departments and agencies take appropriate actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy. Federal agencies are directed to expedite their reviews of authorizations for energy-related projects and to take other action necessary to accelerate the completion of such projects, while maintaining safety, public health and environmental protections.

    The potential impacts to fish and invertebrate ichthyoplankton populations are presented in Appendix G of the Port Dolphin Deepwater Port License Application EIS.

19. If a license is issued, Port Dolphin Energy LLC will be required to develop a Prevention, Monitoring, and Mitigation Plan to assess, minimize, and mitigate impacts on marine fisheries species (including ichthyoplankton) associated with port operations. The plan would be developed in consultation with NMFS and other cooperating agencies, as appropriate, and subject to approval by the Maritime Administrator. The requirements for this plan are contained in Appendix H of the Port Dolphin Deepwater Port License Application EIS.



The DEIS estimates the distance from pile driving and pipeline laying/burying activities in which injury (permanent threshold shift or PTS) and behavioral harassment may occur to protected species. Although JASCO (2008) is referenced, no source levels, frequencies, or duration of the noise are provided, nor is modeling provided to demonstrate how these zones of influence were estimated. From NMFS' review of the literature, no measurements of pile driving noise have been taken from any LNG deepwater port in the southeast United States, or from any other marine construction project in the Gulf of Mexico. Although the DEIS states that the same type of hammer type will be used as referenced in JASCO Research Limited (2005), the amount of noise produced is highly dependent on the force required to drive the pile, which is dependent upon various factors such as pile diameter and substrata being driven through, as well as the pile type (e.g., concrete or steel). Additionally, the propagation environment (e.g., water depth and substrate type) will also determine how the noise is transmitted through the water. Due to the uncertainty in the assumptions used in estimating the noise characteristics and propagation in the project area, we are unable to clearly determine the level and magnitude of potential effects to protected species at this time. 20

Page 4-13 of Appendix G states that sawfish are uncommon in the project area. NMFS agrees that the density of sawfish may be lower in the terminal construction area; however, the majority of sightings of this species are reported in inshore areas where pipeline construction will occur. This section should be clarified to reflect these differences in species abundance between project areas and the greater likelihood of interactions or impacts occurring to this species in the inshore construction areas. 21

GENERAL COMMENTS

Table 3-1 (Appendix G, page 3-1) incorrectly lists green sea turtles as threatened in Florida. Green sea turtles are listed as threatened throughout much of their range, with the exception of the Florida breeding population. The table should be corrected to list their status as endangered with the following footnote: The green sea turtle Florida breeding population is listed as endangered; however, the species in the Atlantic is threatened throughout the rest of its range. 22

NMFS recently changed our marine mammal stranding hotline number. The number given in Appendix G (page 6-6) is incorrect. Although the old number is still temporarily functional, the new stranding number should be given as 1-877-433-8299. 23

On page 4-10 of Appendix G, harassment distances from SRV and LNG tanker noise during offloading or construction vessel noise associated with Port Dolphin are not estimated. These noise sources are discussed in the DEIS and should appear in these tables (note, the tables are on page 4-9). 24

On page 4-10 of Appendix G, it is stated that the applicant might need to seek an incidental harassment authorization for sperm whales. In previous comments provided, NMFS has indicated it is unlikely sperm whales will be affected due to their offshore association with deeper water off the west coast of Florida; however, Atlantic spotted dolphins and bottlenose dolphins are common to the area and should be included in the analysis. 25

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20. Due to the uncertainty of noise measurement assumptions based on the limited data available in the Jasco Report (2005), and the lack of empirical testing of this sort, the Applicant has committed to using sound-muffling devices and other BMPs to reduce acoustic disturbance. Also, the Applicant has reviewed the specific requirements for the preparation of IHA and LOA applications, and has initiated pre-application consultations with the NOAA/NMFS – Protected Resources Office in Silver Spring, MD regarding the Port Dolphin Project and applicable IHA or LOA requirements and mitigations. In addition, if a license is issued, the USCG and the Maritime Administration would require the Applicant to develop a site specific monitoring plan consistent with other projects licensed in the GOM. These plans would include the appropriate noise monitoring and initiate any necessary mitigation.

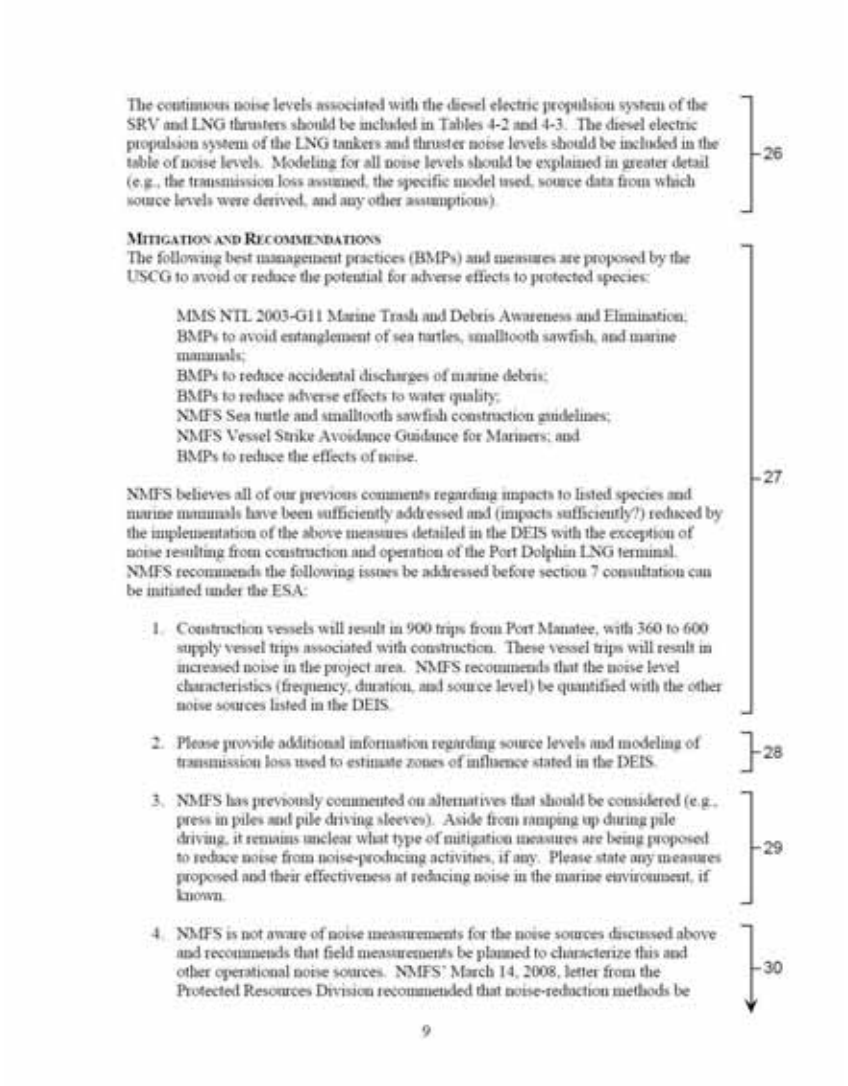
21. The discussion in section 3.2.3.4 was expanded to clarify the potential locations of smalltooth sawfish in relationship to the port site and pipeline. The potential impact of pipeline construction on smalltooth sawfish was analyzed in Section 4.2.1.5.1 of the Final EIS.

22. The text referred to in Appendix G was revised per comment.

23. Text revised per comment.

24. Additional acoustic noise modeling discussions have been added to the appropriate tables in Section 4.1.1 of Appendix G and Sections 4.2.1.2.1 and 4.8.1 of the EIS, including potential harassment distances from noise sources.

25. Analysis has been revised in Section 4.2.1.7 of the EIS to include Atlantic spotted dolphins and bottlenose dolphins. Text regarding sperm whale has been revised per comment.



The continuous noise levels associated with the diesel electric propulsion system of the SRV and LNG thrusters should be included in Tables 4-2 and 4-3. The diesel electric propulsion system of the LNG tankers and thruster noise levels should be included in the table of noise levels. Modeling for all noise levels should be explained in greater detail (e.g., the transmission loss assumed, the specific model used, source data from which source levels were derived, and any other assumptions). 26

MITIGATION AND RECOMMENDATIONS

The following best management practices (BMPs) and measures are proposed by the USCG to avoid or reduce the potential for adverse effects to protected species:

MMS NTL 2003-G11 Marine Trash and Debris Awareness and Elimination;
BMPs to avoid entanglement of sea turtles, smalltooth sawfish, and marine mammals;
BMPs to reduce accidental discharges of marine debris;
BMPs to reduce adverse effects to water quality;
NMFS Sea turtle and smalltooth sawfish construction guidelines;
NMFS Vessel Strike Avoidance Guidance for Mariners; and
BMPs to reduce the effects of noise. 27

NMFS believes all of our previous comments regarding impacts to listed species and marine mammals have been sufficiently addressed and (impacts sufficiently?) reduced by the implementation of the above measures detailed in the DEIS with the exception of noise resulting from construction and operation of the Port Dolphin LNG terminal. NMFS recommends the following issues be addressed before section 7 consultation can be initiated under the ESA:

1. Construction vessels will result in 900 trips from Port Manatee, with 360 to 600 supply vessel trips associated with construction. These vessel trips will result in increased noise in the project area. NMFS recommends that the noise level characteristics (frequency, duration, and source level) be quantified with the other noise sources listed in the DEIS. 27
2. Please provide additional information regarding source levels and modeling of transmission loss used to estimate zones of influence stated in the DEIS. 28
3. NMFS has previously commented on alternatives that should be considered (e.g., press in piles and pile driving sleeves). Aside from ramping up during pile driving, it remains unclear what type of mitigation measures are being proposed to reduce noise from noise-producing activities, if any. Please state any measures proposed and their effectiveness at reducing noise in the marine environment, if known. 29
4. NMFS is not aware of noise measurements for the noise sources discussed above and recommends that field measurements be planned to characterize this and other operational noise sources. NMFS' March 14, 2008, letter from the Protected Resources Division recommended that noise-reduction methods be 30

9

26. Operational noise tables and additional details about the noise modeling have been added to Section 4.8 and Appendix E (Biological Assessment) per the comment.

27. The noise impacts of construction vessel noise were added to Section 4.8.1.

28. Additional information regarding noise model assumptions and source levels were added to Section 4.8.1. Table 4.8-1 provides the source levels for noises associated with construction.

29. BMPs and mitigation measures are provided in Section 4.11 of the EIS. Suction piles have been considered as an alternative anchoring method in Section 2.1.1.4 and the associated impacts are discussed throughout Section 4. Port Dolphin has reviewed the specific requirements for the preparation of an IHA and LOA applications, and has initiated pre-application consultations with the NOAA/NMFS – Protected Resources Office in Silver Springs, MD regarding the Port Dolphin Project and applicable IHA or LOA requirements and mitigations. In addition, if a license is issued, the USCG and the Maritime Administration would require the Applicant to develop a site specific monitoring plan consistent with other projects licensed in the GOM. These plans would include appropriate construction noise monitoring and initiate any necessary mitigation.

30. If a license is issued, the USCG and the Maritime Administration would require the Applicant to develop a site specific monitoring plan consistent with other projects licensed in the GOM. These plans would include appropriate construction noise monitoring and initiate any necessary mitigation.



utilized, that noise levels be measured in the field to verify noise measurements from construction and operation activities and the effectiveness of any noise-reduction methods or technologies be utilized during construction. To date, there are no measurements of pile driving noise from offshore LNG terminals and all modeling has been based on other studies from areas and projects that may not be comparable to the methods being proposed for Port Dolphin. In addition to pile driving, other potential noises of concern include those from pipeline laying, vessel construction operations, and SRV and thruster noise during LNG tanker offloading during terminal operation. David Mann at the University of South Florida (USF), college of Marine Science is installing autonomous recorders in waters off west Florida, including the project area. NMFS recommends Port Dolphin utilize this existing study to monitor noise levels as part of ESA consultation with NMFS to address uncertainties in the noise estimates used in the DEIS, and to monitor the effectiveness of any noise-reduction methodologies proposed. NMFS is available to assist in the design of a monitoring protocol to measure construction noise and further information regarding the current study underway at USF.

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Based on the information provided in the DEIS, an incidental take authorization under MMPA section 101 (a)(5) is necessary for Atlantic spotted dolphins and bottlenose dolphins. Atlantic spotted dolphins and bottlenose dolphins are common to the project area. A publication is available on these dolphin species in the proposed project area,[1] and studies are ongoing by these authors at Mote Marine Laboratory on these species. Please contact Kenneth Hollingshead of our Protected Resources Division at (301) 713-2289 for additional information regarding an incidental take authorization. Additional information is also available at http://www.nmfs.noaa.gov/pr/permits/incidental.htm.

31

The USCG requested informal section 7 consultation under the ESA on August 24, 2007. Although most of our previous comments regarding impacts to listed species and marine mammals have been sufficiently addressed, our comment regarding noise impacts, modeling, and field measurements have not been sufficiently addressed for us to initiate section 7 consultation under the ESA. Once these remaining comments are sufficiently addressed, NMFS believes we will be able to initiate section 7 consultation with the USCG on Port Dolphin.

32

[1] Griffin, R.B. and N.J. Griffin. 2003. Distribution, habitat partitioning, and abundance of Atlantic spotted dolphins, bottlenose dolphins, and loggerhead sea turtles on the eastern Gulf of Mexico continental shelf. Gulf of Mexico Science 2003(1):23–34.

10

31. BMPs and mitigation measures are provided in Section 4.11 of the EIS. Suction piles have been considered as an alternative anchoring method in Section 2.1.1.4 and the associated impacts are discussed throughout Section 4. Port Dolphin has reviewed the specific requirements for the preparation of an IHA and LOA applications, and has initiated pre-application consultations with the NOAA/NMFS – Protected Resources Office in Silver Springs, MD regarding the Port Dolphin Project and applicable IHA or LOA requirements and mitigations. In addition, if a license is issued, the USCG and the Maritime Administration would require the Applicant to develop a site specific monitoring plan consistent with other projects licensed in the GOM. These plans would include appropriate construction noise monitoring and initiate any necessary mitigation.

32. Additional information on noise impacts on threatened and endangered marine species has been included in Sections 4.2.1.2 through 4.2.1.5. Responses to specific comments are included with each comment.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

June 2, 2008

Mr. Mark Prescott, Chief
Deepwater Ports Standards Division (CG-3PSO-5)
United States Coast Guard Headquarters
2100 Second Street, S.W.
Washington, D.C. 20593

Subject: Port Dolphin Liquefied Natural Gas Deepwater Port Draft Environmental Impact Statement; Docket Number: USCG-2007-28532; CEQ: 20070463; ERP: CGD-E03017-FL

Dear Mr. Prescott:

Pursuant to Section 309 of the Clean Air Act (CAA) and Section 102(2)(C) of the National Environmental Policy Act (NEPA), the U.S. Environmental Protection Agency (EPA) Region 4 has reviewed the U. S. Coast Guard's (USCG) Draft Environmental Impact Statement (draft EIS) for the proposed Port Dolphin Liquefied Natural Gas (LNG) Deepwater Port. Under Section 309 of the CAA, EPA is responsible for reviewing and commenting on major federal actions significantly affecting the quality of the human environment. In addition, EPA is a cooperating agency under NEPA for this project because Port Dolphin LLC has applied to EPA for National Pollutant Discharge Elimination System (NPDES) and Clean Air Act (CAA) approvals to construct and operate this facility. EPA's review of the draft EIS also includes comments pursuant to EPA's regulatory roles.

Port Dolphin Energy LLC proposes to construct, own and operate an LNG receiving and regasification facility in the Gulf of Mexico approximately 28 miles offshore from Manatee County, Florida. The proposed port would consist of two submerged-buoy mooring points to dock two vessels concurrently while allowing them to be unloaded sequentially. Vaporization of the LNG would occur on specially designed shuttle and regasification vessels (SRVs) by means of a closed-loop Shell and Tube Vaporization (STV) system. Flexible gas pipeline risers from each mooring would connect the ships to manifolds on the seabed. The gas would flow into pipelines along the seabed extending approximately 2 miles from each mooring to a common junction and then into a 46-mile pipeline to a connection on the shore, 4 miles east of Port Manatee. The proposed peak regasification capacity would be 1.2 billion standard cubic feet of gas per day.

Alternative technologies were considered in the Draft EIS in addition to the proposed closed loop Shell and Tube Vaporization technology. While most of the technologies would utilize seawater to heat the gas, Ambient Air Vaporization (AAV) entirely avoids seawater withdrawals and air emissions. AAV was discussed, but not

1

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1. Ambient Air Vaporization (AAV) has been evaluated for use with the FSRU port technology. It is now discussed as a vaporization technology in Section 2.1.7.3. Impacts are discussed in Section 4.

carried forward for detailed evaluation. While we agree with the selection of the Shell and Tube Vaporization technology, we recommend that the AAV alternative be analyzed further in the final EIS due to its anticipated environmental and operational benefits. 1

EPA also requests further analysis of an additional pipeline alternative landfall route within Sarasota County to allow for a possible connection to an existing pipeline. Pipeline alternatives were considered, but only the options of routing a pipeline into Tampa Bay and into the commercial harbor of Port Manatee were considered in detail. The preferred route terminates at Port Manatee and is expected to result in adverse impacts to estuarine resources, as well as potential conflicts with navigation and another pipeline. The draft EIS has insufficient information about potential impacts of this alternative landfall route to determine whether the 2,137 acres of hardbottom habitat, 13 acres of emergent wetlands, and additional seagrass habitat impacts of the preferred pipeline route could be substantially reduced. 2

In summary, EPA has environmental concerns regarding this project, as proposed, and rates this draft EIS as "EC-2" (*i.e.*, environmental concerns with additional information requested in the final EIS). Our primary concerns relate to the scope of the analysis of alternatives, minimization of impacts to hard bottom marine habitat, accuracy of the analysis of seawater intake and discharge impacts to ichthyoplankton, and need to clarify the potential air quality impacts from port construction and operation. EPA supports the selection of the proposed STV port design which confines the operational components onboard specially designed ships. The proposed closed-loop STV design would result in substantial minimization of marine resource impacts and thereby reduce the overall environmental impacts of the proposed port. I have enclosed EPA's detailed comments as well as the explanation of EPA's ratings with this letter.

Thank you for the opportunity to review and comment on this draft EIS. We look forward to working with you, the USCG staff and the Port Dolphin Energy LLC to adequately address these remaining concerns. We encourage open communication between our technical staffs to achieve this goal. If you wish to discuss EPA's comments, please contact me at 404/562-9611 (mueller.heinz@epa.gov) or Ted Bisterfeld of my staff at 404/562-9621 (bisterfeld.ted@epa.gov)

Sincerely,

Heinz J. Mueller, Chief
NEPA Program Office
Office of Policy and Management

Enclosures: Detailed Comments on the draft EIS
EPA Rating System Description

cc: MARAD, Washington, DC
NMFS, St. Petersburg

2

2. As noted in the Draft EIS, there are no alternative onshore locations for pipeline landfall and HDD construction other than Port Manatee due to dense development and inappropriate land uses. Therefore, an interconnection with the Florida Gas Transmission pipeline in Sarasota County is not feasible and was not carried forward. As noted, the near shore areas have multiple sensitive species and habitat areas which are denser than those on lower Tampa Bay. The discussion in Section 2.1.1.3 has been expanded to clarify and Appendix F has been added to provide additional detail on the screening process.

ENCLOSURE: Detailed EPA Comments on Port Dolphin Draft EIS

PERMITS AND APPROVALS

Page 1-14, Table 1.1-6 1. EPA's Ocean Discharge Criteria Evaluation pertains to the Section 403(c) of the Clean Water Act. 3

DETAILED DESCRIPTION OF THE PROJECT AND ALTERNATIVES

1. Page 2-17, Section 2.1.1.3. EPA recommends that the mapped "Sand Resources" shown on Figure 2.1-10 be clarified to indicate they are wholly within State of Florida jurisdictional waters and, therefore, not under MMS federal jurisdiction. 4

2. Page 2-15 thru 18, Section 2.1.1.3. The alternative site evaluation criteria of Phases 1, 2, and 3 may be met for a pipeline landfall near the Town of Osprey in Sarasota County. A major Florida Gas Transmission pipeline terminates very near the coast and US Highway 41, as shown on Figure 2.1-8. Please provide the exact location of this terminus and clarify how a connection to this pipeline compares to the preferred alternative. A connection here may avoid and/or minimize impacts to important marine resources and the designated sand resource area, as well as reduce the engineering complexity required to bring the pipeline into Tampa Bay to Port Manatee. The Phase 2 Alternatives Analysis discussion does not indicate whether this potential connection point and other offshore port sites were considered in the analysis. A landfall for the pipeline in this vicinity potentially avoids substantial estuarine resources in lower Tampa Bay and conflict with other pipelines and vessel traffic in the Port Manatee vicinity. In addition, the required pipeline distance to Port Manatee may be less. If this pipeline landfall point is considered in the Phase 3 Pipeline Route Analysis, it potentially meets all 5 selection criteria on Page 2-17. Finally, horizontal directional drilling (HDD) technology for pipeline emplacement could be utilized and may greatly minimize impacts to beach and estuarine habitats. Development of a mitigation plan during the permit review stage is mentioned on Page 4-139. EPA recommends that it be prepared sooner and presented in the final EIS, as recommended by NEPA. 5

3. Page 2-24, Section 2.1.1.5. EPA and USCG staff have discussed the relevance of Ambient Air Vaporization technology for several LNG deepwater port projects, e.g., Bienville Deepwater Port and Calypso Deepwater Port. EPA has recommended that such technology be considered in detail in EISs, including the viability of the technology and its environmental merits. Therefore, we strongly recommend the USCG reconsider its decision to not consider AAV further in any detail. EPA urges that USCG fully document in the final EIS its evaluation of the viability of this technology, even if such evaluation is independent of a project-specific application. It is particularly relevant for proposed LNG projects in peninsular Florida to consider AAV with the other major technologies in a side-by-side documentation of the impacts. AAV appears particularly suitable to peninsular Florida because of the meteorological conditions. 6

1

3. Text revised per comment.

4. The discussion of sand resources in Section 2.1.1.3 has been expanded and the figure revised to show the Federal/State water boundary.

5. As noted in the Draft EIS, there are no alternative onshore locations for pipeline landfall and HDD construction other than Port Manatee due to dense development and inappropriate land uses. Therefore, an interconnection with the Florida Gas Transmission pipeline in Sarasota County is not feasible and was not carried forward. As noted, the near shore areas have multiple sensitive species and habitat areas which are denser than those on lower Tampa Bay. The discussion in section 2.1.1.3 has been expanded to clarify.

   The exact location of the Florida Gas Transmission terminal is not available from FERC and cannot be provided in a public document since it is considered critical energy infrastructure.

   Although the Final EIS identifies recommended monitoring and mitigation, the plan development cannot be completed until permit reviews (including EPA's) have progressed and final engineering design is completed.

6. Ambient Air Vaporization (AAV) has been evaluated for use with the FSRU port technology. It is now discussed as a vaporization technology in Section 2.1.1.6. Impacts are discussed in Section 4.

4. Page 4-5, Section 4.1.1.1. The text indicates a total offshore pipeline length of 42 miles; however, text on page 2-34 indicates there is an additional 4 miles of pipeline (one 36 inch diameter 2- mile long flowline from each PLEM) not accounted for in this total nor in Table ES-6. EPA recommends the text be corrected to clarify that the total length is 50 miles for the project. — 7

MARINE RESOURCES

1. Page 2-19, Section 2.1.1.3. EPA believes this section does not provide sufficient information about potential adverse impacts to the benthos to enable comparison of the three port sites independent of the pipelines. Table 4.2-1 only provides data for the proposed port site and pipeline. Having these data on benthic habitat would assume greater importance if an additional pipeline route to shore was identified to enable comparisons of pipeline route alternatives alone. It is also unclear whether Table 4.2-1 includes the benthic impact of constructing the 4 miles of flowline connectors. EPA recommends that the additional data be included in the final EIS. — 8

2. Page 2-25, Section 2.1.1.6. Entrainment of small marine life can be reduced by the use of exclusion systems for seawater intakes. The DEIS does not identify the proposed slot size for the seawater intake, but the slot size is at least as important as the intake velocity at the screen. EPA recommends the final EIS assess the available performance of small slot size openings. Also, some text appears to be missing on the subject of biocides from this section. — 9

3. Page 4-22, Section 4.2.1.2. We appreciate the USCG's emphasis towards minimization of impacts to marine protected areas, mostly in the Terra Ceia Aquatic Preserve. While rooted seagrass exists in that area, the direct loss and estimated indirect impacts from sediment and turbidity deposition are unclear. Also, the draft EIS does not indicate whether seagrass impacts are included in the direct effects to 6, 650 acres of soft bottom area for the total project. EPA recommends the final EIS clarify the potential magnitude of impacts to seagrass. — 10

4. Page 4-44, thru 4-57 Section 4.2.1.7. The draft EIS estimates total hard bottom habitat impacts from construction to be 2,137 acres and to have long term duration. Because colonization of new hard structure is uncertain, it may be more appropriate to consider this loss as permanent. Further, this section mentions the HDD technique relative only to minimizing impacts to rooted seagrass. EPA recommends the final EIS more fully define the capabilities of HDD and that the USCG further consider the potential for this technology to mitigate benthic losses. In addition, we recommend that the USCG reconcile the tabulated impacts data in Table 4-5 of the Volume II Appendix G, "Biological Assessment" with the data presented in Table 4-5 on pg. 4-14 of Volume I. — 11

5. Page 4-58 thru 4-63, Section 4.2.1.12. While the introductory paragraph of Section 4 states that each alternative is analyzed in this section, no analysis appears to be included for alternative vaporization technologies. For example, the analysis of the potential ichthyoplankton impacts addresses cooling water discharges only of the closed-loop — 12

2

7. Text clarified per comment. Pipeline lengths have been updated to reflect revisions made by the Applicant to the proposed pipeline route.

8. The information in Table 4.2-1 has been updated to reflect revisions made by the Applicant to the proposed pipeline route. The impacts from the flowlines have been separately listed for clarity. Impacts for the Southern Pipeline Route Alternative are discussed in Section 4.3.2.1.

9. Text was revised for clarification in Section 2.1.1.7, Alternatives for Marine Life Exclusion Systems. Smaller slot sizes were not considered because they would require larger intake structures or increased intake velocities, as explained in Section 2.1.1.7. Please note that the impact analysis for ichthyoplankton assumes 100 percent mortality and does not take credit for any potential minimization of impacts that would result from the use of screens.

   The missing text (Section head and 1 line of text) has been restored.

10. Text revised to clarify in Section 4.2.1.6 that based on Applicant provided survey results, seagrass beds will not be impacted. The EIS recommends that a license condition require additional seagrass surveys prior to construction. See Section 4.2.1.6.1 for information regarding survey.

11. Text revised to clarify. Because hard bottom areas are dispersed along the proposed pipeline route, it would not be practical to use HDD to avoid impacts to hard bottom areas (See Section 4.2.1.6). Construction methods proposed by the applicant have been evaluated based on geotechnical data and impacts to hard bottom areas have been minimized. The values in Section 4.2.1.6 and the BA have been revised and made consistent.

12. The closed loop vaporization system and the AAV have been carried forward for analysis. The greater impacts to marine resources from open-loop vaporization systems were acknowledged in the screening discussions in Section 2.1.7.4.

alternative. The draft EIS does not document the expected greater adverse impacts to icthyoplankton from the added withdrawals and discharge of seawater for open-loop gas vaporization. EPA recommends that the final EIS include such analyses, which would be similar to previously reviewed, similarly situated LNG projects. 12

In our efforts to be consistent in our review of NEPA documentation for LNG projects, we continue to strongly recommend that ichthyoplankton/fisheries assessments not focus on a few indicator species and that such assessments include consideration of the impacts occurring within the discharge plume. We believe that a focus on indicator species can significantly underestimate the true impacts. EPA recommends the USCG include comprehensive ichthyoplankton/fisheries assessments in EISs. 13

6. Page 4-78, Section 4.2.3.2. The Southern Port Site Alternative is mentioned in this section and a survey of 30 acres apparently was done, separate from a survey of pipeline construction impacts. However, the draft EIS presents no data on the composition of the benthic communities at the proposed and southern site alternative. The survey data within Section 3.2.4 are exclusive to the preferred alternative. Because it is important to determine whether the proposed port site and pipeline route would have greater or fewer impacts on hard bottom benthos than the alternatives, EPA recommends that such data be included in the final EIS, if it is available. 14

7. Page 4-139, Section 4.11. The draft EIS identifies numerous mitigation measures. A proposed mitigation plan is mentioned for unavoidable adverse impacts to hard bottom marine resources, but the draft EIS notes that it will be developed during the permitting process. EPA recommends that the final EIS include the proposed mitigation plan, thus allowing initial public and agency review to expedite approval of a plan. EPA appreciates MARAD agreeing to require monitoring and mitigation of ichthyoplankton impacts and to develop a plan with interagency input. 15

AIR QUALITY MODELING AND TRANSPORTATION

1. Executive Summary. Some statements in the draft EIS do not reflect the analyses and information provided in the draft EIS. EPA recommends the following changes based on the content of the draft EIS.

ES-8, Line 39: Since the project will have both short-term and long-term minor impacts, EPA recommends adding "and long-term" to the first sentence. 16

ES-8, Line 41: EPA recommends adding the following sentence: "Estimated adverse onshore construction impacts appear to be major in the short-term." 17

ES-8, Line 45: Given that the project impacts are not negligible, EPA recommends clarifying the description of impacts on Class I areas so that the revised sentence reads, "No significant impacts on Class I areas are expected." 18

ES-9, Line 1: Add the word "operational" to the first sentence. Also, PM_{10} and SO_2 operational impacts have been shown to be greater than the SIL. EPA recommends this sentence be revised. 19

3

13. The scope and methodology for ichthyoplankton analysis in this EIS follows protocol developed by USCG and NOAA, and is consistent with analyses performed for other similar projects. As discussed in Section 4.2.1.11 and Appendix G, the analysis has been expanded per consultation with NMFS. Assumptions and limitations of the analysis are discussed in Section 4.2.1.11 and Appendix G.

14. Section 4.3.2.1 has been expanded to include information on the Southern Site and Route Alternative that was surveyed by the applicant after the Draft EIS was published.

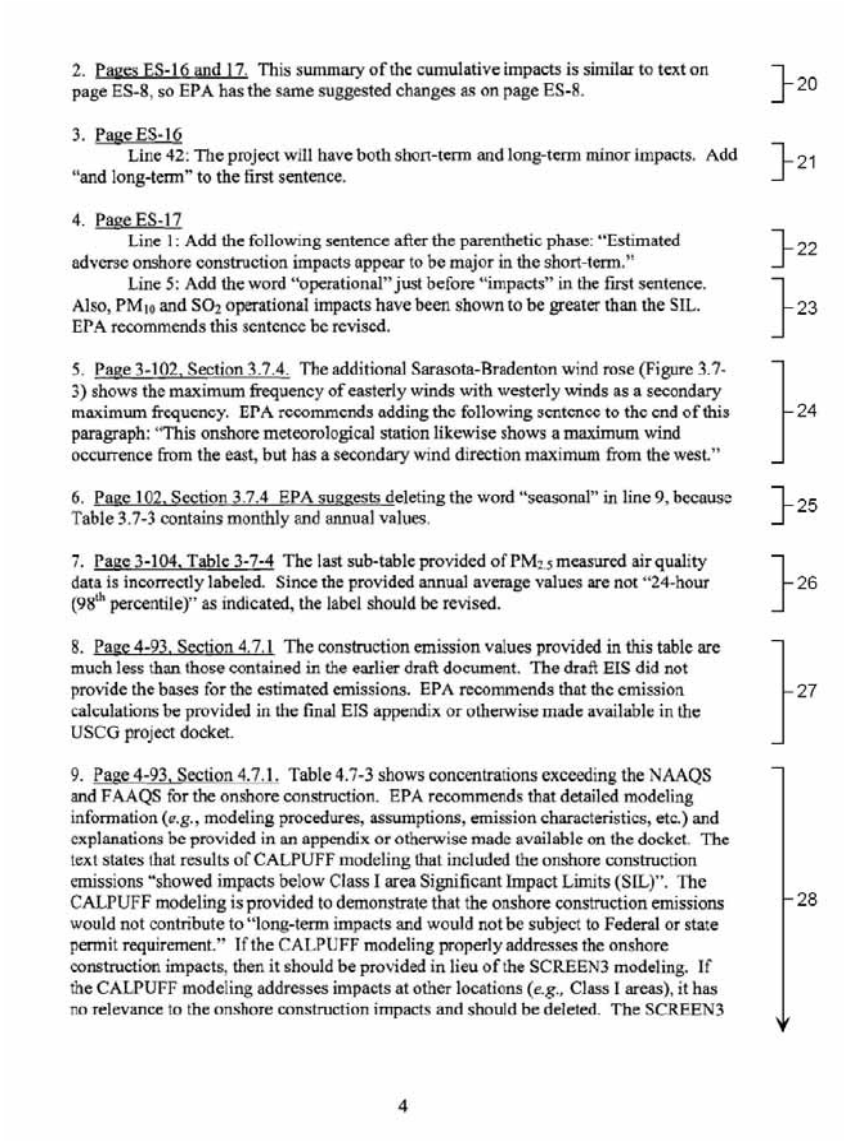
15. Although the Final EIS identifies recommended monitoring and mitigation, a meaningful plan cannot be developed until permit reviews (including EPA's) have progressed and final engineering design is being completed. This approach is consistent with other similar projects.

16. Text revised per comment.

17. Text revised per comment.

18. Text revised per comment.

19. Text revised per comment



2. Pages ES-16 and 17. This summary of the cumulative impacts is similar to text on page ES-8, so EPA has the same suggested changes as on page ES-8. 20

3. Page ES-16
Line 42: The project will have both short-term and long-term minor impacts. Add "and long-term" to the first sentence. 21

4. Page ES-17
Line 1: Add the following sentence after the parenthetic phase: "Estimated adverse onshore construction impacts appear to be major in the short-term." 22
Line 5: Add the word "operational" just before "impacts" in the first sentence. Also, PM_{10} and SO_2 operational impacts have been shown to be greater than the SIL. EPA recommends this sentence be revised. 23

5. Page 3-102, Section 3.7.4. The additional Sarasota-Bradenton wind rose (Figure 3.7-3) shows the maximum frequency of easterly winds with westerly winds as a secondary maximum frequency. EPA recommends adding the following sentence to the end of this paragraph: "This onshore meteorological station likewise shows a maximum wind occurrence from the east, but has a secondary wind direction maximum from the west." 24

6. Page 102, Section 3.7.4 EPA suggests deleting the word "seasonal" in line 9, because Table 3.7-3 contains monthly and annual values. 25

7. Page 3-104, Table 3-7-4 The last sub-table provided of $PM_{2.5}$ measured air quality data is incorrectly labeled. Since the provided annual average values are not "24-hour (98th percentile)" as indicated, the label should be revised. 26

8. Page 4-93, Section 4.7.1 The construction emission values provided in this table are much less than those contained in the earlier draft document. The draft EIS did not provide the bases for the estimated emissions. EPA recommends that the emission calculations be provided in the final EIS appendix or otherwise made available in the USCG project docket. 27

9. Page 4-93, Section 4.7.1. Table 4.7-3 shows concentrations exceeding the NAAQS and FAAQS for the onshore construction. EPA recommends that detailed modeling information (*e.g.*, modeling procedures, assumptions, emission characteristics, etc.) and explanations be provided in an appendix or otherwise made available on the docket. The text states that results of CALPUFF modeling that included the onshore construction emissions "showed impacts below Class I area Significant Impact Limits (SIL)". The CALPUFF modeling is provided to demonstrate that the onshore construction emissions would not contribute to "long-term impacts and would not be subject to Federal or state permit requirement." If the CALPUFF modeling properly addresses the onshore construction impacts, then it should be provided in lieu of the SCREEN3 modeling. If the CALPUFF modeling addresses impacts at other locations (*e.g.*, Class I areas), it has no relevance to the onshore construction impacts and should be deleted. The SCREEN3 28

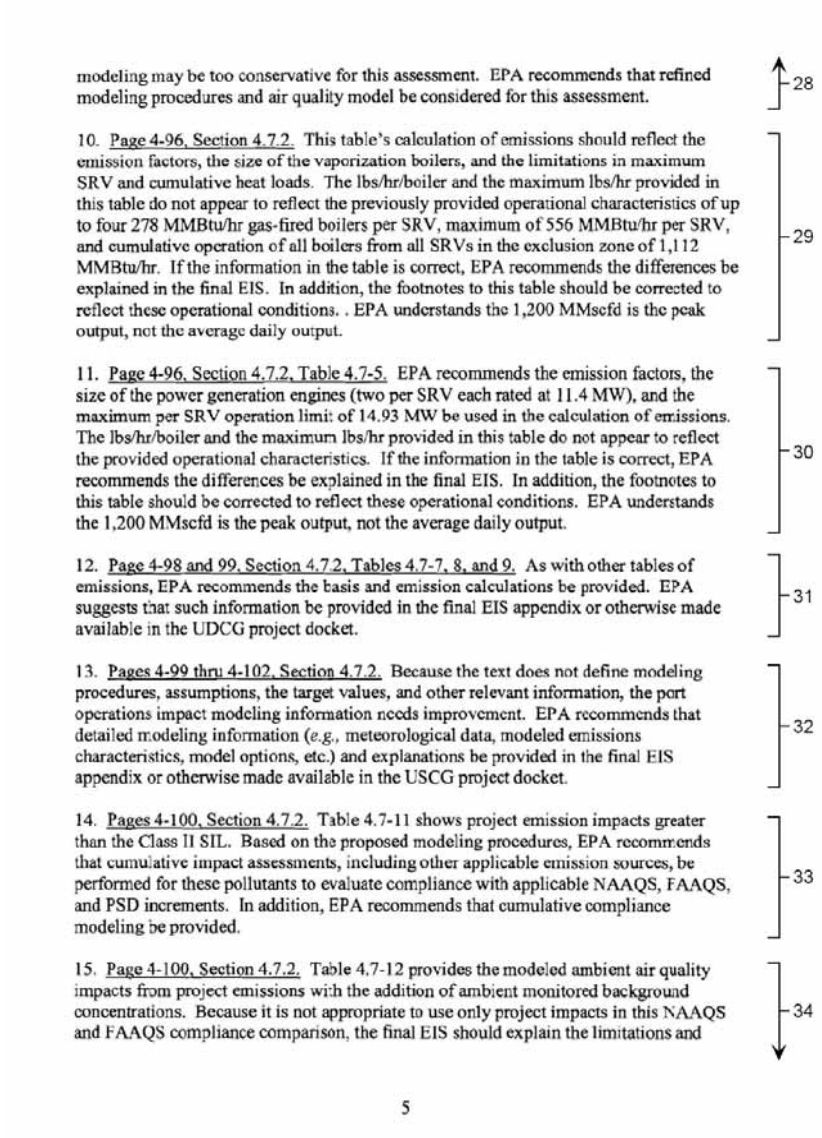
4

20 - 25. Text revised per comment.

26. Label revised per comment.

27. Comment noted. Applicant provided documents including the air emission calculations are available electronically via the Federal Docket Management System (*www.regulations.gov*), Docket No. USCG-2007-28532.

28. Sentence referring to Class I impacts was deleted. Construction activity for onshore facilities (e.g. pipeline) will occur along the designated corridor. The SCREEN3 analysis demonstrates that potential air quality impacts in the immediate vicinity of ongoing construction activity are expected to exceed ambient standards (Section 4.7.1.1). A "refined analysis" entails modeling an emission scenario for hourly meteorology spanning an extended time period (typically five years). During construction, the emission scenario would be constantly changing. A refined analysis based on average emissions over the construction period would understate peak short-term impacts; if based on peak short-term emissions at each location, the analysis would basically reproduce the SCREEN3 results. Without a stationary location or a clearly defined (fixed) "ambient boundary" for construction activities, a meaningful "refined" modeling analysis was judged to be infeasible. The modeling reports are too lengthy to include in the EIS but are available electronically via the Federal Docket Management System (*www.regulations.gov*), Docket No. USCG-2007-28532.



modeling may be too conservative for this assessment. EPA recommends that refined modeling procedures and air quality model be considered for this assessment. 28

10. Page 4-96, Section 4.7.2. This table's calculation of emissions should reflect the emission factors, the size of the vaporization boilers, and the limitations in maximum SRV and cumulative heat loads. The lbs/hr/boiler and the maximum lbs/hr provided in this table do not appear to reflect the previously provided operational characteristics of up to four 278 MMBtu/hr gas-fired boilers per SRV, maximum of 556 MMBtu/hr per SRV, and cumulative operation of all boilers from all SRVs in the exclusion zone of 1,112 MMBtu/hr. If the information in the table is correct, EPA recommends the differences be explained in the final EIS. In addition, the footnotes to this table should be corrected to reflect these operational conditions. . EPA understands the 1,200 MMscfd is the peak output, not the average daily output. 29

11. Page 4-96, Section 4.7.2, Table 4.7-5. EPA recommends the emission factors, the size of the power generation engines (two per SRV each rated at 11.4 MW), and the maximum per SRV operation limit of 14.93 MW be used in the calculation of emissions. The lbs/hr/boiler and the maximum lbs/hr provided in this table do not appear to reflect the provided operational characteristics. If the information in the table is correct, EPA recommends the differences be explained in the final EIS. In addition, the footnotes to this table should be corrected to reflect these operational conditions. EPA understands the 1,200 MMscfd is the peak output, not the average daily output. 30

12. Page 4-98 and 99, Section 4.7.2, Tables 4.7-7, 8, and 9. As with other tables of emissions, EPA recommends the basis and emission calculations be provided. EPA suggests that such information be provided in the final EIS appendix or otherwise made available in the UDCG project docket. 31

13. Pages 4-99 thru 4-102, Section 4.7.2. Because the text does not define modeling procedures, assumptions, the target values, and other relevant information, the port operations impact modeling information needs improvement. EPA recommends that detailed modeling information (e.g., meteorological data, modeled emissions characteristics, model options, etc.) and explanations be provided in the final EIS appendix or otherwise made available in the USCG project docket. 32

14. Pages 4-100, Section 4.7.2. Table 4.7-11 shows project emission impacts greater than the Class II SIL. Based on the proposed modeling procedures, EPA recommends that cumulative impact assessments, including other applicable emission sources, be performed for these pollutants to evaluate compliance with applicable NAAQS, FAAQS, and PSD increments. In addition, EPA recommends that cumulative compliance modeling be provided. 33

15. Page 4-100, Section 4.7.2. Table 4.7-12 provides the modeled ambient air quality impacts from project emissions with the addition of ambient monitored background concentrations. Because it is not appropriate to use only project impacts in this NAAQS and FAAQS compliance comparison, the final EIS should explain the limitations and 34

5

29. Text revised per comment. Tables renumbered to 4.7-3 and 4.7-4 from 4.7-4 and 4.7-5). Footnote a in Table 4.7-3 has been modified to four 278 MMBTU first bullet.

    The EIS includes an evaluation of potential impacts from the project as proposed.

30. The table referred to has been revised. Issues raised in the comment have been resolved.

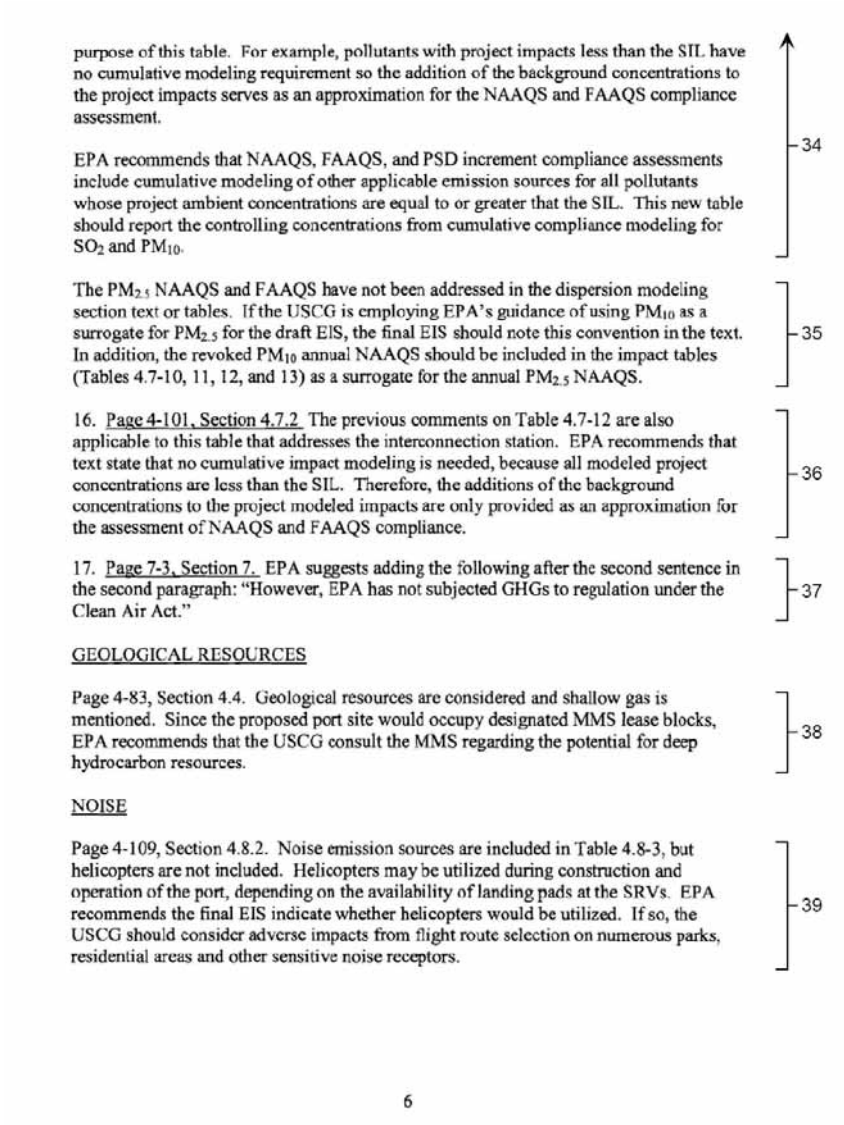
31. Comment noted. Applicant documents are available electronically via the Federal Docket Management System (*www.regulations.gov*), Docket No. USCG-2007-28532.

32. Comment noted. Applicant documents are available electronically via the Federal Docket Management System (*www.regulations.gov*), Docket No. USCG-2007-28532.

33. Potential impacts are below the Class II SIL (as demonstrated by SCREEN3 modeling). Text in Section 4.7.1.2 revised to clarify.

34. Refined, cumulative modeling would ordinarily be required by Florida DEP as a condition for permitting the onshore interconnection station (assuming that the station is a large enough emission source to warrant modeling). That is a more appropriate venue for such modeling, since Florida is the responsible permitting authority for that facility, and the facility design will be more refined at that stage of project development.

    Table 4.7-12 demonstrates that the impacts of the proposed facility, plus a conservative estimate of ambient background, are in compliance with applicable standards and increments, with a comfortable margin for impacts from other emission sources. These results demonstrate that, absent impacts from any existing nearby emissions sources, the impacts of the project alone, plus background, do not exceed any ambient air quality standards.



purpose of this table. For example, pollutants with project impacts less than the SIL have no cumulative modeling requirement so the addition of the background concentrations to the project impacts serves as an approximation for the NAAQS and FAAQS compliance assessment.

EPA recommends that NAAQS, FAAQS, and PSD increment compliance assessments include cumulative modeling of other applicable emission sources for all pollutants whose project ambient concentrations are equal to or greater that the SIL. This new table should report the controlling concentrations from cumulative compliance modeling for SO_2 and PM_{10}.

34

The $PM_{2.5}$ NAAQS and FAAQS have not been addressed in the dispersion modeling section text or tables. If the USCG is employing EPA's guidance of using PM_{10} as a surrogate for $PM_{2.5}$ for the draft EIS, the final EIS should note this convention in the text. In addition, the revoked PM_{10} annual NAAQS should be included in the impact tables (Tables 4.7-10, 11, 12, and 13) as a surrogate for the annual $PM_{2.5}$ NAAQS.

35

16. Page 4-101, Section 4.7.2 The previous comments on Table 4.7-12 are also applicable to this table that addresses the interconnection station. EPA recommends that text state that no cumulative impact modeling is needed, because all modeled project concentrations are less than the SIL. Therefore, the additions of the background concentrations to the project modeled impacts are only provided as an approximation for the assessment of NAAQS and FAAQS compliance.

36

17. Page 7-3, Section 7. EPA suggests adding the following after the second sentence in the second paragraph: "However, EPA has not subjected GHGs to regulation under the Clean Air Act."

37

GEOLOGICAL RESOURCES

Page 4-83, Section 4.4. Geological resources are considered and shallow gas is mentioned. Since the proposed port site would occupy designated MMS lease blocks, EPA recommends that the USCG consult the MMS regarding the potential for deep hydrocarbon resources.

38

NOISE

Page 4-109, Section 4.8.2. Noise emission sources are included in Table 4.8-3, but helicopters are not included. Helicopters may be utilized during construction and operation of the port, depending on the availability of landing pads at the SRVs. EPA recommends the final EIS indicate whether helicopters would be utilized. If so, the USCG should consider adverse impacts from flight route selection on numerous parks, residential areas and other sensitive noise receptors.

39

6

35. If USCG employs USEPA guidance to use PM_{10} as a surrogate for $PM_{2.5}$, the (revoked) annual PM_{10} standard will be included in impact tables (and $PM_{2.5}$ entries will be removed, since they will be redundant). Tables updated for $PM_{2.5}$ standards. Currently EPA standard requires evaluation of $PM_{2.5}$.

36. Table revised to show comparison of SILs instead of NAAQS and FAAQS.

37. Sentence added.

38. MMS is a cooperating agency on this project and has been consulted regarding alternate offshore uses.

39. No helicopters will be used during construction or operation.

ENCLOSURE

U.S. ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL IMPACT STATEMENT (EIS) RATING SYSTEM CRITERIA
EPA has developed a set of criteria for rating Draft EISs. The rating system provides a basis upon which EPA makes recommendations to the lead agency for improving the draft.

RATING THE ENVIRONMENTAL IMPACT OF THE ACTION

LO (Lack of Objections): The review has not identified any potential environmental impacts requiring substantive changes to the preferred alternative. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposed action.

EC (Environmental Concerns): The review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact.

EO (Environmental Objections): The review has identified significant environmental impacts that should be avoided in order to adequately protect the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). The basis for environmental objections can include situations:

1. Where an action might violate or be inconsistent with achievement or maintenance of a national environmental standard;
2. Where the Federal agency violates its own substantive environmental requirements that relate to EPA's areas of jurisdiction
or expertise;
3. Where there is a violation of an EPA policy declaration;
4. Where there are no applicable standards or where applicable standards will not be violated but there is potential for significant environmental degradation that could be corrected by project modification or other feasible alternatives; or
5. Where proceeding with the proposed action would set a precedent for future actions that collectively could result in significant environmental impacts.

EU (Environmentally Unsatisfactory): The review has identified adverse environmental impacts that are of sufficient magnitude that EPA believes the proposed action must not proceed as proposed. The basis for an environmentally unsatisfactory determination consists of identification of environmentally objectionable impacts as defined above and one or more of the following conditions:

1. The potential violation of or inconsistency with a national environmental standard is substantive and/or will occur on along-term basis;
2. There are no applicable standards but the severity, duration, or geographical scope of the impacts associated with the proposed action warrant special attention; or
3. The potential environmental impacts resulting from the proposed action are of national importance because of the threat to national environmental resources or to environmental policies.

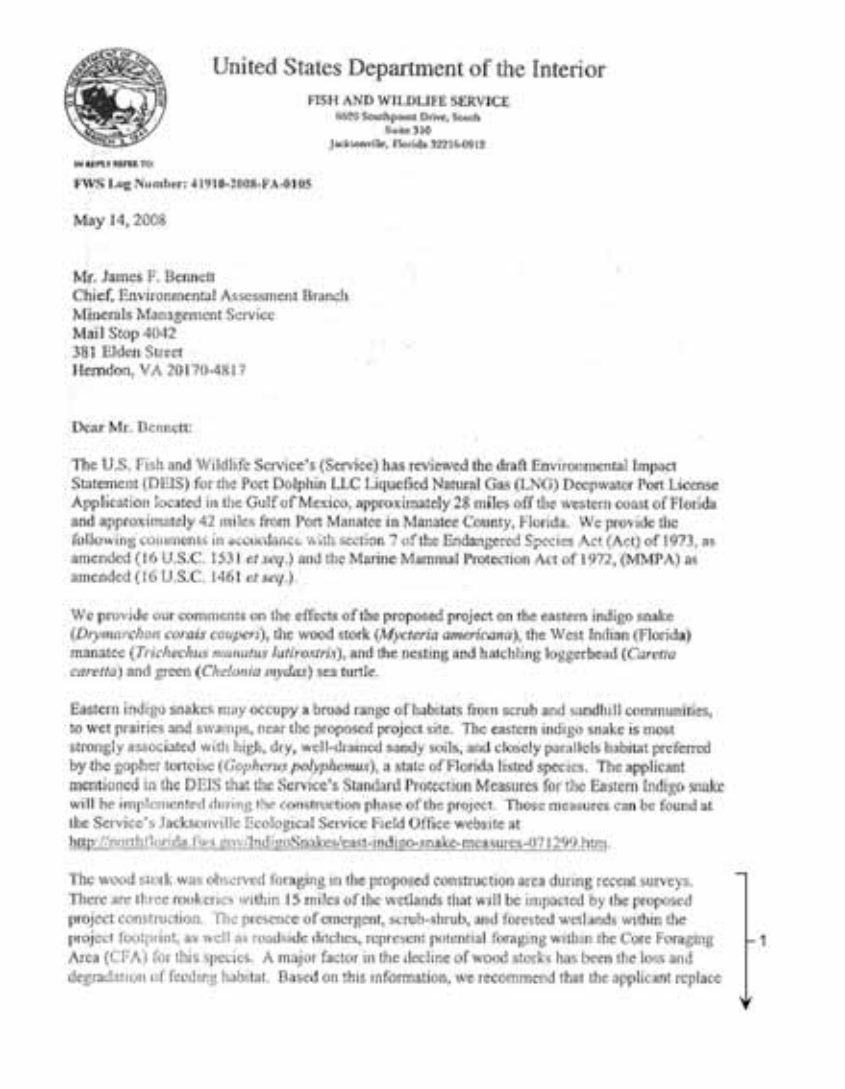
RATING THE ADEQUACY OF THE ENVIRONMENTAL IMPACT STATEMENT (EIS)

1 (Adequate): The Draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

2 (Insufficient Information). The Draft EIS does not contain sufficient information to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the Draft EIS, which could reduce the environmental impacts of the proposal. The identified additional information, data, analyses, or discussion should be included in the Final EIS.

3 (Inadequate): The Draft EIS does not adequately assess the potentially significant environmental impacts of the proposal, or the reviewer has identified new, reasonably available, alternatives, that are outside of the spectrum of alternatives analyzed in the Draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. The identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. This rating indicates EPA's belief that the Draft EIS does not meet the purposes of NEPA and/or the Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised Draft EIS.

1



United States Department of the Interior

FISH AND WILDLIFE SERVICE
6620 Southpoint Drive, South
Suite 310
Jacksonville, Florida 32216-0912

IN REPLY REFER TO:
FWS Log Number: 41910-2008-FA-0105

May 14, 2008

Mr. James F. Bennett
Chief, Environmental Assessment Branch
Minerals Management Service
Mail Stop 4042
381 Elden Street
Herndon, VA 20170-4817

Dear Mr. Bennett:

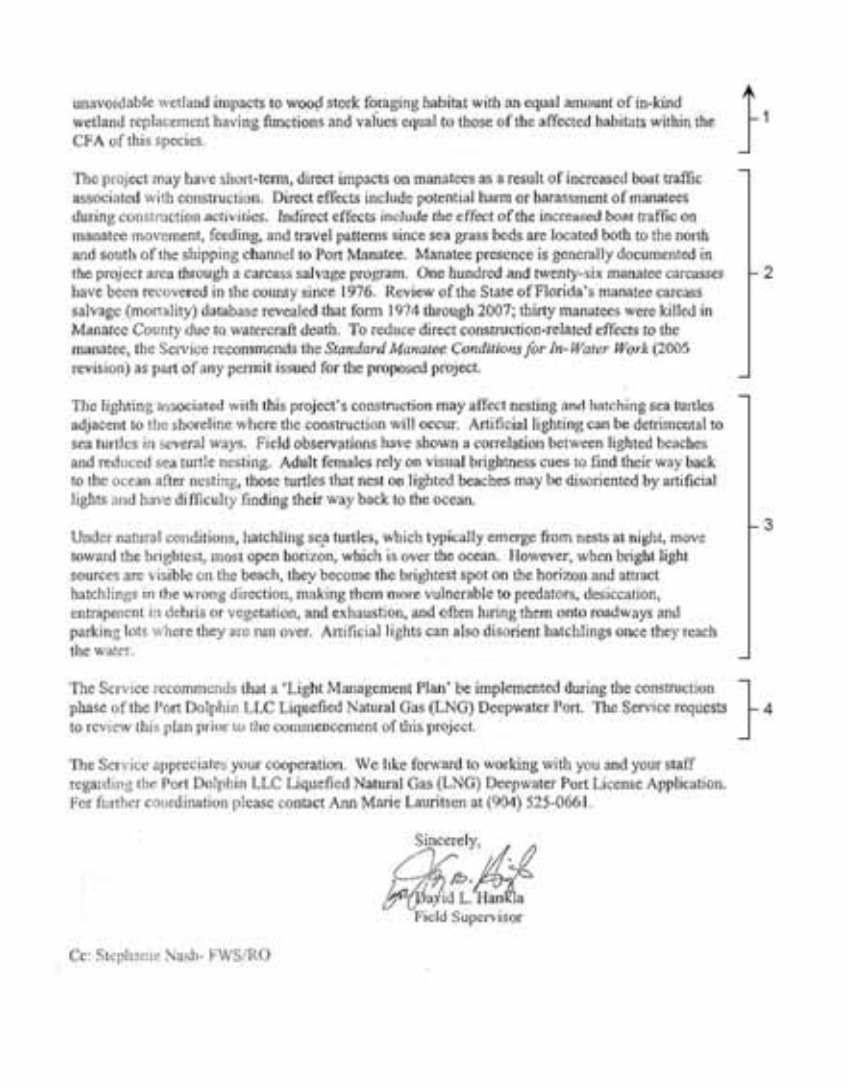
The U.S. Fish and Wildlife Service's (Service) has reviewed the draft Environmental Impact Statement (DEIS) for the Port Dolphin LLC Liquefied Natural Gas (LNG) Deepwater Port License Application located in the Gulf of Mexico, approximately 28 miles off the western coast of Florida and approximately 42 miles from Port Manatee in Manatee County, Florida. We provide the following comments in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*) and the Marine Mammal Protection Act of 1972, (MMPA) as amended (16 U.S.C. 1461 *et seq.*).

We provide our comments on the effects of the proposed project on the eastern indigo snake (*Drymarchon corais couperi*), the wood stork (*Mycteria americana*), the West Indian (Florida) manatee (*Trichechus manatus latirostris*), and the nesting and hatchling loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) sea turtle.

Eastern indigo snakes may occupy a broad range of habitats from scrub and sandhill communities, to wet prairies and swamps, near the proposed project site. The eastern indigo snake is most strongly associated with high, dry, well-drained sandy soils, and closely parallels habitat preferred by the gopher tortoise (*Gopherus polyphemus*), a state of Florida listed species. The applicant mentioned in the DEIS that the Service's Standard Protection Measures for the Eastern Indigo snake will be implemented during the construction phase of the project. Those measures can be found at the Service's Jacksonville Ecological Service Field Office website at http://northflorida.fws.gov/IndigoSnakes/east-indigo-snake-measures-071299.htm.

The wood stork was observed foraging in the proposed construction area during recent surveys. There are three rookeries within 15 miles of the wetlands that will be impacted by the proposed project construction. The presence of emergent, scrub-shrub, and forested wetlands within the project footprint, as well as roadside ditches, represent potential foraging within the Core Foraging Area (CFA) for this species. A major factor in the decline of wood storks has been the loss and degradation of feeding habitat. Based on this information, we recommend that the applicant replace

1. The proposed action would not cross known wood stork feeding habitat or known rookeries. Please see the impact discussion in Section 4.2.1.4, and Section 4.11 for mitigation and monitoring discussions for the terrestrial portion of the project.



unavoidable wetland impacts to wood stork foraging habitat with an equal amount of in-kind wetland replacement having functions and values equal to those of the affected habitats within the CFA of this species. 1

The project may have short-term, direct impacts on manatees as a result of increased boat traffic associated with construction. Direct effects include potential harm or harassment of manatees during construction activities. Indirect effects include the effect of the increased boat traffic on manatee movement, feeding, and travel patterns since sea grass beds are located both to the north and south of the shipping channel to Port Manatee. Manatee presence is generally documented in the project area through a carcass salvage program. One hundred and twenty-six manatee carcasses have been recovered in the county since 1976. Review of the State of Florida's manatee carcass salvage (mortality) database revealed that form 1974 through 2007; thirty manatees were killed in Manatee County due to watercraft death. To reduce direct construction-related effects to the manatee, the Service recommends the *Standard Manatee Conditions for In-Water Work* (2005 revision) as part of any permit issued for the proposed project. 2

The lighting associated with this project's construction may affect nesting and hatching sea turtles adjacent to the shoreline where the construction will occur. Artificial lighting can be detrimental to sea turtles in several ways. Field observations have shown a correlation between lighted beaches and reduced sea turtle nesting. Adult females rely on visual brightness cues to find their way back to the ocean after nesting, those turtles that nest on lighted beaches may be disoriented by artificial lights and have difficulty finding their way back to the ocean.

Under natural conditions, hatchling sea turtles, which typically emerge from nests at night, move toward the brightest, most open horizon, which is over the ocean. However, when bright light sources are visible on the beach, they become the brightest spot on the horizon and attract hatchlings in the wrong direction, making them more vulnerable to predators, desiccation, entrapment in debris or vegetation, and exhaustion, and often luring them onto roadways and parking lots where they are run over. Artificial lights can also disorient hatchlings once they reach the water. 3

The Service recommends that a 'Light Management Plan' be implemented during the construction phase of the Port Dolphin LLC Liquefied Natural Gas (LNG) Deepwater Port. The Service requests to review this plan prior to the commencement of this project. 4

The Service appreciates your cooperation. We like forward to working with you and your staff regarding the Port Dolphin LLC Liquefied Natural Gas (LNG) Deepwater Port License Application. For further coordination please contact Ann Marie Lauritsen at (904) 525-0661.

Sincerely,

David L. Hankla
Field Supervisor

Cc: Stephanie Nash- FWS/RO

2. This recommendation has been added to Section 4.11 of the EIS.

3. Potential impacts on turtle hatchlings from construction lighting are addressed in Section 4.2.1.3 of the EIS.

4. This recommendation is included in Section 4.11 of the EIS.

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From: prvs=Jarvis.Abbott=022dbea34@mms.gov
[mailto:prvs=Jarvis.Abbott=022dbea34@mms.gov] On Behalf Of Abbott, Jarvis
Sent: Friday, May 23, 2008 4:17 PM
To: Martin, Raymond
Cc: Webb, James L; Slitor, Doug; Moore, David M.; Richardson, Ed
Subject: Port Dolphin DEIS Review Comments - MMS

Ray,

Attached to this message are the comments from the MMS reviewers regarding the Port Dolphin DEIS delivered to coincide with the June 2nd deadline. The comments contained within represent MMS' experienced, expert opinion on environmental concerns in the proposed project areas.

Also please note the various citations of MMS Notice to Lessees (NTL) documents. The MMS understands that LNG DWP applicants are not lessees and fall under the regulatory authority of the Maritime Administration; however, MMS published NTLs represent a useful source of information for potential DWP applicants to ensure that their planned activities are carried out using MMS recognized best practices for operating in the offshore environment. 1

For example, NTL No. 2005-G07 provides guidance on MMS regulations regarding archaeological discoveries, and deepwater survey requirements. I believe applicants who conduct their required surveys according to the guidance issued in this document should generally find themselves on the right side of the National Historic Preservation Act (NHPA) and with the appropriate information to apply for a pipeline ROW grant for DWP associated pipelines included in their EIS documentation.

Jarvis B. Abbott
Petroleum Engineer
Department of the Interior
Minerals Management Service
381 Elden St., MS - 4023
Herndon, VA 20170
jarvis.abbott@mms.gov
703.787.1866

1. Thank you for your comment. The Maritime Administration and USCG value MMS expertise and appreciate MMS cooperation on this project.

Matrix for Suggested Changes to Port Dolphin Draft EIS

Received from Minerals Management Service on May 23, 2008

	Section	Page	Line	Reviewer (initials)	Comment
1.	General Comment			GEdR	This Draft EIS review concentrated on the offshore aspects of the proposed Port Dolphin deepwater port project.
2.	General Comment			TG	Migratory birds were discussed and the possible impacts. Migratory bats should also be discussed with potential, if any, impacts.
3.	General Comment			GSB	All of my comments on the Interim DEIS still stand. The ones that could have had responses or changes in the Interim DEIS were not addressed in the new Draft EIS. I will restate parts of those that need repeating. Overall, this project is proposing to cause substantial impacts to hard bottom (live bottom) communities in Federal waters offshore of St. Petersburg Florida. In Table 4.2-1, long-term impacts on a total of 2,137 acres of various types of hard bottom communities are anticipated. This is a far greater impact than the entirety of the eastern portion of the Gulfstream pipeline, but this project currently has no attached mitigations I am aware of. The MMS Live Bottom (low relief) stipulation (in NTL 2004-G05) applies in the eastern Gulf for all areas shallower than 100 m and also applies to right-of-way pipeline installation, specifically states, "all bottom disturbances from right-of way pipeline construction activities are limited in the same manner as bottom disturbances occurring from lease operations." And further states, If it is determined that live-bottom areas might be adversely impacted by the proposed activity, then the RD will require the lessee to undertake any measure deemed economically, environmentally, and technically feasible to protect live bottom areas. The Gulfstream pipeline was required to use midline buoys on anchor cables used for the plowing operation that was said to reduce impacted areas due to cable sweep 93% from 3,764 acres down to 254 acres. It is suggested that this mitigation be required for this pipeline installation as

1. Comment noted.

2. Comment noted.

3. The applicant is consulting with USCG and the Maritime Administration to develop appropriate mitigation plans and additional geophysical surveys. Additionally, video mapping results from the Gulfstream Pipeline Project EIS (2001) are being compiled to augment the predicted benthic impacts, as appropriate. All available data, will be used to specify mitigation type, extent, duration, and schedule. The referenced NTL has been included in the discussion of BMPs and mitigation measures in Section 4.11. The Applicant has committed to use of midline buoys and other measures to reduce impacts to hardbottom areas as described in Section 4.2.1.6 and 4.11. Construction details, including the use of plows or other pipeline construction processes, were submitted by the Applicant in December 2008. The documents are available via the Federal Docket Management System (www.regulations.gov), Docket No. USCG-2007-28532.

	Section	Page	Line	Reviewer (initials)	Comment
					well. The State of Florida also required extensive artificial reef mitigation as well as monitoring of the effectiveness of various configurations of artificial reefs to mitigate for the destruction of live bottom by plowing and anchoring. While MMS was not necessarily supportive of this mitigation, we did want to see results from monitoring of anchor scar and plow trench recovery of impacted hard bottom areas. Results from that requirement for the Gulfstream pipeline have yet to be received and MMS still lacks basic information on recovery rates of low relief live bottom impacts. This is also suggested as a mitigation for the Port Dolphin pipeline installation. There is still no commitment as to what kind of trenching method will be used. This could make a huge difference in how much impact to live bottoms there will be. The section describing physical impacts to benthic communities is extremely brief. Maps are on a very large scale and there is no way to determine the accuracy of impact estimates. There is no obvious documentation of the impacts from anchor cable sweep separated from direct anchor impacts. Again, the use of a plow experienced extensive problems in the Gulfstream project and long portions of the pipeline that required burial remained either partially or fully exposed above the seabed due to the ineffectiveness of the plow in hard carbonate substrates (the same as will be experienced offshore St Petersburg).
4.	Executive Summary	ES-7	21 & 22	GEdR	The Draft EIS states, "Benthic communities would be expected to recover quickly by recolonization from surrounding communities of similar organisms." This is only partially true. Benthic communities will be adversely affected by the sweep of the mooring systems for the two buoys and the flexible riser. Recolonization is not likely to occur in these areas because of the constant disturbance of the sea bottom.

4. Discussion of benthic impacts was revised to match the impact discussion in Section 4.2.1.6. The text was deleted regarding recovery. Statement clarified to meet intent of comment.

	Section	Page	Line	Reviewer (initials)	Comment
5.	Executive Summary	Executive Summary ES-9	1 Mitigation	LH	Add some discussion of mitigation for wetland crossings and how the mitigation will be monitored, evaluated and maintained. Also, add this info to mitigation section of the report.
6.	Executive Summary	ES-10	37 through 40	GEdR	Please include monitoring requirements along with the mitigation requirements that the applicant must perform to comply with the license.
7.	Cumulative	ES-11	7	LH	Add discussion of any cumulative affect of vessel traffic erosion on wetland resources. Make appropriate changes in section 6 to support this discussion.
8.	Executive Summary	ES-11	11 through 13	GEdR	The MMS wants to have the opportunity to participate in the environmental monitoring program developed in consultation with NMFS. The program would include preconstruction/baseline monitoring and operational monitoring aimed at identifying potential effects and developing procedures to minimize adverse impacts. Likewise, the MMS wants to receive and review the data collected from the program's studies and to review the subsequent reports.
9.	Executive Summary	ES-11	19 through 33	GEdR	Please include "ramping up" of machinery as a mitigative measure for noise abatement. This may give time for biota to leave or avoid the area that is adversely affected by noise from construction, operation, and decommissioning activities.
10.	Executive Summary	ES-9 & ES-17	ES-9: 42 & 43 ES-17: 14 & 15	GEdR	There is an inconsistency in the Draft EIS. At page ES-9, the document states, "An Independent Risk Assessment for the Project estimated the maximum thermal radiation distance to be 1,935 m (1.2 mi)." While at page ES-17, the Draft EIS states, "An Independent Risk Assessment for the Project estimated the maximum thermal radiation distance to be 7,330 m (4.6 mi)." This inconsistency needs to be resolved and the text appropriately modified.

5. Mitigation, monitoring, and BMPs are discussed in Section 4.11. The Applicant would be required to follow FERC Certificate requirements including wetland crossing techniques.

6. Specific monitoring requirements would be developed after a license is issued. The License issued by the Maritime Administration would include an Operations Manual and Facility Security Plan from the Applicant. The Operations Manual and Facility security plan will have to be approved by the Coast Guard and will include mitigation measures for all the hazards discussed and identified by the stakeholders. The local USCG Sector will inspect and monitor.

7. Increased erosion to onshore wetlands from vessel traffic from the Port Dolphin Project would be negligible to minor. Current and proposed LNG projects in the GOM are located off the coast of Louisiana and Alabama and not expected to impact the onshore wetlands in the Port Dolphin Project. Section 6.3.4 provides a discussion of these impacts.

8. Comment Noted.

9. Text added per comment. Ramping up of machinery is considered a Best Management Practice and part of project design.

10. Text modified in the Executive Summary per comment to reflect a bounding case pool fire distance of 4,500 m with a heat flux > 5kW/m^2.

	Section	Page	Line	Reviewer (initials)	Comment
11.	1.2	1-4	22 23 24 25	BLJ	Change "The adjacent coastal state to which the deepwater port is to be directly connected by pipeline has developed, or is making at the time the application is submitted, reasonable progress, toward developing an approved coastal zone management program pursuant to the Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. 1451 et seq.)." To "The adjacent coastal state, the State of Florida, to which the deepwater port is to be directly connected by pipeline has an approved coastal zone management program pursuant to the Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. 1451 et seq.)."
12.	1.2.1 Increasing Demand for Natural Gas	1-6	17 & 18	GEdR	The Draft EIS states, "Lower 48 states offshore natural gas production is projected to decrease." From the Gulf of Mexico perspective, it is true that shallow water gas production has declined recently. However, several large deepwater gas projects such as the Independence Hub have begun production. These projects will offset some of the decline in the Gulf's shallow water natural gas production. The MMS is also providing incentives to develop shallow water, deep gas prospects that will assist in increasing gas production from the Region.
13.	1.4	1-10	30	ALJ	This EIS assesses potential environmental impacts associated with the installation, operation, and decommissioning of the Port. Shouldn't the EIS mention that it assess the potential impacts associated with a ROW pipeline associated with the Port?
14.	1.5	1-12	11-12	ALJ	FERC 02/11/08 NOI was for the onshore portion of the pipeline ROW and related facilities, however Table 1.6-1 (page 1-13) indicates FERC is responsible for construction, installation, own, operate, and maintain a pipeline. Is this just for the onshore portion? What about MMS's duty to permit the offshore portion of the pipeline? It does not indicate that MMS will issue a ROW permit for the offshore portion of the pipeline.

11. Text is quoted from the Deepwater Port Act and cannot be changed.

12. The discussion of domestic gas supply has been updated to include the most recent projections by EIA. See Section 1.2.

13. "Port" changed to "project".

14. The Maritime Administration and USCG have requested input from cooperating agencies, including MMS, and have incorporated information received as appropriate. However, for a deepwater port, a pipeline ROW issued by MMS is not required.

	Section	Page	Line	Reviewer (initials)	Comment
15.	2	2-1	2-13	ALJ	Once again, the EIS fails to mention that impacts associated with the installation and maintenance of a 36-inch transmission pipeline is part of the proposed action.
16.	Criterion 4, Avoidance of Ocean Dredged Material Disposal Sites.	2-17	12	GEdR	The Draft EIS states, "Siting a project in an identified dredged material disposal site would be difficult, and likely would not be approved by MMS." Please change the reference from the MMS in this sentence to the Corps of Engineers (COE) in coordination with the US EPA. Permits for the ocean dumping of dredged materials are issued by the COE subject to the US EPA approval (Marine Protection, Research and Sanctuaries Act, Section 103).
17.	2.1.1.3	2-17	29, 33, 38	ALJ	Instead of saying "MMS lease blocks", the EIS should refer to the Blocks as, "MMS OCS blocks" or "OCS blocks" or "St. Petersburg Blocks 190, 233, etc".
18.	2	2-20		GSB	Comment for this table was not addressed. It would seem that avoidance of live bottom areas would be a "Selection Criteria," particularly when there is a "proposed" anchor handling plan that is intended for "judicious anchor placement" described on page 4-13. This appears to be a proposal and no details or commitments are indicated.
19.	2.1.2.1 Energy Source Alter-natives	2-27 through 2-29	Whole Section	GEdR	There is no discussion on the use of ocean currents as an energy source alterative. Add a section to the Final EIS that discusses this alterative. Note in the "new section" that the MMS has the responsibility for Alternate Energy Uses on the OCS (Energy Policy Act of 2005 – Public Law 1098-58).
20.	Various Sections	Various Pages	Various Lines	GEdR	There are inconsistencies in the Draft EIS regarding the MMS blocks that will be affected by the proposed port's location. Correct the location description throughout the document. Here are examples. In the Abstract, the Draft EIS states, "Abstract: Port Dolphin Energy LLC, proposes to own, construct, and operate a deepwater port, named Port Dolphin, in the Federal waters of the Outer Continental Shelf in lease blocks designated by the Minerals Management Service as St.

15. The second paragraph to the introductory project descriptions includes the pipeline description. Please see Section 2.1.1.3 for a detailed description of the proposed port locations and pipeline route alternatives, and Section 4 for impacts for the pipeline and alternatives.

16. Text changed per comment.

17. Text changed to "MMS PB blocks" per comment.

18. Comment noted. See Section 4.2.1.6 for a discussion of impacts on hardbottom areas for each alternative.

19. The discussion in Section 2.1.2.1, *Energy Source Alternatives,* is limited to alternatives that are currently commercially available. According to a technology White Paper on Wave Energy Potential in the US OCS, May 2006 (available at http:ocsenergy.anl.gov), the technologies that capture energy from waves are still being developed, and are not ready for commercial application. Therefore, no change to text has been made.

20. Global change to document: "…MMS St. Petersburg (PB) blocks: PB545, PB546, PB547, PB548, PB504, PB505, PB506, PB507, PB463, and PB589 (See **Figure 2.2-4)**."

	Section	Page	Line	Reviewer (initials)	Comment
					Petersburg (PB) blocks: PB545, PB589, and PB590." From the maps/diagrams on various pages, it appears that the port will affect PB 545, PB 589, and PB 590. In the Description of the Proposed Action (page ES-4), the Draft EIS states, "The Port would be located in areas designated by the U.S. Department of the Interior (DOI) Minerals Management Service (MMS) as Lease Blocks St. Petersburg (PB) 546 and PB589." In the Overview (page 2-30), the Draft EIS states, "The Applicant proposes to construct, own, and operate a deepwater port, named Port Dolphin, in the Federal waters of the OCS in St. Petersburg blocks PB545 and PB589, …" In the Lease Blocks and Overall Site Plan (page 2-34), the Draft EIS states, "The Port unloading buoys would be in MMS lease blocks PB545, PB546, and PB589." Table 2.3-1, Proposed Action Lease Block Information Description OCS Area OCS Lease Blocks, shows the following locations: North Unloading Buoy St. Petersburg 589 South Unloading Buoy St. Petersburg 545 and 546
21.	2.3.2	2-34	36, 39, 42	ALJ	When identifying OCS blocks, especially for this project, it would be useful to a complete identifier i.e., St. Petersburg (PB) Area (NG 17-01) Blocks 545, 546, etc instead of "MMS lease blocks PB545, PB546, and PB589." This should be indicated the first time the PB Block(s) is mentioned.

21. Comment noted; See **Figure 2.2-4.**

	Section	Page	Line	Reviewer (initials)	Comment
22.	2.3.8 Pipelines	2-46	3	JES	Construction corridor of 3000 ft. may not be wide enough to account for typical anchor spread of lay vessels. If the survey extends only 1500 ft. to each side of the pipeline, all bottom disturbances must be kept within that area. "As placed" survey plats should be required to show the actual occurrence of bottom disturbances.
23.	Figure 2.3-8	2-46		JES	Text in this figure is far too small. All text should be a minimum of 10 pt equivalent.
24.	Figure 2.3-9	2-47		JES	Text in this figure is far too small. All text should be a minimum of 10 pt equivalent.
25.	2.3.8 Pipeline Crossing	2-47	4	JES	This sentence needs clarification, "The easternmost crossing would be 898 m (2,947 feet), and the westernmost crossing would be 407 m (1,335 feet)." What are these measurements? Distance from some point of origin? Location markers?
26.	Offshore Pre-construction Activities	2-53	30 through 40	GEdR	• The MMS would like to be involved in the following activities: • Review of the applicant's construction plan • Review of the geotechnical and hazard surveys • Evaluation of FMV and clearance of the project footprint (including project pipelines); issuance of the MMS Segment Number, clearance letter, or other evidence that the project does not conflict with planned or existing OCSLA regulated facilities or activities. • Review of detailed construction procedures • Review of the pre-lay survey of pipeline routes and review of the anchor placement plans
27.	2.3-11	2.53	34	ALJ	There is no mentioning of MMS issuing a ROW permit for the offshore portion of the pipeline.

22. The Applicant has developed an anchor plan, and has surveyed proposed anchor placement locations. Potential impacts are discussed in Section 4.2.1.6.

23. Figures have been modified to improve readability. Full-sized figures are available electronically via the Federal Docket Management System (*www.regulations.gov*), Docket No. USCG-2007-28532

24. Figures have been modified to improve readability. Full-sized figures are available electronically via the Federal Docket Management System (*www.regulations.gov*), Docket No. USCG-2007-28532

25. The text has been clarified to more fully describe the HDD offshore crossing locations.

26. Comment noted.

27. The Maritime Administration and USCG have requested input from cooperating agencies, including MMS, and have incorporated information received as appropriate. However, for a deepwater port, a pipeline ROW issued by MMS is not required.

	Section	Page	Line	Reviewer (initials)	Comment
28.	Offshore Construction Sequence	2-54	Whole Section	GEdR	The USCG and MARAD must require the applicant to conduct post-pipeline lay surveys – commonly called "as-built" surveys. This allows the regulating agencies to know the exact locations of the pipelines at the time of their construction and installation. This is also essential to ensure adherence to the mandated mitigative measures during the pipelines' installations. This must be a condition for the license. See the MMS' NTL No. 98-09, Proposed and As-Built Pipeline Location Data (effective date: August 10, 1998).
29.	Gulf of Mexico: Water	3-6	18	GEdR	Please change the term "dead zones" to "anoxic zones." This is in keeping with the scientific terms of low oxygen concentrations in the seawater. Then explain the term anoxic in the document.
30.	3.2.3.1	3-14	43	TG	Are there any recent surveys of the Florida manatee populations? The one indicated was based on 1995 aerial survey.
31.	Threatened & End. Fish Species	3-23	After line 33 add Gulf Sturgeon section	LH	Primarily historic sightings but check for current near shore occurrence or habitat. Just note that this is part of historic range but no designated critical habitat. See note on #8 below
32.	3.2.4 Benthic Resources	3-26	34	JES	"Benthos" can refer to both the substrate and the organisms that live on it. "Benthic communities" would only refer to the organisms. Description of benthic habitat in the rest of the paragraph is excellent.
33.	3.2.4 Benthic Resources	3-27	8 – 13	JES	Is "Inner Shelf Live Bottom Assemblage I" different from "Inner and Middle Shelf Live Bottom I"? Should this be "II" or did you leave out the description of the third assemblage? Looks like there are two assemblages described using four different names in this short paragraph. Clarify.
34.	3.2.4 Benthic Resources	3-27	8 – 13	JES	The characterization of these assemblages is important to the site description. Two sentences about each assemblage seems inadequate. Consider expanding this description.

28. The Maritime Administration and USCG would require the Applicant to follow the Best Management Practices for operating in the offshore environment. See section 4.11.6 for discussion of MMS recommended mitigation and monitoring measures.

29. No change to text.

30. Text revised to include Synoptic Survey data through 2008.

31. Text revised per comment.

32. Text revised per comment.

33. Text revised per comment.

34. Discussion has been expanded per the comment.

	Section	Page	Line	Reviewer (initials)	Comment
35.	3.2.4 Benthic Resources	3-28	24	JES	The info given does not show "less than 6 percent" of non-algal cover. If you use the smallest percent of cover (20%) described for habitat Type A and multiply it by the smallest percent of non-algal cover (100% - 68% = 32%), the result is 6.4%. In other words, this is the minimum non-algal benthic cover found, not representative.
36.	3.2.5	Many		TG/CR	Information on Marine Mammals, particularly endangered marine mammals, is very outdated. Viada 2000 is the sole reference for this section and that is 8 years old. Several of the species rarely seen have been sighted in the Gulf since Viada's records so accounts of sightings are incorrect. Since NMFS does an annual abundance estimate, those data can be easily obtained.
37.	3.3 Cultural Resources 3.3.1 Definitions of a Resource	3-65	3 & 4	GEdR	The correct citing for the MMS' NTL regarding the list of blocks requiring archaeological surveys is Revision to the List of OCS Lease Blocks, Requiring Archaeological Resource Surveys, NTL No. 2006-G07 (not NTL No. 2007-G01 as stated in the Draft EIS). The MMS' latest NTL regarding the Shallow Hazards Program is NTL No. 2008-G05. Please change the text in all locations where this reference occurs in the Draft EIS.
38.	3.3.1	3-65	4	JBI	Shallow hazard NTL still incorrectly listed as 98-20. Should read 2007-G01
39.	3.3.2	3-67	18	JBI	Should read Alternate Route Sonar Contact 10, not 1. See survey report p. 18 and Sidescan Sonar Contact Table, which is described as shipwreck-like debris.
40.	3.4.1.	3-70	2-4	ALJ	One distinguishing component of soil isn't included in this definition of Soil: i.e., organics or organic material.
41.	3.4.3.1 Southern Site and Route Geology	3-80	Whole Section	GEdR	If the Southern Site and Route is selected for installation, additional shallow hazard surveys and analyses must be required of the applicant. This alternate pipeline routing is not adequately assessed or evaluated in the Draft EIS.

35. Text revised to clarify.

36. The marine mammal discussion has been updated and the discussion expanded, see Section 3.2.4 .1 and 3.2.6.

37. Text changed per comment.

38. Text changed per comment.

39. Text changed per comment.

40. Text revised to add organic material to physical soil characteristics, see Section 3.4.1.

41. If the Southern Site and Route were used then additional surveys and studies would be required as necessary to evaluate existing conditions and potential impacts associated with implementation of the project along that alignment.

	Section	Page	Line	Reviewer (initials)	Comment
42.	Sediments	3-81	11 through 13	GEdR	The Draft EIS suggest that there may be strong currents along the proposed southern pipeline route evidenced by sand waves or ridges. The USCG must ensure that if this alternative is selected, the pipelines will be monitored for scour. The concern is that the scour could lead to spanning of the pipeline. Remedial actions would be required of the licensee.
43.	Geologic Hazards	3-81	30 through 32	GEdR	The MMS is concerned that areas to the south of the proposed pipeline route (and the alternative southern route) on the 14-inch pipeline segment could be candidate sites for future mining of sandy sediments. The location of the pipeline in these areas could interfere with potential mining operations.
44.	3.4.3.1.	3-81	30-32	ALJ	I'm not sure why reference is made to the 14-inch PL segment. What 14-inch PL segment?
45.	3.5 Marine Areas and Land Use: 3.5.1 Definition of the Resource	3-87	This Section	GEdR	The MMS provides guidance to all OCS Right-of-Way applicants in its NTL No. 2007-G20, Coastal Zone Management Program Requirements for OCS Right-of-way Pipeline Applications (effective date: May 25, 2007). The applicant should be required to adhere to this NTL.
46.	3.5 Marine Areas and Land Use: 3.5.1 Definition of the Resource	3-87	This Section	GEdR	The MMS has the responsibility for Alternate Energy Uses on the OCS (Energy Policy Act of 2005 – Public Law 1098-58). This mandated responsibility should be addressed in this section as well.
47.	3.5.1.	3-87	25	ALJ	This could be correct but the wording is different. Also, should include ROW permits as well as lease blocks.
48.	3.5.2 Marine Areas	3-88	9	GEdR	The MMS is also responsibility for Alternate Energy Uses on the OCS (Energy Policy Act of 2005 – Public Law 1098-58).

42. Comment noted. If the Southern Site and Route were used then additional surveys and studies would be required as necessary to evaluate existing conditions and potential impacts associated with implementation of the project along that alignment.

43. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are discussed in Sections 3.4 and 4.4.

44. Text revised to remove the 14-inch pipeline segment.

45. The Maritime Administration and USCG would require the Applicant to follow the Best Management Practices for operating in the offshore environment. See section 4.11.6 for discussion of MMS recommended mitigation and monitoring measures.

46. Text changed per comment.

47. The Maritime Administration and USCG would require the Applicant to follow the Best Management Practices for operating in the offshore environment. See section 4.11.6 for discussion of MMS recommended mitigation and monitoring measures.

48. Text changed per comment.

	Section	Page	Line	Reviewer (initials)	Comment
49.	3.5.2.1 Lease Blocks	3-88	This Section	GEdR	It is worthy to note that there is a moratorium on certain activities in a portion of the Eastern Planning Area of the Gulf of Mexico. The Gulf of Mexico Energy Security Act (GOMESA) established a moratorium (until June 30, 2022) on leasing, pre-leasing, and other activities in defined areas within the eastern Gulf.
50.	3.5.2.1.	3-88	16-18	ALJ	An oil and gas lease sale does not begin with the reading of sealed bids; That's one of the last steps. Each oil and gas Lease sale goes through the NEPA process first. The referenced blocks are within 100 miles of Florida's (west) coastline and are not subject to being leased at this time. Additionally, the St. Petersburg blocks that the proposed pipeline would traverse should be included in the listing of blocks potentially affected by the proposed action and not just the blocks potentially impacted by the LNG Port.
51.	3.5.3 Coastal Zone Manage-ment Areas	3-89	This Section	GEdR	The MMS provides guidance to all OCS Right-of-Way applicants in its NTL No. 2007-G20, Coastal Zone Management Program Requirements for OCS Right-of-way Pipeline Applications (effective date: May 25, 2007). The applicant should be required to adhere to this NTL.
52.	3.5.3	3-89	18 18	BLJ	Change "Florida CZM" to "FDEP" Change "determination" to "concurrence, objection, or request for an extension"
53.	4.1 Water Resources	4-4	1	GEdR	Please add the following words, "gauging and" (it appears in italics in the following sentence) to the narrative in the EIS, "…the discharges of water from gauging and hydrostatic testing of the pipelines; …."
54.	4.1 Water Resources	4-4	4	GEdR	The Draft EIS states, "The offshore portion of the Project would not degrade marine water quality …." This is not true. During construction, the marine water quality will be adversely affected from the temporary re-suspension of sediments and the resulting increases in turbidity in the water column. Please change the text.
55.	4.1.1 Con-struction Impacts	4-4	14	GEdR	Please add the following word and punctuation, ", gauging," (it appears in italics in the following sentence) to the narrative in the EIS, "Installation, gauging, and hydrostatic testing of the pipeline…."

49. Text changed to meet intent of comment.

50. Text revised to "It is possible that MMS could lease the blocks traversed by the project should a license be granted and the lease blocks receive a bid (see **Figure 2.2-4**)."

51. The Maritime Administration and USCG would require the Applicant to follow the Best Management Practices for operating in the offshore environment. See section 4.11.6 for discussion of MMS recommended mitigation and monitoring measures.

52. Text revised per comment.

53. Text changed per comment.

54. Text changed to state that the degradation of marine water quality during offshore construction affected from the temporary resuspension of sediments and the resulting increase in turbidity column would be minimal.

55. Text changed per comment.

	Section	Page	Line	Reviewer (initials)	Comment
56.	Proposed Pipeline Route Location	4-5	36 & 37	GEdR	The Draft EIS states, "Sediment suspension modeling for mooring line sweep, which would occur routinely during operations, was not been completed by the Applicant." This discussion seems to be out of place. The text is discussing the pipeline impacts. However, since this seafloor disturbance will occur throughout the life of the project, the US Coast Guard should require appropriate modeling of the mooring line sweeps.
57.	4.1.3 Decommis-sioning 2 4.1.3.1 Offshore Impacts	4-12	Whole Section	GEdR	The US Coast Guard should require all equipment imbedded in the seafloor to be severed at least 5 meters below the mud line and removed. The MMS has specific requirements to abandon pipelines. The applicant must be required to comply with them. For example, the ends of the abandoned pipeline must be recovered to preclude interference with futures uses on the OCS. The Draft EIS did not include this requirement in the text. The text should be revised in the EIS to include this requirement.
58.	4.2.1.1 General Impacts Dis-cussion Con-struction Impacts Seafloor Dis-turbance	4-13	39 & 40	GEdR	The Draft EIS states, "…by judicious anchor placement during the first pass offers the greatest potential for further reduction of live bottom impact area." The US Coast Guard should require the applicant to adhere to an anchor placement plan that minimizes the adverse effects to the live bottom areas.
59.	Vessel Traffic	4-16	Whole Section	GEdR	It is appropriate to require the applicant to adhere to the MMS' NTL No. 2007-G04, Vessel Strike Avoidance and Injured/Dead Protected Species Reporting. The text in the EIS should be revised to reflect this requirement.

56. The out of place paragraph has been incorporated into Section 4.1.2.1, SRV Mooring. The sediment suspension modeling for the mooring line sweep has been obtained and incorporated.

57. The Maritime Administration and USCG would require the Applicant to follow the Best Management Practices for operating in the offshore environment. See section 4.11.6 for discussion of MMS recommended mitigation and monitoring measures.

58. The applicant is currently involved in consultation with USCG and the Maritime Administration to develop appropriate mitigation plans and additional geophysical surveys. Additionally, video mapping results from the Gulfstream Pipeline Project EIS (2001) are being compiled to augment the predicted benthic impacts, as appropriate. All available data will be used to specify mitigation type, extent, duration, and schedule. The referenced NTL has been included in the discussion of BMPs and mitigation measures in Section 4.11. The Applicant has committed to use of midline buoys and other measures to reduce impacts to hardbottom areas as described in Section 4.2.1.6 and 4.11. Construction details, including the use of plows or other pipeline construction processes, were submitted by the Applicant in December 2008. The documents are available via the Federal Docket Management System (www.regulations.gov), Docket No. USCG-2007-28532.

59. Text revised per comment. The Maritime Administration and USCG would require the Applicant to follow the Best Management Practices for operating in the offshore environment. See section 4.11.6 for discussion of MMS recommended mitigation and monitoring measures.

	Section	Page	Line	Reviewer (initials)	Comment
60.	Noise	4-17	Whole Section	GEdR	Noise will also emanate from helicopters that may be used during the construction and operational life of the project. There should be a discussion of this noise source in the EIS.
61.	Oper-ations Impacts: Seafloor dis-turbance	4-18	42 through 44	GEdR	There is an inconsistency in the Draft EIS. In this section, the Draft EIS states, "Modeling results indicate that continuous anchor sweep would resuspend and deposit the sediments in the immediate vicinity of the chains and that cumulative accumulation of deposited sediment would not occur." However, back on page 4-5, the Draft EIS states, "Sediment suspension modeling for mooring line sweep, which would occur routinely during operations, was not been completed by the Applicant." Has modeling been done or not on the anchor sweep area? The text needs to be appropriately modified.
62.	Marine Debris	4-21	29	GEdR	The MMS has issued NTL No. 2007-G03, Marine Trash and Debris Awareness and Elimination that supersedes NTL 2003-G11. Please revise the text as appropriate.
63.	Decommis-sioning	4-22	11 & 12	GEdR	The MMS has very specific requirement to abandon pipelines in place during decommissioning operations. For example, pipelines must be flushed and filled. A right-of-way grantee cannot just seal and abandon the pipeline in place, as stated in the Draft EIS. See the applicable MMS Operating Regulations at 30 CFR 250.1006.
64.	4.2.1.3			TG	Only marine mammals not sea turtles should be discussed in this section. Similarly, Section 4.2.1.4 should only discuss sea turtles not marine mammals.
65.	Hydro-static Pipeline Integrity Testing	4-24 & 4-25	Whole Section	GEdR	The water use here does not take into consideration the "gauging and cleaning run" prior to the hydrostatic pipeline integrity testing. Revise the section accordingly.
66.	Vessel Traffic	4-25 throug h 4-27	Whole Section	GEdR	It is appropriate to require the applicant to adhere to the MMS' NTL No. 2007-G04, Vessel Strike Avoidance and Injured/Dead Protected Species Reporting. The text in this section of the EIS should be revised to reflect this requirement.

60. No helicopters will be used during construction or operation.

61. Anchor sweep modeling has been completed, and information has been added to the Final EIS, see Section 4.2.1.6.1.

62. Text revised per comment.

63. Text added to specify that specific requirements for decommissioning will conform to requirements in place at that time.

64. Text revised per comment.

65. Text revised per comment.

66. The Maritime Administration and USCG would require the Applicant to follow the Best Management Practices for operating in the offshore environment. See section 4.11.6 for discussion of MMS recommended mitigation and monitoring measures.

	Section	Page	Line	Reviewer (initials)	Comment
67.	Threatened and Endangered Fish Species	p.4-43 section 20	Within section 20	LH	Need to mention that the Tampa Bay/ Port Charlotte area while not designated as critical habitat, was part of the historic range for Gulf sturgeon. Based on USFWS (Paruka, Perscom 2008)information an occasional fish has been captured in the area as recent as 3 years ago. Reference: Paruka , Frank. pers. comm may 2008. US FWS Gulf Sturgeon Recovery Team . Panama City Field Office
68.	4.7.2	4-49	21	CH	'Predicted impacts at Class II receptors are above the SILs for SO2 and PM10.' So how do you resolve or deal with this situation? Use mitigations?
69.	4.2.1.10 Operations Impacts	4-54	37	JES	1° C above ambient?
70.	4.2.1.11 Operations Impacts	4-56	34	JES	1° C above ambient?
71.	4.2.1.12 Appendix F			GSB	While the analysis of SEAMAP plankton data was good, there is little analysis of EFH impacts from installation anywhere in Chapter 4 and it is completely ignored in the EFH Assessment in Appendix F (other than a box in a matrix table). The brief EFH Assessment needs to be referenced in Chapter 4 as well as Chapter 3. The subject of EFH assessment and consultation should be specifically addressed somewhere in the text of the EIS and the four required specific requirements of an EFH Assessment identified; (1) description of the proposed action; (2) description of the action agency's approach to protection of EFH and proposed mitigation, if applicable; (3) description of EFH and managed and associated species in the vicinity of the proposed action; and (4) analysis of the effects of the proposed and cumulative actions on EFH, the managed species, and associated species. The mitigation discussion in Appendix F, page 1-7 make no mention of installation impacts and the long-term impact to 2,137 acres hard bottom

67. Text revised per comment.

68. Impacts above SILs warranted further investigation to ensure compliance with ambient standards. Results of that further investigation are shown in Table 4.7-12 and indicate compliance with applicable standards and increments by a comfortable margin. No mitigation is warranted.

69. Correct. The discharged water would cool from 10°C above ambient water temperature to 1°C above ambient water temperature. Text revised to clarify.

70. Correct. The discharged water would cool from 10°C above ambient water temperature to 1°C above ambient water temperature. Text revised to clarify.

71. Text revised per comment.

	Section	Page	Line	Reviewer (initials)	Comment
72.	Operations Impacts: Seafloor disturbance	4-79	28 through 30	GEdR	The Draft EIS states, "Because the Southern Port Site and the offshore portions of the Alternative Route were not surveyed, the acreage of each habitat type disturbed under this alternative is unknown." Should this alternative be chosen for the port, additional surveys and analyses would be required to evaluate the potential impacts from this choice. A supplemental EIS may be required.
73.	4.3 Cultural Resources 4.3.1 Construction Impacts 4.3.1.1 Offshore	4-80	Whole Section	GEdR	It is essential that the applicant have an anchoring plan and that those individuals that oversee the project be aware of the areas to be avoided by bottom disturbing activities. An "undiscovered resource plan" must also be in place before initiating operations.
74.	4.3 Cultural Resources 4.3.1 Construction Impacts 4.3.1.1 Offshore	4-80 & 4-81	Whole Section	GEdR	The applicant should be required to adhere to the MMS' NTL No. 2005-G07, Archaeological Resource Surveys and Reports (effective date: 1 July 2005).
75.	4.4 Geological Resources	4-83	Whole Section	GEdR	The applicant should be required to adhere to the MMS' NTL No. 2008-G05, Shallow Hazards Program (effective date: 1 May 2008).
76.	5 4.4.1.1 Port Instal-lation			GEdR	Please modify the section to require the applicant to adhere to the provisions found in NTL 2007-G014, Pipeline Risers Subject to the Platform Verification Program. This is an integral part of the overall safety of the facility.

72. If the Southern Site and Route were used then additional surveys and studies would be required as necessary to evaluate existing conditions and potential impacts associated with implementation of the project along that alignment.

73. The Applicant has submitted an anchoring plan with buffer zone, and the Unanticipated Discovery Plan is included in Appendix I.

74. The Maritime Administration and USCG would require the Applicant to follow the Best Management Practices for operating in the offshore environment. See section 4.11.6 for discussion of MMS recommended mitigation and monitoring measures.

75. The Maritime Administration and USCG would require the Applicant to follow the Best Management Practices for operating in the offshore environment. See section 4.11.6 for discussion of MMS recommended mitigation and monitoring measures.

76. The Maritime Administration and USCG would require the Applicant to follow the Best Management Practices for operating in the offshore environment. See section 4.11.6 for discussion of MMS recommended mitigation and monitoring measures.

	Section	Page	Line	Reviewer (initials)	Comment
77.	4.4.1.2 Offshore Pipeline Instal-lation	4-84	Whole Section	GEdR	The applicant should be required to submit an "as built" survey for the pipelines associated with the project. This allows the permitting agencies to know the precise location of the pipelines and if mitigations were adhered to during construction and installation.
78.	4.4.2 Oper-ations Impacts	4-85	Whole Section	GEdR	The US Coast Guard should require the applicant to consider the use of midline buoys for the final design on the port's mooring system. The buoys use would reduce the amount of anchor chain sweep thus minimizing the environmental impacts to the seafloor and biota in the area.
79.	4.4.3 Decommis-sioning	4-86	26 & 27	GEdR	The Draft EIS states, "The underground decommissioning would consist of the removal of any hydrocarbons in the pipe through flushing, filling the pipe with treated freshwater, and capping the ends of the pipe." The applicant must be required to also bury/cover the ends of the pipeline when abandoning the pipelines "in place" to help preclude future interference with other uses of the OCS lands.
80.	4.4.3 Decommis-sioning	4-86	Whole Section	GEdR	The applicant must be required to adhere to the MMS' latest NTL for Structure Removal Operations - NTL No. 2004-G06. In addition, site clearance verification procedures would be required after decommission operations had been done.
81.	4.5.1 Con-struction Impacts	4-87	31	GEdR	Please avoid the term "construction ROW" in the text. A better term may be "construction corridor." The Draft EIS states that the "…construction ROW for the offshore portion for the pipeline is 3,000 feet wide…." In actuality, this is the area affected by the construction and installation operations. A pipeline right-of-way is limited to 200 ft in width – 100 ft either side of the centerline of the pipeline route. As written, the text can be confusing to the readers.
82.	4.7	4-92	18	CH	Air quality impacts associated with the Project are expected to be minor – Very good.
83.	4.7	4-92	6	CH	Construction-related activities/emissions for the pipeline/station facilities do not require Federal regulations. Remark: MMS does regulate construction –related emission activities.
84.	4.7.2	4-99	2	CH	Dispersion Modeling - Provide the version for CALPUFF dispersion model.

77. The Maritime Administration and USCG would require the Applicant to follow the Best Management Practices for operating in the offshore environment. An as built survey is recommended in Section 4.11.6.

78. This mitigation is included in Section 4.11.

79. The Maritime Administration and USCG would require the Applicant to follow the Best Management Practices for operating in the offshore environment. Given that decommissioning would occur 25 years from now, it seems reasonable to expect that technologies for decommissioning and removal, as well as the understanding of impacts on the marine ecosystem, might be different from current conditions. This issue will be addressed at the time of decommission (estimated at 2034), at which time the owner would be required to adhere to all applicable and appropriate requirements. The owner would consult with the appropriate Federal agencies at the time and submit a decommissioning plan to the Secretary for approval.

80. The Maritime Administration and USCG would require the Applicant to follow the Best Management Practices for operating in the offshore environment. See section 4.11.6 for discussion of MMS recommended mitigation and monitoring measures.

81. Text changed throughout the document.

82. Comment noted.

83. Wording modified to clarify the discussion. The intent was to discuss permit requirements and to distinguish between temporary, mobile emission sources and permanent, stationary sources.

84. Versions for CALPUFF and CALMET added.

	Section	Page	Line	Reviewer (initials)	Comment
85.	4.7.2	4-99	2	CH	Mesoscale datasets – Provide the source of the datasets such as where to download these datasets or provide the website for these datasets (MM4 and MM5)
86.	Mitigation and monitoring	4-106	Mitigation and monitoring	LH	Discuss mitigation planning, monitoring , maintenance for wetland crossings for pipelines. Also may want to add table comparing the NWI classifications affected by the proposed and alternative pipeline corridors.
87.	4.11 Mitigation and Minimiza-tion Measures and Mon-itoring	4-132	Whole Section	GEdR	It is essential that the US Coast Guard and MARAD include all mitigation, minimizing measures, and monitoring requirements in the Record of Decision and in the license, should it be granted. The US Coast Guard should make periodic checks on the licensee and its contractors to ensure that the mitigation, minimizing measures and monitoring requirements are being conducted in manner prescribed by the license.
88.	4.11	4-132		ALJ	Quite a few mitigations have been proposed. However, there are some parts of the proposed action that would occur in federal waters that MMS
89.	4.11.2 The Maritime Admin-istration/ USCG-Recom-mended Mitigation Measures	4-142	Whole Section	GEdR	It is essential that the US Coast Guard and MARAD require the licensee to perform an "as built" survey of the pipelines. This requirement should be included in the mitigation section.
90.	4.11.4 NOAA/ NMFS Recommend ations	4-146	Whole Section	GEdR	It is essential that the US Coast Guard and MARAD require the licensee to perform an "as built" survey of the pipelines. This requirement should be included in the mitigation section.

85. These data sets are proprietary and are not available publicly. The datasets can be obtained from the Applicant.

86. Mitigation, monitoring, and BMPs are discussed in Section 4.11. The Applicant would be required to follow FERC Certificate requirements including wetland crossing techniques.

87. Comment noted.

88. Comment submitted was incomplete.

89. An as built survey of project pipelines is recommended in Section 4.11.6.

90. The Maritime Administration and USCG would require the Applicant to follow the Best Management Practices for operating in the offshore environment. See section 4.11.6 for discussion of MMS recommended mitigation and monitoring measures.

	Section	Page	Line	Reviewer (initials)	Comment
91.	5.3.4.1 Deepwater Port	5-6	9 through 11	GEdR	The Draft EIS states, "Construction on the Northeast Gateway Deepwater Port in Massachusetts Bay was initiated in spring 2007 and is anticipated to be operational in the near future." It is my understanding that the NE Gateway DW Port is about to receive its initial cargo delivery. Please revise the text for the Final EIS to recognize the fact that there are now two DW ports that are operational (including the Gulf Gateway DW Port).
92.	4 5.5.1 Marine Safety Standards	5-13	Whole Section	GEdR	The MMS respectfully requests the opportunity to review the proposed port's operations manual before the US Coast Guard makes its final determination on the adequacy of the document.
93.	5.5.2 Naviga-tional Safety Measures	5-15	Add a Section	GEdR	It is appropriate to include another section that discusses the No Anchoring Activity Zone. Though it is likely to be encompassed by the ATBA, a discussion should be provided for the readers. The no anchoring mandate would protect the subsea infrastructure of the proposed deepwater port.
94.	5.6.1 Offshore Pipeline Safety Standards	5-17	Whole Section	GEdR	The applicant should be required to adhere to the MMS' NTL No. 2007-G14, Pipeline Risers Subject to the Platform Verification Program, (effective date: May 7, 2007).
95.	5.6.1 Offshore Pipeline Safety Standards	5-17	22 & 23	GEdR	The MMS would like to have the opportunity to "witness" the hydrostatic testing of the pipelines associated with the proposed port.
96.	5.6.1 Offshore Pipeline Safety Standards	5-17 & 5-18	Whole Section	GEdR	The US Coast Guard and the MMS should reserve the right to conduct announced as well as unannounced inspections on the port's pipelines to ensure the licensee is properly adhering to all of the appropriate safety, maintenance, and operational standards.

91. Text revised per comment.

92. Comment noted.

93. This is discussed in Section 2.3.10, under *Surface Requirements*. No change to text.

94. The Maritime Administration and USCG would require the Applicant to follow the Best Management Practices for operating in the offshore environment. See section 4.11.6 for discussion of MMS recommended mitigation and monitoring measures.

95. Comment noted.

96. Inspection details will be outlined in the Operations Manual if the Project is granted a license.

	Section	Page	Line	Reviewer (initials)	Comment
97.	6.2.1 LNG Projects	6-3	Table 6.2-1	GEdR	This table will need to be undated for the Final EIS.
98.	6.2.4 Oil and Gas Leasing/ Mineral Leasing	6-5	Whole Section	GEdR	Gulf of Mexico Sale 224 was held on 19 March 2008 in New Orleans, LA. The MMS received 58 bids from 6 companies on 36 tracts resulting in $ 64,713,213 in high bids. Also, note that the MMS prepared and disseminated to the public the Gulf of Mexico OCS Oil and Gas Lease Sale 224: Eastern Planning Area, Final Supplemental Environmental Impact Statement (EIS) (MMS, October 2007). Please revise the text for the Final EIS to reflect these changes.
99.	Table 6.3-1. Cumula-tive Impacts on Resources	6-11	Navigation and Transporta tion	GEdR	In the Known Future Actions column of the table, MPEH should also be added to this segment. Both MPEH and BOET should be recognized as known future actions and for their effects on navigation and transportation.
100.	Threat-ened and Endanger-ed Species	6-13	15 & 16	GEdR	By definition in the Endangered Species Act, as amended, harassment as well as "… injury or death…" constitute a "take."
101.	Marine Mammals	6-14	24	GEdR	Please insert the word "operators" in to the following sentence. It should read, "…solid debris from vessels by lessees and operators (emphasis added) by the MMS …."
102.	Sea Turtles	6-15	1 & 2	GEdR	By definition in the Endangered Species Act, as amended, harassment as well as "… injury or death…" constitute a "take."
103.	Sea Turtles	6-15	11	GEdR	Please insert the word "operators" in to the following sentence. It should read, "…solid debris from vessels by lessees and operators (emphasis added) by the MMS …."

97. Table updated as of January 2009.

98. Text revised per comment.

99. MPEH and BOET are considered in the cumulative impacts section, and are included in Table 6.2-1. However, because of their relation to the Port Dolphin as outlined in Figure 6.1-1, no cumulative impacts to transportation and navigation are anticipated.

100. Text revised per comment.

101. Text revised per comment.

102. Text revised per comment.

103. Text revised per comment.

	Section	Page	Line	Reviewer (initials)	Comment
104.	Non-threatened and Non-endanger-ed Marine Mammal.	6-16	25 & 26	GEdR	Harassment as well as "… injury or death …" constitutes a "take" under the MMPA.
105.	Non-threatened and Non-endanger-ed Coastal and Marine Birds	6-16	Whole Section	GEdR	This is an inadequate discussion on the potential cumulative effects on nonthreatened and nonendangered coastal and marine birds. The current discussion in the Draft EIS is one sentence long.
106.	6.4.3 Cultural Resources Offshore Com-ponents	6-25	24 through 26	GEdR	The Draft EIS states, "Avoid by a distance of 250 feet the margins of buried relict fluvial channels in the Port's buoy mooring area in Blocks PB545 and PB589 …." It appears that the mooring system may also impinge into PB 590. This mitigation measure should include the additional block.
107.	6.4.4 Geo-logical Resources	6-26	8 & 9	GEdR	This whole section is one sentence. More discussion is warranted on the potential effects of this topic.
108.	6.4.7 Air Quality	6-26	28 & 29	GEdR	The Draft EIS states, "Construction of the interconnection station would also cause major, short-term, localized impacts on air quality." Since the construction would cause major but short-term, localized effects, more discussion is warranted on the mitigation measures to reduce the potential adverse impacts.

104. Comment noted.

105. The discussion of cumulative impacts on marine and coastal birds has been expanded.

106. Text changed per comment.

107. This discussion of cumulative impacts on geological resources has been expanded.

108. Such impacts are unavoidable, given that in the construction phase there is no "buffer zone" separating emission sources and ambient air. Mitigation measures are discussed in Section 4.11.

	Section	Page	Line	Reviewer (initials)	Comment
109.	6.5 Irrevers-ible and Irretriev-able Commit-ment of Resources	6-27	30 & 31	GEdR	The Draft EIS states, "…building materials for new structures, platforms, and other equipment." The word "platforms" needs to be deleted in this sentence. I could understand lumping the buoys and pipelines under the "new structures" title, but no "platforms" are proposed with this port. This can be confusing to the public because people in the Gulf states think of offshore oil and gas structure as platforms.

109. Text revised per comment.

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Richard B. Russell Federal Building
75 Spring Street, S.W.
Atlanta, Georgia 30303

TAKE PRIDE IN AMERICA

ER 08/450

June 2, 2008

Docket Management Facility (USCG-2007-28532)
U.S. Department of Transportation
West Building, Ground Floor, Room W12-140
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Re: Review of Draft Environmental Impact Statement for the Port Dolphin LNG Deepwater Port License Application (U.S. Coast Guard Docket No. USCG-2007-28532)

Dear Mr. Prescott,

The U.S. Department of Interior has reviewed the U.S. Coast Guard's (USCG) and Maritime Administration's (MARAD) April 2008 Draft Environmental Impact Statement (DEIS) on the Port Dolphin LLC Deepwater Port License Application. Comments were received from the Minerals Management Service and they are presented in the attached comment matrix form.

We thank you for the opportunity to comment. For any questions about the comments you may contact Mr. Dirk Herkhof of the Minerals Management Service at 703-787-1735. I can be reached at 404-331-4524.

Sincerely,

Gregory Hogue
Regional Environmental Officer

Attachment

cc:
Mark A. Prescott, USCG
Raymond W. Martin, USCG
J. F. Bennett, MMS
V.N. Rai, OEPC, Washington, DC

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Comments in this comment response matrix have been responded to as part of the document provided by Mr. Jarvis Abbott, also with DOI MMS. Please see that document for comments and responses.

Comment Matrix for Review of Port Dolphin Draft EIS

	Section	Page	Line	Reviewer (initials)	Comment
1.	General Comment			GEdR	This Draft EIS review concentrated on the offshore aspects of the proposed Port Dolphin deepwater port project.
2.	Executive Summary	ES-7	21-22	GEdR	The Draft EIS states, "Benthic communities would be expected to recover quickly by recolonization from surrounding communities of similar organisms." This is only partially true. Benthic communities will be adversely affected by the sweep of the mooring systems for the two buoys and the flexible riser. Recolonization is not likely to occur in these areas because of the constant disturbance of the sea bottom.
3.	Executive Summary	ES-10	37-40	GEdR	Please include monitoring requirements along with the mitigation requirements that the applicant must perform to comply with the license.
4.	Executive Summary	ES-11	11-13	GEdR	The MMS wants to have the opportunity to participate in the environmental monitoring program developed in consultation with NMFS. The program would include preconstruction/baseline monitoring and operational monitoring aimed at identifying potential effects and developing procedures to minimize adverse impacts. Likewise, the MMS wants to receive and review the data collected from the program's studies and to review the subsequent reports.
5.	Executive Summary	ES-11	29-33	GEdR	Please include "ramping up" of machinery as a mitigative measure for noise abatement. This may give time for biota to leave or avoid the area adversely affected by noise from construction, operation, and decommissioning activities.

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	Section	Page	Line	Reviewer (initials)	Comment
6.	Executive Summary	ES-9 and ES-17	ES-9: 42-43 ES-17: 14-15	GEdR	There is an inconsistency in the Draft EIS. At page ES-9, the document states, "An Independent Risk Assessment for the Project estimated the maximum thermal radiation distance to be 1,935 m (1.2 mi)", while at page ES-17, the Draft EIS states, "An Independent Risk Assessment for the Project estimated the maximum thermal radiation distance to be 7,330 m (4.6 mi)." This inconsistency needs to be resolved and the text appropriately modified.
7.	1.2.1 Increasing Demand for Natural Gas	1-6	17-18	GEdR	The Draft EIS states, "Lower 48 states offshore natural gas production is projected to decrease." From the Gulf of Mexico perspective, it is true that shallow water gas production has declined recently. However, several large deepwater gas projects such as the Independence Hub have begun production. These projects will offset some of the decline in the Gulf's shallow water natural gas production. The MMS is also providing incentives to develop shallow water, deep gas prospects that will assist in increasing gas production from the Region.
8.	Criterion 4, Avoidance of Ocean Dredged Material Disposal Sites.	2-17	11-12	GEdR	The Draft EIS states, "Siting a project in an identified dredged material disposal site would be difficult, and likely would not be approved by MMS." Please change the reference from the MMS in this sentence to the Corps of Engineers (COE) in coordination with the US EPA. Permits for the ocean dumping of dredged materials are issued by the COE subject to the US EPA approval (Marine Protection, Research and Sanctuaries Act, Section 103).
9.	2.1.2.1 Energy Source Alter-natives	2-27 through 2-29	Whole Section	GEdR	There is no discussion on the use of ocean currents as an energy source alterative. We suggest that you add a section to the Final EIS that discusses this alterative. Note in the "new section" that the MMS has the responsibility for Alternate Energy Uses on the OCS (Energy Policy Act of 2005 – Public Law 1098-58).

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	Section	Page	Line	Reviewer (initials)	Comment
10.	Various Sections	Various Pages	Various Lines	GEdR	There are inconsistencies in the Draft EIS regarding the MMS blocks that would be affected by the proposed port's location. Please correct the location description throughout the document. Here are examples. In the Abstract, the Draft EIS states, "**Abstract:** Port Dolphin Energy LLC, proposes to own, construct, and operate a deepwater port, named Port Dolphin, in the Federal waters of the Outer Continental Shelf in lease blocks designated by the Minerals Management Service as St. Petersburg (PB) blocks: PB545, PB589, and PB590." From the maps/diagrams on various pages, it appears that the port will affect PB 545, PB 589, and PB 590. In the Description of the Proposed Action (page ES-4), the Draft EIS states, "The Port would be located in areas designated by the U.S. Department of the Interior (DOI) Minerals Management Service (MMS) as Lease Blocks St. Petersburg (PB) 546 and PB589." In the Overview (page 2-30), the Draft EIS states, "The Applicant proposes to construct, own, and operate a deepwater port, named Port Dolphin, in the Federal waters of the OCS in St. Petersburg blocks PB545 and PB589, …" In the Lease Blocks and Overall Site Plan (page 2-34), the Draft EIS states, "The Port unloading buoys would be in MMS lease blocks PB545, PB546, and PB589." Table 2.3-1, Proposed Action Lease Block Information Description OCS Area OCS Lease Blocks, shows the following locations: North Unloading Buoy St. Petersburg 589 South Unloading Buoy St. Petersburg 545 and 546

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	Section	Page	Line	Reviewer (initials)	Comment
11.	Offshore Precon-struction Activities	2-53	30-40	GEdR	• The MMS would like to be involved in the following activities: • Review of the applicant's construction plan • Review of the geotechnical and hazard surveys • Evaluation of FMV and clearance of the project footprint (including project pipelines); issuance of the MMS Segment Number, clearance letter, or other evidence that the project does not conflict with planned or existing OCSLA regulated facilities or activities. • Review of detailed construction procedures • Review of the pre-lay survey of pipeline routes and review of the anchor placement plans
12.	Offshore Con-struction Sequence	2-54	Whole Section	GEdR	The USCG and MARAD must require the applicant to conduct post-pipeline lay surveys – commonly called "as-built" surveys. This allows the regulating agencies to know the exact locations of the pipelines at the time of their construction and installation. This is also essential to ensure adherence to the mandated mitigative measures during the pipelines' installations. This must be a condition for the license. See the MMS' NTL No. 98-09, *Proposed and As-Built Pipeline Location Data* (effective date: August 10, 1998).
13.	Gulf of Mexico: Water	3-6	18	GEdR	Please change the term "dead zones" to "anoxic zones." This is in keeping with the scientific terms of low oxygen concentrations in the seawater. You should then explain the term anoxic in the document.
14.	3.3 Cultural Resources 3.3.1 Def-initions of a Resource	3-65	3-4	GEdR	The correct citing for the MMS' NTL regarding the list of blocks requiring archaeological surveys is *Revision to the List of OCS Lease Blocks, Requiring Archaeological Resource Surveys,* NTL No. 2006-G07 (not NTL No. 2007-G01 as stated in the Draft EIS). The MMS' latest NTL regarding the *Shallow Hazards Program* is NTL No. 2008-G05. Please change the text in all locations where this reference occurs in the Draft EIS.

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	Section	Page	Line	Reviewer (initials)	Comment
15.	3.4.3.1 Southern Site and Route Geology	3-80	Whole Section	GEdR	If the Southern Site and Route is selected for installation, additional shallow hazard surveys and analyses must be required of the applicant. This alternate pipeline routing is not adequately assessed or evaluated in the Draft EIS.
16.	Sediments	3-81	11-13	GEdR	The Draft EIS suggest that there may be strong currents along the proposed southern pipeline route evidenced by sand waves or ridges. The USCG must ensure that if this alternative is selected, the pipelines will be monitored for scour. The concern is that the scour could lead to spanning of the pipeline. Remedial actions would be required of the licensee.
17.	Geologic Hazards	3-81	30-32	GEdR	The MMS is concerned that areas to the south of the proposed pipeline route (and the alternative southern route) on the 14-inch pipeline segment could be candidate sites for future mining of sandy sediments. The location of the pipeline in these areas could interfere with potential mining operations.
18.	3.5 Marine Areas and Land Use: 3.5.1 Definition of the Resource	3-87	This Section	GEdR	The MMS provides guidance to all OCS Right-of-Way applicants in its NTL No. 2007-G20, *Coastal Zone Management Program Requirements for OCS Right-of-way Pipeline Applications* (effective date: May 25, 2007). The applicant should be required to adhere to this NTL.

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	Section	Page	Line	Reviewer (initials)	Comment
19.	3.5 Marine Areas and Land Use: 3.5.1 Definition of the Resource	3-87	This Section	GEdR	The MMS has the responsibility for Alternate Energy Uses on the OCS (Energy Policy Act of 2005 – Public Law 1098-58). This mandated responsibility should be addressed in this section as well.
20.	3.5.2 Marine Areas	3-88	9	GEdR	The MMS is also responsibility for Alternate Energy Uses on the OCS (Energy Policy Act of 2005 – Public Law 1098-58).
21.	3.5.2.1 Lease Blocks	3-88	This Section	GEdR	It is worthy to note that there is a moratorium on certain activities in a portion of the Eastern Planning Area of the Gulf of Mexico. The Gulf of Mexico Energy Security Act (GOMESA) established a moratorium (until June 30, 2022) on leasing, pre-leasing, and other activities in defined areas within the eastern Gulf.
22.	3.5.3 Coastal Zone Manage-ment Areas	3-89	This Section	GEdR	The MMS provides guidance to all OCS Right-of-Way applicants in its NTL No. 2007-G20, *Coastal Zone Management Program Requirements for OCS Right-of-way Pipeline Applications* (effective date: May 25, 2007). The applicant should be required to adhere to this NTL.
23.	4.1 Water Resources	4-4	1	GEdR	Please add the following words, "gauging and" (it appears in italics in the following sentence) to the narrative in the EIS, "…the discharges of water from *gauging and* hydrostatic testing of the pipelines; …."
24.	4.1 Water Resources	4-4	4	GEdR	The Draft EIS states, "The offshore portion of the Project would not degrade marine water quality …." This is not true. During construction, the marine water quality would be adversely affected from the temporary re-suspension of sediments and the resulting increases in turbidity in the water column. Please change the text.

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	Section	Page	Line	Reviewer (initials)	Comment
25.	4.1.1 Con-struction Impacts	4-4	14	GEdR	Please add the following word and punctuation, ", gauging," (it appears in italics in the following sentence) to the narrative in the EIS, "Installation, *gauging*, and hydrostatic testing of the pipeline…."
26.	Proposed Pipeline Route Location	4-5	36-37	GEdR	The Draft EIS states, "Sediment suspension modeling for mooring line sweep, which would occur routinely during operations, was not been completed by the Applicant." This discussion seems to be out of place. The text is discussing the pipeline impacts. However, since this seafloor disturbance will occur throughout the life of the project, the US Coast Guard should require appropriate modeling of the mooring line sweeps.
27.	4.1.3 Decommis-sioning 2 4.1.3.1 Offshore Impacts	4-12	Whole Section	GEdR	The US Coast Guard should require all equipment imbedded in the seafloor to be severed at least 5 meters below the mud line and removed. The MMS has specific requirements to abandon pipelines. The applicant must be required to comply with them. For example, the ends of the abandoned pipeline must be recovered to preclude interference with futures uses on the OCS. The Draft EIS did not include this requirement in the text. We suggest that you revise the text in the EIS to include this requirement.

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	Section	Page	Line	Reviewer (initials)	Comment
28.	4.2.1.1 General Impacts Dis-cussion Con-struction Impacts Seafloor Dis-turbance	4-13	39-40	GEdR	The Draft EIS states, "…by judicious anchor placement during the first pass offers the greatest potential for further reduction of live bottom impact area." The US Coast Guard should require the applicant to adhere to an anchor placement plan that minimizes the adverse effects to the live bottom areas.
29.	Vessel Traffic	4-16	Whole Section	GEdR	It is appropriate to require the applicant to adhere to the MMS' NTL No. 2007-G04, *Vessel Strike Avoidance and Injured/Dead Protected Species Reporting*. The text in the EIS should be revised to reflect this requirement.
30.	Noise	4-17	Whole Section	GEdR	Noise will also emanate from helicopters that may be used during the construction and operational life of the project. There should be a discussion of this noise source in the EIS.
31.	Oper-ations Impacts: Seafloor dis-turbance	4-18	42-44	GEdR	There is an inconsistency in the Draft EIS. In this section, the Draft EIS states, "Modeling results indicate that continuous anchor sweep would resuspend and deposit the sediments in the immediate vicinity of the chains and that cumulative accumulation of deposited sediment would not occur." However, on page 4-5 the Draft EIS states, "Sediment suspension modeling for mooring line sweep, which would occur routinely during operations, was not been completed by the Applicant." Note also that in line 37 the word "was" should be "has". Please clarify whether you have completed modeling of the anchor sweep area.

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	Section	Page	Line	Reviewer (initials)	Comment
32.	Marine Debris	4-21	29	GEdR	The MMS has issued NTL No. 2007-G03, *Marine Trash and Debris Awareness and Elimination* that supersedes NTL 2003-G11. Please revise the text as appropriate.
33.	Decommis-sioning	4-22	11-12	GEdR	The MMS has very specific requirement to abandon pipelines in place during decommissioning operations. For example, pipelines must be flushed and filled. A right-of-way grantee cannot just seal and abandon the pipeline in place, as stated in the Draft EIS. See the applicable MMS Operating Regulations at 30 CFR 250.1006.
34.	Hydro-static Pipeline Integrity Testing	4-24 and 4-25	Whole Section	GEdR	The water use here does not take into consideration the "gauging and cleaning run" prior to the hydrostatic pipeline integrity testing. Revise the section accordingly.
35.	Vessel Traffic	4-25 through 4-27	Whole Section	GEdR	It is appropriate to require the applicant to adhere to the MMS' NTL No. 2007-G04, *Vessel Strike Avoidance and Injured/Dead Protected Species Reporting*. The text in this section of the EIS should be revised to reflect this requirement.
36.	Oper-ations Impacts: Seafloor dis-turbance	4-79	28-30	GEdR	The Draft EIS states, "Because the Southern Port Site and the offshore portions of the Alternative Route were not surveyed, the acreage of each habitat type disturbed under this alternative is unknown." Should this alternative be chosen for the port, additional surveys and analyses would be required to evaluate the potential impacts from this choice. This may necessitate the preparation of a supplemental EIS.

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	Section	Page	Line	Reviewer (initials)	Comment
37.	4.3 Cultural Resources 4.3.1 Construction Impacts 4.3.1.1 Offshore	4-80	Whole Section	GEdR	It is essential that the applicant have an anchoring plan and that those individuals that oversee the project be aware of the areas to be avoided by bottom disturbing activities. An "undiscovered resource plan" must also be in place before initiating operations.
38.	4.3 Cultural Resources 4.3.1 Construction Impacts 4.3.1.1 Offshore	4-80 and 4-81	Whole Section	GEdR	The applicant should be required to adhere to the MMS' NTL No. 2005-G07, *Archaeological Resource Surveys and Reports* (effective date: 1 July 2005).
39.	4.4 Geological Resources	4-83	Whole Section	GEdR	The applicant should be required to adhere to the MMS' NTL No. 2008-G05, *Shallow Hazards Program* (effective date: 1 May 2008).
40.	5 4.4.1.1 Port Installation			GEdR	Please modify the section to require the applicant to adhere to the provisions found in NTL 2007-G014, *Pipeline Risers Subject to the Platform Verification Program*. This is an integral part of the overall safety of the facility.

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	Section	Page	Line	Reviewer (initials)	Comment
41.	4.4.1.2 Offshore Pipeline Instal-lation	4-84	Whole Section	GEdR	The applicant should be required to submit an "as built" survey for the pipelines associated with the project. This allows the permitting agencies to know the precise location of the pipelines and if mitigations were adhered to during construction and installation.
42.	4.4.2 Oper-ations Impacts	4-85	Whole Section	GEdR	The US Coast Guard should require the applicant to consider the use of midline buoys for the final design of the port's mooring system. The buoys use would reduce the amount of anchor chain sweep thus minimizing the environmental impacts to the seafloor and biota in the area.
43.	4.4.3 Decommis-sioning	4-86	26-27	GEdR	The Draft EIS states, "The underground decommissioning would consist of the removal of any hydrocarbons in the pipe through flushing, filling the pipe with treated freshwater, and capping the ends of the pipe." The applicant must be required to also bury/cover the ends of the pipeline when abandoning the pipelines "in place" to help preclude future interference with other uses of the OCS lands.
44.	4.4.3 Decommis-sioning	4-86	Whole Section	GEdR	The applicant must be required to adhere to the MMS' latest NTL for *Structure Removal Operations* - NTL No. 2004-G06. In addition, site clearance verification procedures would be required after decommission operations had been done.
45.	4.5.1 Con-struction Impacts	4-87	31	GEdR	Please avoid the term "construction ROW" in the text. A better term may be "construction corridor." The Draft EIS states that the "…construction ROW for the offshore portion for the pipeline is 3,000 feet wide…." In actuality, this is the area affected by the construction and installation operations. A pipeline right-of-way is limited to 200 ft in width – 100 ft either side of the centerline of the pipeline route. As written, the text can be confusing to the readers.

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	Section	Page	Line	Reviewer (initials)	Comment
46.	4.11 Mitigation and Minimiza-tion Measures and Mon-itoring	4-132	Whole Section	GEdR	It is essential that the US Coast Guard and MARAD include all mitigation, minimizing measures, and monitoring requirements in the Record of Decision and in the license. The US Coast Guard should make periodic checks on the licensee and its contractors to ensure that the mitigation, minimizing measures and monitoring requirements are conducted in a manner prescribed by the license.
47.	4.11.2 The Maritime Admin-istration/ USCG-Recom-mended Mitigation Measures	4-142	Whole Section	GEdR	It is essential that the US Coast Guard and MARAD require the licensee to perform an "as built" survey of the pipelines. This requirement should be included in the mitigation section.
48.	4.11.4 NOAA/ NMFS Recomme ndations	4-146	Whole Section	GEdR	It is essential that the US Coast Guard and MARAD require the licensee to perform an "as built" survey of the pipelines. This requirement should be included in the mitigation section.
49.	5.3.4.1 Deepwater Port	5-6	9-11	GEdR	The Draft EIS states, "Construction on the Northeast Gateway Deepwater Port in Massachusetts Bay was initiated in spring 2007 and is anticipated to be operational in the near future." It is my understanding that the NE Gateway DW Port is about to receive its initial cargo delivery. Please revise the text for the Final EIS to recognize the fact that there are now two DW ports that are operational (including the Gulf Gateway DW Port).

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	Section	Page	Line	Reviewer (initials)	Comment
50.	4 5.5.1 Marine Safety Standards	5-13	Whole Section	GEdR	The MMS requests the opportunity to review the proposed port's operations manual before the US Coast Guard makes its final determination on the adequacy of the document.
51.	5.5.2 Naviga-tional Safety Measures	5-15	Add a Section	GEdR	It is appropriate to include another section that discusses the No Anchoring Activity Zone. Though it is likely to be encompassed by the ATBA, a discussion should be provided for the readers. The no anchoring mandate would protect the subsea infrastructure of the proposed deepwater port.
52.	5.6.1 Offshore Pipeline Safety Standards	5-17	Whole Section	GEdR	The applicant should be required to adhere to the MMS' NTL No. 2007-G14, *Pipeline Risers Subject to the Platform Verification Program,* (effective date: May 7, 2007).
53.	5.6.1 Offshore Pipeline Safety Standards	5-17	22-23	GEdR	The MMS would like to have the opportunity to "witness" the hydrostatic testing of the pipelines associated with the proposed port.
54.	5.6.1 Offshore Pipeline Safety Standards	5-17 and 5-18	Whole Section	GEdR	The US Coast Guard and the MMS should reserve the right to conduct announced as well as unannounced inspections on the port's pipelines to ensure the licensee is properly adhering to all of the appropriate safety, maintenance, and operational standards.
55.	6.2.1 LNG Projects	6-3	Table 6.2-1	GEdR	This table will need to be undated for the Final EIS.

	Section	Page	Line	Reviewer (initials)	Comment
56.	6.2.4 Oil and Gas Leasing/ Mineral Leasing	6-5	Whole Section	GEdR	Gulf of Mexico Sale 224 was held on 19 March 2008 in New Orleans, LA. The MMS received 58 bids from 6 companies on 36 tracts resulting in $ 64,713,213 in high bids. Also, note that the MMS prepared and disseminated to the public the *Gulf of Mexico OCS Oil and Gas Lease Sale 224: Eastern Planning Area, Final Supplemental Environmental Impact Statement (EIS)* (MMS, October 2007). Please revise the text for the Final EIS to reflect these changes.
57.	Table 6.3-1. Cumula-tive Impacts on Resources	6-11	Navigation and Transporta tion	GEdR	In the Known Future Actions column of the table, MPEH should also be added to this segment. Both MPEH and BOET should be recognized as known future actions and for their effects on navigation and transportation.
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59.	*Marine Mammals*	6-14	24	GEdR	Please insert the word "operators" in to the following sentence. It should read, "…solid debris from vessels by lessees ***and*** **operators** (emphasis added) by the MMS …."
60.	*Sea Turtles*	6-15	1-2	GEdR	By definition in the Endangered Species Act, as amended, harassment as well as "… injury or death…" constitute a "take."
61.	*Sea Turtles*	6-15	11	GEdR	Please insert the word "operators" in to the following sentence. It should read, "…solid debris from vessels by lessees ***and*** **operators** (emphasis added) by the MMS …."

15

	Section	Page	Line	Reviewer (initials)	Comment
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63.	*Non-threatened and Non-endanger-ed Coastal and Marine Birds*	6-16	Whole Section	GEdR	This is an inadequate discussion on the potential cumulative effects on nonthreatened and nonendangered coastal and marine birds. The current discussion in the Draft EIS is one sentence long.
64.	6.4.3 Cultural Resources Offshore Com-ponents	6-25	24-26	GEdR	The Draft EIS states, "Avoid by a distance of 250 feet the margins of buried relict fluvial channels in the Port's buoy mooring area in Blocks PB545 and PB589 …." It appears that the mooring system may also impinge into PB 590. This mitigation measure should include the additional block.
65.	6.4.4 Geo-logical Resources	6-26	8-9	GEdR	This whole section is one sentence. More discussion is warranted on the potential effects of this topic.
66.	6.4.7 Air Quality	6-26	28-29	GEdR	The Draft EIS states, "Construction of the interconnection station would also cause major, short-term, localized impacts on air quality." Since the construction would cause major but short-term, localized effects, more discussion is warranted on the mitigation measures to reduce the potential adverse impacts.

16

	Section	Page	Line	Reviewer (initials)	Comment
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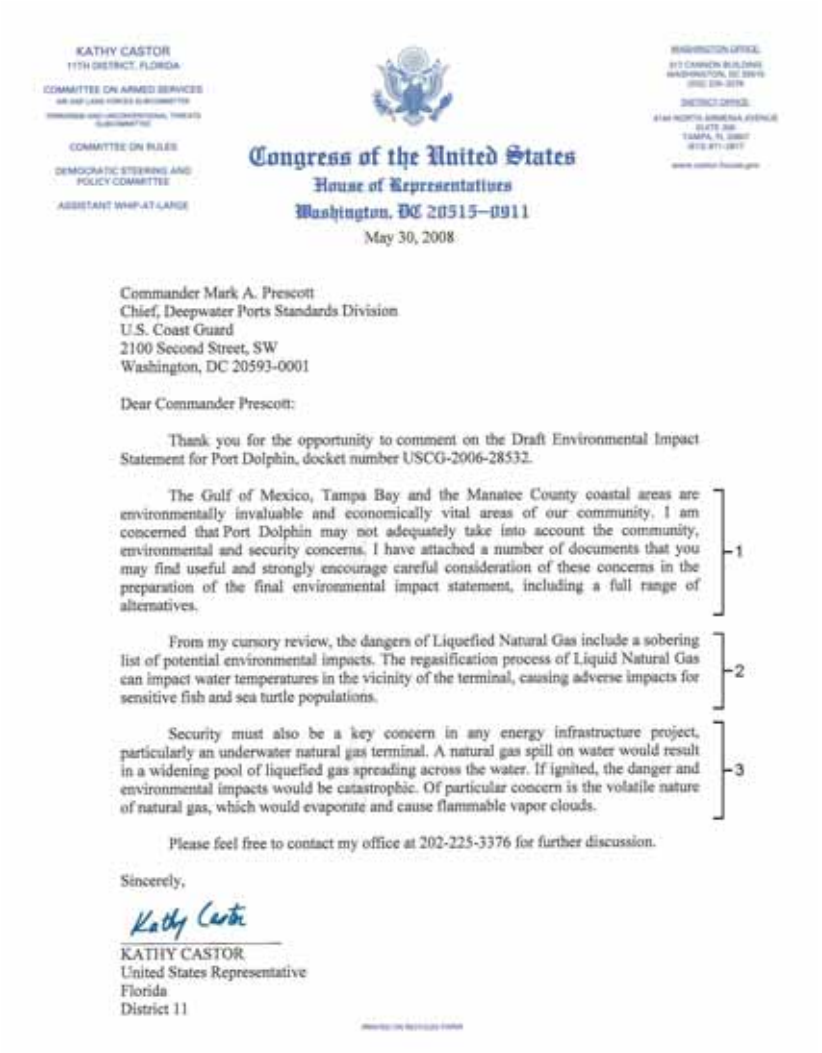
GEdR = G. Ed Richardson, Senior Environmental Scientist, Minerals Management Service, Gulf of Mexico OCS Region, 828-628-9451, 19 May, 2008.

17



KATHY CASTOR
11TH DISTRICT, FLORIDA

COMMITTEE ON ARMED SERVICES

COMMITTEE ON RULES

DEMOCRATIC STEERING AND POLICY COMMITTEE

ASSISTANT WHIP-AT-LARGE

Congress of the United States
House of Representatives
Washington, DC 20515–0911

May 30, 2008

Commander Mark A. Prescott
Chief, Deepwater Ports Standards Division
U.S. Coast Guard
2100 Second Street, SW
Washington, DC 20593-0001

Dear Commander Prescott:

Thank you for the opportunity to comment on the Draft Environmental Impact Statement for Port Dolphin, docket number USCG-2006-28532.

The Gulf of Mexico, Tampa Bay and the Manatee County coastal areas are environmentally invaluable and economically vital areas of our community. I am concerned that Port Dolphin may not adequately take into account the community, environmental and security concerns. I have attached a number of documents that you may find useful and strongly encourage careful consideration of these concerns in the preparation of the final environmental impact statement, including a full range of alternatives. -1

From my cursory review, the dangers of Liquefied Natural Gas include a sobering list of potential environmental impacts. The regasification process of Liquid Natural Gas can impact water temperatures in the vicinity of the terminal, causing adverse impacts for sensitive fish and sea turtle populations. -2

Security must also be a key concern in any energy infrastructure project, particularly an underwater natural gas terminal. A natural gas spill on water would result in a widening pool of liquefied gas spreading across the water. If ignited, the danger and environmental impacts would be catastrophic. Of particular concern is the volatile nature of natural gas, which would evaporate and cause flammable vapor clouds. -3

Please feel free to contact my office at 202-225-3376 for further discussion.

Sincerely,

Kathy Castor

KATHY CASTOR
United States Representative
Florida
District 11

1. Potential impacts to the community are discussed in Section 4.9, socioeconomic impacts. The material provided was considered in evaluations of impacts.

2. Potential impacts from the regasification process are discussed throughout Section 4 of the Final EIS. Impacts from discharge of water used to cool electrical generating equipment onboard the SRVs is discussed in Sections 4.1 and 4.2 of the Final EIS. The regasification process proposed by the Applicant would not have a water discharge.

3. Section 5 and Independent Risk Assessment (IRA) (Appendix J) of the FEIS describes the major hazards due to LNG spill on water and provides the limits of the hazard zones due to pool fire and vapor dispersion. Phase I IRA consisted of developing accidental and intentional scenarios resulting from an LNG spill and determining impacts to public safety due to identified worst credible scenarios. A Risk Assessment which is the second phase developed the most applicable and effective mitigation measures for all accidental and intentional scenarios identified by the stake holders in Phase I.

Order Code RL32205

CRS Report for Congress

Liquefied Natural Gas (LNG) Import Terminals: Siting, Safety, and Regulation

Updated January 9, 2008

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Congressional Research Service

Liquefied Natural Gas (LNG) Import Terminals: Siting, Safety, and Regulation

Summary

Liquefied natural gas (LNG) is a hazardous fuel frequently shipped in large tankers to U.S. ports from overseas. While LNG has historically made up a small part of U.S. natural gas supplies, rising gas prices, current price volatility, and the possibility of domestic shortages are sharply increasing LNG demand. To meet this demand, energy companies have proposed building dozens of new LNG import terminals throughout the coastal United States. Many of these terminals would be built onshore near populated areas.

The Federal Energy Regulatory Commission (FERC) grants federal approval for the siting of new onshore LNG facilities under the Natural Gas Act of 1938 and the Energy Policy Act of 2005 (P.L. 109-58). This approval process incorporates minimum safety standards for LNG established by the Department of Transportation. Although LNG has had a record of relative safety for the last 45 years, and no LNG tanker or land-based facility has been attacked by terrorists, proposals for new LNG terminal facilities have generated considerable public concern. Some community groups and governments officials fear that LNG terminals may expose nearby residents to unacceptable hazards, and that these hazards may not be appropriately considered in the federal siting approval process. Ongoing public concern about LNG terminal safety has focused congressional attention on the exclusivity of FERC's LNG siting authority, proposals for a regional LNG siting process, the lack of "remote" siting requirements in FERC regulations, state permitting requirements under the Clean Water Act and the Coastal Zone Management Act, terrorism attractiveness of LNG, and other issues.

Faced with the widely perceived need for greater LNG imports, and persistent public concerns about LNG safety, Congress is debating changes to safety and environmental provisions in federal LNG siting regulation. S. 323 would require LNG terminal developers to identify employees and agents engaged in activities to persuade communities of the benefits of the approval. S. 1174 would require state concurrence of federal siting approval decisions for onshore LNG terminals. H.R. 2042 includes provisions both for state LNG siting concurrence and for developer agent identification. H.R. 1564 would prohibit the construction of LNG terminals employing "a floating storage regasification unit" in estuaries of national significance. S. 1579 seeks to promote improved coordination among Federal, regional, state, and local agencies conducting LNG siting reviews under the Coastal Zone Management Act.

Both industry and government analysts project continued growth in the demand for natural gas — and a decreasing ability for domestic gas producers to meet that demand. Greater LNG imports represent one way to address this growth in demand, along with increased North American gas production, conservation, fuel-switching, and the development of renewable energy sources. If policy makers encourage LNG imports, then the need to foster the other energy options may be diminished — and vice versa. Thus decisions about LNG infrastructure could have consequences for a broader array of natural gas supply policies.

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Liquefied Natural Gas (LNG) Import Terminals: Siting, Safety, and Regulation

Introduction

Liquefied natural gas (LNG) historically has played a minor role in U.S. energy markets, but concerns about rising natural gas prices, current price volatility, and the possibility of domestic shortages are sharply increasing demand for LNG imports. To meet this demand, dozens of new onshore and offshore LNG import terminals have been proposed in coastal regions throughout the United States. But LNG, like other fossils, is a hazardous[1] liquid transported and stored in enormous quantities, often near populated areas. Concerns exist about the safety of new LNG import terminals and the federal government's role in addressing LNG safety in the terminal siting process. In addition, various energy policy proposals could impact the need for new LNG terminals by encouraging the development of alternative U.S. energy supplies and promoting conservation.

This report provides an overview of recent industry proposals for new LNG import terminals. The report summarizes LNG hazards and the industry's safety record. It discusses federal laws and regulations related to LNG terminal siting with a focus on the authorities of key federal agencies and safety provisions in the permitting of onshore facilities. The report reviews controversial safety issues in recent LNG siting proceedings, such as safety zones, marine hazards, hazard modeling, and remote siting. The report outlines policy issues related to LNG terminal safety, including the Federal Energy Regulatory Commission's (FERC's) LNG siting authority, regional LNG siting, "remote" siting requirements in federal regulations, state permitting requirements, terrorism, and other issues.

Issues Facing Congress

Proposed LNG terminals will directly affect the safety of communities in a number of states and congressional districts, and will influence energy costs nationwide. Faced with the widely perceived national need for greater LNG imports, and persistent public concerns about LNG hazards, some in Congress are proposing changes to safety provisions in federal LNG siting regulation. S. 323, introduced by Senator Barbara Boxer on January 17, 2007, would require LNG terminal developers to identify employees and agents engaged in activities to persuade communities of the benefits of the approval. S. 1174 introduced by Senators Benjamin Cardin and Barbara Mikulski on April 19, 2007, would require state concurrence of federal siting

[1] 49 C.F.R. § 172.101. *List of Hazardous Materials.* Office of Hazardous Materials Safety, U.S. Department of Transportation.

approval decisions for onshore LNG terminals.[2] H.R. 2042, introduced by Representative Dutch Ruppersberger and three cosponsors on April 25, 2007, includes provisions both for state LNG siting concurrence as in S. 1174 and for developer agent identification as in S. 323 (for onshore LNG terminals only). H.R. 1564, introduced on March 19, 2007 by Representative Timothy Bishop and seven cosponsors, prohibits the construction of LNG terminals employing "a floating storage regasification unit" in estuaries of national significance. S. 1579, introduced by Senator Olympia Snowe and two cosponors on June 7, 2007, would require FERC and the Department of Commerce to report to Congress regarding improved coordination among government agencies reviewing coastal energy activities under the Coastal Zone Management Act. If Congress concludes that new LNG terminals as currently regulated will pose an unacceptable risk to public safety, Congress may consider additional LNG safety-related legislation, or may exercise its oversight authority in other ways to influence LNG terminal siting approval. Alternatively, Congress may consider other changes in U.S. energy policy legislation to reduce the nation's demand for natural gas.

Scope and Limitations

This report focuses broadly on industry and federal activities related to safety in LNG import terminal siting. For a more specific discussion of LNG security, see CRS Report RL32073, *Liquefied Natural Gas (LNG) Infrastructure Security: Background and Issues for Congress*, by Paul W. Parfomak. This report also deals primarily with those parts of LNG terminals which transfer, store, and process LNG prior to injection to natural gas pipelines for transmission off site. For more discussion of general natural gas or pipeline hazards, see CRS Report RL33347, *Pipeline Safety and Security: Federal Programs*, by Paul W. Parfomak. Also, this report discusses mostly onshore facilities and near-shore shipping, since they pose the greatest public hazards. Offshore LNG terminal siting regulations are summarized in the **Appendix**.

Background

What Is LNG and Where Does It Come From?

When natural gas is cooled to temperatures below minus 260° F it condenses into liquefied natural gas, or LNG. As a liquid, natural gas occupies only 1/600th the volume of its gaseous state, so it is stored more effectively in a limited space and is more readily transported. A single tanker ship, for example, can carry huge quantities of LNG — enough to supply a single day's energy needs of over 10 million homes. When LNG is warmed it "regasifies" and can be used for the same purposes as conventional natural gas such as heating, cooking, and power generation.

[2] The Senate rejected an amendment proposed by Sen. Cardin to H.R. 6, the Renewable Fuels, Consumer Protection and Energy Efficiency Act of 2007, that would have required state approval of federal LNG terminal citing decisions.

In 2007, LNG imports to the United States originated in Trinidad and Tobago (57.3%), Egypt (15.3%), Nigeria (12.7%), Algeria (9.9%), Qatar (2.4%), and Equatorial Guinea (2.4%).[3] In recent years, some LNG shipments have also come from Malaysia, Oman, Australia, and other countries.[4] Brunei, Indonesia, Libya, and the United Arab Emirates also export LNG, and may be significant U.S. suppliers in the future. In addition to importing LNG to the lower 48 states, the United States exports Alaskan LNG to Japan.

Expectations for U.S. LNG Import Growth

The United States has used LNG commercially since the 1940s. Initially, LNG facilities stored domestically produced natural gas to supplement pipeline supplies during times of high gas demand. In the 1970s, LNG imports began to supplement domestic production. Primarily because of low domestic gas prices, LNG imports stayed relatively small — accounting for only 1% of total U.S. gas consumption in 2002.[5] In countries with limited domestic gas supplies, however, LNG imports grew dramatically over the same period. Japan, for example, imported 97% of its natural gas supply as LNG in 2002, more than 11 times as much LNG as the United States.[6] South Korea, France, Spain, and Taiwan also became heavy LNG importers.

Natural gas demand has accelerated in the United States over the last several years due to environmental concerns about other energy sources, widespread building of natural gas-fired electricity generation, and low natural gas prices through the 1980s and 1990s. Domestic gas supplies have not kept up with this demand, however, so prices have often become high and volatile. At the same time, international prices for LNG have fallen substantially because of increased supplies and lower production and transportation costs, making LNG more competitive with domestic natural gas.

In 2003 testimony before Congress, the Federal Reserve Chairman called for a sharp increase in LNG imports to help avert a potential barrier to the U.S. economic recovery. According to the Chairman's testimony: "... high gas prices projected in the American distant futures market have made us a potential very large importer.... Access to world natural gas supplies will require a major expansion of LNG terminal import capacity."[7] FERC leadership has also spoken about the strategic importance of increased LNG imports. FERC Commissioner Suedeen Kelly told industry representatives in 2006 that "the U.S. cannot meet projected demand in the coming

[3] U.S. Dept. of Energy Team, Office of Fossil Energy. "Natural Gas Import/Export Reports." Internal database. January 7, 2008. Excludes December 2007 imports.

[4] Energy Information Administration (EIA). *Natural Gas Year-In-Review 2006*. Washington, DC, March 2007. p. 5.

[5] Energy Information Administration (EIA). *Natural Gas Annual 2005*. Tables 1 and 9. November 16, 2006.

[6] Energy Information Administration (EIA). "World LNG Imports by Origin, 2002." Washington, DC. October 2003.

[7] Greenspan, A., Chairman, U.S. Federal Reserve Board. "Natural Gas Supply and Demand Issues." Testimony before the House Energy and Commerce Committee. June 10, 2003.

years without LNG unless we shed more industrial load," and that it was unlikely that industrial needs would wane. She predicted that "while LNG has made a marginal contribution to gas supply over the last 30 years, it is poised to make a major contribution in the future."[8]

Proposed LNG Import Terminals in the United States

LNG tankers unload their cargo at dedicated marine terminals which store and regasify the LNG for distribution to domestic markets. Onshore terminals consist of docks, LNG handling equipment, storage tanks, and interconnections to regional gas transmission pipelines and electric power plants. Offshore terminals regasify and pump the LNG directly into offshore natural gas pipelines or may store LNG in undersea salt caverns for later injection into offshore pipelines.

There are five active onshore LNG import terminals in the United States: Everett, Massachusetts; Lake Charles, Louisiana; Cove Point, Maryland; Elba Island, Georgia; and Peñuelas, Puerto Rico. One active offshore import terminal is located in the Gulf of Mexico. A second offshore terminal near Boston, Massachusetts, is scheduled to begin operations in early 2008.[9] (There is also one export terminal in Kenai, Alaska.) In addition to these active terminals, developers have proposed more than 70 new LNG import terminals to serve the U.S. market. A number of these proposals have been withdrawn because of siting problems, financing problems, or other reasons. Many others are well-advanced, however, with recent or pending federal permit approvals. **Figure 1** shows summary information for active LNG terminal proposals located in North America.

[8] *Inside F.E.R.C.* "Kelly-LNG Poised for 'Major Contribution' to Energy Supply, to Meet Industrial Demand." April 10, 2006.

[9] "Boston Offshore LNG Port Nears Clearance to Open." *Reuter's*. January 9, 2008.

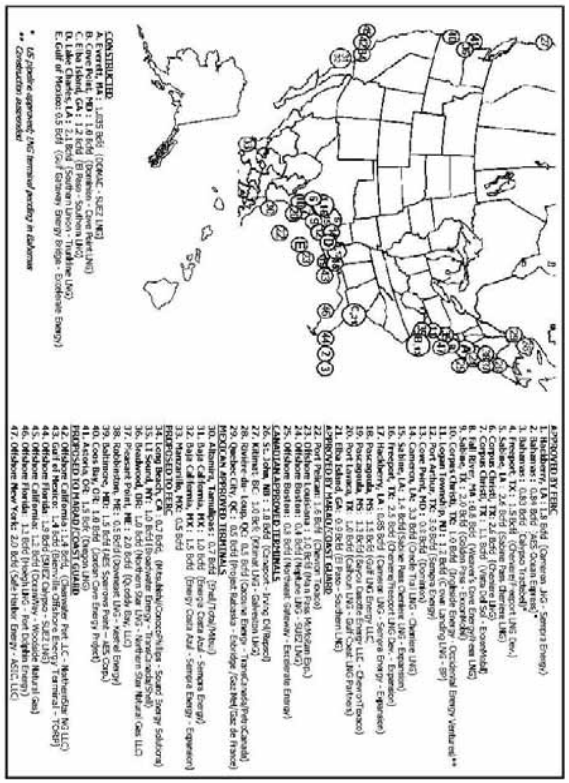

Figure 1. Proposed and Operating LNG Terminals in North America

Source: Federal Energy Regulatory Commission (FERC), at [http://www.ferc.gov/industries/lng.asp], updated October 31, 2007

Potential Safety Hazards from LNG Terminals

The safety hazards associated with LNG terminals have been debated for decades. A 1944 accident at one of the nation's first LNG facilities killed 128 people and initiated public fears about LNG hazards which persist today.[10] Technology improvements and standards since the 1940s have made LNG facilities much safer, but serious hazards remain since LNG is inherently volatile and is usually shipped and stored in large quantities. A January 2004 accident at Algeria's Skikda LNG terminal, which killed or injured over 100 workers, added to the ongoing controversy over LNG facility safety.[11]

Physical Hazards of LNG

Natural gas is combustible, so an uncontrolled release of LNG poses a hazard of fire or, in confined spaces, explosion. LNG also poses hazards because it is so cold. The likelihood and severity of catastrophic LNG events have been the subject of controversy. While questions remain about the credible impacts of specific LNG hazards, there appears to be consensus as to what the most serious hazards are.

Pool Fires. If LNG spills near an ignition source, evaporating gas will burn above the LNG pool.[12] The resulting "pool fire" would spread as the LNG pool expanded away from its source and continued evaporating. A pool fire is intense, burning far more hotly and rapidly than oil or gasoline fires.[13] It cannot be extinguished — all the LNG must be consumed before it goes out. Because an LNG pool fire is so hot, its thermal radiation may injure people and damage property a considerable distance from the fire itself. Many experts agree that a large pool fire, especially on water, is the most serious LNG hazard.[14]

Flammable Vapor Clouds. If LNG spills but does not immediately ignite, the evaporating natural gas will form a vapor cloud that may drift some distance from the spill site. If the cloud subsequently encounters an ignition source, those portions of the cloud with a combustible gas-air concentration will burn. Because only a fraction of such a cloud would have a combustible gas-air concentration, the cloud would not likely ignite all at once, but the fire could still cause considerable

[10] Bureau of Mines (BOM). *Report on the Investigation of the Fire at the Liquefaction, Storage, and Regasification Plant of the East Ohio Gas Co., Cleveland, Ohio, October 20, 1944.* February 1946.

[11] Junnola, Jill, et al. "Fatal Explosion Rocks Algeria's Skikda LNG Complex." *Oil Daily.* January 21, 2004. p. 6.

[12] Methane, the main component of LNG, burns in gas-to-air ratios between 5% and 15%.

[13] Havens, J. "Ready to Blow?" *Bulletin of the Atomic Scientists.* July/August 2003. p. 17.

[14] Havens. 2003. p. 17.

damage.[15] An LNG vapor cloud fire would gradually burn its way back to the LNG spill where the vapors originated and would continue to burn as a pool fire.[16]

Other Safety Hazards. LNG spilled on water could (theoretically) regasify almost instantly in a "flameless explosion," although an Idaho National Engineering Laboratory report concluded that "transitions caused by mixing of LNG and water are not violent."[17] LNG vapor clouds are not toxic, but they could cause asphyxiation by displacing breathable air.[18] Such clouds may begin near the ground (or water) when they are still very cold, but rise in air as they warm, diminishing the threat to people. Extremely cold LNG could injure people or damage equipment through direct contact.[19] Such contact would likely be limited, however, as a major spill would likely result in a more serious fire. The environmental damage associated with an LNG spill would be confined to fire and freezing impacts near the spill since LNG dissipates completely and leaves no residue.[20]

Terrorism Hazards. LNG tankers and land-based facilities could be vulnerable to terrorism. Tankers might be physically attacked in a variety of ways to destroy their cargo — or commandeered for use as weapons against coastal targets. LNG terminal facilities might also be physically attacked with explosives or through other means. Some LNG facilities may also be indirectly disrupted by "cyber-attacks" or attacks on regional electricity grids and communications networks which could in turn affect dependent LNG control and safety systems.[21] The potential attractiveness of LNG infrastructure to terrorists is discussed later in this report.

Safety Record of LNG

The LNG tanker industry claims a record of relative safety over the last 45 years; since international LNG shipping began in 1959, tankers reportedly have carried over 45,000 LNG cargoes without a serious accident at sea or in port.[22] LNG tankers have experienced groundings and collisions during this period, but none has

[15] West, H.H. and Mannan, M.S. "LNG Safety Practices and Regulations." Prepared for the American Institute of Chemical Engineering Conference on Natural Gas Utilization and LNG Transportation. Houston, TX. April 2001. p. 2.

[16] Quillen, D. ChevronTexaco Corp. "LNG Safety Myths and Legends." Presentation to the Natural Gas Technology Conference. Houston, TX. May 14-15, 2002. p. 18.

[17] Siu, Nathan, et al. *Qualitative Risk Assessment for an LNG Refueling Station and Review of Relevant Safety Issues*. Idaho National Engineering Laboratory. INEEL/EXT-97-00827 rev2. Idaho Falls, ID. February 1998. p. 71.

[18] Siu. 1998. p. 62.

[19] Siu. 1998. p. 63.

[20] Quillen. 2002. p. 28.

[21] Skolnik, Sam. "Local Sites Potential Targets for Cyberterror." *Seattle Post-Intelligencer*. Seattle, WA. September 2, 2002.

[22] Foss, M.M. "Introduction to LNG." University of Texas at Austin, Center for Energy Economics. January, 2007. p. 28.

resulted in a major spill.[23] The LNG marine safety record is partly due to the double-hulled design of LNG tankers. This design makes them more robust and less prone to accidental spills than single-hulled oil and fuel tankers like the *Exxon Valdez*, which caused a major Alaskan oil spill after grounding in 1989.[24] LNG tankers also carry radar, global positioning systems, automatic distress systems and beacons to signal if they are in trouble. Cargo safety systems include instruments that can shut operations if they deviate from normal as well as gas and fire detection systems.[25]

The safety record of onshore LNG terminals is more mixed. There are more than 40 LNG terminals (and more than 150 other LNG storage facilities) worldwide. Since 1944, there have been approximately 13 serious accidents at these facilities directly related to LNG. Two of these accidents caused single fatalities of facility workers — one in Algeria in 1977, and another at Cove Point, Maryland, in 1979. On January 19, 2004, a fire at the LNG processing facility in Skikda, Algeria killed an estimated 27 workers and injured 74 others. The Skikda fire destroyed a processing plant and damaged a marine berth, although it did not damage a second processing plant or three large LNG storage tanks also located at the terminal.[26] Nor did the Skikda accident injure the rest of the 12,000 workers at the complex. Nonetheless, it was considered the worst petrochemical plant fire in Algeria in over 40 years.[27] According to press reports, the accident resulted from poor maintenance rather than a facility design flaw.[28] Another three accidents at worldwide LNG plants since 1944 have also caused fatalities, but these were construction or maintenance accidents in which LNG was not present.

LNG Hazard Models

Since the terror attacks of September 11, 2001, technical studies have been commissioned to evaluate the safety hazards of LNG terminals and associated shipping. The most widely cited of these studies are listed in **Table 1.** These studies have caused controversy because some reach differing conclusions about the potential public hazard of LNG terminal accidents or terror attacks. Consequently, community groups fear that LNG hazards may be misrepresented by government agencies, or that certain LNG hazards may simply not be understood well enough to support a terminal siting approval.

[23] Foss, 2007.; CH-IV International. *Safety History of International LNG Operations*. TD-02109. Millersville, MD. July 2004. pp. 13-18.

[24] Society of International Gas Tanker & Terminal Operators Ltd. (SIGTTO). "Safe Havens for Disabled Gas Carriers." Third Edition. London. February 2003. pp. 1-2.

[25] Petroplus International, N.V. "Energy for Wales: LNG Frequently Asked Questions." Internet home page. Amsterdam, Netherlands. August 4, 2003.

[26] Junnola, J., et al. January 21, 2004. p. 6.

[27] Hunter, C. "Algerian LNG Plant Explosion Sets Back Industry Development." *World Markets Analysis*. January 21, 2004. p. 1.

[28] Antosh, N. "Vast Site Devastated." *Houston Chronicle*. January 21, 2004. p. B1.

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Table 1. Recent LNG Hazard Studies

Author	Sponsor	Subject
Lloyd's Register of Shipping[29]	Distrigas (Tractebel)	Focused analysis models possible terror attacks on LNG ships serving Everett
Quest Consultants Inc.[30]	DOE (lead), FERC, DOT	Models catastrophic breach of an LNG ship tank
James Fay (MIT)[31]	Fair Play for Harpswell	Models fire and vapor hazards of proposed Harpswell LNG terminal
Tobin & Associates[32]	City of Vallejo	Reviews general safety of proposed Mare Island LNG terminal
Lehr and Simecek-Beatty[33]	NOAA staff	Compares hypothetical LNG and fuel oil fires on water
Det Norske Veritas[34]	LNG Industry Companies	Models LNG maximum credible failures
ABSG Consulting[35]	FERC (lead), DOT, USCG	Reviews consequence assessment methods for LNG tanker incidents
Sandia National Laboratories[36]	DOE	Examines effect of large-scale LNG spill on water

Source: Congressional Research Service.

[29] Waryas, Edward. Lloyd's Register Americas, Inc. "Major Disaster Planning: Understanding and Managing Your Risk." Fourth National Harbor Safety Committee Conference. Galveston, TX. March 4, 2002. Summary excerpts are in this presentation.

[30] Juckett, Don. U.S. Department of Energy (DOE). "Properties of LNG." LNG Workshop. Solomons, MD. February 12, 2002. Quest study summary are in this presentation.

[31] Fay, James A. "Public Safety Issues at the Proposed Harpswell LNG Terminal." FairPlay for Harpswell. Harpswell, ME. November 5, 2003.

[32] Tobin & Assoc. "Liquefied Natural Gas in Vallejo: Heath and Safety Issues." Report by the LNG Safety Committee of the Disaster Council, Vallejo, CA. January 16, 2003.

[33] Lehr, W. and Simecek-Beatty, D. "Comparison of Hypothetical LNG and Fuel Oil Fires on Water." *Journal of Hazardous Materials*. v. 107. 2004. pp. 3-9.

[34] Pitblado, R.M., J. Baik, G. J. Hughes, C. Ferro, and S. J. Shaw., Det Norske Veritas. "Consequences of LNG Marine Incidents." Presented at the Center for Chemical Process Safety (CCPS) Conference. Orlando, FL. June 29-July 1, 2004. Available at [http://www.dnv.com/press/dnvcompletesstudyonlngmarinereleases.asp].

[35] ABSG Consulting. *Consequence Assessment Methods for Incidents Involving Releases from Liquefied Natural Gas Carriers*. GEMS 1288209. Prepared for the Federal Energy Regulatory Commission under contract FERC04C40196. May 13, 2004.

[36] Sandia National Laboratories (SNL). *Guidance on Risk Analysis and Safety Implications of a Large Liquefied Natural Gas (LNG) Spill Over Water*. SAND2004-6258. Albuquerque, NM. December 2004.

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Most hazard analyses for LNG terminals and shipping depend on computer models to approximate the effects of hypothetical accidents. Federal siting standards specifically require computer modeling of thermal radiation and flammable vapor cloud exclusion zones (49 C.F.R. §§ 193.2057, 2059).[37] Such models are necessary because there have been no major LNG incidents of the type envisioned in LNG safety research and because historical LNG experiments have been limited in scale and scope. But LNG hazards models simulate complex physical phenomena and are inherently uncertain, relying on calculations and input assumptions about which fair-minded analysts may legitimately disagree. Even small differences in an LNG hazard model have led to significantly different conclusions. Referring to the recent LNG safety zone studies, for example, FERC notes that "distances have been estimated to range from 1,400 feet to more than 4,000 feet for [hazardous] thermal radiation."[38]

The LNG hazard studies in **Table 1** have been sponsored by a range of stakeholders and have been performed by individuals with various kinds of expertise. It is beyond the scope of this report to make detailed comparisons of the methodologies and findings of these studies and FERC analysis. Furthermore, each of the available studies (or its application) appears to have significant limitations, or has been questioned by critics. For example, the ABSG Consulting study released by FERC in May 2004, which reviewed existing LNG hazard models, concluded that

- No release models are available that take into account the true structure of an LNG carrier....
- No pool spread models are available that account for wave action or currents.
- Relatively few experimental data are available for validation of models involving LNG spills on water, and there are no data available for spills as large as the spills considered in this study.[39]

The Sandia National Laboratories study similarly reported that "there are limitations in existing data and current modeling capabilities for analyzing LNG spills over water."[40] Nonetheless, the Sandia report concluded that "existing [analytic] tools ... can be used to identify and mitigate hazards to protect both public safety and property."[41]

Uncertainty related to LNG hazard modeling continues. A December 2006 study using yet another LNG computer model of a large LNG fire states that "current generation models that are being used to calculate the radiant heat ... from the fire are

[37] Gas Research Institute (GRI). "LNGFIRE: A Thermal Radiation Model for LNG Fires" Version 3. GRI-89/0176. Washington, DC. June 29, 1990; "LNG Vapor Dispersion Prediction with the DEGADIS: Dense Gas Dispersion Model." GRI-89/00242; "Evaluation of Mitigation Methods for Accidental LNG Releases. Vol. 5: Using FEM3A for LNG Accident Consequence Analyses." GRI 96/0396.5. Washington, DC.

[38] FERC. November 2003. p. 4-133.

[39] ABSG Consulting. May 13, 2004. p. iii.

[40] SNL. December 2004. p. 14.

[41] SNL. December 2004. p. 14.

found to be overly conservative."[42] In February 2007, the Government Accountability Office (GAO) issued a report comparing six recent unclassified studies (including studies in **Table 1**) of the consequences of LNG spills. The GAO report concluded that[43]

> Because there have been no large-scale LNG spills or spill experiments, past studies have developed modeling assumptions based on small-scale spill data. While there is general agreement on the types of effects from an LNG spill, the results of these models have created what appears to be conflicting assessments of the specific consequences of an LNG spill, creating uncertainty for regulators and the public.

Following the GAO report, Members of Congress have expressed renewed concern about the uncertainty associated with LNG hazard analysis.[44]

Hazards vs. Risks. In reviewing the various LNG hazard studies, it is important to be clear about the distinction between *hazards* and *risks*. Although theoretical models may try to quantify the effects of "worst-case" hazards, evaluating the risks associated with those hazards requires an estimate of the probability that they will occur. Some argue that a significant *hazard* that is nonetheless highly unlikely does not represent an unacceptable *risk* to the public. In this view, worst-case hazard studies alone do not provide a sufficient basis for evaluating public safety. Unfortunately, few LNG safety studies comprehensively and convincingly address the probability of catastrophic accidents or attacks actually occurring.[45] In part, this shortcoming arises from a lack of historical LNG incidents and detailed terrorist threat information on which to base such probabilities. Faced with this analytic uncertainty, decision makers are forced to draw the best information they can get and rely upon their own best judgment to reach conclusions about LNG safety.

LNG Terminal Safety in Perspective

Other Hazardous Materials. LNG terminals and tankers have a high profile because of recent media coverage, although there are few of them relative to all the hazardous chemical plants and ships currently operating near U.S. cities. According

[42] Raj, P.K. *Spectrum of Fires in an LNG Facility: Assessments, Models and Consideration in Evaluations*. Prepared for the U.S. Department of Transportation, Pipeline & Hazardous Materials Safety Admin. by Technology & Management Systems, Inc. Burlington, MA. December 5, 2006. p. E-4.

[43] Government Accountability Office (GAO). *Maritime Security: Public Safety Consequences of a Terrorist Attack on a Tanker Carrying Liquefied Natural Gas Need Clarification*. GAO-07-316. February 2007. p. 22.

[44] See, for example Senator Barbara A. Mikulski, testimony before the House Transportation and Infrastructure Committee, Coast Guard and Maritime Transportation Subcommittee field hearing on the Safety and Security of Liquefied Natural Gas and the Impact on Port Operations. Baltimore, MD. April 23, 2007.

[45] One attempt at such a study is: Clarke, R.A., et al. *LNG Facilities in Urban Areas*. Good Harbor Consulting, LLC. Prepared for the Rhode Island Office of Attorney General. GHC-RI-0505A. May 2005.

to the U.S. Environmental Protection Agency (EPA), for example, more than 500 toxic chemical facilities operate in "urban" areas at which worst-case accidents could affect 100,000 or more people.[46] These include chlorine plants in city water systems and ammonia tanks in agricultural fertilizer production. There are also oil refineries and other liquefied petroleum gas (e.g., propane, butane) terminals operating in U.S. ports that pose safety hazards similar to those of LNG. Based on the most recent data available from the U.S. Office of Hazardous Materials Safety, there are over 100,000 annual U.S. shipments of hazardous marine cargo such as ammonia, crude oil, liquefied petroleum gases, and other volatile chemicals.[47] Many of these cargoes pose a similar hazard to LNG and pass through the same harbors serving existing or proposed LNG terminals. For further information on hazardous chemical marine cargoes, see CRS Report RL33048, *Marine Security of Hazardous Chemical Cargo*, by Paul Parfomak and John Frittelli.

Civil and Criminal Liability. One reason LNG tanker and terminal operators seek to ensure public safety is to avoid civil and criminal liability from an LNG accident; there are no special provisions in U.S. law protecting the LNG industry from such liability. The 1989 *Exxon Valdez* oil spill, for example, cost Exxon over $1 billion in criminal and civil settlements for violations of federal and state laws. In January 2003, the Justice Department announced over $100 million in civil and criminal penalties against Olympic Pipeline and Shell Pipeline resolving claims from a fatal pipeline fire in Bellingham, Washington in 1999.[48] In March 2003, emphasizing the environmental aspects of homeland security, Attorney General Ashcroft reportedly announced a crackdown on companies failing to protect against possible terrorist attacks on storage tanks, transportation networks, industrial plants, and pipelines.[49] Notwithstanding these announcements, some observers are skeptical that government scrutiny will ensure LNG infrastructure safety.

Even if no federal or state regulations are violated, LNG companies could still face civil liability for personal injury or wrongful death in the event of an accident. In the Bellingham case, the pipeline owner and associated defendants reportedly agreed to pay a $75 million settlement to the families of two children killed in the accident.[50] In 2002, El Paso Corporation settled wrongful death and personal injury

[46] Based on facilities submitting Risk Management Plans required under Section 112 of the Clean Air Act (42 U.S.C. § 7412) and classified in the December 1, 2003, update of the EPA National Database using EPA's software RMP*Review (v2.1). EPA states that an entire population is highly unlikely to be affected by any single chemical release, even in the worst case. In an actual release, effects on a population would depend on wind direction and many other factors. In addition, these worst-case scenarios do not account for emergency response measures facility operators or others might take to mitigate harm.

[47] Office of Hazardous Materials Safety, Department of Transportation. *Hazardous Materials Shipments*. Washington, DC. October 1998. Table 2. p. 2.

[48] *Energy Daily*. "Shell, Olympic Socked for Pipeline Accident." January 22, 2003.

[49] Heilprin, John. "Ashcroft Promises Increased Enforcement of Environmental Laws for Homeland Security." Assoc. Press. *Washington Dateline*. Washington, DC. March 11, 2003.

[50] Business Editors. "Olympic Pipe Line, Others Pay Out Record $75 Million in Pipeline

(continued...)

lawsuits stemming from a natural gas pipeline explosion near Carlsbad, New Mexico, which killed 12 campers.[51] Although the terms of those settlements were not disclosed, two additional lawsuits sought a total of $171 million in damages. The impact of these lawsuits on the company's business is unclear, however; El Paso's June 2003 quarterly financial report noted that "our costs and legal exposure ... will be fully covered by insurance."[52]

Regulation of Onshore LNG Siting

The Department of Transportation (DOT) and FERC are the federal agencies primarily responsible for the regulation of onshore LNG facilities. Although federal statutes do not explicitly designate the relative jurisdiction of DOT and FERC, the agencies have clarified their roles through interagency agreement. These roles and their relation to other authorities are summarized below.

Department of Transportation

The DOT sets safety standards for onshore LNG facilities. The DOT's authority originally stemmed from the Natural Gas Pipeline Safety Act of 1968 (P.L. 90-481) and the Hazardous Liquids Pipeline Safety Act of 1979 (P.L. 96-129). These acts were subsequently combined and recodified as the Pipeline Safety Act of 1994 (P.L. 102-508). The acts were further amended by the Pipeline Safety Improvement Act of 2002 (P.L. 107-355) and the Pipeline Safety Improvement Act of 2006 (P.L. 109-468). Under the resulting statutory scheme, DOT is charged with issuing minimum safety standards for the siting, design, construction, and operation of LNG facilities. It does not approve or deny specific siting proposals, because that authority is vested with FERC, as discussed below.

The Pipeline Safety Act, as amended, includes the following provisions concerning LNG facility siting (49 U.S.C. § 60103):

> The Secretary of Transportation shall prescribe minimum safety standards for deciding on the location of a new liquefied natural gas pipeline facility. In prescribing a standard, the Secretary shall consider the —
>
> (1) kind and use of the facility;
> (2) existing and projected population and demographic characteristics of the location;
> (3) existing and proposed land use near the location;
> (4) natural physical aspects of the location;

[50] (...continued)
Explosion Wrongful Death Settlement." *Business Wire*. April 10, 2002.

[51] National Transportation Safety Board (NTSB). *Pipeline Accident Report* PAR-03-01. February 11, 2003.

[52] El Paso Corp. *Quarterly Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934*. Form 10-Q. For the period ending June 30, 2002. Houston, TX.

> (5) medical, law enforcement, and fire prevention capabilities near the location that can cope with a risk caused by the facility; and
> (6) need to encourage remote siting.

General safety-related regulations may also impact siting decisions and affect the operation of existing facilities. The Secretary is authorized to order corrective action if operating an LNG facility could be hazardous to life, property, or the environment (49 U.S.C. §§ 60112, 60117). DOT's implementing regulations for the Pipeline Safety Act, as amended, are in 49 C.F.R.§§ 190-199. Safety standards, including those on siting, for LNG facilities are in 49 C.F.R. § 193 and are overseen by the Department's Office of Pipeline Safety within the Pipeline and Hazardous Materials Safety Administration (PHMSA).

The siting provisions in 49 C.F.R. § 193 incorporate by reference standard 59A from the National Fire Protection Association (NFPA).[53] NFPA 59A requires thermal exclusion zones and flammable vapor-gas dispersion zones around LNG terminals (§§ 193.2057, 193.2059). The DOT regulations also adopt many of NFPA's design and construction guidelines including requirements for LNG facilities to withstand fire, wind, hydraulic forces, and erosion from LNG spills (§§ 193.2067, 193.2155, 193.2301). Other provisions address operations (§§ 193.2501-2521), maintenance (§§ 193.2601-2639), employee qualification (§§ 193.2701-2719), and security (§§ 193.2901-2917).

Federal Energy Regulatory Commission (FERC)

Under the Natural Gas Act of 1938 (NGA), FERC grants federal approval for the siting of new onshore LNG facilities.[54] Section 7 of the NGA authorizes FERC to issue certificates of "public convenience and necessity" for "the construction or extension of any facilities ... for the transportation in interstate commerce of natural gas" (15 U.S.C. § 717f). Section 7 does not expressly cover LNG facilities, however, so recent agency policy has FERC exercising LNG siting regulation under its Section 3 authority.[55,56] Section 3 of the NGA authorizes FERC to approve the import and export of natural gas (15 U.S.C. § 717b). Specifically, FERC asserts approval

[53] National Fire Protection Association (NFPA). *Standard for the Production, Storage, and Handling of Liquefied Natural Gas*, 1996 Edition. NFPA 59A. Quincy, MA. 1996.

[54] Natural Gas Act (NGA) of June 21, 1938, ch. 556, 52 Stat. 812 (codified as amended at 15 U.S.C. §§ 717 et seq.); the Department of Energy Organization Act of 1977 (P.L. 95-91) transferred to the NGA authority to approve siting, construction and operation of onshore LNG facilities to the Secretary of Energy (§ 301b). The Secretary, in turn, delegated this authority to FERC.

[55] California Energy Commission (CEC). *Liquefied Natural Gas in California: History, Risks and Siting*. No.700-03-005. Sacramento, CA. p. 16; 94 FERC 61,188 § 61,663.

[56] In 1997, FERC reaffirmed its Section 3 authority despite changes to the Natural Gas Act in the Energy Policy Act of 1992 (P.L. 102-486). For details *see* 97 FERC ¶ 61,231 (2001). Also note that FERC's regulatory power regarding LNG importation under section 3 has been held to allow FERC to impose requirements equivalent to any in section 7, so long as FERC finds them necessary or appropriate to the public interest. Distrigas Corp. v. FPC, 495 F.2d 1057, 1066 (D.C. Cir. 1974).

authority over the place of entry and exit, siting, construction, and operation of new LNG terminals as well as modifications or extensions of existing LNG terminals.[57]

The Energy Policy Act of 2005 (P.L. 109-58) amends Section 3 of the NGA to give FERC explicit and "exclusive" authority to approve onshore LNG terminal siting applications (Sec. 311c). The 2005 act requires FERC to promulgate regulations for pre-filing of LNG import terminal siting applications and directs FERC to consult with designated state agencies regarding safety in considering such applications. It permits states to conduct safety inspections of LNG terminals in conformance with federal regulations, although it retains enforcement authority at the federal level. The 2005 act also requires LNG terminal operators to develop emergency response plans, including cost-sharing plans to reimburse state and local governments for safety and security expenditures (Sec. 311(d)). The 2005 act designates FERC as the "lead agency for the purposes of coordinating all applicable Federal authorizations" and for complying with federal environmental requirements, discussed below (Sec. 313a). It also establishes FERC's authority to set schedules for federal authorizations and establishes provisions for judicial review of FERC's siting decisions in the U.S. Court of Appeals, among other administrative provisions (Sec. 313(b)).

FERC implements its authority over onshore LNG terminals through the agency's regulations at 18 C.F.R. § 153. These regulations detail the application process and requirements under Section 3 of the NGA. The process begins with a pre-filing, which must be submitted to FERC at least six months prior to the filing of a formal application. The pre-filing procedures and review processes are set forth at 18 C.F.R. § 157.21. Once the pre-filing stage is completed, a formal application may be filed. FERC's formal application requirements include detailed site engineering and design information, evidence that a facility will safely receive or deliver LNG, and delineation of a facility's proposed location (18 C.F.R. § 153.8). Additional data are required if an LNG facility will be in an area with geological risk (18 C.F.R. § 153.8). The regulations also require LNG facility builders to notify landowners who would be affected by the proposed facility (18 C.F.R. § 157.6d). Facilities to be constructed at the Canadian or Mexican borders for import or export of natural gas also require a Presidential Permit.[58] According to FERC officials, applications under their Section 3-based regulations are also sufficient for Presidential Permit purposes (18 C.F.R. §§ 153.15-153.17).[59]

Under the National Environmental Policy Act of 1969 (P.L. 91-190), FERC must prepare an environmental impact statement in its review of an LNG terminal siting application (18 C.F.R. § 380.6). Applicants must prepare certain environmental reports to aid FERC in its preparation of the environmental impact statement (18 C.F.R. § 380.3(c)(2)(i)). These reports require analysis of, among

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[57] *See* 18 C.F.R. § 153; *see also* Foley, R., Federal Energy Regulatory Commission (FERC), Office of Energy Projects. "Liquefied Natural Gas Imports." Slide presentation. January 2003. p. 10.

[58] Executive Order No. 10,485 requires that FERC obtain a favorable recommendation from the Secretaries of State and Defense prior to issuing a Presidential Permit.

[59] FERC Office of Energy Projects, Personal communication, December 10, 2003.

other things, the socioeconomic impact of the LNG facility, geophysical characteristics of the site, safeguards against seismic risk, facility effects on air and noise quality, public safety issues in the event of accidents or malfunctions, and facility compliance with reliability standards and relevant safety standards (18 C.F.R. § 380.12). Once these environmental reports are received, the EPA may become involved in the approval process. The EPA often assists in the review of the environmental reports and the issuance of the environmental impact statements.[60]

In an effort to speed the review process for LNG projects and other natural gas infrastructure projects, FERC recently approved rules to expand eligibility for "blanket certificates." Blanket certificates are granted by FERC to companies that have previously been granted certificates for construction for public convenience and necessity under Section 7 of the NGA. A company that possesses a blanket certificate may improve or upgrade existing facilities or construct certain new facilities without further case-by-case authorization from FERC. Regulations governing acceptable actions under blanket certificate authority can be found at 18 C.F.R. §§ 157.201-157.218.

FERC also has created a Liquefied Natural Gas Compliance Branch to monitor the safety of operational LNG facilities on an ongoing basis.[61] This branch is responsible for the continued safety inspections and oversight of operating LNG facilities, and it reviews final facility design and engineering compliance with FERC orders. The staff comprises LNG engineers, civil and mechanical engineers, and other experts. The branch coordinates FERC's LNG Engineering Branch, the U.S. Coast Guard (USCG), and DOT to address safety and security at LNG facilities.[62]

FERC-DOT Jurisdictional Issues. Jurisdiction between the two federal agencies with LNG oversight responsibilities historically has been a point of contention.[63] In practice, FERC requires compliance with DOT's siting and safety regulations as a starting point, but can regulate more strictly if it chooses. This working arrangement is not explicitly established under the relevant federal law. Neither do the statutes and regulations clearly define the roles of the agencies vis-a-vis one another. The revised Pipeline Safety Act, for example, states:

> In a proceeding under section 3 or 7 of the Natural Gas Act (15 U.S.C. § 717b or 717f), each applicant ... shall certify that it will design, install, inspect, test, construct, operate, replace, and maintain a gas pipeline facility under ... section

[60] In July of 2006 EPA issued a "Liquefied Natural Gas Regulatory Roadmap" in an effort to assist LNG project applicants (both onshore and offshore) in dealing with environmental regulatory requirements. [http://www.epa.gov/opci/lng/lngroadmap.pdf]

[61] Press Release, Federal Energy Regulatory Commission, "Commission Establishes LNG Compliance Branch," May 2, 2006.

[62] *Id.*

[63] S.Rept. No. 96-182. 1979. p. 4.

> 60108 of this title. The certification is binding on the Secretary of Energy and the Commission... (49 U.S.C. § 60104(d)(2)).[64]

Despite this provision, which might appear to give DOT full control of gas safety regulation (including LNG siting authority), the authors of the House committee report for the revised Pipeline Safety Act indicated their intention to preserve FERC jurisdiction over LNG.[65] Accordingly, FERC has held that the Pipeline Safety Act does not remove its jurisdiction under the NGA to regulate LNG safety.[66] In 1985, FERC and DOT executed a Memorandum of Understanding expressly acknowledging "DOT's exclusive authority to promulgate Federal safety standards for LNG facilities" but recognizing FERC's ability to issue more stringent safety requirements for LNG facilities when warranted. This agreement appears to have resolved any jurisdictional conflict between the agencies at that time.[67] In February 2004, FERC streamlined the LNG siting approval process through an agreement with the USCG and DOT to coordinate review of LNG terminal safety and security. The agreement "stipulates that the agencies identify issues early and quickly resolve them."[68]

U.S. Coast Guard

The USCG has authority to review, approve, and verify plans for marine traffic around proposed onshore LNG marine terminals as part of the overall siting approval process led by FERC. The USCG is responsible for issuing a Letter of Recommendation regarding the suitability of waterways for LNG vessels serving proposed terminals. The agency is also responsible for ensuring that full consideration is given in siting application reviews to the safety and security of the port, the LNG terminal, and the vessels transporting LNG. The USCG acts as a cooperating agency in the evaluation of LNG terminal siting applications. The Coast Guard provides guidance to applicants seeking permits for onshore LNG terminals in "Guidance on Assessing the Suitability of a Waterway for Liquefied Natural Gas Marine Traffic" (NVIC 05-05) issued on June 14, 2005.[69]

National Fire Protection Association (NFPA)

As noted above, LNG terminal safety regulations incorporate standards set by the NFPA. The NFPA is an international nonprofit organization which advocates fire prevention and serves as an authority on public safety practices. According to NFPA, its 300 safety codes and standards "influence every building, process, service, design,

[64] 49 U.S.C. § 61018 specifies DOT's requirements for pipeline facility inspection and maintenance.

[65] *See* H.Rept. No. 1390, 1968, *reprinted in* 1968 U.S.C.C.A.N. 3223, 3251. Note, FERC was known as the Federal Power Commission (FPC) at the time.

[66] Chatanooga Gas Co., 51 FPC 1278, 1279 (1974).

[67] See "Notice of Agreement Regarding Liquefied Natural Gas," 31 FERC ¶ 61,232 (1985).

[68] Federal Energy Regulatory Commission (FERC). Press release R-04-3. February 11, 2004.

[69] Available at [http://www.uscg.mil/hq/g-m/nvic/NVIC%2005-05.doc.pdf].

and installation in the United States."[70] The NFPA LNG Standards Committee includes volunteer experts with diverse representation from industry and government, including FERC, DOT, USCG, and state agencies. The NFPA standards for LNG safety were initially adopted in 1967, with 10 subsequent revisions, most recently in 2006.[71] According to the Society of International Gas Tanker and Terminal Operators (SIGTTO), although the NFPA standards originated in the United States, they were the first internationally recognized LNG standards and are widely used throughout the world today.[72]

State Regulatory Roles

While the federal government is primarily responsible for LNG terminal safety and siting regulation, state and local laws, such as environmental, health and safety codes, can affect LNG facilities as well. Under the Pipeline Safety Act, a state also may regulate *intra*state pipeline facilities if the state submits a certification under section 60105(a) or makes an agreement with the DOT under section 60106. Under these provisions, a state "may adopt additional or more stringent safety standards" for LNG facilities so long as they are compatible with DOT regulations (49 U.S.C. 60104(c)). Of course, if a particular LNG facility would otherwise not fall under FERC and DOT jurisdiction, states may regulate without going through the certification or agreement process. Regulation of *inter*state facilities remains the primary responsibility of federal agencies. The Office of Pipeline Safety may, however, delegate authority to *intra*state pipeline safety offices, allowing state offices to act as "agents" administering *inter*state pipeline safety programs (excluding enforcement) for those sections of *inter*state facilities within their boundaries.[73] As of 2008, all 50 states, the District of Columbia, and Puerto Rico were participants in the natural gas pipeline safety program.[74]

State regulation of LNG facility safety and siting runs the gamut from piecemeal to comprehensive. For example, Arizona sets out specific requirements for LNG storage facilities, including "peak shaving" plants used by regional gas utilities, consistent with DOT regulations for construction maintenance and safety standards (Ariz. Admin. Code R14-5-202, R14-5-203, 126-01-001). Colorado and Georgia have comprehensive administrative systems for enforcing the federal standards (see 4 Co. Admin. Code 723-11; Ga. Admin. Code 515-9-3-03).

Apart from state regulation aimed specifically at LNG facilities, generally applicable state and local laws, such as zoning laws and permit requirements for

[70] National Fire Protection Assoc. (NFPA). *About NFPA.* Web page. Quincy, MA. 2008.

[71] National Fire Protection Association (NFPA). *Standard for the Production, Storage, and Handling of Liquefied Natural Gas*, 2006 Edition. NFPA 59A. Quincy, MA. 2007.

[72] Society of International Gas Tanker and Terminal Operators (SIGTTO). Personal communication. London, England. December 19, 2003.

[73] 49 U.S.C. 601. States may recover up to 50% of their costs for these programs from the federal government.

[74] Office of Pipeline Safety. "Federal, State and Industry OPS Partners." Web page. January 9, 2008. [http://ops.dot.gov/init/partner/partners.htm]

water, electricity, construction, and waste disposal, also may impact the planning and development of LNG facilities. This is discussed in more detail later in this report.

Federal-State Jurisdictional Conflicts. Federal and state government agencies have had jurisdictional disagreements specifically related to the siting of new LNG terminals. In February 2004, for example, the California Public Utilities Commission (CPUC) disputed FERC's jurisdiction over the siting of a proposed LNG terminal at Long Beach because, in the CPUC's opinion, the terminal would not be involved in interstate sales or transportation and therefore would not come under the Natural Gas Act.[75] In March 2004, FERC rejected the CPUC's arguments and asserted exclusive regulatory authority for all LNG import terminal siting and construction.[76] In April 2004, the CPUC voted to assert jurisdiction over the Long Beach terminal and filed a request for FERC to reconsider its March ruling.[77] In June 2004, FERC reasserted its March ruling, prompting a federal court appeal by California regulators. The Energy Policy Act of 2005 effectively codified FERC's jurisdictional rulings, however, leading the CPUC to drop its lawsuit challenging FERC's LNG siting authority in September 2005. Notwithstanding the CPUC case, other state challenges to FERC jurisdiction remain a possibility.

Key Policy Issues

Proposals for new LNG terminal facilities have generated considerable public concern in many of the communities where the terminals could be built. Some community groups and government officials fear that LNG terminals may expose nearby residents to unacceptable hazards, and that these hazards may not be appropriately considered in the federal siting approval process. Ongoing public concern about LNG terminal safety has focused congressional attention on the exclusivity of FERC's LNG siting authority, proposals for a regional LNG siting process, the lack of "remote" siting requirements in FERC regulations, state permitting requirements under the Clean Water Act (CWA) and the Coastal Zone Management Act (CZMA), terrorism attractiveness of LNG, and other issues.

"Exclusive" Federal Siting Authority

As stated earlier in this report, the Energy Policy Act of 2005 (P.L. 109-58) gives FERC the "exclusive" authority to approve onshore LNG terminal siting applications (Sec. 311(c)). Supporters of this provision argue that it is necessary to prevent federal-state jurisdictional disputes over LNG siting authority, and that it reduces the possibility that state agencies might prevent or unduly delay the development of LNG infrastructure considered essential to the nation's energy supply. They further argue that states retain considerable influence over LNG siting

[75] FERC. "Notice of Intervention and Protest of the Public Utilities Commission of the State of California." Docket No. CP04-58-000. February 23, 2004. p. 6.

[76] Lorenzetti, M. "LNG Rules." *Oil & Gas Journal*. April 5, 2004. p. 32.

[77] *Gas Daily*. "PUC Seeks Rehearing of FERC's Order on Long Beach LNG Project." April 27, 2004. p. 7.

approval through their federally delegated permitting authorities under the Coastal Zone Management Act of 1972 (16 U.S.C. 1451 et seq.), the Clean Air Act (42 U.S.C. 7401 et seq.), and the Federal Water Pollution Control Act (33 U.S.C. 251 et seq.). They maintain that states have a role in siting reviews under provisions in P.L. 109-58 requiring FERC to consult with governor-designated state agencies regarding state and local safety considerations prior to issuing LNG terminal permit (Sec. 311(d)).

A number of lawmakers at the federal and state levels have suggested that Congress should consider amending or repealing FERC's exclusive authority under P.L. 109-58. Critics of this authority argue that it vests too much power in the federal government at the expense of state agencies, which may have a better understanding of local siting issues and may bear most of the risks or burdens associated with a new LNG facility. They do not believe that FERC adequately seeks state input in its LNG siting reviews, nor adequately addresses state concerns in its siting decisions.[78] Critics question why governors lack the authority to veto onshore LNG terminal proposals as they can offshore terminal proposals under the Deepwater Port Act (33 U.S.C. § 1503(c)(8)). Some in Congress have proposed granting governors similar veto authority over onshore LNG terminal proposals, or other legislation to increase state authority in terminal siting reviews. Accordingly, S. 1174 and H.R. 2042 both would require state concurrence of federal siting approval decisions for onshore LNG terminals.

Regional Siting Approach

In areas such as the Northeast, where a number of onshore LNG terminal proposals have been particularly controversial, some policy makers have sought to establish a regional approach for identifying suitable sites for such terminals. They argue that FERC's consideration of LNG terminals on a proposal-by-proposal basis does not adequately take into account the regional needs for LNG, public safety concerns, and environmental impacts.[79] They also argue that the proposal-by-proposal approach does not adequately account for the relative merits of multiple LNG terminals proposed in the same region. They assert a regional LNG siting process would be more efficient than FERC's current process because it would focus attention on sites and projects with the highest chances of success rather than having numerous communities and state and local agencies react to individual plans, many of which are unlikely to be approved.[80]

FERC officials reportedly have stated that while they are not opposed to regional siting in principle, the commission cannot adopt such a regional approach because it has no land-use authority or responsibility and must let the energy market

[78] *EnergyWashington Week*. "New England Officials Want Rewrite of FERC's LNG Siting Authority." Vol. 4, No. 2. January 10, 2007.

[79] Congressman John F. Tierney, et al. Letter to the Hon. Patrick Wood, Chairman, Federal Energy Regulatory Commission (FERC). October 18, 2004.

[80] *Bangor Daily News*. "Regional Energy." December 8, 2006. p. A10.

determine which terminals ultimately are constructed.[81] In the past, FERC officials also have reportedly expressed skepticism about the effectiveness of regional siting processes, for example, in finding storage locations for low-level radioactive waste.[82] As oversight of federal LNG siting activities continues, Congress may be asked to consider whether legislation that incorporates regional siting in the LNG siting process could alleviate state concerns about FERC's current process while supporting the nation's needs for new LNG infrastructure.

"Remote" Siting of LNG Terminals

The LNG safety provisions in the federal pipeline safety law require the Secretary of Transportation to "consider the ... need to encourage remote siting" of new LNG facilities (49 U.S.C. § 60103). Federal regulations contain no clear "remote" siting requirements, relying instead on safety exclusion zones to satisfy the remoteness requirements under the Pipeline Safety Act. This regulatory alternative was criticized by the General Accounting Office (GAO) in 1979 testimony to Congress supporting remote siting in the Pipeline Safety Act:

> We believe remote siting is the primary factor in safety. Because of the inevitable uncertainties inherent in large-scale use of new technologies and the vulnerability of the facilities to natural phenomena and sabotage, the public can be best protected by placing these facilities away from densely populated areas.[83]

In 2003, Representative Edward Markey, an original sponsor of the Pipeline Safety Act, reportedly expressed concern that DOT regulations did not go far enough in complying with the congressional intent of the remote siting provisions.[84]

Industry and government officials maintain that exclusion zones do provide adequate public safety based on the current state of knowledge about LNG. They argue that LNG terminals are no longer a new technology and face far fewer operational uncertainties than in 1979. In particular, some experts believe that hazard models in the 1970s were too conservative. They believe that more recent models have led to a better understanding of the physical properties of LNG and, consequently, a better basis for design decisions affecting public safety.[85] They point

[81] *Foster Natural Gas Report*. "Northeast States Need LNG, Especially New England; No Evidence of Regional Planning." December 15, 2006. p. 5.

[82] Howe, P.J. "LNG Supplies, Solutions Lacking." *The Boston Globe*. September 26, 2006. p. C4.

[83] Peach, J.D. General Accounting Office (GAO), Director, Energy and Minerals Division. Testimony to the Senate Committee on Commerce, Science and Transportation. Washington, DC. April 25, 1979. p. 10. The General Accounting Office is now known as the Government Accountability Office.

[84] Raines, B. "Congress Wanted LNG Plants at 'Remote' Sites." *Mobile Register*. Mobile, AL. November 16, 2003.

[85] Tobin, L.T. Remarks at a meeting of the City of Vallejo Seismic Safety Commission. Meeting minutes. Vallejo, CA. September 11, 2003. p. 5; see also: *Federal Register*. Vol.

(continued...)

out that LNG terminals like those in Everett, Massachusetts (1971); Barcelona, Spain (1969); Fezzano, Italy (1969); and Pyongtaek, Korea (1986) have been operating for decades near populated areas without a serious accident affecting the public. Of the 28 existing LNG terminals in Japan, a seismically active country, most are near major cities such as Tokyo and Osaka.[86] While the Algerian terminal accident was serious, experts point out that it did not lead to the catastrophic failure of the main LNG storage tanks and did not cause injuries to the general public. Nonetheless, some policy makers reportedly have called for amendments to federal energy law prohibiting new LNG terminals in urban and densely populated areas.[87]

Clean Water and Coastal Zone Management Acts

Section 311(c) of the Energy Policy Act of 2005 explicitly preserves states' authorities in LNG siting decisions under the Federal Water Pollution Control Act, the Coastal Zone Management Act of 1972, and other federal laws. Under the Federal Water Pollution Control Act, often referred to as the Clean Water Act (CWA), states have the authority to develop and enforce their own water quality standards.[88] Any federal permit applicant that may discharge pollutants into navigable waters must provide the permitting agency with a certification from the state in which the discharge originates or will originate that the discharge is in compliance with the applicable provisions of the CWA, including the state's water quality standards.[89] Thus, states could use their certification authority under the Clean Water Act to influence the siting of an LNG project by attaching conditions to the required water quality certificate or by denying certification. This certification authority has become an important tool used by states to protect the integrity of their waters. It is worth noting that the Energy Policy Act of 2005 created one potential avenue of relief for potential developers by providing for expedited review in a federal court of any order or action, or alleged inaction, by a federal or state agency acting under the authority of federal law.[90] Previously, parties seeking to challenge a state's decision regarding a water quality certificate had to do so in state court.[91]

States have delegated authority under the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1451 et seq., which also could influence permitting of LNG terminals. Under the CZMA, applicants for federal permits to conduct activity

[85] (...continued)
62, No. 37. February 25, 1997. pp. 8402-8403.

[86] California Energy Commission (CEC). "Asia Pacific Countries Liquefied Natural Gas (LNG)." January 2008. [http://www.energy.ca.gov/lng/worldwide/asia_pacific.html]

[87] *Energy Washington Week*. January 10, 2007.

[88] 33 U.S.C. § 1251(a),(b).

[89] *Id.* at § 1341(a).

[90] EPAct of 2005, P.L. 109-58 at §§ 717r(d)(1)-(2).

[91] For further discussion of the water quality certification process and its impact on LNG siting, see Dweck, J., Wochner, D., and Brooks, M. "Liquefied Natural Gas (LNG) Litigation after the Energy Policy Act of 2005: State Powers in LNG Terminal Siting." *Energy Law Journal*, Vol. 27, No. 45 (2006). p. 482-85.

affecting the coastal zone of a state must be certified by that state that the proposed activity complies with the state's federally approved coastal program and will be conducted in a manner consistent with that program.[92] A state wishing to forestall the licensing of an LNG terminal in its coastal waters could deny the certification required by the CZMA.[93] However, unlike the state-issued water quality certificates required for federal permitting by the Clean Water Act, the CZMA provides an alternative to applicants who are unable to obtain state certification. Under the CZMA, applicants may appeal the state's decision to the Department of Commerce, which may find that the activity is consistent with the objectives of the CZMA, or is otherwise necessary in the interest of national security, and thus override the state's denial of certification.[94] One analyst has suggested that there is a specific set of circumstances in which a state could create a regulatory stalemate pursuant to its CZMA authority by rejecting an application as incomplete (rather than rejecting it as improper or by failing to act). Under these circumstances the statute does not grant the Secretary of Commerce authority to review the decision. Indeed, battles between state regulatory agencies and applicants for LNG terminals have played out in this manner on at least two occasions.[95]

The discussion above suggests that authorities under the CWA and CZMA, at a minimum, give states the opportunity to have their concerns addressed when applicants seek federal approval for new LNG terminals. One legal commentator has stated that

> ultimately, while the EPAct of 2005 might have streamlined the federal [LNG siting] review process in some respects and changed the rules under which the review takes place, it has not dramatically changed the balance of power between the federal government and states.[96]

Indeed, a recent decision by the U.S. District Court for the District of Maryland seems to confirm this commentator's position. In AES Sparrows Point LNG, LLC v. Smith, Slip. Op., 2007 WL 1826889 (D. Md 2007), the court held that a recent amendment to the Baltimore County Zoning Regulations prohibiting the siting of an LNG facility in a particular "critical area" of the Chesapeake Bay was not preempted by the Natural Gas Act as amended by the Energy Policy Act of 2005. The plaintiffs claimed that the statutes explicitly gave LNG siting authority to the federal government, and thus the states could not interfere with FERC authority to rule on the plaintiff's LNG facility permit application.[97]

[92] 16 U.S.C. § 1456(c)(3)(A).

[93] The state must actively state its objection to the applicant's certification; a state's failure to act is presumed to be concurrence with project certification. *Id.*

[94] 16 U.S.C. § 1456(c)(3)(A).

[95] For further discussion see Ewing, K.A. and E. Petersen. "Significant Environmental Challenges to the Development of LNG Terminals in the United States." *Texas Journal of Oil, Gas and Energy Law*. November 2006. pp. 21-23; Dweck et al., p. 487-90.

[96] Dweck et al. 2006, p. 475.

[97] The same court had previously overturned a Baltimore County zoning ordinance that (continued...)

The provisions of the Natural Gas Act as amended by the Energy Policy Act of 2005 that grant FERC LNG siting authority specifically provide that "nothing in [the Natural Gas Act] affects the rights of States under ... the Coastal Zone Management Act" and other environmental statutes.[98] The court held that the new zoning regulation had been enacted as part of the state's Coastal Zone Management Plan, that had been approved by the Secretary of Commerce as required by the CZMA. The court held that not every detail of the CZMP must be approved by the Secretary of Commerce, and the Secretary's approval of the Maryland plan that expressly provided for delegation of authority to local jurisdictions to implement local protection plans was sufficient to make the elements of those local protection plans enforceable under the CZMA.[99] The court's decision may enhance the states' ability to influence LNG siting even after the enactment of Section 311 of the Energy Policy Act of 2005.

As oversight of the federal LNG siting process continues, Congress may consider how federal authorities under the Energy Policy Act of 2005, the CWA, the CZMA, and other federal statutes fit together to achieve their various objectives. For example, S. 1579 would amend the CZMA to require FERC and the Department of Commerce to submit a report to Congress regarding development of a memorandum of understanding for a "coordinated process for review of coastal energy activities that provides for ... improved coordination among Federal, regional, state, and local agencies concerned with conducting review under the Coastal Zone Management Act."[100]

Terror Attractiveness

Potential terrorist attacks on LNG terminals or tankers in the United States have been a key concern of policy makers because such attacks could cause catastrophic fires in ports and nearby populated areas. A 2007 report by the Government Accountability Office states that, "the ship-based supply chain for energy commodities," specifically including LNG, "remains threatened and vulnerable, and appropriate security throughout the chain is essential to ensure safe and efficient delivery."[101] Accordingly, the Coast Guard's FY2006 budget requested funding for "additional boat crews and screening personnel at key LNG hubs."[102] To date, no

[97] (...continued)
prohibited siting of LNG facilities within a certain distance of residential and commercial facilities on those same grounds. See AES Sparrows Point LNG, LLC v. Smith, 470 F.Supp.2d 586 (D.Md. 2007).

[98] 15 U.S.C. § 717b(d).

[99] AES Sparrows Point LNG, LLC v. Smith, 2007 WL at *7.

[100] S. 1579 at § 21.

[101] Government Accountability Office (GAO). "Maritime Security: Federal Efforts Needed to Address Challenges in Preventing and Responding to Terrorist Attacks on Energy Commodity Tankers," GAO-08-141, December 10, 2007, p.77.

[102] Dept. of Homeland Security (DHS). *Budget-in-Brief, Fiscal Year 2006.* [https://www.dhs.gov/xlibrary/assets/Budget_BIB-FY2006.pdf].

LNG tanker or land-based LNG facility in the world has been attacked by terrorists. However, similar natural gas and oil assets have been terror targets internationally. The Department of Homeland Security (DHS) included LNG tankers among a list of potential terrorist targets in a security alert late in 2003.[103] The DHS also reported that "in early 2001 there was some suspicion of possible associations between stowaways on Algerian flagged LNG tankers arriving in Boston and persons connected with the so-called 'Millennium Plot'" to bomb targets in the United States. Although these suspicions could not be proved, DHS stated that "the risks associated with LNG shipments are real, and they can never be entirely eliminated."[104] The 2004 report by Sandia National Laboratories concluded that potential terrorist attacks on LNG tankers could be considered "credible and possible."[105] Former Bush Administration counterterrorism advisor Richard Clarke has asserted that terrorists have both the desire and capability to attack LNG shipping with the intention of harming the general population.[106]

Although they acknowledge the security information put forth by federal agencies, some experts believe that concern about threats to LNG infrastructure is overstated.[107] In 2003, the head of one university research consortium reportedly remarked, "from all the information we have ... we don't see LNG as likely or credible terrorist targets."[108] Industry representatives argue that deliberately causing an LNG catastrophe to injure people might be possible in theory, but would be extremely difficult to accomplish. Likewise, the Federal Energy Regulatory Commission (FERC) and other experts believe that LNG facilities are relatively secure compared with other hazardous chemical infrastructures that receive less public attention. In a December 2004 report, the FERC stated that

> for a new LNG terminal proposal ... the perceived threat of a terrorist attack may be considered as highly probable to the local population. However, at the national level, potential terrorist targets are plentiful.... Many of these pose a similar or greater hazard to that of LNG.[109]

[103] Office of Congressman Edward J. Markey. Personal communication with staff. January 5, 2004.

[104] Turner, Pamela J., Assistant Secretary for Legislative Affairs, Department of Homeland Security (DHS). Letter to U.S. Representative Edward Markey. April 15, 2004. p. 1.

[105] Sandia National Laboratories (SNL). *Guidance on Risk Analysis and Safety Implications of a Large Liquefied Natural Gas (LNG) Spill Over Water*. SAND2004-6258. Albuquerque, NM. December 2004. pp. 49-50.

[106] Clarke, Richard A. et al. *LNG Facilities in Urban Areas*. Good Harbor Consulting, LLC. Prepared for the Rhode Island Office of Attorney General. GHC-RI-0505A. May 2005.

[107] McLaughlin, J. "LNG Is Nowhere Near as Dangerous as People Are Making it Out to Be." *Lloyd's List*. February 8, 2005. p. 5.

[108] Behr, Peter. "Higher Gas Price Sets Stage for LNG." *Washington Post*. July 5, 2003. p. D10.

[109] Federal Energy Regulatory Commission (FERC). *Vista del Sol LNG Terminal Project, Draft Environmental Impact Statement*. FERC/EIS-0176D. December 2004. p. 4-162.

The FERC also remarked, however, that "unlike accidental causes, historical experience provides little guidance in estimating the probability of a terrorist attack on an LNG vessel or onshore storage facility."[110] Former Director of Central Intelligence James Woolsey has stated his belief that a terrorist attack on an LNG tanker in U.S. waters would be unlikely because its potential impacts would not be great enough compared with other potential targets.[111] LNG terminal operators that have conducted proprietary assessments of potential terrorist attacks against LNG tankers have expressed similar views.[112] In its September 2006 evaluation of a proposed LNG terminal in Long Island Sound, the USCG states that "there are currently no specific, credible threats against" the proposed LNG facility or tankers serving the facility.[113] The evaluation also notes, however, that the threat environment is dynamic and that some threats may be unknown.[114]

Because the probability of a terrorist attack on LNG infrastructure cannot be known, policy makers and community leaders must, to some extent, rely on their own judgment to decide whether LNG security is adequately addressed in FERC siting application reviews. As oversight of the federal role in LNG terminal siting continues, Congress may explore policies to reduce this uncertainty by improving the gathering and sharing of terrorism intelligence related to LNG.

Other Issues

Conducting More Safety Research. Analysts have suggested for several years that Congress could call for additional LNG safety research to help reduce uncertainties about specific LNG terminal or shipping hazards.[115] Among the LNG terminal hazard reports issued by federal agencies, LNG developers, and community groups, there appears to be widespread agreement that additional "objective" LNG safety research would be beneficial. The ABSG report states, for example, that "additional research will need to be performed to develop more refined models, and additional large-scale spill tests would be useful for providing better data for

[110] FERC. FERC/EIS-0176D. December 2004. p. 4-162. Notwithstanding this assertion, in its subsequent draft review of the Long Beach LNG terminal proposal, the FERC states that "the historical probability of a successful terrorist event would be less than seven chances in a million per year...." See FERC. October 7, 2005. p. ES-14.

[111] Woolsey, James. Remarks before the National Commission on Energy LNG Forum, Washington, DC, June 21, 2006.

[112] Grant, Richard, President, Distrigas. Testimony before the Senate Committee on Energy and Natural Resources, Subcommittee on Energy hearing on "The Future of Liquefied Natural Gas: Siting and Safety." February 15, 2005.

[113] U.S. Coast Guard. *U.S. Coast Guard Captain of the Port Long Island Sound Waterways Suitability Report for the Proposed Broadwater Liquefied Natural Gas Facility*. September 21, 2006. p. 146.

[114] Ibid.

[115] See, for example: Kytömaa, H. and Gavelli, F. "Studies of LNG Spills Over Water Point Up Need for Improvement." *The Oil and Gas Journal*. May 9, 2005. p. 61.

validation of models."[116] The Sandia study similarly concludes that "obtaining experimental data for large LNG spills over water would provide needed validation and help reduce modeling uncertainty."[117] Physical testing (as opposed to computer simulations) of impacts and explosions on LNG tanker hulls by the USCG could also fill important gaps in engineering knowledge about the potential effects of terrorist attacks.

DOE is funding a study by Sandia National Laboratories to conduct LNG fire experiments to refine and validate existing LNG hazard models. In its 2007 report, the GAO stated that DOE's proposed research plan at that time would "address only 3 of the top 10 issues — and not the second-highest ranked issue — that our panel of experts identified as potentially affecting public safety."[118] In response to the GAO's concerns and those of congressional staff, the DOE and Sandia have since modified their test program to better align with the priorities put forward by the GAO.[119] The DOE's study could, nonetheless, still be subject to the same types of technical limitations and criticisms facing existing analysis, so while it may reduce key uncertainties, it may not eliminate them altogether. As Congressional oversight of DOE or other federal LNG research continues, Congress may seek to determine whether federal resources are appropriately devoted to reduce the LNG uncertainties of greatest importance to public safety.

Developer Employee Disclosure. Some policy makers are concerned that LNG terminal developers may engage in non-public community lobbying or other similar activities promoting individual LNG terminals. Concern arises that these activities may limit public information and awareness about the proposed terminals and, therefore, may impede the federal LNG siting review process. Accordingly, S. 323 would require an applicant for siting approval for an onshore or offshore LNG terminal to identify each of its employees and agents "that are engaged, directly or indirectly, in activities to persuade communities of the benefits" of approval of the siting application. Supporters of such a policy view it as a means of ensuring public transparency in LNG terminal siting. Disclosure requirements of this type may trigger some First Amendment concerns, however. The Supreme Court has recognized that such government disclosure requirements may have a deterrent effect on the exercise of First Amendment rights.[120] In balancing First Amendment interests, for example, against the government's interest preserving the integrity of the legislative process, the Court has generally upheld the constitutionality of disclosure requirements related to "direct" lobbying of members of Congress.[121] It is unclear how the Court would rule on a disclosure law such as S. 323 related to

[116] ABSG Consulting. May 13, 2004. p. iv.

[117] SNL. December 2004. p. 18.

[118] GAO. 2007. pp. 22-23.

[119] Sandia National Laboratories, Fire Science and Technology Dept. Personal communication. November 5, 2007.

[120] *Buckley v. Valeo*, 424 U.S. 1, 65 (1976).

[121] *United States v. Harriss*, 347 U.S. 612 (1954).

"indirect" lobbying efforts targeting constituents or otherwise taking place at the local level.[122]

Reducing LNG Demand. Some policy makers argue that Congress should try to reduce the need for new LNG terminals by acting to curb growth in domestic LNG demand, or growth in natural gas demand overall. For example, Congress could change public and industrial incentives for conservation, switching to other fuels, or developing renewable energy supplies. But other fuels like coal and nuclear power pose their own hazards to communities and the environment, so their expansion may not be preferable to additional LNG infrastructure. Conservation and renewable energy sources are less hazardous, although they face significant technological and cost barriers to public adoption on the scale that would be required. Federal investments in renewables research or conservation subsidies might have to be large, and might not have enough impact to alleviate the need for LNG expansion altogether. Various provisions in recent proposed energy legislation would encourage the development of conservation and other alternatives to natural gas, but critics believe they would not likely go far enough to significantly affect near-term natural gas consumption.

Another potential way to curb U.S. LNG demand would be to encourage greater North American production of natural gas. Provisions in the Energy Policy Act of 2005 seek to promote this objective, as do proposals to encourage construction of an Alaska gas pipeline. An Alaska gas pipeline would take years to build, however, and would not on its own be able to meet the anticipated long-term growth in U.S. gas demand. Increased production from natural gas wells in the lower 48 states could help alleviate a possible near-term natural gas supply shortage, but may not offer a sustainable long-term supply solution since domestic gas reserves may not be able to keep pace with rising gas demand.

Conclusion

Proposals for new U.S. LNG import terminals are numerous, but LNG imports pose safety challenges. LNG is inherently hazardous and its infrastructure is potentially attractive to terrorists. The 2004 LNG terminal fire in Algeria demonstrates that, despite technological improvements since the 1940s, LNG facilities can still experience serious accidents. Many lawmakers and the general public are concerned about these hazards.

The U.S. LNG industry is subject to more extensive siting and safety regulation than many other similarly hazardous facilities. Federal, state, and local governments have also put in place security measures intended to safeguard LNG against newly perceived terrorist threats. Some community groups and other stakeholders fear that federal siting requirements for LNG facilities are still not stringent enough, but the responsible federal agencies disagree.

[122] For further discussion on this topic, see CRS Report RL33794, *Grassroots Lobbying: Constitutionality of Disclosure Requirements*, by Jack Maskell.

The safety issues associated with LNG terminal siting are both important and familiar. Every major energy source poses some hazard to public safety. Similar public concerns have been raised around siting of other types of energy facilities such as nuclear power plants, oil import terminals, pipelines, and electric transmission lines. In evaluating new LNG terminal proposals, therefore, policy makers face a full range of facilities and safety hazards associated with U.S. energy supplies, not only LNG needs and hazards on their own.

Although LNG terminal regulations are extensive, and the global industry has decades of experience operating LNG facilities, many stakeholders question LNG terminal safety. Some of these questions might be resolved through additional research on key LNG topics. LNG siting decisions are already underway, however, so any research efforts intended to affect the siting process would probably have to be completed quickly. Revising LNG safety requirements after completion of a facility could be disruptive of energy supplies. Some cite the Shoreham nuclear power plant in the 1980s, which was closed after construction due to new public safety requirements, as an example of the need to resolve safety concerns before capital is invested.

Both industry and government analysts project continued near-term growth in the demand for natural gas — and a decreasing ability for domestic gas producers to meet that demand.[123] Greater LNG imports represent one way to address this growth in demand, along with increased North American gas production, conservation, fuel-switching, and the development of renewable energy sources. One way or another the fundamental gas supply and demand balance must be maintained. If policy makers encourage LNG imports, then the need to foster the other energy options may be diminished — and vice versa. Thus decisions about LNG infrastructure could have consequences for a broader array of natural gas supply policies.

[123] Energy Information Administration (EIA). *Annual Energy Outlook 2008* (Early Release). DOE/EIA-0383(2008). Fig. 3. December 2007.

Appendix: Offshore LNG Terminal Regulation

Under the Deepwater Port Act of 1974 (P.L. 93-627) the Secretary of Transportation is directed to "authorize and regulate the location, ownership, construction, and operation of deepwater ports" (33 U.S.C. §§ 1501(a), 1503). The Secretary has delegated this authority to the Maritime Administration (MARAD) within the Department of Transportation, and to the Coast Guard (USCG), within the Department of Homeland Security.[124] Originally, P.L. 93-627 applied only to offshore oil ports and terminals and not LNG facilities. However, the Maritime Transportation Security Act of 2002 (P.L. 107-295) amended P.L. 93-627 to include natural gas facilities, including LNG terminals, developed offshore. As amended, "deepwater ports" are:

> any fixed or floating manmade structure other than a vessel ... located beyond State seaward boundaries ... intended for use as a port or terminal for the transportation, storage, or further handling of oil *or natural gas* for transportation to any State... (33 U.S.C. § 1502(9a))[125]

The Deepwater Port Act sets out a detailed process for offshore facility siting applications. The act also authorizes regulations addressing potential threats to the environment or human welfare posed by development of offshore LNG facilities (33 U.S.C. §§ 1504, 1508; 33 C.F.R. § 148). The act also requires regulations for the designation of safety zones around deepwater ports (33 U.S.C. § 1509(d)). Among the amendments to the act is a provision exempting LNG terminals from the limitation on the number of "deepwater ports" that can be located in a designated "application area," a provision applicable to oil terminals (33 U.S.C. §§ 1504(d)(4), (i)(4)). Additionally, a preexisting provision of the act allows the governor of a state adjacent to a proposed offshore LNG facility to have that facility license conform to state environmental protection, land and water use, or coastal zone management programs (33 U.S.C. § 1508(b)).

The USCG's regulations regarding LNG facilities are codified throughout 33 C.F.R., with major provisions in part 127. These regulations detail the requirements for siting applications, which include information about the proposed location, design, construction, and operation (33 C.F.R. § 148.109). NEPA analysis is often instrumental in siting and safety-related decisions at specific proposed facilities and is facilitated by the Minerals Management Service, the agency responsible for offshore minerals extraction and the Outer Continental Shelf leasing program.[126] Unlike requirements for onshore facilities, the Coast Guard does not appear to require generally applicable exclusion zones for offshore facilities, but relies instead

[124] For a recent LNG siting application, MARAD performed financial analysis and USCG evaluated environmental impacts; the agencies cooperated on all other aspects of the review. ("First Offshore Terminal in U.S. is About to Secure Federal License." *Foster Natural Gas Report*. Bethesda, MD. November 20, 2003. p. 21.

[125] The statute defines natural gas to include "liquefied natural gas." 33 U.S.C. § 1502(14).

[126] Sierra B. Weaver, Note, "Local Management of Natural Resources: Should Local Governments Be Able to Keep Oil Out?," 26 *HARV. ENVTL. L. REV.* 231, 246 (2002).

on case-by-case designation of safety zones.[127] Additional USCG regulations include agency oversight of emergency procedures, security, fire protection, and design and construction standards (33 C.F.R. §§ 127.109, 127.701-127.711, 127.601-127.617, 127.1101-127.1113, 149.205).

[127] See 33 C.F.R. § 165, Regulated Navigation Areas and Limited Access Areas.

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CRS Report for Congress

Liquefied Natural Gas (LNG) Infrastructure Security: Issues for Congress

Updated March 25, 2008

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Prepared for Members and
Committees of Congress

Liquefied Natural Gas (LNG) Infrastructure Security:
Issues for Congress

Summary

Liquefied natural gas (LNG) is a hazardous fuel shipped in large tankers from overseas to U.S. ports. Because LNG infrastructure is highly visible and easily identified, it can be vulnerable to terrorist attack. Since September 11, 2001, the U.S. LNG industry and federal agencies have put new measures in place to respond to the possibility of terrorism. Nonetheless, public concerns about LNG risks continue to raise questions about LNG security. Faced with a perceived national need for greater LNG imports, and persistent public concerns about LNG risks, some in Congress are examining the adequacy of security provisions in federal LNG regulation.

LNG infrastructure consists primarily of tankers, import terminals, and inland storage plants. There are seven active U.S. terminals and proposals for many others. Although potentially catastrophic events could arise from a serious accident or attack on such facilities, LNG has a record of relative safety for the last 40 years, and no LNG tanker or land-based facility has been attacked by terrorists. The likelihood and possible impacts from LNG attacks continue to be debated among experts.

Several federal agencies oversee LNG infrastructure security. The Coast Guard has lead responsibility for LNG shipping and marine terminal security under the Maritime Transportation Security Act of 2002 (P.L. 107-295) and the Security and Accountability for Every Port Act of 2006 (P.L. 109-347). The Office of Pipeline Safety (OPS) and the Transportation Security Administration (TSA) both have security authority for LNG storage plants within gas utilities, as well as some security authority for LNG marine terminals. The Federal Energy Regulatory Commission (FERC) approves the siting, with some security oversight, of on-shore LNG marine terminals and certain utility LNG plants. The Coast Guard, OPS and FERC cooperate in the siting approval of new LNG facilities, inspection and operational review of existing facilities, informal communication, and dispute resolution.

Federal initiatives to secure LNG are still evolving, but a variety of industry and agency representatives suggest they are reducing the vulnerability of LNG to terrorism. S. 1594 would strengthen federal protection of vessels and infrastructure handling LNG and other especially hazardous cargoes through new international standards, new training requirements, vessel security cost-sharing, incident response and recovery plans, and other provisions. H.R. 2830 would require the Coast Guard to certify that new LNG terminals will be adequately secured before they can be approved. As Congress continues its oversight of LNG, it may consider whether future LNG security requirements will be appropriately funded, whether these requirements will be balanced against evolving risks, and whether the LNG industry is carrying its fair share of the security burden. Congress may also act to improve its understanding of LNG security risks. Costly "blanket" investments in LNG security might be avoided if more refined terror threat information were available to focus security spending on a narrower set of infrastructure vulnerabilities. Finally, Congress may initiate action to better understand the security and trade implications of efforts to promote U.S.-flagged LNG tankers and U.S. crews.

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Liquefied Natural Gas (LNG) Infrastructure Security: Issues for Congress

Introduction

Liquefied natural gas (LNG) facilities are receiving a great deal of public attention due to their increasingly important role in the nation's energy infrastructure and their potential vulnerability to terrorist attack. LNG has long been important to U.S. natural gas markets, although energy economics and public perceptions about LNG risks have limited the industry's growth. Concerns about rising natural gas prices and the possibility of domestic gas shortages have been driving up demand for LNG imports. But LNG is a hazardous[1] liquid transported and stored in large quantities. Consequently, LNG infrastructure may directly impact the security of communities where this infrastructure is located. Faced with the widely perceived national need for greater LNG imports, and persistent public concerns about LNG risks, some in Congress are examining the adequacy of security provisions in federal LNG regulation.[2]

S. 1594, which was introduced by Senator Frank Lautenberg and three cosponsors and referred to the Senate Committee on Commerce, Science, and Transportation on June 12, 2007, would strengthen federal protection of vessels and infrastructure handling LNG and other especially hazardous cargoes. H.R. 2830, which was introduced by Representative James Oberstar and two cosponsors on June 22, 2007, and reported by the House Transportation and Infrastructure Committee on September 20, 2007, would require the Coast Guard to certify that new LNG terminals will be adequately secured before they can be approved, among other provisions. H.R. 2830 as sequentially reported by the House Homeland Security Committee on October 1, 2007, would further require a homeland security impact review of proposed LNG terminals and a comparative risk assessment of vessel-based and facility-based LNG regasification processes.

This report provides an overview of industry and federal activities related to LNG security. The report describes U.S. LNG infrastructure, the industry's safety record and security risks, and the industry's security initiatives since September 11, 2001. It summarizes recent changes in federal LNG and maritime security law and related changes in the security roles of federal agencies. The report discusses several policy concerns related to federal LNG security efforts: 1) public costs of marine

[1] 49 C.F.R. 172.101. *List of Hazardous Materials.* Office of Hazardous Materials Safety, Department of Transportation.

[2] See, for example: U.S. Representative Tim Bishop, "Bishop Calls for Congressional Hearing on Coast Guard's Inability to Protect LNG Tankers," Press release, March 12, 2008.

security, 2) uncertainty regarding LNG terrorism risks, and 3) security implications of building offshore LNG facilities.

Scope and Limitations

This report focuses on industry and federal activities in LNG infrastructure security. The report includes some discussion of state and local agency activities as they relate to federal efforts, but does not address the full range of state and local issues of potential interest to policy makers. The report also focuses on shipping, marine terminals and land-based storage facilities within gas utilities; it does not address LNG trucking, special purpose LNG facilities, or LNG-fueled vehicles. The report discusses activities in LNG safety only as they relate to security. For further discussion of LNG terminal safety, including LNG safety-related legislative proposals, see CRS Report RL32205, *Liquefied Natural Gas (LNG) Terminals: Siting, Safety and Regulation*, by Paul Parfomak and Adam Vann.

Background

What is LNG?

When natural gas is cooled to temperatures below minus 260°F it condenses into *liquefied* natural gas, or "LNG."[3] As a liquid, natural gas occupies only 1/600th the volume of its gaseous state, so it is stored more effectively in a limited space and is more readily transported by ship or truck. A single tanker ship, for example, can carry huge quantities of LNG — enough to supply the daily energy needs of over 10 million homes. When LNG is warmed it "regasifies" and can be used for the same purposes as conventional natural gas such as heating, cooking and power generation.

In 2007, LNG imports to the United States originated in Trinidad and Tobago (57.3%), Egypt (15.3%), Nigeria (12.7%), Algeria (9.9%), Qatar (2.4%), and Equatorial Guinea (2.4%).[4] In recent years, some LNG shipments have also come from Malaysia, Oman, Australia, and other countries.[5] Brunei, Indonesia, Libya, and the United Arab Emirates also export LNG, and may be significant U.S. suppliers in the future. In addition to importing LNG to the lower 48 states, the United States exports Alaskan LNG to Japan.

Expectations for U.S. LNG Growth

The United States has used LNG commercially since the1940s. Initially, LNG facilities stored domestically produced natural gas to supplement pipeline supplies

[3] Natural gas typically consists of at least 80% methane, although LNG is usually over 90% methane. It may also contain other hydrocarbon gases (e.g., propane) and nitrogen.

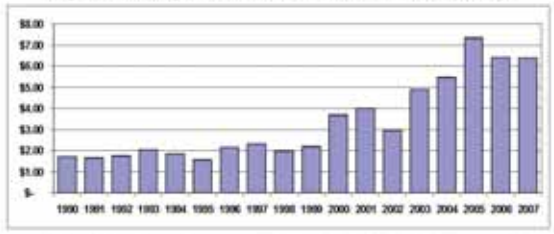
[4] U.S. Dept. of Energy, Office of Fossil Energy. "Natural Gas Import/Export Reports." Internal database. January 7, 2008. Excludes December 2007 imports.

[5] Energy Information Administration (EIA). *Natural Gas Year-In-Review 2006*. Washington, DC, March 2007. p. 5.

during times of high gas demand. In the 1970s LNG imports began to supplement domestic production. Due primarily to low domestic gas prices, LNG imports stayed relatively small — accounting for only 1% of total U.S. gas consumption in 2002.[6] In countries with limited domestic gas supplies, however, LNG imports grew dramatically over the same period. Japan, for example, imported 97% of its natural gas supply as LNG in 2002, over 11 times as much LNG as the United States.[7] South Korea, France, Spain, and Taiwan also became heavy LNG importers.

Natural gas demand has accelerated in the United States over the last several years due to environmental concerns about other energy sources, growth in natural gas-fired electricity generation, and historically low gas prices. Supply has not been able to keep up with demand, however, so gas prices have recently become high and volatile. As **Figure 1** shows, average annual gas prices at the wellhead have risen from between $1.50 and $2.50/Mcf ("thousand cubic feet") through most of the 1990s to above $6.00/Mcf since 2005. At the same time, international prices for LNG have fallen because of increased supplies and lower production and transportation costs, making LNG more competitive with domestic natural gas. While cost estimation is speculative, some industry analysts believe that LNG can be economically delivered to U.S. pipelines for between $2.25 to $4.15/Mcf, depending upon the source.[8]

Figure 1. Average U.S. Natural Gas Wellhead Price ($/Mcf)



Source: Energy Information Administration. "U.S. Natural Gas Wellhead Price." Internet database. Updated Feb. 29, 2008. [http://tonto.eia.doe.gov/dnav/ng/hist/n9190us3m.htm]

In 2003 testimony before the House Energy and Commerce Committee, the Federal Reserve Chairman, Alan Greenspan, called for a sharp increase in LNG imports to help avert a potential barrier to U.S. economic growth. According to Mr. Greenspan's testimony

[6] Energy Information Administration (EIA). *Natural Gas Annual 2005*. Tables 1 and 9. November 16, 2006.

[7] Energy Information Administration (EIA). "World LNG Imports by Origin, 2002." Washington, DC. October 2003.

[8] Donnelly, M. "LNG as Price Taker." *Public Utilities Fortnightly*. November 1, 2006.

> ... notable cost reductions for both liquefaction and transportation of LNG ... and high gas prices projected in the American distant futures market have made us a potential very large importer.... Access to world natural gas supplies will require a major expansion of LNG terminal import capacity.[9]

If current natural gas trends continue, the Energy Information Administration (EIA) projects U.S. LNG imports to account for approximately 13% of total U.S. gas supply in 2030.[10]

Overview of U.S. LNG Infrastructure

The physical infrastructure of LNG consists of interconnected transportation and storage facilities, each with distinct physical characteristics affecting operational risks and security needs. This overview focuses on the three major elements of this infrastructure: tanker ships, marine terminals, and storage facilities.

LNG Tanker Ships

LNG is transported to the United States in very large, specially designed tanker ships. LNG tankers are double hulled, containing several massive refrigerated tanks, each sealed and insulated to maintain safe LNG temperature and prevent leakage during transit. There are currently 200 tankers in service around the world, with a combined cargo capacity of over 24 million cubic meters of LNG, equivalent to over eight times the average daily U.S. natural gas consumption. More than 200 additional tankers are expected to enter service by 2013.[11] There are no U.S.-flagged LNG tankers.

LNG Marine Terminals

LNG tankers unload their cargo at dedicated marine terminals which store and regasify the LNG for distribution to domestic markets. Onshore terminals typically consist of docks, LNG handling equipment, storage tanks, and interconnections to regional gas transmission pipelines. As discussed later in the report, the siting of onshore LNG import terminals is regulated by the Federal Energy Regulatory Commission (FERC). There are six active onshore LNG terminals in the United States:

- **Everett, Massachusetts.** The Everett terminal is located across the Mystic River from Boston; tankers must pass through Boston harbor to reach it. The terminal serves gas utilities and electric power

[9] Greenspan, Alan, Chairman, U.S. Federal Reserve Board. "Natural Gas Supply and Demand Issues." Testimony before the House Energy and Commerce Comm. June 10, 2003.

[10] Energy Information Administration (EIA). *Annual Energy Outlook 2008* (Revised Early Release). DOE/EIA-0383(2008). Table A13. March 2008. p. 25.

[11] *Lloyd's List*. "US Demand for LNG Puts Pressure on Maritime Manpower." September 11, 2007. p. 10.

producers in New England. The terminal receives approximately 65 LNG shipments annually.[12]

- **Lake Charles, Louisiana.** The Lake Charles terminal is located approximately nine miles southwest of the city of Lake Charles near the Gulf of Mexico. The terminal completed a major expansion in 2006, allowing it to receive up to 175 shipments per year.[13]

- **Cove Point, Maryland**. Cove Point is located on the Chesapeake Bay 60 miles southeast of Washington, DC. Under federally approved expansion plans, the terminal could be capable of receiving up to 200 shipments per year in 2008.[14]

- **Elba Island, Georgia.** The Elba Island terminal is located on an island five miles down the Savannah River from Savannah, Georgia and ten miles from the Atlantic coast. The terminal completed a major expansion in 2006, allowing it to receive approximately 118 shipments per year.[15]

- **Peñuelas, Puerto Rico.** The Peñuelas terminal, located on the southern coast of Puerto Rico. The terminal is dedicated to fueling an electric generation plant which supplies 20% of Puerto Rico's power.[16] The terminal receives 10 to 15 LNG shipments annually.[17]

- **Kenai, Alaska.** Built in 1969, this is the oldest LNG marine terminal in the United States and the only one built for export (to Japan). The Kenai terminal is located in Nikiski near the Cook Inlet gas fields. Since 1969 the terminal has exported an average of approximately 34 LNG shipments each year.[18]

Offshore LNG terminals connect to land only by underwater pipelines. These offshore terminal designs seek to avoid community opposition, permitting, and operating obstacles which have hindered the construction of new on-shore LNG terminal facilities. Because offshore terminals would be located far from land, they

[12] Department of Energy, Office of Fossil Energy (OFE). "Imports of Liquefied Natural Gas (LNG)." Unpublished data. Washington, D.C. January 11, 2007.

[13] "Second Trunkline LNG Terminal Expansion Up and Running." *Inside F.E.R.C.* July 31, 2006. p. 12; Federal Register, vol. 67, no. 34, February 20, 2002, p. 7684.

[14] Federal Energy Regulatory Commission (FERC). "Order Issuing Certificates and Granting Section 3 Authority." Issued June 16, 2006. Docket No. CP05-130-000, *et al*. p. 71.

[15] "El Paso Corporation Announces Start of Service From Elba II Expansion." PR Newswire. February 1, 2006; *Federal Register*, vol. 67, no. 181, September 18, 2002, p. 58784.

[16] "Gas Natural Acquires Enron's 50% Stake in 540-MW Gas Plant in Puerto Rico." *Platt's Global Power Report*. McGraw-Hill. July 10, 2003. p11.

[17] OFE. January 11, 2007.

[18] Marathon Oil Corporation. *2003 Annual Report*. Houston. March 8, 2004. p11.

also would present fewer security risks than on-shore LNG terminals. Offshore terminals may present environmental concerns, however, if they use seawater for regasification. Such a process cools the waters in a terminal's vicinity with potential impacts on the local ecosystem due to the lower water temperatures.[19] As discussed later in the report, offshore LNG terminals are regulated jointly by the Maritime Administration (MARAD) and the U.S. Coast Guard. There is currently one operating offshore LNG terminal in U.S. waters:

- **Gulf of Mexico, Louisiana.** The Gulf Gateways (Energy Bridge) terminal was completed in 2004 and received its first LNG shipment in March, 2005. The terminal consists of an offshore gas pipeline buoy system and is served by specialized tankers which regasify their LNG cargoes on board. The terminal expects up to be able to serve up to 60 LNG shipments per year.[20]

A second offshore terminal near Boston, Massachusetts, is scheduled to begin operations in early 2008.[21]

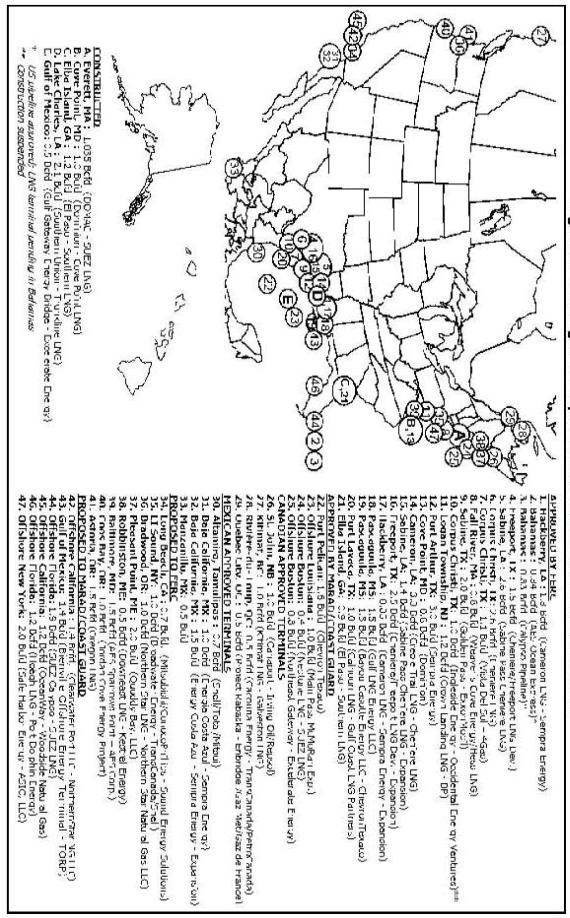
In addition to these active terminals, developers have proposed over 70 new LNG import terminals to serve the U.S. market. A number of these proposals have been withdrawn due to siting problems, financing problems, or other reasons. Many others are well-advanced, however, with recent or pending federal permit approvals. **Figure 2** shows summary information for active LNG terminal proposals located in North America.

[19] O'Driscoll, M. "LNG: Shell's Gulf Landing Offshore Project Gets Green Light." *Greenwire*. E&E Publishing, LLC. Washington, D.C. Feb 18, 2005.

[20] *Natural Gas Intelligence*. "Energy Bridge Terminal Prepares for First 3 Bcf LNG Delivery This Month." Intelligence Press, Inc. March 7, 2005.

[21] "Boston Offshore LNG Port Nears Clearance to Open." Reuter's. January 9, 2008.

Figure 2. Existing and Proposed LNG Terminals in North America



Source: Federal Energy Regulatory Commission (FERC), at [http://www.ferc.gov/industries/lng.asp], updated January 14, 2008.

LNG Peak Shaving Plants

Many gas distribution utilities rely on "peak shaving" LNG plants to supplement pipeline gas supplies during periods of peak demand during winter cold snaps. The LNG is stored in large refrigerated tanks integrated with the local gas pipeline network. The largest facilities usually liquefy natural gas drawn directly from the interstate pipeline grid, although many smaller facilities without such liquefaction capabilities receive LNG by truck. LNG tanks are generally surrounded by containment impoundments which limit the spread of an LNG spill and the potential size of a resulting vapor cloud. LNG peak shaving plants are often located near the populations they serve, although many are in remote areas away from people. According to the Pipeline and Hazardous Materials Safety Administration (PHMSA) there are 103 active LNG storage facilities in the United States distributed across 31 states.[22] These facilities are mostly in the Northeast where pipeline capacity and underground gas storage have historically been constrained.

LNG Risks and Vulnerabilities

The safety hazards associated with LNG terminals have been debated for decades. A 1944 accident at one of the nation's first LNG facilities killed 128 people and initiated public fears about LNG hazards which persist today.[23] Technology improvements and standards since the 1940s have made LNG facilities much safer, but serious hazards remain since LNG is inherently volatile and is usually shipped and stored in large quantities. A January 2004 accident at Algeria's Skikda LNG terminal which killed or injured over 100 workers added to the ongoing controversy over LNG facility safety.[24] LNG infrastructure is also potentially vulnerable to terrorist attack.

Physical Hazards of LNG

Natural gas is combustible, so an uncontrolled release of LNG poses a serious hazard of explosion or fire. LNG also poses hazards because it is extremely cold. Experts have identified several potentially catastrophic events that could arise from an LNG release. The likelihood and severity of these events have been the subject of considerable research and analysis. While open questions remain about the impacts of specific hazards in an actual accident, there appears to be consensus as to what the greatest LNG hazards are.

[22] Pipeline and Hazardous Materials Safety Administration. "Liquefied Natural Gas (LNG) in the U.S." Web page. March 2008. [http://primis.phmsa.dot.gov/comm/LNG.htm]

[23] Bureau of Mines (BOM). *Report on the Investigation of the Fire at the Liquefaction, Storage, and Regasification Plant of the East Ohio Gas Co., Cleveland, Ohio, October 20, 1944.* February 1946.

[24] Junnola, J., et al. "Fatal Explosion Rocks Algeria's Skikda LNG Complex." *Oil Daily.* January 21, 2004. p. 6.

- **Pool fires.** If LNG spills near an ignition source, the evaporating gas in a combustible gas-air concentration will burn above the LNG pool.[25] The resulting "pool fire" would spread as the LNG pool expanded away from its source and continued evaporating. Such pool fires are intense, burning far more hotly and rapidly than oil or gasoline fires.[26] They cannot be extinguished — all the LNG must be consumed before they go out. Because LNG pool fires are so hot, their thermal radiation may injure people and damage property a considerable distance from the fire itself. Many experts agree that a pool fire, especially on water, is the most serious LNG hazard.[27]

- **Flammable vapor clouds.** If LNG spills but does not immediately ignite, the evaporating natural gas will form a vapor cloud that may drift some distance from the spill site. If the cloud subsequently encounters an ignition source, those portions of the cloud with a combustible gas-air concentration will burn. Because only a fraction of such a cloud would have a combustible gas-air concentration, the cloud would not likely explode all at once, but the fire could still cause considerable damage. An LNG vapor cloud fire would gradually burn its way back to the LNG spill where the vapors originated and would continue to burn as a pool fire.[28] If an LNG tank failed due to a collision or terror attack, experts believe the failure event itself would likely ignite the LNG pool before a large vapor cloud could form.[29] Consequently, they conclude that large vapor cloud fires are less likely than instantaneous pool fires.

- **Flameless explosion.** If LNG spills on water, it could theoretically heat up and regasify almost instantly in a "flameless explosion" (also called a "rapid phase transition"). While the effects of tanker-scale spills have not been studied extensively, Shell Corporation experiments with smaller LNG spills in 1980 did not cause flameless explosions. Even if there were a flameless explosion of LNG, experts believe the hazard zones around such an event "would not be as large as either vapor cloud or pool fire hazard zones."[30]

In addition to these catastrophic hazards, an LNG spill poses hazards on a smaller scale. An LNG vapor cloud is not toxic, but could cause asphyxiation by displacing breathable air. Such clouds rise in air as they warm, however, diminishing the threat to people on the ground. Alternatively, extremely cold LNG could injure

[25] Methane, the main component of LNG, burns in gas-to-air ratios between 5% and 15%.

[26] Havens, J. "Ready to Blow?" *Bulletin of the Atomic Scientists.* July/August 2003. p. 17.

[27] Havens. 2003. p. 17.

[28] Quillen, D. ChevronTexaco Corp. "LNG Safety Myths and Legends." Presentation to the Natural Gas Technology Conference. Houston, TX. May 14-15, 2002. p. 18.

[29] Havens. 2003. p. 17.

[30] Havens. 2003. p. 17.

people or damage equipment through direct contact. The extent of such contact would likely be limited, however, as a major spill would likely result in a more serious fire. The environmental damage associated with an LNG spill would be confined to fire and freezing impacts near the spill since LNG dissipates completely and leaves no residue (as crude oil does).[31]

Safety Record of LNG

The LNG tanker industry claims a record of relative safety over the last 45 years; since international LNG shipping began in 1959, tankers reportedly have carried over 47,000 LNG cargoes without a serious accident at sea or in port.[32] LNG tankers have experienced groundings and collisions during this period, but none has resulted in a major spill.[33] The LNG marine safety record is partly due to the double-hulled design of LNG tankers. This design makes them more robust and less prone to accidental spills than single-hulled oil and fuel tankers like the *Exxon Valdez*, which caused a major Alaskan oil spill after grounding in 1989.[34] LNG tankers also carry radar, global positioning systems, automatic distress systems and beacons to signal if they are in trouble. Cargo safety systems include instruments that can shut operations if they deviate from normal as well as gas and fire detection systems.

The safety record of onshore LNG terminals is more mixed. There are more than 40 LNG terminals (and more than 150 other LNG storage facilities) worldwide. Since 1944, there have been approximately 13 serious accidents at these facilities directly related to LNG. Two of these accidents caused single fatalities of facility workers — one in Algeria in 1977, and another at Cove Point, Maryland, in 1979. On January 19, 2004, a fire at the LNG processing facility in Skikda, Algeria killed an estimated 27 workers and injured 74 others. The Skikda fire completely destroyed a processing plant and damaged a marine berth, although it did not damage a second processing plant or three large LNG storage tanks also located at the terminal.[35] The Skikda accident did not injure the rest of the 12,000 workers at the complex, but it was considered the worst petrochemical plant fire in Algeria in over 40 years.[36] According to press reports, the accident resulted from poor maintenance rather than a facility design flaw.[37] Another three accidents at worldwide LNG plants since 1944

[31] Quillen. 2002. p. 28.

[32] Society of International Gas Tanker and Terminal Operators Ltd. (SIGTTO)."Worth Repeating." *SIGTTO News*. Vol. 17. March 2007. p. 10.

[33] SIGGTO 2007; CH-IV International. *Safety History of International LNG Operations*. TD-02109. Millersville, MD. July, 2004. pp. 13-18.

[34] Society of International Gas Tanker & Terminal Operators Ltd. (SIGTTO). "Safe Havens for Disabled Gas Carriers." Third Edition. London. February 2003. pp. 1-2.

[35] Junnola, J., et al. January 21, 2004. p. 6.

[36] Hunter, C. "Algerian LNG Plant Explosion Sets Back Industry Development." *World Markets Analysis*. January 21, 2004. p. 1.

[37] Antosh, N. "Vast Site Devastated." *Houston Chronicle*. January 21, 2004. p. B1.

have also caused fatalities, but these were construction or maintenance accidents in which LNG was not present.[38]

LNG Security Risks

LNG tankers and land-based facilities may be vulnerable to terrorism. Tankers could be physically attacked to destroy their cargo — or commandeered for use as weapons against coastal targets. Land-based LNG facilities could also be physically attacked with explosives or through other means. Alternatively, computer control systems could be "cyber-attacked," or both physical and cyber attack could happen at the same time. Some LNG facilities could also be indirectly disrupted by other types of terror strikes, such as attacks on regional electricity grids or communications networks, which could in turn affect dependent LNG control and safety systems. Since LNG is fuel for power plants, heating, military bases, and other uses, disruption of LNG shipping or storage poses additional "downstream" risks, especially in more LNG-dependent regions like New England.

LNG Tanker Vulnerability. LNG tankers cause the most concern among security analysts because they are potentially more accessible than fixed terminal facilities, because they may transit nearer to populated areas, and because LNG spills from tankers could be more difficult to control. According to a 2004 report by Sandia National Laboratories, an intentional LNG spill and resulting fire could cause "major" injuries to people and "significant" damage to structures within approximately 500 meters (0.3 mile) of the spill site, more moderate injuries and structural damage up to 1,600 meters (1.0 mile) from the spill site, and lower impacts out to 2,500 meters (1.5 miles).[39] These results are used by federal agencies in reviewing LNG terminal siting applications.

Other LNG hazard studies have reached somewhat different conclusions about LNG tanker vulnerability. A report by the Government Accountability Office (GAO) released in 2007 reviewed six unclassified studies of LNG tanker hazards, including the Sandia study. The GAO report concluded that[40]

> Because there have been no large-scale LNG spills or spill experiments, past studies have developed modeling assumptions based on small-scale spill data. While there is general agreement on the types of effects from an LNG spill, the results of these models have created what appears to be conflicting assessments of the specific consequences of an LNG spill, creating uncertainty for regulators and the public.

[38] CH-IV International. pp. 6-12.

[39] Sandia National Laboratories (SNL). *Guidance on Risk Analysis and Safety Implications of a Large Liquefied Natural Gas (LNG) Spill Over Water*. SAND2004-6258. Albuquerque, NM. December 2004. p. 54.

[40] Government Accountability Office (GAO). *Maritime Security: Public Safety Consequences of a Terrorist Attack on a Tanker Carrying Liquefied Natural Gas Need Clarification*. GAO-07-316. February 2007. p. 22.

Following the GAO report, Members of Congress have expressed continuing concern about the uncertainty associated with LNG tanker vulnerability and hazard analysis.[41] In 2008, Congress appropriated $8 million to fund large-scale LNG fire experiments by the Department of Energy addressing some of the hazard modeling uncertainties identified in the GAO report.[42] It remains to be seen to what degree this research will increase policy makers' confidence in LNG tanker vulnerability analyses.

The *Gaz Fountain* Attack

Although there have been no terrorist attacks on LNG tankers, there is at least one documented case of a gas tanker of similar construction being attacked in wartime. During the Iran-Iraq War in the 1990s, the double-hulled LPG tanker *Gaz Fountain* was fired upon by an Iranian aircraft using three air-to-ground, armor-piercing Maverick missiles. Two of the missiles exploded on or above the ship's deck, causing relatively minor damage. The third missile penetrated the deck and exploded above a butane storage tank, opening a 6 square-meter (65 square-foot) hole in the roof of the tank. The escaping gas ignited, establishing a large fire on deck above the missile entry hole. The fire aboard the *Gaz Fountain* was successfully extinguished by a salvage ship, her remaining cargo was successfully unloaded to another tanker, and she was eventually repaired.[43]

The *Gaz Fountain* attack and salvage provides some evidence as to the robustness of double-hulled gas tankers like those that carry LNG. But the relatively benign outcome in the *Gaz Fountain* attack does not necessarily demonstrate that attacks on LNG tankers would have similarly limited impacts. The *Gaz Fountain* was fortunate that its storage tank was breached only at the top. If missiles had been targeted at the hull of the ship rather than its deck, one might have penetrated the side of a storage tank, causing a major spill on water and an inextinguishable pool fire. Furthermore, if the gas involved had been LNG rather than butane, the *Gaz Fountain* might have been subject to cryogenic damage since LNG is transported at a much lower temperature than butane (-260°F vs. +25°F). According to the Sandia report, such a combination could lead to cascading failure of adjacent storage tanks and, presumably, an even larger fire.[44]

[41] See, for example Senator Barbara A. Mikulski, testimony before the House Transportation and Infrastructure Committee, Coast Guard and Maritime Transportation Subcommittee field hearing on the Safety and Security of Liquefied Natural Gas and the Impact on Port Operations. Baltimore, MD. April 23, 2007.

[42] Consolidated Appropriations Act, 2008 (P.L.110-161), Division C — Energy and Water Development and Related Agencies Appropriations Act, 2008, Title III, Explanatory Statement, p. 570.

[43] Carter, J.A. "Salvage of Cargo from the War-Damaged *Gaz Fountain*." Proceedings of the Gastech 85 LNG/LPG Conference. Nice, France. November 12-15, 1985.

[44] SNL. December 2004. p. 151.

Federal LNG Security Initiatives

Operators of LNG infrastructure had security programs in place prior to September 11, 2001, but these programs mostly focused on personnel safety and preventing vandalism. The terror attacks of September 11 focused attention on the vulnerability of LNG infrastructure to different threats, such as systematic attacks on LNG facilities by foreign terrorists. Consequently, both government and industry have taken new initiatives to secure LNG infrastructure in response to new threats.

Several federal agencies oversee the security of LNG infrastructure. The Coast Guard has lead responsibility for LNG shipping and marine terminal security. The Department of Transportation's Office of Pipeline Safety and the Department of Homeland Security's Transportation Security Administration have security authority for peak-shaving plants within gas utilities, as well as some security authority for LNG marine terminals. FERC has siting approval responsibility, with some security oversight, for land-based LNG marine terminals and certain peak-shaving plants. In addition to federal agencies, state and local authorities, like police and fire departments, also help to secure LNG.

Security Activities of Federal Maritime Agencies

The two federal agencies with the most significant roles in maritime security as it relates to LNG are the U.S. Coast Guard and the Maritime Administration.

U.S. Coast Guard. The Coast Guard is the lead federal agency for U.S. maritime security, including port security. Among other duties, the Coast Guard tracks, boards, and inspects commercial ships approaching U.S. waters. A senior Coast Guard officer in each port oversees the security and safety of vessels, waterways, and many shore facilities in his geographic area. The Coast Guard derives its security responsibilities under the Ports and Waterways Safety Act of 1972 (P.L. 92-340) and the Maritime Transportation Security Act of 2002 (P.L. 107-295). Maritime security regulations mandated by P.L.107-295 are discussed below. Under P.L.107-295 the Coast Guard and the Maritime Administration share siting approval authority for offshore LNG terminals.

Shortly after September 11, 2001, the Coast Guard began to systematically prioritize protection of ships and facilities, including those handling LNG, based on vulnerability assessments and the potential consequences of security incidents. The Coast Guard evaluated the overall susceptibility of marine targets, their use to transport terrorists or terror materials, and their use as potential weapons. In particular, the Coast Guard evaluated the vulnerability of tankers to "a boat loaded with explosives" or "being commandeered and intentionally damaged."[45] While the assessments focused on Coast Guard jurisdictional vessels and facilities, some scenarios involved other vital port infrastructure like bridges, channels, and tunnels.[46]

[45] 68*FR*126. July 1, 2003. p. 39244.

[46] Ibid., p. 39246.

The Coast Guard used these assessments in augmenting security of key maritime assets and in developing the agency's new maritime security standards.

The Coast Guard began increasing LNG tanker and port security immediately after September 11, 2001. For example, the Coast Guard suspended LNG shipments to Everett for several weeks after the terror attacks to conduct a security review and revise security plans.[47] The Coast Guard also worked with state, environmental and police marine units to establish 24-hour patrols in Boston harbor.[48] In July 2002, the Coast Guard imposed a 1,000-yard security zone around the Kenai LNG terminal — and subsequently imposed similar zones around other U.S. LNG terminals.[49] The Coast Guard also reassessed security at the Cove Point terminal before allowing LNG shipments to resume there for the first time since 1980.[50] As new LNG terminals have been proposed and approved by federal agencies, the Coast Guard has continued its involvement in LNG security.

The most heavily secured LNG shipments are those bound for the Everett terminal because they pass through Boston harbor. Depending upon the level of alert, the Coast Guard and local law enforcement agencies may put in place numerous security provisions for these shipments, including:

- Inspection of security and tanker loading at the port of origin.
- On-board escort to Boston by Coast Guard "sea marshals."
- 96-hour advanced notice of arrival of an LNG tanker.
- Advance notification of local police, fire, and emergency agencies, as well as the Federal Aviation Administration and the U.S. Navy.
- Boarding LNG tankers for inspection prior to Boston harbor entry.
- Harbor escort by armed patrol boats, cutters, or auxiliary vessels.
- Enforcement of a security zone closed to other vessels two miles ahead and one mile to each side of the LNG tanker.
- Suspension of overflights by commercial aircraft at Logan airport.
- Inspection of adjacent piers for bombs by police divers.
- Posting of sharpshooters on nearby rooftops.
- Additional security measures which cannot be disclosed publicly.[51]

[47] McElhenny, J. "Coast Guard Lifts Ban of Natural Gas Tankers in Boston Harbor." Associated Press. October 16, 2001.

[48] Crittenden, J. "Vigilance: Holiday Puts Spotlight on Harbor Security." *Boston Herald*. Boston, MA. June 30, 2002. p. 1.

[49] "LNG Security in Boston to Be Permanent." *Platt's Oilgram News*. New York, NY. August 1, 2002.

[50] "Coast Guard, Mikulski Clear Plan to Reactivate Cove Point LNG Plant." *Platt's Inside FERC*. Washington, DC. January 6, 2003. p. 5.

[51] Greenway, H.D.S. "Is it Safe?" *The Boston Globe Magazine*. July, 27, 2003; Lin, J. and Fifield, A. "Risky Business?" *The Philadelphia Enquirer*. February 20, 2005. p. 1.

According to the Coast Guard, such security provisions have been in place for the other U.S. LNG terminals as well, depending upon local assessments of security risk and the unique characteristics of each marine area.[52]

On October 22, 2003, the Coast Guard issued final rules to implement the new security requirements mandated by P.L. 107-295. The rules are codified in Title 33 of the Code of Federal Regulations, Chapter 1, Subchapter H. Among other provisions, the rules establish Coast Guard port officers as maritime security coordinators and set requirements for maritime area security plans and committees. The rules require certain owners or operators of marine assets to designate security officers, perform security assessments, develop and implement security plans, and comply with maritime security alert levels. The vessel rules apply to all LNG tankers entering U.S. ports. Facility rules apply to all land-based U.S. LNG terminals or proposed offshore LNG terminals. Finally, the rules require certain vessels, including LNG tankers, to carry an automatic identification system.

The Coast Guard also has authority to review, approve, and verify security plans for marine traffic around proposed LNG marine terminals as part of the overall siting approval process led by FERC. The Coast Guard is responsible for issuing a Letter of Recommendation regarding the suitability of waterways for LNG vessels serving proposed terminals. The Coast Guard acts as a cooperating agency in the evaluation of LNG terminal siting applications.[53]

The Coast Guard also led the International Maritime Organization (IMO) in developing maritime security standards outside U.S. jurisdiction.[54] These standards, the International Ship and Port Facility Security Code (ISPS Code) contain detailed mandatory security requirements for governments, port authorities and shipping companies, as well as recommended guidelines for meeting those requirements. The ISPS Code is intended to provide a standardized, consistent framework for governments to evaluate risk and to "offset changes in threat with changes in vulnerability."[55]

On October 13, 2006, President Bush signed the Security and Accountability for Every Port Act of 2006 (P.L. 109-347). While not addressing LNG security specifically, the act includes general maritime security provisions which could apply to LNG vessels and facilities. These provisions include, among others, requirements

[52] O'Malley, Mark, Chief, Ports and Facilities Activities, U.S. Coast Guard. Testimony before the House Committee on Transportation and Infrastructure, Subcommittee on Coast Guard and Maritime Transportation hearing on the Safety and Security of Liquid Natural Gas. May 7, 2007; U.S. Coast Guard, Boston, MA, Captain of the Port. Personal communication. March 22, 2007.

[53] U.S. Coast Guard. *U.S. Coast Guard Captain of the Port Long Island Sound Waterways Suitability Report for the Proposed Broadwater Liquefied Natural Gas Facility*. September 21, 2006. p.2. [http://www.uscg.mil/d1/units/seclis/broadwater/wsrrpt/WSR%20Master%20Final.pdf]

[54] 68*FR*126. July 1, 2003. p. 39241.

[55] International Maritime Organization (IMO). "IMO Adopts Comprehensive Maritime Security Measures." Press release. London. December 17, 2002.

relating to maritime facility security plans (Sec. 102); unannounced inspections of maritime facilities (Sec. 103); long-range vessel tracking (Sec. 107); operational centers for port security (Sec. 108); port security grants (Sec. 112); and training and exercise programs (Sec. 112-113). The Coast Guard is the federal agency primarily responsible for implementing these provisions.

Maritime Administration. The Maritime Administration (MARAD) within the Department of Transportation has as its stated mission "to strengthen the U.S. maritime transportation system - including infrastructure, industry and labor - to meet the economic and security needs of the Nation."[56] As noted above, under P.L.107-295, MARAD shares siting approval authority for offshore LNG terminals with the Coast Guard. Among other activities, the agency also administers its Maritime Security Program "to maintain an active, privately owned, U.S.-flag, and U.S.-crewed liner fleet in international trade."[57] Consistent with this mission, Congress passed the Coast Guard and Maritime Transportation Act of 2006 (P. L. 109 — 241) directing MARAD to implement a program to promote the transportation of LNG to domestic terminals in U.S. flag vessels (Sec. 304(a)). The act also directs the agency to give top priority to the processing of offshore LNG siting applications that will be supplied by U.S. flag vessels (Sec. 304(b). The act also requires the agency to consider the nation of registry for, and the nationality or citizenship of, officers and crew serving on board LNG tankers when reviewing an LNG terminal siting application (Sec. 304(c)).

Federal Pipeline and Chemical Security Agencies

Office of Pipeline Safety. The Office of Pipeline Safety (OPS) within the Pipeline and Hazardous Materials Safety Administration (PHMSA) of the Department of Transportation has statutory authority to regulate the safety and security of LNG peak-shaving plants. The agency derives this authority under the Natural Gas Pipeline Safety Act of 1968 (P.L. 90-481). The OPS security regulations for LNG peak-shaving facilities are found in 49 C.F.R. 193, *Liquefied Natural Gas Facilities: Federal Safety Standards* (Subpart J-Security). These regulations govern security procedures, protective enclosures, communications, monitoring, lighting, power sources, and warning signs. Federal LNG *safety* regulations (33 C.F.R. 127) and National Fire Protection Association standards for LNG also include provisions addressing security, such as requirements for monitoring facilities and preparing emergency response plans.[58]

On December, 28, 2006, the OPS published in the *Federal Register* a security advisory for LNG facility operators after an August, 2006 security breach at an LNG

[56] Maritime Administration (MARAD). "MARAD Mission, Goals and Vision." Web page. March 16, 2008. [http://www.marad.dot.gov/welcome/mission.html]

[57] Maritime Administration (MARAD). "MARAD Fact Sheet." March 16, 2008. p. 2. [http://www.marad.dot.gov/Headlines/factsheets/PDF%20Versions/Mission%20Fact%20Sheet.pdf]

[58] National Fire Protection Association (NFPA). *Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG)*. NFPA 59A. Quincy, MA. 2006.

peak-shaving plant in Lynn, MA.[59] Although not a terrorist incident, the security breach involved the penetration of intruders through several security barriers and alert systems, permitting them to access the main LNG storage tank at the facility. The OPS advisory recommends that LNG facility operators ensure alarms and monitoring devices are functioning; ensure security personnel are properly trained; determine whether security personnel can respond to security breaches in a timely manner; update security procedures to incorporate the most relevant threat information; confirm that personnel properly coordinate their security activities; and independently audit facility security or conduct.[60]

Transportation Security Administration. The Transportation Security Administration (TSA) is the lead federal authority for the security of the interstate gas pipeline network under the Natural Gas Pipeline Safety Act of 1968 (P.L. 90-481). This security authority was transferred to TSA from the Transportation Department's Office of Pipeline Safety (OPS) under the Aviation and Transportation Security Act of 2001(P.L. 107-71). The TSA has asserted its security authority over land-based LNG facilities that are considered an integral part of the interstate pipeline network.[61] The TSA exercises its pipeline and LNG security oversight through the Pipeline Security Division (PSD) within the agency's Office of Transportation Sector Network Management.[62] The mission of TSA's Pipeline Security Division currently includes developing security standards; implementing measures to mitigate security risk; building and maintaining stakeholder relations, coordination, education and outreach; and monitoring compliance with security standards, requirements, and regulations.

Since 2003, TSA has put in place a number of initiatives related to pipeline security. These initiatives include the coordination, development, implementation, and monitoring of pipeline security plans; on-site reviews of pipeline operator security; United States and Canadian security assessment and planning for critical cross-border pipelines; regional supply studies for key natural gas markets; and pipelines security training, among other initiatives.[63] As of February 2008, TSA had completed 73 CSR reviews.[64] According to TSA, virtually all of the companies reviewed have developed security plans, identified critical assets, and conducted background checks on new employees. Most have also implemented employee security training programs and raised local community and law enforcement

[59] Pipeline and Hazardous Materials Safety Administration (PHMSA). "Pipeline Safety: Lessons Learned From a Security Breach at a Liquefied Natural Gas Facility." Docket No. PHMSA-04-19856. *Federal Register*. Vol. 71. No. 249. December 28, 2006. p. 78269.

[60] Ibid.

[61] TSA, Intermodal Security Program Office. Personal communication. August 18, 2003.

[62] These offices were formerly known as the Pipeline Security Program Office and the Intermodal Security Program Office, respectively.

[63] Transportation Security Administration, *Pipeline Modal Annex*, June 2007, pp. 10-11. [http://www.dhs.gov/xlibrary/assets/Transportation_Pipeline_Modal_Annex_5_21_07.pdf]

[64] TSA, Intermodal Security Program Office, personal communication, February 27, 2008.

awareness of pipeline security as part of their emergency response obligations.[65] In 2005, TSA issued an overview of recommended security practices for pipeline operators "for informational purposes only ... not intended to replace security measures already implemented by individual companies."[66] The agency released revised guidance on security best practices at the end of 2006 and plans to release a second revision in 2008.[67]

Federal Energy Regulatory Commission (FERC). The FERC is responsible for permitting new land-based LNG facilities, and for ensuring the safe operation of these facilities through subsequent inspections.[68] The initial permitting process requires approval of safety and security provisions in facility design, such as hazard detectors, security cameras, and vapor cloud exclusion zones. Every two years, FERC staff inspect LNG facilities to monitor the condition of the physical plant and inspect changes from the originally approved facility design or operations.[69] The FERC derives its LNG siting authority under the Natural Gas Act of 1938 (15 U.S.C. 717). The agency has jurisdiction over all on-shore LNG marine terminals and 12 peak-shaving plants involved in interstate gas trade.[70]

In response to public concern about LNG plant security since September 11, 2001, FERC has emphasized the importance of security at LNG facilities. According to the commission, FERC staff played key roles at inter-agency technical conferences regarding security at the Everett and Cove Point LNG terminals. According FERC staff, the commission has added a security chapter to its LNG site inspection manuals which consolidates previous requirements and adds new ones.[71] As part of its biennial inspection program, FERC also inspected 11 jurisdictional LNG sites in 2005 "placing increased emphasis on plant security measures and improvements."[72] FERC's FY2006 annual report states that "the Commission continues to give the highest priority to deciding any requests made for the recovery of extraordinary

[65] Mike Gillenwater, TSA, "Pipeline Security Overview," Presentation to the Alabama Public Service Commission Gas Pipeline Safety Seminar, Montgomery, AL, December 11, 2007; TSA, Pipeline Security Division, personal communication, July 6, 2007.

[66] TSA, Intermodal Security Program Office, *Pipeline Security Best Practices*, October 19, 2005, p. 1.

[67] TSA, February 27, 2008.

[68] U.S. Code of Federal Regulations. 18 C.F.R. 157.

[69] Foley, R. Federal Energy Regulatory Commission (FERC), Office of Energy Projects. "Liquefied Natural Gas Imports." Slide presentation. January 2003. p. 17.

[70] Robinson, J.M, Federal Energy Regulatory Commission (FERC). Testimony before the Senate Energy and Natural Resources Committee, Subcommittee on Energy. February 15, 2005.

[71] FERC. Personal communication. August 13, 2003.

[72] Federal Energy Regulatory Commission (FERC). 2005 Annual Report. Washington, DC. 2006. p. 18.

expenditures to safeguard the reliability and security of the Nation's energy transportation systems and energy supply infrastructure."[73]

Department of Homeland Security. The Department of Homeland Security (DHS) Appropriations Act of 2007 (P.L. 109-295) grants DHS the authority to regulate chemical facilities that "present high levels of security risk" (Sec. 550). In November, 2007, DHS finalized its chemical facility security regulations under the act, requiring that facilities with certain hazardous chemicals, including LNG, at or above screening threshold quantities submit information to DHS through an on-line screening tool. Based on these evaluations, DHS will identify high risk facilities required to conduct a security vulnerability assessments and prepare site security plans to address identified vulnerabilities and meet risk-based performance standards.[74] These regulations may apply to inland LNG peak-shaving plants, although they exempt LNG facilities in ports which are subject to security regulations under the Maritime Transportation Security Act of 2002 (P.L. 107-295), as amended.

Federal Interagency Cooperation in LNG Security

The Coast Guard, TSA, and FERC all have potentially overlapping security jurisdiction over certain facilities at onshore LNG terminals. For example, FERC's biennial LNG site visits explicitly include security inspections, and TSA oversees onsite pipeline security — but the Coast Guard asserts lead security authority over the entire terminal in its maritime security regulations. Under current authority, both the Coast Guard and TSA could both require their own facility security assessments for pipelines and LNG storage at LNG marine terminals.

To avoid jurisdictional confusion, the Coast Guard, OPS and FERC have entered into an interagency agreement to ensure that they

> work in a coordinated manner to address issues regarding safety and security at waterfront LNG facilities, including the terminal facilities and tanker operations, to avoid duplication of effort, and to maximize the exchange of relevant information related to the safety and security aspects of LNG facilities and the related marine concerns.[75]

The agreement requires the agencies to cooperate in the siting approval of new LNG facilities, inspection and operational review of existing facilities, informal

[73] Federal Energy Regulatory Commission (FERC). *Federal Energy Regulatory Commission Annual Report FY2006*. 2007. p. 23.

[74] 72 Fed. Reg. 17688. "Chemical Facility Anti-Terrorism Standards." April 9, 2007; 72 Fed. Reg. 65396. "Appendix to Chemical Facility Anti-Terrorism Standards." November 20, 2007.

[75] Federal Energy Regulatory Commission (FERC). "Interagency Agreement Among the Federal Energy Regulatory Commission United States Coast Guard and Research and Special Programs Administration for the Safety and Security Review of Waterfront Import/Export Liquefied Natural Gas Facilities." February 11, 2004. p. 1.

communication, and dispute resolution.[76] According to FERC, in FY2006, the commission the "performed detailed reviews of [LNG] safety and security issues, in coordination with the U.S. Coast Guard and the U.S. Department of Transportation."[77]

The FERC's security review for new LNG terminal applications is conducted in consultation with the US Coast Guard. Security assessments of individual terminal proposals are conducted by Coast Guard field units through security workshops involving federal, state and local law enforcement officials as well as port stakeholders. FERC engineers provide technical assistance on marine spill issues. FERC and the Coast Guard require LNG terminal applicants to also submit a navigational suitability review under 33 C.F.R. 127, and begin a security assessment of their proposal in accordance with 33 C.F.R. 105. According to FERC, where site-specific security concerns have been raised, the agencies have conducted non-public technical workshops with "all relevant stakeholders and federal, state and local expert agencies" to resolve those security concerns.[78]

Industry Initiatives for Land-Based LNG Security

After the September 11 attacks, gas infrastructure operators, many with LNG facilities, immediately increased security against the newly perceived terrorist threat. The operators strengthened emergency plans; increased liaison with law enforcement; increased monitoring of visitors and vehicles on utility property; increased employee security awareness; and deployed more security guards.[79] In cooperation with the OPS, the Interstate Natural Gas Association of America (INGAA) formed a task force to develop and oversee industry-wide security standards "for critical onshore and offshore pipelines and related facilities, as well as liquefied natural gas (LNG) facilities."[80] The task force also included representatives from the Department of Energy (DOE), the American Gas Association (AGA), and non-member pipeline operators. With the endorsement of the OPS, the INGAA task force issued security guidelines for natural gas infrastructure, including LNG facilities, in September

[76] FERC. February 11, 2004. pp. 2-4.

[77] Federal Energy Regulatory Commission (FERC). 2006 Annual Report. Washington, DC. 2007. p. 25.

[78] Robinson, J.M., Federal Energy Regulatory Commission (FERC). Testimony before the Senate Energy and Natural Resources Committee, Subcommittee on Energy. February 15, 2005.

[79] American Gas Association (AGA) *Natural Gas Distribution Industry Critical Infrastructure Security*, 2002, and AGA, *Natural Gas Infrastructure Security—Frequently Asked Questions*. April 30, 2003.

[80] Haener, W.J., CMS Energy Corp. Testimony on behalf of the Interstate Natural Gas Association of America (INGAA) before the House Transportation and Infrastructure Subcommittee on Highways and Transit. February 13, 2002. p. 4.

2002.[81] The task force also worked with federal agencies, including the Department of Homeland Security, on a common government threat notification system.[82]

Key Policy Issues in LNG Security

Government and industry have taken significant steps to secure the nation's LNG infrastructure. But continued progress in implementing and sustaining LNG infrastructure protection activities may face several challenges. As discussed in detail in the following sections, members of Congress and federal officials are concerned about the growing public costs of LNG security, the uncertainty of terrorist threats against LNG, and security differences between foreign and U.S. LNG vessels and crews.

Public Costs of LNG Marine Security

Some policymakers are concerned about the public cost and sustainability of securing LNG shipments. Overall cost data for LNG security are unavailable, but estimates have been made for Everett shipments. In 2003, the Coast Guard Program Office estimated that it cost the Coast Guard approximately $40,000 to $50,000 to "shepherd" an LNG tanker through a delivery to the Everett terminal, depending on the duration of the delivery, the nature of the security escort, and other factors.[83] A 2007 update from the Coast Guard Boston Sector estimates an average direct cost to the Coast Guard of an LNG delivery to Everett of approximately $62,000.[84] State and local authorities also incur costs for overtime police, fire and security personnel overseeing LNG tanker deliveries. The state of Massachusetts and the cities of Boston and Chelsea estimated they spent a combined $37,500 to safeguard the first LNG shipment to Everett after September 11, 2001.[85] Based on these figures, the public cost of security for an LNG tanker shipment to Everett is on the order of $100,000, excluding costs incurred by the terminal owner.

Marine security costs at other active LNG terminals could be lower than for Everett to the extent they are farther from dense populations and face fewer vulnerabilities. But these terminals expect more shipments. Altogether, the six active onshore U.S. LNG terminals, including Everett, expect to have enough capacity for over 600 shipments per year in 2009. Further increasing LNG imports to meet 13% of total U.S. gas supply by 2030 as projected by the EIA could require

[81] Interstate Natural Gas Association of America (INGAA) et al., *Security Guidelines Natural Gas Industry Transmission and Distribution*. Washington, DC. September 6, 2002.

[82] Haener. February 13, 2002. p. 4.

[83] U.S. Coast Guard, Program Office. Personal communication. August 12, 2003. This estimate is based on boat, staff and administrative costs for an assumed 20-hour mission.

[84] Cdr. Mark Meservey, House Liaison, U.S. Coast Guard. "Sector Boston LNG Security Approximate Costs." Unpublished memorandum. May 4, 2007.

[85] McElhenny, J. "State Says LNG Tanker Security Cost $20,500." Associated Press. November 2, 2001. p. 1.

some 2,300 LNG shipments to LNG terminals serving the United States. Assuming an average security cost only half that for Everett, or $50,000 per shipment, annual costs to the public for marine LNG security could exceed $30 million by 2009 and $115 million by 2030.[86]

The potential increase in security costs from growing U.S. LNG imports, and the potential diversion of Coast Guard and safety agency resources from other activities have been a persistent concern to policy makers.[87] According to Coast Guard officials, the service's LNG security expenditures are not all incremental, since they are part of the Coast Guard's general mission to protect the nation's waters and coasts. Nonetheless, Coast Guard staff have acknowledged that resources dedicated to securing maritime LNG might be otherwise deployed for boating safety, search and rescue, drug interdiction, or other security missions. LNG security is funded from the Coast Guard's general maritime security budget, so it is not a line item in the FY2009 Department of Homeland Security budget request. However, the Coast Guard's FY2006 budget did include an additional $11 million in funding over FY2005 levels for "Increased Port Presence and LNG Transport Security," specifically including "additional boat crews and screening personnel at key LNG hubs."[88]

In a December 2007 report, the GAO recommended that the Coast Guard develop a national resource allocation plan to address growing LNG security requirements.[89] In subsequent testimony before Congress, Coast Guard Commandant Admiral Thad Allen expressed concern about the costs to the Coast Guard of securing dangerous cargoes such as LNG and called for a "national dialogue" on the issue.[90] During questioning, Admiral Allen acknowledged that the Coast Guard did not currently possess sufficient resources to secure future LNG deliveries to a proposed LNG terminal in Long Island Sound which has subsequently been authorized by FERC.[91]

[86] Note that security costs associated with any LNG terminals in Canada, Mexico and the Bahamas (built primarily to serve U.S. markets) would not be a direct U.S. responsibility, although such costs might still be priced into LNG supplied from those terminals.

[87] See, for example, Representative Peter Defazio, remarks before the House Homeland Security Committee hearing on Securing Liquid Natural Gas Tankers to Protect the Homeland. March 21, 2007.

[88] Department of Homeland Security (DHS). *Budget-in-Brief, Fiscal Year 2006.*

[89] Government Accountability Office. *Maritime Security: Federal Efforts Needed to Address Challenges in Responding to Terrorist Attacks on Energy Commodity Tankers*. GAO-08-141. December 10, 2007. p. 79.

[90] Admiral Thad Allen, Commandant, U.S. Coast Guard. Testimony before the House Committee on Appropriations, Subcommittee on Homeland Security hearing, "Coast Guard Budget: Impact on Maritime Safety, Security, and Environmental Protection." March 5, 2008.

[91] Admiral Thad Allen, March 5, 2008; Federal Energy Regulatory Commission. "Order Granting Authority Under Section 3 of the Natural Gas Act and Issuing Certificates." Docket No. CP06-54-0000. March 20, 2008.

State and local agencies are also seeking more funding to offset the costs of LNG security. Otherwise, they believe that LNG security needs may force them to divert limited local resources from other important public services. Addressing these concerns, the Energy Policy Act of 2005 requires private and public sector cost-sharing for LNG tanker security (Section 311d). In compliance with the act and prior FERC policy, FERC officials require new LNG terminal operators to pay the costs of any additional security or safety needed for their facilities.[92] The FERC has also recommended that LNG terminal operators provide private security staff to supplement Coast Guard and local government security forces.[93]

The public costs of LNG security may decline as federally mandated security systems and plans are implemented. New security technology, more specific threat intelligence, and changing threat assessments may all help to lower LNG security costs in the future. Nonetheless, the potential increase in security costs from growing U.S. LNG shipments may warrant a review of these costs and associated recovery mechanisms. S. 1594 would allow the DHS to establish a security cost-sharing plan to assist the USCG in securing LNG tankers and other vessels carrying especially hazardous cargo (Sec. 6). H.R. 2830 would prohibit LNG facility security plans based upon the provision of security by a state or local government unless that government has an LNG security arrangement with the facility operator (Sec. 328 (b)). H.R. 2830 would also require that, before facility security plans for new LNG terminals are approved, the Coast Guard certify that the agency has adequate resources in the sector where the terminal would be located to secure that terminal (Sec. 328(d)). Because the accounting of these security costs is unclear, however, and cost recovery may be partly tied to uncertain sources of federal funding, such as DHS security grants or future agency appropriations, stakeholders may continue to voice concern over costs for LNG security and incident response.

Uncertainty About LNG Threats

The likelihood of a terrorist attack on U.S. LNG infrastructure has been the subject of debate since September 11, 2001. To date, no LNG tanker or land-based LNG facility in the world has been attacked by terrorists. However, similar natural gas and oil facilities have been favored terror targets internationally. For example, since 2001, gas and oil pipelines have been attacked in at least half a dozen countries.[94] In October 2002, the French oil tanker *Limburg* was attacked off the Yemeni coast by a bomb-laden fishing boat.[95] In June 2003, U.S. intelligence

[92] Baldor, L.C. "Federal Agency, R.I. Officials Meet over LNG Terminal." *Associated Press*. March 17, 2005.

[93] Federal Energy Regulatory Commission (FERC). "Response to Senator Jack Reed's 2/1/05 letter regarding the proposed Weaver's Cove LNG Project in Fall River, MA & the proposed KeySpan LNG Facility Upgrade Project in Providence, RI under CP04-293 et al." March 3, 2005. p. 2.

[94] For specific examples, see CRS Report RL31990, *Pipeline Security: An Overview of Federal Activities and Current Policy Issues*, by Paul Parfomak.

[95] "Ships as Terrorist Targets." *American Shipper*. November, 2002. p. 59.

agencies warned about possible Al Qaeda attacks on energy facilities in Texas.[96] The Homeland Security Council included terrorist attacks on "cargo ships" carrying "flammable liquids" among the fifteen hazards scenarios it developed in 2004 as the basis for U.S. homeland security "national preparedness standards."[97]

In addition to warnings of a terrorist threat to energy facilities in general, federal agencies have identified LNG infrastructure in particular as a potential terrorist target. The Department of Homeland Security (DHS) specifically included LNG assets among a list of potential terrorist targets in a security alert late in 2003.[98] The DHS also reported that "in early 2001 there was some suspicion of possible associations between stowaways on Algerian flagged LNG tankers arriving in Boston and persons connected with the so-called 'Millennium Plot'" to bomb targets in the United States. While these suspicions could not be proved, DHS stated that "the risks associated with LNG shipments are real, and they can never be entirely eliminated."[99] The 2004 report by Sandia National Laboratories concluded that potential terrorist attacks on LNG tankers, could be considered "credible and possible."[100] The Sandia report identified LNG tankers as vulnerable to ramming, pre-placed explosives, insider takeover, hijacking, or external terrorist actions (such as a *Limburg*-type, missile or airplane attack).[101] Others further assert that terrorists have demonstrated both the desire and capability to attack such shipping with the intention of harming the general population.[102]

Although they acknowledge the security information put forth by federal agencies, many experts believe that concern about threats to LNG tankers is overstated.[103] In 2003, the head of one university research consortium remarked, for example, "from all the information we have ... we don't see LNG as likely or credible terrorist targets."[104] Industry representatives argue that deliberately causing an LNG catastrophe to injure people might be possible in theory, but would be extremely difficult to accomplish. Likewise, the Federal Energy Regulatory Commission

[96] Hedges, M. "Terrorists Possibly Targeting Texas." *Houston Chronicle*. June 24, 2003.

[97] Homeland Security Council. *Planning Scenarios: Executive Summaries*. July 2004. p. 6-1.

[98] Office of Congressman Edward J. Markey. Personal communication with staff. January 5, 2004.

[99] Turner, P.J., Assistant Secretary for Legislative Affairs, Department of Homeland Security (DHS). Letter to U.S. Representative Edward Markey. April 15, 2004. p. 1.

[100] Sandia National Laboratories (SNL). *Guidance on Risk Analysis and Safety Implications of a Large Liquefied Natural Gas (LNG) Spill Over Water*. SAND2004-6258. Albuquerque, NM. December 2004. pp. 49-50.

[101] SNL. December 2004. pp. 61-62.

[102] Clarke, R.A., et al. *LNG Facilities in Urban Areas*. Good Harbor Consulting, LLC. Prepared for the Rhode Island Office of Attorney General. GHC-RI-0505A. May 2005.

[103] McLaughlin, J. "LNG is Nowhere Near as Dangerous as People Are Making it Out to Be." *Lloyd's List*. February 8, 2005. p5.

[104] Behr, Peter. "Higher Gas Price Sets Stage for LNG." *Washington Post*. July 5, 2003. p. D10.

(FERC) and other experts believe that LNG facilities are relatively secure compared to other hazardous chemical infrastructures which receives less public attention. In a 2004 report, the FERC stated that

> for a new LNG terminal proposal ... the perceived threat of a terrorist attack may be considered as highly probable to the local population. However, at the national level, potential terrorist targets are plentiful.... Many of these pose a similar or greater hazard to that of LNG.[105]

The FERC also has remarked, however, that "unlike accidental causes, historical experience provides little guidance in estimating the probability of a terrorist attack on an LNG vessel or onshore storage facility."[106]

Former Director of Central Intelligence, James Woolsey, has stated his belief that a terrorist attack on an LNG tanker in U.S. waters would be unlikely because its potential impacts would not be great enough compared to other potential targets.[107] LNG terminal operators which have conducted proprietary assessments of potential terrorist attacks against LNG tankers, have expressed similar views.[108] In a September 2006 evaluation of a proposed LNG terminal in Long Island Sound, the Coast Guard stated that there were "currently no specific, credible threats against" the proposed LNG facility or tankers serving the facility.[109] The evaluation also noted, however, that the threat environment is dynamic and that some threats may be unknown.[110] Because the probability of a terrorist attack on LNG cannot be known with certainty, policy makers and community leaders must, to some extent, rely on their own judgment to decide whether LNG security measures for a specific facility will adequately protect the public. S. 1594 would increase federal protection of vessels and infrastructure handling LNG through new international standards (Sec. 2); safety and security assistance for foreign ports (Sec. 4-5), incident response and recovery plans (Sec. 7); and other provisions. The House Homeland Security

[105] Federal Energy Regulatory Commission (FERC). *Vista del Sol LNG Terminal Project, Draft Environmental Impact Statement*. FERC/EIS-0176D. December 2004. p. 4-162; For example, based on data from the U.S. Office of Hazardous Materials Safety, 600 LNG tanker shipments would account for less than 1% of total annual U.S. shipments of hazardous marine cargo such as ammonia, crude oil, liquefied petroleum gases, and other volatile chemicals.

[106] FERC. FERC/EIS-0176D. December 2004. p4-162. Notwithstanding this assertion, in its subsequent draft review of the Long Beach LNG terminal proposal, the FERC states that "the historical probability of a successful terrorist event would be less than seven chances in a million per year..." See FERC. October 7, 2005. p. ES-14.

[107] Woolsey, James. Remarks before the National Commission on Energy, LNG Forum, Washington, D.C., June 21, 2006.

[108] Grant, Richard, President, Distrigas. Testimony before the Senate Committee on Energy and Natural Resources, Subcommittee on Energy hearing on "The Future of Liquefied Natural Gas: Siting and Safety." February 15, 2005.

[109] U.S. Coast Guard. *U.S. Coast Guard Captain of the Port Long Island Sound Waterways Suitability Report for the Proposed Broadwater Liquefied Natural Gas Facility*. September 21, 2006. p. 146.

[110] Ibid.

Committee version of H.R. 2830 would prohibit the federal authorization of new LNG terminal facilities without the approval of DHS based upon a "comprehensive homeland security impact review" (Sec. 708).

Foreign vs. U.S. LNG Tankers and Crews

There are currently no U.S.-flagged LNG tankers and few, if any, U.S. citizens among LNG tanker crews. Some policy makers are concerned that, compared to U.S. vessels and crews, foreign-flagged LNG tankers may not face the same security requirements or may not face the same level of security oversight and verification.[111] This rationale underlies the provisions in P.L. 109-241 that promote LNG shipping to the United States on U.S.-flagged vessels with U.S. crews. Prompted by these provisions, at least four LNG developers have committed to using U.S. crews in their LNG terminal siting proposals.[112] Some stakeholders have called for similar measures to promote U.S. flags and crews for tankers serving onshore LNG terminals regulated by FERC.

Notwithstanding the LNG tanker provisions in P.L. 109-241, Coast Guard officials have stated that existing security provisions for foreign-flagged LNG tankers and foreign place them on an equal security footing with potential U.S. counterparts.[113]

> Our domestic maritime security regime is closely aligned with the International Ship and Port Facility Security (ISPS) Code.... Under the ISPS Code, vessels in international service, including LNG vessels, must have an International Ship Security Certificate (ISSC). To be issued an ISSC by its flag state, the vessel must develop and implement a threat-scalable security plan that, among other things, establishes access control measures, security measures for cargo handling and delivery of ships stores, surveillance and monitoring, security communications, security incident procedures, and training and drill requirements. The plan must also identify a Ship Security Officer who is responsible for ensuring compliance with the ship's security plan. The Coast Guard rigorously enforces this international requirement by evaluating security compliance as part of our ongoing port state control program.

Others have questioned preferential treatment of U.S. LNG tankers and crews on the grounds that it may impinge on free trade principles by discriminating against foreign LNG tanker operators fully adhering to international standards.[114] Given the potential maritime treaty and trade implications, federal efforts to promote U.S. flags and

[111] See, for example: Senator Barbara A. Mikulski. Testimony before the House of Transportation and Infrastructure Committee, Coast Guard and Maritime Transportation Subcommittee field hearing on Safety and Security of Liquefied Natural Gas and the Impact on Port Operations. Baltimore, MD. April 23, 2007.

[112] States News Service. "Agreement Means New Jobs for U.S. Mariners on LNG Tankers." February 8, 2008.

[113] O'Malley. May 7, 2007.

[114] "LNG Must Uphold US Free Trade, Warns ICS." *Lloyd's List*. February 21, 2007. p. 3.

crews on LNG tankers may require careful consideration of potential benefits and costs.

Conclusions

The U.S. LNG industry is growing quickly. While rising LNG imports may offer economic benefits, they also pose risks. LNG infrastructure is inherently hazardous and it is potentially attractive to terrorists. Both lawmakers and the general public are concerned about these risks, although the LNG industry has a long history of relatively safe operations and has taken steps to secure its assets against terrorist attack. No LNG tanker or land-based facility has been attacked by terrorists, and federal, state and local governments have put in place security measures intended to safeguard LNG against newly perceived terrorist threats. These measures are evolving, but a variety of industry and agency representatives suggest that these federal initiatives are reducing the vulnerability of U.S. LNG to terrorism.

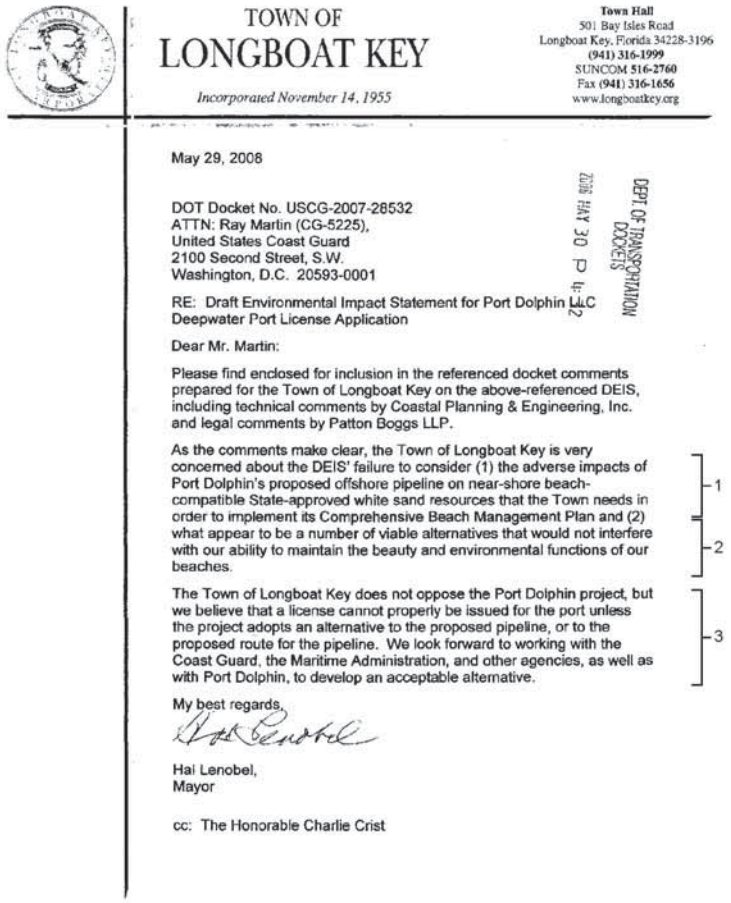
The ongoing debate about LNG infrastructure security in the United States has often been contentious. Local officials and community groups have challenged numerous LNG infrastructure proposals on the grounds that they may represent an unacceptable risk to the public. Heightened public scrutiny of LNG facilities has made it difficult to site new LNG terminals near major gas markets and has increased the cost and complexity of LNG terminal siting approval. Nonetheless, both industry and government officials acknowledge that enough new LNG infrastructure will likely be approved to meet long-term U.S. import requirements. Indeed, federal agencies have approved the construction of a number of new U.S. import terminals, several of them onshore. Numerous additional terminal proposals await federal approval. Together with the expansion of the existing U.S. import terminals and the construction of new LNG terminals in Canada and Mexico, the approved U.S. facilities would provide enough added capacity to meet the bulk of U.S. LNG demand for the next 20 years.

New U.S. LNG terminals may not be ideally located so as to minimize the cost of natural gas, but building them in these locations may be better than not building them at all. Furthermore, because their security has been subject to intense public scrutiny, new LNG terminal and tanker operations may be safer than they might have been without such scrutiny and their siting may be less likely to be challenged at a later time when construction is already underway. The construction and subsequent closure of the Shoreham nuclear power plant in the 1980's due to new public opposition offers an example of the need to resolve safety and security concerns before capital is invested. From a purely economic perspective, therefore, the added costs of building more heavily protected LNG terminals potentially farther from their primary markets may represent the U.S. public's willingness to pay for LNG security. Whether this implicit price of LNG security is reasonable is an open question, but the continued interest of private companies to invest billions of dollars in U.S. LNG terminals suggests that it will not prevent needed LNG development.

As Congress continues its oversight of LNG infrastructure development, it may decide to examine the public costs and resource requirements of LNG security,

especially in light of dramatically increasing LNG imports. In particular, Congress may consider whether future LNG security requirements will be appropriately funded, whether these requirements will be balanced against evolving risks, and whether the LNG industry is carrying its fair share of the security burden. Congress may also act to improve its understanding of LNG security risks. Costly "blanket" investments in LNG security might be avoided if more refined terror threat information were available to focus security spending on a narrower set of infrastructure vulnerabilities. Finally, Congress may initiate action to better understand the security and trade implications of efforts to promote U.S.-flagged LNG tankers.

In addition to these specific issues, Congress might consider how the various elements of U.S. LNG security activity fit together in the nation's overall strategy to protect critical infrastructure. Maintaining high levels of security around LNG tankers, for example, may be of limited benefit if other hazardous marine cargoes are less well-protected. U.S. LNG security also requires coordination among many groups: international treaty organizations, federal agencies, state and local agencies, trade associations and LNG infrastructure operators. Reviewing how these groups work together to achieve common security goals could be an oversight challenge for Congress.



TOWN OF
LONGBOAT KEY
Incorporated November 14, 1955

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May 29, 2008

DOT Docket No. USCG-2007-28532
ATTN: Ray Martin (CG-5225),
United States Coast Guard
2100 Second Street, S.W.
Washington, D.C. 20593-0001

2008 MAY 30 P 12:42
DEPT OF TRANSPORTATION DOCKETS

RE: Draft Environmental Impact Statement for Port Dolphin LLC Deepwater Port License Application

Dear Mr. Martin:

Please find enclosed for inclusion in the referenced docket comments prepared for the Town of Longboat Key on the above-referenced DEIS, including technical comments by Coastal Planning & Engineering, Inc. and legal comments by Patton Boggs LLP.

As the comments make clear, the Town of Longboat Key is very concerned about the DEIS' failure to consider (1) the adverse impacts of Port Dolphin's proposed offshore pipeline on near-shore beach-compatible State-approved white sand resources that the Town needs in order to implement its Comprehensive Beach Management Plan and (2) what appear to be a number of viable alternatives that would not interfere with our ability to maintain the beauty and environmental functions of our beaches. 1, 2

The Town of Longboat Key does not oppose the Port Dolphin project, but we believe that a license cannot properly be issued for the port unless the project adopts an alternative to the proposed pipeline, or to the proposed route for the pipeline. We look forward to working with the Coast Guard, the Maritime Administration, and other agencies, as well as with Port Dolphin, to develop an acceptable alternative. 3

My best regards,

Hal Lenobel,
Mayor

cc: The Honorable Charlie Crist

1. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

2. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

3. Thank you for the comment.

COASTAL PLANNING & ENGINEERING, INC.
BOCA RATON • WILMINGTON • TAMPA BAY

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POTENTIAL IMPACTS OF THE PORT DOLPHIN PIPELINE ON THE TOWN OF LONGBOAT KEY COMPREHENSIVE BEACH-MANAGEMENT PLAN: TOWN COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STAEMENT ON THE PORT DOLPHIN LLC DEEPWATER PORT LICENSE APPLICATION

EXECUTIVE SUMMARY

On March 29, 2007, Port Dolphin, LLC, submitted to the United States Coast Guard and the Maritime Administration an application for a Deepwater Port License. The proposed port would be a liquid natural gas re-gasification and offloading facility located approximately 28 miles offshore Anna Maria Island/Manatee County. As proposed, this facility would then be connected to Port Manatee via a subsea pipeline. On April 18, 2008 the United States Coast Guard and the United States Department of Transportation, Maritime Administration issued a Draft Environmental Impact Statement on the proposed Port Dolphin Project. The document is currently available for public comment, with comments due by June 2, 2008. The following information presented by the Town of Longboat Key summarizes both the Longboat Key Beach-management plan and the potential impacts the proposed Port Dolphin Project would have on the viability of this program.

The Town of Longboat Key manages an active beach-management plan for the entire coast of Longboat Key. This program is funded through Town revenue, State of Florida cost sharing, and the Tourist Development Council "Bed Tax" of both Manatee and Sarasota Counties, which is supported by the extensive tourism industry of these Counties (including Longboat Key). In addition to supporting the Bed Tax, the extensive tourism industry and natural beach environment of Longboat Key supports the existing ad valorem property tax base for the Town. 4

4. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

As of June 1, 2007, the Town of Longboat Key had a cumulative property valuation of $6,606,809,366. This valuation (and subsequent tax revenue) is significantly related to both the viability of the beaches of Longboat Key and the associated tourism industry. However, the beaches of Longboat Key are eroding and require maintenance through implementation of a comprehensive beach nourishment program. This beach-management plan relies on a proven, existing, native, white, but greatly-limited beach-compatible Gulf of Mexico sand resource located off the northwestern tip of Anna Maria Island as the ideal sand source for beach nourishment. Longboat Key has previously defined and permitted a beach-compatible mineral resource within the feature described above. This resource, was used for the 2005/2006 beach nourishment project, and still contains an additional 1,500,000 cubic yards of beach-compatible material available to Longboat Key for future beach-nourishment projects. The high similarity of this sand source with the native beach makes it an invaluable resource ideally suited for the geologic, biologic, and recreational needs of Longboat Key's white sandy beaches. It is these white sandy beaches that support the tourism driven economy of Longboat Key, Manatee County, Sarasota County, and the State of Florida. 4

The Town of Longboat Key Beach-management plan, and ultimately the beaches of Longboat Key, is in jeopardy due to the proposed location of Port Dolphin LLC's preferred and southern alternative routes for the Port Dolphin natural gas pipeline. This pipeline is proposed to be built directly through a previously permitted, ideal sand source that supports the current and future beach nourishment projects of Longboat Key, Borrow Area IX (Figures 1 and 2). A "borrow area" is an area specifically identified and delineated through geophysical and geotechnical investigations as the sediment source for a beach nourishment project. Borrow areas are also identified in permit documents as the allowable sediment source for a beach nourishment project. Nevertheless, the proposed preferred pipeline route impacts a much large area than just Borrow Area IX. The pipeline, as well as a large buffer zone which must be established along either side of the pipeline route, greatly impacts the volume of sand available for the Town of Longboat Key's Beach-management plan (Figures 1 and 2). Extraction of sand by

dredging would be prohibited over the pipe and in the buffer zone effectively eliminating the sand for future beach nourishment use. Direct impacts to this sand resource revolve around the fact that a significant volume of these beach-compatible sands will become permanently unavailable for future beach nourishment projects depending on the extent of the required buffer zone which is provided to protect the gas pipeline. This direct impact, while extreme by itself, could lead to significant cumulative impacts to the economy, public safety and the environment of the Town of Longboat Key. 5

If this existing borrow area (permitted for use under Florida Department of Environmental Protection Consolidated Joint Coastal Permit and Sovereign Submerged Lands Authorization Number 0202209-001-JC as "Borrow Area IX"), containing approximately 1,500,000 cubic yards of beach-compatible sand, is impacted by the construction of the pipeline (as currently proposed) and an associated safety buffer of potentially up to 1,000 meters, significant programmatic issues would arise. Specifically, the Town will lose access to most, if not all, of the remaining sand in the borrow area. Not only would this represent a direct loss of the time, money, and effort spent developing this as a fully permitted beach-compatible mineral source, but the Town would be forced to explore other as yet unknown sand resources to replace the remaining beach-compatible sand in Borrow Area IX. Assuming such high quality resources can be found, these resources will assuredly occur further away from the project area, causing an increase in the cost to construct future Longboat Key beach-nourishment projects. If this was to occur, the costs of future beach nourishment projects would increase substantially, up to a potential increase of $4,750,000 (or greater) depending on the final safety buffer imposed around the pipeline and the resulting additional distance to the new, as yet unknown replacement beach-compatible sand resource. 6

Additionally, the Town of Longboat Key has begun exploring offshore sand resources for potential as future, beach-compatible sand sources. The current proposed pipeline route crosses at least four of these individual sediment sources which occur in the form of 7

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5. Representatives of FDEP have stated that they have no requirements for a buffer around pipelines. The Applicant has proposed a 400 foot buffer centered on the pipeline and the analysis in Section 4.4 is based on that buffer.

   In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

6. Representatives of FDEP have stated that they have no requirements for a buffer around pipelines. The Applicant has proposed a 400 foot buffer centered on the pipeline and the analysis in Section 4.4 is based on that buffer.

   In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

7. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

underwater "hills", impacting not only the Town of Longboat Key's current beach-compatible sand resource, but potential regional sand resources needed for the viability of Longboat Key and other regional shore-protection programs for the foreseeable future (Figure 1). 7

By forcing the Town of Longboat Key to abandon its permitted, existing beach-compatible sand resource, by impacting the larger sediment deposit adjacent to the borrow area, and by removing several offshore sand hills from the inventory of future sand resources, the construction of the pipeline may result in the Town of Longboat Kay having to use a more distant, potentially lesser-compatible sand resource for future beach-nourishment projects, at an increased cost to the overall project. This could result in the reduced effectiveness of future projects and may present permitting difficulties at the State level. 8

A weakened beach-management plan, due to lesser-compatible beach materials and more costly, more distant sand sources, could result in the continued erosion of Longboat Key's white sandy beaches. If this were allowed to happen, significant cumulative impacts to biological, recreational, and socioeconomic resources would occur, as well as the introduction of sensitive public safety issues, including: 9

1. A reduced or weakened beach-management plan could result in the increased erosion of Longboat Key's beaches resulting in the loss of the public beaches (a major public recreation resource) of Longboat Key;
2. A reduced or weakened beach-management plan could result in the erosion of Longboat Key's beaches resulting in the loss of tourists, affecting the local socioeconomic structure through a reduction in employment and tax revenues; 10
3. A reduced or weakened beach-management plan could result in the erosion of Longboat Key's beaches resulting in the loss of protection the beaches afford the island, resulting in the potential for increased flooding and undermining of vital hurricane and emergency evacuation routes for both Longboat Key and Anna Maria Island. Increased shoreline erosion will also threaten public and private infrastructure, including 11 12

8. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

9. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

10. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

11. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

12. Comment noted.

wastewater systems, telephone utilities, power utilities, and other existing critical systems along Longboat Key. 12

4. A reduced or eliminated shore protection program could result in the erosion of Longboat Key's beaches resulting in the loss of the beach as habitat, and loss of critical habitat needed for threatened and endangered sea turtle nesting; 13

These issues are vital to the continued well being of Longboat Key, yet none of these concerns are addressed in the Draft Environmental Impact Statement issued by the United States Coast Guard and Maritime Administration or the Deepwater Port License Application issued by the Port Dolphin, LLC. Longboat Key believes that all of these issues need to be included and comprehensively addressed within the Draft Environmental Impact Statement so that the United States Coast Guard and the United States Department of Transportation Maritime Administration, and the Governor of Florida (as a Governor of an adjacent coastal state) can make a fully informed decision on the Application for a Deepwater Port License submitted by Port Dolphin LLC. 14

The Town also feels that it important to state unequivocally that the Port Dolphin LLC Deepwater Port and associated pipeline and the Town of Longboat Key Beach-management plan are not mutually exclusive projects. In fact, several seemingly viable pipeline route alternatives exist that can allow the Port Dolphin project to be constructed without affecting the vital and highly limited sand resources required by Longboat Key for its beach-management plan (Figure 3). 15

These alternatives include:

1. Constructing the Port Dolphin pipeline from the deepwater port to an existing y-valve in the Gulfstream natural gas pipeline, where the Port Dolphin facility could then tie-into the existing pipeline. This option also eliminates many of the environmental impacts associated with the preferred route; 16

13. Based on analysis of the revised pipeline route proposed by the Applicant, sufficient quantities of beach quality sand should be available as discussed in Section 4.4. Therefore, impacts to sea turtle nesting are not expected.

14. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

15. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

16. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

2. A new alternative that would construct the pipeline route from the proposed deepwater port site straight to a spot approximately 2,000 feet south of where the existing Gulfstream pipeline crosses the Federal/State Boundary, approximately nine miles west of Egmont Key. At this point, the new pipeline could be collocated, or constructed parallel to, the existing Gulfstream pipeline all the way into Port Manatee. 17
3. A new alternative that would construct the pipeline straight from the offshore deepwater port site, directly to Southwest Passage (not Passage Key Inlet), crossing the Gulfstream Pipeline, and then continuing straight to its planned location in West-Central Lower Tampa Bay (all in one straight line). 18
4. Follow the preferred pipeline route as it is proposed, from the deepwater port toward Southwest Passage, where the pipeline would then deviate to the proposed northern alternative route as it enters Tampa Bay through Southwest Passage. Once inside of Tampa Bay, the pipeline could then deviate back to the preferred route. The vast majority of the preferred pipeline route could be retained with this minor adjustment. 19

Each of these alternatives results in no impacts (direct or cumulative) to Borrow Area IX or the beach-compatible mineral resources off Anna Maria Island that are vital to The Town of Longboat Key's beach-management plan. With this in mind, the Town strongly believes that a more detailed alternatives analysis needs to be presented in the DEIS. This analysis needs to build on the previously described alternatives, while adding the new alternatives suggested by the Town. Each alternative needs to be critically evaluated in terms of direct and cumulative environmental resource impacts, with the greatest weight given to the alternative(s) that have the least impacts to these environmental resources. In addition, the direct and cumulative impacts raised by the Town in these detailed comments need to be included and critically evaluated in the Draft Environmental Impact Statement. 20

In its current form, the Draft Environmental Impact Statement lacks a significant amount of information regarding alternatives and true resource impacts, and as such the Town feels 21

17. The Draft EIS included discussion of 3 port sites and 2 pipeline route alternatives. A 3rd alternative pipeline route (offshore interconnection with the Gulfstream Pipeline) has been added to the Final EIS in Section 2.1.4. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

18. Comment noted.

19. Comment noted.

20. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

21. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

another Draft Environmental Impact Statement needs to be issued that addresses these significant issues prior to going to the Final Environmental Impact Statement stage.

While the Town of Longboat Key has strong objections to the way the pipeline route is currently proposed, the Town feels that there are seemingly minor changes that can be made by Port Dolphin LLC to the preferred pipeline route that would result in no impacts to vital beach-compatible mineral resources. With this in mind, the Town is willing to work directly with the Port Dolphin LLC and/or the United States Coast Guard and the United States Department of Transportation, Maritime Administration to explore these alternatives in order to design a route that is mutually beneficial to both Longboat Key and Port Dolphin LLC. 21

ACRONYMS AND ABBREVIATIONS

BBCS	FDEP Bureau of Beaches and Coastal Systems
cy	Cubic Yards
DEIS	Draft Environmental Impact Statement
ECL	Erosion Control Line
FDEP	Florida Department of Environmental Protection
FERC	Federal Energy Regulatory Commission
JCP	Joint Coastal Permit
LNG	Liquid Natural Gas
MARAD	United States Department of Transportation, Maritime Administration
MMS	United States Minerals Management Service
NEPA	National Environmental Policy Act
ROSS	FDEP Reconnaissance Offshore Sand search
"the County"	Manatee County, Florida
"the Town"	Town of Longboat Key, Florida
USCG	United States Coast Guard

INTRODUCTION

The Town of Longboat Key (i.e. the Town) has been maintaining its beaches for both shore-protection and recreational purposes since the early 1990's. The Town's 1995 Comprehensive Beach-management plan, 1999 Beach Comprehensive Plan Update, and 2008 Comprehensive Plan Update were developed by Coastal Planning & Engineering, Inc. (CPE) to provide a framework for the Town's decision making process regarding their beach resources. Since 1995, the Town has proactively managed its resources and implemented many of the recommendations of the plan and the plan update. A large portion of the Plan relies on periodic "nourishment" of the Town's beaches from offshore sand sources. These sand sources undergo extensive exploration and testing in order to meet the stringent State of Florida beach-compatibility guidelines. These guidelines address engineering, geological, and biological standards required for matching offshore sand sources to the recipient beach.

HISTORY

The beaches of Longboat Key were critically eroded in the late 1980's and early 1990's. Short term structural solutions were implemented in an attempt to protect coastal infrastructure and buildings. Seawalls and revetments were used along most of the Key in an attempt to protect homes and roads, however, these structures may have contributed to further beach losses. Groins were also used with minimum success to hold sand along portions of the Key.

In 1993, a major beach nourishment project was constructed along the island with over 3 million cubic yards of fine white sand taken from the ebb shoals of Longboat Pass and New Pass. As part of this project, most groins were removed from Longboat Key as a permit condition.

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22. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

    Based on analysis of the revised pipeline route proposed by the Applicant, sufficient quantities of beach quality sand should be available as discussed in Section 4.4. Therefore, impacts to sea turtle nesting are not expected.

This first project provided enough sand to widen the beach about 100 feet. Soon after the construction (1994-1995 timeframe), however, some sections of the beach narrowed significantly. The beach nourishment project did not provide enough sediment to offset volumetric losses which occurred prior to 1993. At the Bayport Condominium property the dry beach reduced to 25 feet as much of the fine sand moved offshore. In Section 2 and at the Islander Club Condominium property (section 4) the sand moved south leaving those sections of beach narrower than desired.

In 1995, a beach management program was developed to address these problems and improve long-term management of the beach. During the 1996/1997 nourishment, coarser gray sand was placed along portions of Section 3 and all of Section 4. Sand filled tubes were also employed to slow the movement of sand offshore at Bayport and alongshore at the Diplomat Condominium, Portobello, and Mark IV properties and at the Islander Club Condominium.

The coarser gray sand, which was obtained well offshore of Longboat Key, was placed on the beach at Bayport. Longshore losses were slowed at the Islander but not eliminated. However, public reaction to the non-native coarse gray sand was mixed as many residents and tourists did not like the color and texture which did not match the natural white sand. To address public concern, as well as the concerns of the State of Florida over potential impacts to turtle nesting from the coarse grey sand, the 2005/2006 beach nourishment was planned primarily as a white sand project along the entire Key using white colored sediments which matched the island's native sand. The native sediment buried a gray sand underlayer in three high-erosion areas (40% of the Key). This project was constructed in 2005/2006 and is currently being monitored for performance. Over 1,000,000 cubic yards of white sand for this project was taken from Borrow Area IX. Over 1,500,000 cubic yards of beach-compatible white sand remain available in this borrow area for future use.

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TOWN COMMENTS ON THE PORT DOLPHIN DRAFT ENVIRONMENTAL IMPACT STATEMENT

The Town has reviewed the DEIS on the Port Dolphin LLC Deepwater Port License Application in order to determine what potential impacts the preferred alternatives may have on The Town of Longboat Key's Beach-management plan. Potential impacts (both major and minor), as well as areas where information identifying the potential impacts is missing and/or deficient, are outlined below, referenced to the specific DEIS sections.

Section 2: Detailed Description of Project and Alternatives

The Town reviewed Section 2 in order to understand how the preferred alternative pipeline route was selected. After a detailed review of the Alternatives Analysis, the Town found several areas where information was either contradictory to other public comments, lacking information, or missing altogether.

2.1. Alternatives Considered

2.1.1 Alternatives for Analysis

2.1.1.3 Port and Pipeline Location Alternatives

This section lists several criteria for identifying and evaluating the alternative pipeline corridor locations. Of particular interest to the Town is Criterion 3. This criterion states that "siting a project in an identified sand resource would be difficult, and likely would not be approved by the Minerals Management Service" (USCG and MARAD, 2008). With this statement, there is a strong acknowledgement that sand resources in Federal waters would be protected for such uses as beach nourishment. However, this statement and alternatives analysis, while true, does not fully describe the situation regarding mapped sand resources, specifically those within State of Florida jurisdictional waters. The MMS does have authority over identifying and permitting sand resources in Federal waters, but the proposed pipeline route also impacts offshore sovereign

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submerged lands of the State of Florida. The MMS has no jurisdiction or authority for these lands. In regards to State of Florida sand and mineral resources, the FDEP BBCS has full authority for permitting the use of these sands as identified resources for shore protection projects through Florida Administrative Code 62B-41. In the case of this alternatives analysis, it does not appear that the USCG and MARAD, or Port Dolphin LLC in the Application (Port Dolphin, 2007a), coordinated with the FDEP BBCS in order to determine if the proposed alternatives impacted any sand resources.

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There is reference to one report in which "Sand Resources" were identified. These resources are mapped on the Figure 2.1-10 (and many other figures) of the DEIS (USCG and MARAD, 2008). Upon further review of this referenced report, the "Sand Resources" as mapped within the DEIS are areas were the potential for sand resources may exist and not actual, beach-compatible mapped resources at all. The reliance of Port Dolphin LLC on this one source of mineral resource information resulted in the misinterpretation of true sand resources and the resulting location of the proposed pipeline route, which directly impacts a regionally limited, beach-compatible sand resource (Figures 1 and 2).

The exploration, identification, permitting, and use of sand resources are highly regulated actions by the State of Florida. As such, a great detail of time, money, and effort are expended to complete the regulatory process to the satisfaction of FDEP BBCS and the State of Florida. Applicants typically conduct both geophysical and geotechnical studies to identify appropriate, site-specific, beach-compatible sediment sources for beach nourishment use. Geophysical surveys are conducted after extensive research into existing and historical geological data to identify areas of potential beach-compatible sediment for application to specific beaches, such as the mineral resource off the northern end of Anna

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23. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 4.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

Maria Island. These geophysical surveys include seismic sub-bottom investigations of the sub-surface sediment strata, sidescan sonar to map surficial ocean bottom features, bathymetric data to develop overlying water depths, magnetometer surveys to identify any potential cultural resources and/or hazards to borrow area development, and if necessary, diver surveys of the proposed borrow areas. After a borrow area is identified, a more detailed (30 meter spacing) seismic sub-bottom, sidescan sonar, and magnetometer survey is conducted under the supervision of a Marine Archaeologist to map all magnetic and geophysical anomalies for further study into cultural resource significance. Vibracores (sediment cores) are obtained, and the sediment layers within the vibracores are analyzed to determine sediment characteristics and compatibility with the recipient beach sediments. The vibracore and sediment data is then extrapolated to the seismic sub-bottom data in order to verify the geophysical survey data. If all of the surveys, studies, and analysis provide supportive results, a specific borrow area is identified and approved by the FDEP for use in the beach nourishment process. The sediments contained in the larger geologic feature in which the borrow area is located may also contain beach-compatible sediment resources that are suitable for future use in beach nourishment projects. This is true for the sediment deposit located next to Borrow Area IX off the north end of Anna Maria Island.

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As part of the process to identify sediments which meet the stringent criteria for beach nourishment, easements and State of Florida "consent to use" decisions are issued for identified resources lying within State of Florida jurisdictional waters. Had Port Dolphin LLC contacted FDEP BBCS to determine if actual identified beach-compatible sand resources were going to be impacted, it would have been apparent that an existing, fully permitted existing borrow area, as well as a very-limited, highly-valuable, native, white sand mineral resource

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24. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

currently used for beach nourishment projects would be directly impacted by the Preferred and Southern alternative pipeline routes (direct impacts to Geologic Resources will be discussed in greater detail in the comments on section 4.4 below). The northern pipeline route, as it approaches Egmont Key and enters Tampa Bay through Southwest Passage, does not impact any identified sand resources, and as such, the northern pipeline route alternative should be considered the preferred alternative in regards to Criterion 3. The decision to route the preferred and the southern routes through Passage Key Inlet has led to the direct impact to identified sand resources, whereas the routing of the pipeline through Southwest Passage results in no impacts to identified sand resources (Figures 1 and 2). Therefore, a route through Southwest Passage should be thoroughly reviewed in the alternatives analysis. 24

In response to the selected pipeline route, the Town requests a detailed analysis of the preferred pipeline route, but taking into consideration the actual identified and mapped sediment resources described above (and not the generic "potential sand resource" currently shown in the DEIS), which were not considered in the DEIS. There appear to be a number of alternatives which require additional analysis (Figure 3). 25

One option the Town requests that Port Dolphin LLC analyze is the potential use of a small portion of the northern route which deviates north of the sediment resource area. In this manner, the vast majority of the preferred route could be retained for use as the pipeline route. The Town believes that revision of the preferred pipeline route to incorporate that portion of the northern pipeline route that enters Tampa Bay through Southwest Passage, fully by-passing the beach-compatible sediment deposit, is a realistic alternative (Figure 3). 26

25. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

26. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

Another option is to connect into the existing Gulfstream pipeline (Figure 3). The Gulfstream pipeline apparently has both capacity and an offshore point of connection available to Port Dolphin, assuming a number of technical issues can be addressed. A major advantage to use of the Gulfstream line is avoidance of environmental impacts associated with the proposed Port Dolphin pipeline. Nevertheless, each alternative provides a satisfactory solution to the potential loss of sand resources which have been identified for use as the Longboat Key beach nourishment sediment source (addressed by the Town later in these comments). This alternative will be addressed in greater detail below. 27

A pipeline route which continues straight from the offshore Deepwater Port site, directly to Southwest Passage, crossing the Gulfstream Pipeline, and then continuing straight to its planned location in Central Tampa Bay (all in one straight line) is also an option, although not one specifically identified in the DEIS. This route may involve more study, but is a logical stand-alone pipeline route, and may actually result in a reduction of the overall length of pipeline, while maintaining the same number (2) of planned crossings of the Gulfstream Pipeline (Figure 3). 28

There is another alternative that is not addressed in the DEIS. This alternative would have the preferred pipeline route begin at the proposed Deepwater Port site and then continue to a spot approximately 2,000 feet south of where the existing Gulfstream Pipeline crosses the Federal/State Boundary, approximately nine miles west of Egmont Key. At this point, the new pipeline should be collocated, or constructed parallel to, the existing Gulfstream pipeline (Figure 3). In order to prevent impacts to either pipeline, the construction should occur outside of the easement of either Pipeline, but on a parallel path from offshore to Port Manatee. It would reduce the overall environmental impacts (addressed 29

27. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

28. In Response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

29. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

    An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

by the Town later in these comments) while maintaining access for the Port Dolphin pipeline. This route would also avoid impacts to all identified sand resources. Without an analysis of an alternative pipeline route based on collocating the Port Dolphin pipeline parallel to the existing Gulfstream pipeline in Florida State waters, the DEIS Alternatives Analysis is not complete. 29

The alternative of greatest viability may be the option of Port Dolphin LLC constructing their pipeline to, and connecting with the existing offshore piggable y-type valve already available as part of Gulfstream's existing pipeline at milepost 392.6. This valve was specifically constructed for this type of situation although as reported in the DEIS, technical issues would need to be addressed. This alternative was discussed in the DEIS, however, it was not addressed in detail and may have been dismissed after Port Dolphin LLC determined to use the preferred route. The DEIS lists several pipeline engineering reasons as to why this is not a feasible alternative, however, in response to the FERC proceeding for the onshore portion of the pipeline (and submitted as public comment to the DEIS proceeding) Gulfstream states that these issues can be successfully addressed. There is a minor discrepancy between the information presented in the DEIS and the information presented by Gulfstream regarding operating pressures of the Gulfstream Pipeline and of the re-vaporized gas at the Port Dolphin LLC terminal. However, minor revisions to the pipeline or vessel engineering systems should be considered more seriously if they result in significant reduction in impacts to environmental resources by tapping into an existing pipeline offshore, and avoid the beach-compatible sand resources required for beach nourishment projects. 30

A reduction in major and minor environmental impacts would be accomplished be eliminating over 20 miles of new pipeline construction. Additionally, the 31

30. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

31. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

Gulfstream pipeline was constructed with this valve in order to provide access to additional providers (like Port Dolphin). This appears to have been required by FERC in order to be in the public interest by allowing additional providers of natural gas access to the Gulfstream pipeline. The Town questions whether it is in the public interest to allow Port Dolphin to refuse this connection and to construct a new pipeline through sensitive and scarce resources that have significant environmental, economic, and public safety value to the Town (see later sections for detailed discussion of the impacts). 31

Based on these facts and observations it is the Town's opinion that the Alternatives Analysis presented in the DEIS is not complete, and that at least four potential alternatives need to be further explored, with greater importance given to the reduction in environmental impacts and avoidance of sand resources of each of these alternatives. These alternatives, shown in Figure 3 and listed below in order with the smallest potential for environmental impacts listed first (and Town preference) is: 32

1. A more detailed discussion regarding tapping into the Gulfstream pipeline at milepost 392.6, including a detailed analysis of the engineering issues involved and a qualitative and quantitative discussion on the reduction in environmental impacts by not having to construct 20+ miles of new pipeline;
2. A discussion of a new alternative that would construct the preferred pipeline route beginning at the proposed Deepwater Port site and then continue to a spot approximately 2,000 feet south of where the existing Gulfstream Pipeline crosses the Federal/State Boundary, approximately nine miles west of Egmont Key. At this point, the new pipeline could be collocated, or constructed parallel to, the existing Gulfstream pipeline all the way into Port Manatee.

32. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

3. A discussion of a new alternative of constructing the pipeline straight from the offshore Deepwater Port site, directly to Southwest Passage (not Passage Key Inlet), crossing the Gulfstream Pipeline, and then continuing straight to its planned location in West-Central Lower Tampa Bay (all in one straight line).
4. A discussion of the potential for diverting the pipeline to follow a small portion of the northern alternative route as it enters Tampa Bay via Southwest Passage to avoid the beach-compatible sediment resource areas, while retaining the greater majority of the preferred pipeline route.

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Section 3: Affected Environment

Upon review of Section 3, the Town feels that the discussion relating to several resources was deficient in regards to issues specific to the West-Florida Coast. Additionally, information was missing in regards to the regulatory authority of State of Florida agencies on mineral resource management, which resulted in a major oversight of previously defined and active mineral resources directly in the path of the proposed pipeline route. These issues are discussed below.

3.2 Biological Resources

3.2.3 Threatened and Endangered Species

3.2.3.2 Threatened and Endangered Sea Turtles

The beaches of Longboat Key and the west coast of Florida provide valuable nesting habitat for sea turtles. Five sea turtle species have been known to nest on Florida beaches, including the threatened loggerhead sea turtle (*Caretta caretta*), endangered green sea turtle (*Chelonia mydas*), endangered leatherback sea turtle (*Dermochelys coriacea*), endangered hawksbill sea turtle (*Eretmochelys imbricata*), and endangered Kemp's ridley sea turtle (*Lepidochelys kempii*). On average, 223 sea turtle nests were laid annually on Longboat Key between the years 2000 and

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33. Based on analysis of the revised pipeline route proposed by the Applicant, sufficient quantities of beach quality sand should be available as discussed in Section 4.4. Therefore, impacts to sea turtle nesting are not expected.

2006, with loggerheads accounting for approximately 99% of nesting (Tucker *et. al.*, 2007). Erosion of these beaches reduces available nesting habitat; however, Longboat Key's periodic beach nourishment with fill material that replicates the native beach sand increases the area that may be utilized for sea turtle nesting. 33

Sand source compatibility is a major consideration for the nourishment of a project area (NMFS and USFWS, 1991). Following beach nourishment, the increase in success of sea turtle hatchlings on a nourished beach environment is attributable to the type of sand (fill material) used in the project. Characteristics such as color, grain size, compaction and gas balance in the nest are major determinants in the success of nesting. Beach sand characteristics strongly influence the relative suitability of sea turtle nesting success (a choice to nest or false crawl) and hatchling success (the percentage of eggs that produce hatchlings) (T. Tucker, personal communication, 2008). According to Broadwell (1991), conditions favoring hatchling production may rely heavily on pore spacing and moisture content. The sand composition, color, and grain size can affect the incubation time, sex, and hatching success of turtle hatchlings (Street *et al.*, 2005). The color of the fill material can affect the temperature of the nest; increased nest temperatures have been linked to a strongly female-biased hatchling sex ratio among loggerhead sea turtles, which has serious implications for the reproductive success of the species (Mrosovsky and Provancha, 1992). 34

It is important that beach fill material be compatible with sea turtle nesting and hatching requirements. Fill material should resemble native grain size distribution and sorting level, color and shape to better maintain native beach habitats. The sediment source off of the north end of Anna Maria Island, including Borrow Area IX, meets the rigorous requirements of the State of Florida concerning "beach-compatible" sediment, and it is the only known economical sediment deposit with

34. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

    Based on analysis of the revised pipeline route proposed by the Applicant, sufficient quantities of beach quality sand should be available as discussed in Section 4.4. Therefore, impacts to sea turtle nesting are not expected.

similar sediment characteristics to that of the Longboat Key beach currently available to the Town of Longboat Key. The sediment very closely matches the existing beach sand, therefore utilization of this sand source for Longboat Key beach nourishment projects maintains the beaches as suitable and valuable sea turtle nesting habitat. 34

While The DEIS has a relatively extensive discussion on threatened and endangered sea turtles, it fails to discuss the importance of beaches and sediment characteristics required by threatened and endangered sea turtles to nest and successfully reproduce. This is a major oversight, and the Town considers the DEIS incomplete without a discussion on: 35

1. A description of the optimal native beach habitat required for threatened and endangered sea turtles to successfully nest and reproduce; 36
2. A discussion on the importance of quality beach material and access to successful sea turtle reproduction; 37
3. A discussion on the requirements of beach-compatible borrow sand quality and characteristics required for maintaining suitable beach habitat for threatened and endangered sea turtles to successfully nest and reproduce. 38

3.4 Geological Resources

3.4.2 Offshore Regional Geology (Mineral Resources)

As described in the Town's comments for Section 2.1.1.3, there was limited to no discussion of State of Florida sand and mineral resources. There was only a cursory mention of sand resources within Florida State waters, and that comment was incorrect. In both the application and DEIS, there are repeated assertions that the MMS has final regulatory authority over these resources. While this is true for Federal mineral resources, it is not true for State of Florida mineral resources which extend from the mean high water line out to a distance of nine (9) miles offshore. The FDEP BBCS has full 39

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35. Based on analysis of the revised pipeline route proposed by the Applicant, sufficient quantities of beach quality sand should be available as discussed in Section 4.4. Therefore, impacts to sea turtle nesting are not expected.

36. Based on analysis of the revised pipeline route proposed by the Applicant, sufficient quantities of beach quality sand should be available as discussed in Section 4.4. Therefore, impacts to sea turtle nesting are not expected.

37. Based on analysis of the revised pipeline route proposed by the Applicant, sufficient quantities of beach quality sand should be available as discussed in Section 4.4. Therefore, impacts to sea turtle nesting are not expected.

38. Based on analysis of the revised pipeline route proposed by the Applicant, sufficient quantities of beach quality sand should be available as discussed in Section 4.4. Therefore, impacts to sea turtle nesting are not expected.

39. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

regulatory authority over the identification, permitting, and use of State of Florida sand resources for shore protection activities under Florida Administrative Code 62B-41. It is believed that Port Dolphin LLC failed to address the potential presence of beach-compatible mineral resources required for regional beach nourishment projects within the planned pipeline route with the FDEP BBCS, instead relying on one report that shows a large region of potential sand resources offshore of Anna Maria Island and Longboat Key, and not actual identified and mapped beach-compatible sand resources (*i.e.* mapped mineral resources as the NEPA process requires). However, even in considering this larger area of potential sand resources referenced in the DEIS, Port Dolphin LLC ignored that information and selected a pipeline route through the potential resource area even though there were other viable pipeline routes. 39

As stated earlier, potential sand deposits within the area mapped as potential sand resources in the DEIS are actually undefined, and most of them do not meet the current strict "beach compatibility" standards for use as borrow material in beach nourishment projects. The exploration and identification of beach-compatible sand resources is a highly-regulated process governed by the FDEP BBCS. The goals of these strict regulations are to identify and use only the best and most appropriate sand for beach nourishment activities, primarily seeking sediment which most closely matches the native beach sediment. In order to be deemed suitable, proposed offshore sand sources are reviewed in context with the recipient beach by the FDEP BBCS. The review includes comment by outside agencies (State Fish and Wildlife, State Historic Preservation Office, etc.) to insure that adverse environmental or cultural impacts will not occur. In addition, sediments must meet specific criteria. The performance of a beach nourishment project is related to the quality and quantity of sand used to nourish or replenish the eroding shoreline. State and federal regulatory agencies require that sand resources for nourishment be "beach-compatible" or similar to the natural sand for any given area. Various qualities like grain size, silt content, color, and mineralogical content are taken 40

40. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

into account. The quality of material that can be placed on Florida's beaches is governed by Rule 62B-41.007(2)(j) F.A.C. which states that:

> To protect the environmental functions of Florida's beaches, only beach-compatible fill shall be placed on the beach or in any associated dune system. Beach-compatible fill is material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system. Such material shall be predominately of carbonate, quartz or similar material with a particle size distribution ranging between 0.062 mm (4.0 phi) and 4.76 mm (-2.25 phi) (classified as sand by either the Unified Soils or the Wentworth classification), shall be similar in color and grain size distribution (sand grain frequency, mean and median grain size, and sorting coefficient) to the material in the existing coastal system at the disposal site and shall not contain:
>
> 1. Greater than 5 percent, by weight, silt, clay or colloids passing the #230 sieve (4.0 phi);
> 2. Greater than 5 percent, by weight, fine gravel retained on the #4 sieve (-2.25 phi);
> 3. Coarse gravel, cobbles or material retained on the 3/4 inch sieve in a percentage or size greater than found on the native beach;
> 4. Construction debris, toxic material or other foreign matter; and
> 5. Not result in cementation of the beach.

If rocks or other non-specified materials appear on the surface of the filled beach in excess of 50% of background in any 10,000 square foot area, then surface rock should be removed from those areas. These areas shall also be tested for subsurface rock percentage and remediated as required. If the

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natural beach exceeds any of the limiting parameters listed above, then the fill material shall not exceed the naturally occurring level for that parameter.

Once a borrow area is found to be compatible with the recipient beach, a detailed Quality Assurance/Quality Control (QA/QC) plan is developed (in conjunction with, and approved by the FDEP BBCS) which must be followed exactly during construction of the shore protection project. This plan specifies a range of sediment characteristics which are considered acceptable for placement. The characteristics typically include mean grain size, silt content, color and shell content. These plans are site specific and can include other parameters as well. A detailed sampling regimen is provided to determine if material placed meets the QA/QC criteria. The plan also provides guidance on mitigation in the event that material fails to meet the criteria. Mitigation often involves either removal of non-compliant material or mixing with other material in order to meet QA/QC standards.

Based on these strict standards and rules, the area mapped in Figure 2.1-10 of the DEIS (USCG and MARAD, 2008) is not an accurate representation of sand resources. It does show the area of potential resources based on available data, but unfortunately does not highlight high-quality, regionally-limited, beach-compatible sediment resources such as Borrow Area IX and the sediment deposit off the north end of Anna Maria Island. In fact, beach-compatible sand is a severely limited resource, and as such, needs to be conserved whenever possible for future use in beach-nourishment programs. Nevertheless, Port Dolphin LLC still selected a preferred pipeline route through the potential sediment resources when there were viable pipeline routes that would have preserved the limited beach-compatible sediment resources for shoreline protection.

Due to what appears to be a major oversight in not thoroughly investigating potential beach nourishment sediment resources in the path of the preferred pipeline, the

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applicant missed the important beach-compatible beach nourishment sediment source for both Manatee County and the Town of Longboat Key. Port Dolphin LLC may not have been familiar with the strict rules governing the identification of a beach-compatible sand resource, not aware of the various criteria that must be met to receive approval of a beach-compatible, beach nourishment sediment source. Port Dolphin LLC may have not been aware of the fact that such resources are highly limited, and greatly sought after by communities which need the sediment to maintain their beaches. Communication with FDEP BBCS and local government agencies in charge of local beach-management plans (the Town of Longboat Key, Manatee County Department of Conservation Lands Management, Pinellas County Department of Environmental Resource Management, etc.) would have provided the applicant with information that would have been important in developing a pipeline route to avoid the beach-compatible sand resource area, as directed by the NPEA process. The Applicant apparently did consult with the ROSS database for potential sediments, however, the applicant did not follow up on the ROSS information to learn of the specific resources in the direct path of the preferred pipeline route. As a result, the Application and DEIS failed to identify the true beach-compatible sand resources along the preferred pipeline route. In addition to the sediment deposit as a whole, specifically, a fully permitted, active, existing Borrow Area IX for Longboat Key is directly bisected by the proposed pipeline route (see comments in section 4.4 for more impact information). This borrow area was permitted for use by the FDEP BBCS under Consolidated Joint Coastal Permit and Sovereign Submerged Lands Authorization Number 0202209-001-JC.

Due to the proposed pipeline route, a significant portion of the sediment deposit offshore the northwestern tip of Anna Maria Island, in addition to the specific borrow area mentioned above, will not be available for use on both Anna Maria Island and Longboat Key after construction. This sediment is the ideal sand mineral resource for shore protection projects on Longboat Key. The geologic character (as described above

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in Florida Administrative Code 62B-41.007(2)(j)) is an excellent match for both Longboat Key and Anna Maria Island. In addition to being the sand source for the Longboat Key project, this sediment deposit has served as a successful sand source for the last three Anna Maria Island beach nourishment projects. Longboat Kay considers this shoal to be the current and long-term, white, beach-compatible sand source for its beach-management plan. Specific impacts to this sediment source, as well as offshore regional mineral resources, will be described in detail under comments for section 4.4 (below). 40

When defining a potential pipeline route, Port Dolphin LLC should conduct a title determination on the submerged lands to be included on, or near, the proposed pipeline route. It appears that this was not done, or not completed properly, for the Application or the DEIS. If it had been, the existing Longboat Key borrow area and historic Anna Maria Island borrow areas should have been mapped as identified sand resources.

In summary, the Town finds this section of the DEIS severely lacking in regard to information on actual geologic mineral resources within the proposed project area. As such, the Town considers the DEIS incomplete until a detailed discussion is included on: 41

1. The detailed and highly-regulated process by which mineral resources are identified in Florida State waters;
2. A detailed description of true identified mineral resources (including sand borrow areas permitted for use by FDEP BBCS) as opposed to a generic mention a large portion of seafloor that has limited potential for sand resources;
3. A detailed discussion on the regional needs for sand resources for beach-management plans in the vicinity of the project area.

3.6 Recreation and Aesthetics

3.6.1 Definition of the Resource

41. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

Although Longboat Key has an extensive white sand beach, no Longboat Key facilities were mentioned in the DEIS as important recreational resources. In particular, the section titled "Recreation on Local Islands" solely focused on island parks in Hillsborough and Pinellas County, with two of the mentioned parks (Caladesi and Honeymoon Island) occurring over 35 miles from the proposed project location, while Longboat Key is immediately south of the preferred pipeline route.

The Town believes that there was a significant oversight of the Longboat Key beaches themselves, which are in direct proximity to the project area. Longboat actively maintains all ten miles of island coastline as part of its beach-management plan. The beach-management plan is partly funded by the State of Florida, and the Manatee County and Sarasota County "Bed Tax" programs, as well as through special assessments from the Town itself. In order to qualify for State funds for shore protection, the Town has to maintain beach access and parking facilities for the general public along portions of the shoreline of Longboat Key. As part of the certification process, the FDEP BBCS identifies all available access points and provides funding based on actual availability. In the case of Longboat Key, over 10,000 feet of beachfront serves as direct access points to the general public. The process of determining public access and eligibility for State cost-sharing also includes the determination of an Erosion Control Line (ECL). Since the State of Florida cost-shares the construction (and related) costs of Longboat Key's beach nourishment projects, the ECL was determined and platted in relation to the existing mean-high water line prior to the construction of the first beach-nourishment project. Once determined, the ECL becomes the legal boundary between upland, private property and public, State of Florida sovereign lands, meaning that anything seaward of the ECL is State of Florida public property. This rule is critical to the Florida shore protection program by ensuring that all constructed beaches that are funded (at least partly) by the State of Florida are owned by the State and considered public property for the enjoyment of the citizens of the State of Florida.

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42. Comment noted.

The goal of this process is to ensure, on behalf of the Governor and Board of Trustees for the Internal Improvement Trust Fund of the State of Florida, access to the general public to the sandy beaches of the State of Florida. In essence, this allows for a significant portion of the shoreline of Longboat Key to be accessed and enjoyed by the general public, and therefore, is a major public recreation area. Due to this fact, the maintenance of these public recreational resources through shore protection activities like beach nourishment is vital to the protection and continued availability to the general public. This is a major recreational resource enjoyed by the general public and tourists from all over the United States and abroad. 43

The DEIS does not identify or otherwise mention the beaches of Longboat Key as a major recreational resource. The Town considers the DEIS to be incomplete and misleading without the inclusion of a detailed discussion of the existing public beach access program present on Longboat Key and neighboring barrier islands.

3.9 Socioeconomic Resources and Environmental Justice

3.9.1 Definition of the Resource

The DEIS states that "NEPA requires an analysis of socioeconomic issues if socioeconomic effects are interrelated with environmental effects" and continues to define the resource as "the basic attributes and resources associated with the human environment, particularly population and economic activity" (USCG and MARAD, 2008). One of the largest economic sectors of the State of Florida, Manatee County, Sarasota County and the Town of Longboat Key is the tourism industry. The tourism industry in Florida and Longboat Key is highly dependent on the environment, in particular, to the access and health of Florida's white sandy beaches. The Town was dismayed to see that the DEIS discussion of socioeconomics was limited to fisheries and fisheries management as well as basic statistics as to general onshore economic industries, 44

43. Comment noted.

44. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

population, and employment. There is only brief mention of tourism, on DEIS page 3-116, that is inadequate at best. This reference is to recreational fishing as the only tourism related industry in the region is both highly misleading and incorrect.

The main economic engine for Longboat Key is tourism, which is based on the existence of the beaches of Longboat Key. Rental properties, transportation, retail, food and service industries primarily revolve around the beach–related tourism industry of Longboat Key. None of these economic issues are even addressed in the DEIS. 44

Additionally, the tax base of Longboat Key is dependent on Manatee and Sarasota County's Tourist Development "Bed Taxes", the retail sales tax, and ad valorem property taxes. Currently, it is a combination of these taxes and special assessments that directly fund the beach nourishment projects of Longboat Key. The DEIS fails to discuss any issues related to the extensive tourism industry of Manatee County, Sarasota County, or Longboat Key, or how these issues fund large socioeconomic programs, including environmentally based activities like beach nourishment.

Seeing that these activities are closely linked, the Town believes a detailed discussion of the total tourism industry and its direct impact to tax revenues in Manatee County, Sarasota County, and the Town of Longboat Key is required. Additionally, the links between the tourism industry, "Bed Taxes" and other tax revenue, and beach nourishment need to be addressed in the DEIS. It is important for the DEIS to accurately describe the interconnectivity of beach nourishment (including protection of available beach-compatible mineral resources) to tourism, tax revenue, and the continued support of the beach-management plan through beach nourishment. Without this discussion the DEIS is incomplete. 45

45. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9

Section 4: Environmental Consequences

In Section 4, the Town was able to identify a direct, major impact to a sensitive environmental resource that the Town relies on for shore-protection. The impact to this geologic resource is described below, and several major cumulative impacts due to this direct environmental impact are described later in the Town's comments to Section 6 of the DEIS.

Section 4.4: Geological Resources

The DEIS states that "Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to mineral resources and potential geologic hazards are considered when evaluating potential impacts of the Port Dolphin project on geological resources. Generally, impacts on geological resources or caused by geologic hazards can be avoided or minimized through proper siting" (USCG and MARAD, 2008). Both the DEIS and the Application plainly state, in an effort to properly site the preferred pipeline route, that "the route avoids mapped mineral resources" with the DEIS stating the following: "geological resources generally would not be impacted by the project. Some localized, short-term changes in sedimentation would be expected. It is not expected that the project would cause destruction of any unique geologic feature, increase erosion potential, prevent recovery of mineral resources..." These statements are inaccurate, rendering this portion of the DEIS unacceptable. 46

As discussed earlier in the comments for Section 3.4.2, the DEIS maps a much larger area of potential sand resources instead of referencing actual permitted and identified sand resources (*i.e.* mapped mineral resources as the NEPA process requires). However, even in considering this larger area of potential sand resources referenced in the DEIS, Port Dolphin LLC ignored that information and selected a pipeline route through the potential resource area even though there were other viable pipeline routes. Yet, even with this clearly mapped on figures in the DEIS, the document still states that "It is not expected that the project would cause destruction of any unique geologic feature, increase erosion potential, prevent recovery of mineral 47

46. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

47. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9. Port Dolphin has requested a 400-foot buffer centered over the pipeline.

resources..." This is clearly contradictory to figure 2.1-10 (among others) presented in the DEIS which shows the preferred pipeline route going through the northern section of the potential sand resources. Also, as discussed earlier in the Town's comments on section 3.4.2, had Port Dolphin LLC considered the State of Florida's regulatory authority regarding mineral resources in State of Florida jurisdictional waters, it would have discovered the FDEP BBCS has full regulatory authority over the identification and permitting of mineral resources in Florida State jurisdictional waters. This, together with a properly performed title determination, may have led to the discovery that, as proposed, the preferred pipeline route bisects an existing, fully permitted borrow area used by Longboat Key (Borrow Area IX), as well as bisecting a much larger beach-compatible sand resource, containing an estimated 18,245,000 cy of beach-compatible sand resources, that is the historic and future source for beach-compatible sands for the Town of Longboat Key Beach-management plan and Manatee County's shore-protection program (Figures 1 and 2).

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The borrow area bisected by the proposed pipeline route, Borrow Area IX permitted under the authority of the FDEP BBCS through Consolidated Joint Coastal Permit and Sovereign Submerged Lands Authorization Number 0202209-001-JC, was utilized by the Town for the 2005/2006 beach-nourishment project. At that time, over 1,000,000 cy of white, native, beach-compatible sand was dredged from Borrow Area IX and place along Longboat Key. After construction of the project, an estimated 1,500,000 cy of white, native, beach-compatible, FDEP-permitted sand remained in Borrow Area IX for use in future Longboat Key beach-nourishment projects. This is in addition to the larger volume of sand available in the overall geologic feature surrounding Longboat Key's Borrow Area IX, which is also impacted by the proposed pipeline route.

Due to the limited availability of similar beach-compatible sand resources, and to the fact that this resource has been used successfully on at least four occasions (three for Anna Maria Island and once for Longboat Key), this mineral resource qualifies as a unique geologic feature.

48

48. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

Referring back to the DEIS contention that "it is not expected that the project would cause destruction of any unique geologic feature, increase erosion potential, prevent recovery of mineral resources...", the Town disagrees, as the proposed pipeline route directly impacts a unique geologic feature while also preventing recovery of a substantial volume of vital, regionally-limited, beach-compatible mineral resources, including approximately 1,500,000 cy of material previously permitted by the FDEP BBCS for use by the Town of Longboat Key for future beach nourishment projects. 48

In addition to being the ideal sand source in regards to geologic and biologic native beach compatibility, this high quality sand source is the closest large sediment deposit of this quality to the recipient beaches of Longboat Key. This is one of only three sand resources known to Longboat Key that have the unique, beach specific qualities and proximity to the project area required for the Town's beach-management plan. Unfortunately one source, the Longboat Pass ebb shoal, presently does not qualify for the State of Florida permits required for excavation of those beach-compatible sands and New Pass does not contain sufficient sand volume for the Longboat Key program. This means that the beach-compatible sand resources within Borrow Area IX and the adjacent sediment deposit offshore the northern end of Anna Maria Island are the only sand resource that contains the readily available, ideal beach-compatible sand required by the State of Florida available to the Town for its current and future beach nourishment programs. Therefore, quantifying the impact of the proposed construction of the Port Dolphin natural gas pipeline directly through Borrow Area IX, and also impacting the adjacent sediment deposit, is vital to Longboat Key, as such an analysis will lead to the conclusion that a non-impactive pipeline route is absolutely necessary. 49

In order to determine the true impact that the proposed pipeline route would have on these geologic resources, the Town must consider not just the actual footprint of the pipeline itself, but a "safety buffer", restricting dredging or other bottom impacts, that would be employed around the constructed pipeline in order to avoid future impacts to the natural gas pipeline. In 50

49. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

50. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

the State of Florida, this is a common occurrence when defining boundaries for mineral resources (such as beach-compatible sand borrow areas) when they occur in proximity to cable routes, storm water, and waste water outfalls, and other buried obstructions. Unfortunately, there is no clear precedent for how wide a safety buffer around a natural gas pipeline is must be in the State of Florida. Its size would be determined through the State permitting process. Nevertheless, natural gas pipelines which are located in other areas of the country require buffer zones of 300 to 600 meters (or potentially more) to either side of the pipeline. In Louisiana, these pipelines are quite distant from highly-populated areas in many cases, yet the 300 – 600 meter buffer zones are common. The preferred Port Dolphin pipeline route, as it passes through Borrow Area IX and the surrounding beach-compatible sand source, is close to highly populated areas, and to areas of relatively high recreational boat traffic. Considering the proximity of the proposed pipeline to the populace, it is anticipated that the State of Florida could require at least a 300 meter buffer zone, if not more. In the case of defining and permitting a beach-compatible borrow area, the safety buffer would be negotiated during the permitting process between the beach nourishment project applicant (typically a County or municipality) and the FDEP BBCS, the State regulatory agency in charge of permitting beach-compatible mineral resources and the related beach nourishment projects. Due to the sensitive nature of a natural gas pipeline, it is assumed that the State would err on the side of caution and design a larger "no dredge" safety buffer. 50

Realistic assumptions must be made to try and determine what this safety buffer will be, prior to allowing construction of any pipeline. Louisiana and Texas have extensive oil and gas infrastructure, including widespread oil and gas pipelines throughout their State and Federal submerged lands. Borrow areas have been defined in proximity to these pipelines in the past, and recently, the safety buffer proposed by the MMS (the regulatory agency in charge of Federal oil, gas, and mineral resources) was 1,000 meters to either side of the pipeline, resulting in a 2,000 meter no-dredge corridor centered on the pipeline. This is a significant buffer and probably the worst case scenario regarding a safety buffer for the Port Dolphin

pipeline. In order to determine how a safety buffer may impact the mineral resources along the proposed pipeline route, the worst case scenario of 1,000 meters was considered along with a less restrictive, but still significant, 1,000 foot buffer (Figures 1 and 2).

When a 1,000 meter buffer is applied to the proposed pipeline route, all of Borrow Area IX becomes ineligible for future beach nourishment projects. If that buffer were reduced to 1,000 feet, approximately 50% of Borrow Area IX becomes inaccessible to Longboat Key for future beach-nourishment projects. This however, does not mean the other 50% would still be available, as the proposed pipeline would actually bisect Borrow Area IX, resulting in two separate and small borrow areas. By bisecting Borrow Area IX, the remaining areas would be too small to be effectively dredged for future beach nourishment projects. Therefore, any potential buffer of the proposed pipeline would result in the potential loss of all remaining sand in Borrow Area IX from the inventory of beach-compatible sands available to Longboat Key. This represents a major impact to an existing mineral resource, and to the economy and safety of Longboat Key. 50

As part of the planning and permitting process for the 2005/2006 beach nourishment project, the Town of Longboat Key spent over $500,000 exploring, analyzing, defining, and permitting Borrow Area IX. If the pipeline is constructed along the currently proposed route, removing the remaining material in the borrow area from the inventory of available beach-compatible materials, then that will essentially result in the loss of the $500,000 the Town previously spent on Borrow Area IX. In addition, The Town of Longboat Key would then have to try and locate a replacement, beach-compatible sand source. This will result in a new expenditure of at least $500,000 to try and locate this sand resource, and, due to the fact that beach-compatible sand is a severely limited resource regionally, there is no guarantee that a replacement sand resource could be located and eligible for a state permit. If one is found, it will undoubtedly be located in an area that is further from Longboat Key than Borrow Area IX. 51

51. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

In addition to the $1,000,000 of Town expenditures described above, the Town would have to pay the incremental cost difference of excavating and constructing a sand resource that occurs further away from the project than Borrow Area IX. For discussion purposes, it can be estimated that the incremental cost of construction due to an increase in distance is on the order of a minimum of $0.50/cy per mile based on direct distance traveled from the beach nourishment site to the borrow area. In order to try and quantify the impact in terms of replacing the sand in Borrow Area IX, assuming that a new borrow area would be found 5 miles further away from the project area (or 10 miles roundtrip for the dredge), would result in the incremental cost increase of $2.5/cubic yard of sediment. Borrow Area IX has more than 1,500,000 cy of beach-compatible material remaining within the permitted borrow area, to replace this material from a borrow area 5 miles further away from the project would result in the minimum cost of $3,750,000, at today's rates (which is highly affected by the cost of fuel, which may continue to increase). The construction of the pipeline (as currently proposed) would result in a ***minimum*** impact to the Town of Longboat Key of $4,750,000 for their next beach nourishment project. Depending on how far away a new sand source is, and the economics associated with dredging that borrow area in the future, this cost could rise dramatically. This is not a cumulative impact, or an impact to a potential sand resource; this is a direct impact to a fully designed and FDEP-permitted mineral resource. 51

In addition to the direct impact of the proposed pipeline route to Borrow Area IX, the proposed pipeline route crosses at least four offshore underwater sand hill features, all of which show promise as sediment resources for beach nourishment. These features are currently being investigated by Longboat Key to determine what potential they may have as future, beach-compatible sand resources. If the pipeline is constructed across them, then they will become unavailable for future beach nourishment projects, not only for Longboat Key, but for regional communities including Pinellas County, Manatee County, and Sarasota County. The currently proposed preferred pipeline route does not take into account regional beach-compatible sand resource needs, despite language stating so in the DEIS. This is a major issue to Longboat Key 52

52. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

and its neighbors, as regionally-limited, beach-compatible sand resources are a highly sought after commodity, uniquely qualified for beach nourishment and shore protection projects along Florida's west coast. If these sand resources become further restricted due to the construction of the Port Dolphin pipeline, the Longboat Key Beach-management plan, together with the other regional shore protection programs, will see increased competition for already limited regional resources, resulting in long-term project impacts that would result in the cumulative impacts addressed in the Town's comments on Section 6, addressed later in this document.

The DEIS entry overlooks the impacts to the unique mineral resources listed above. The DEIS describes the destruction of unique geological features as a major impact, and impacts due to siting of facilities to prevent recovery of mineral resources can have varying degrees of importance. With that knowledge, the DEIS then goes on to say that "Geological resources generally would not be impacted by the project. Some localized, short-term changes in sedimentation would be expected. It is not expected that the project would cause destruction of any unique geologic feature, increase erosion potential, prevent recovery of mineral resources, increase the potential for geologic hazards (e.g., seismicity), or alter soil composition or structure." This is inaccurate and misrepresents the true impacts to geologic resources due to the construction of the pipeline (as it is currently proposed) and the implementation of a "no-dredge" safety buffer around the pipeline. Without a discussion of the issues listed in the above comments, with specific details on existing, permitted, State of Florida borrow areas and unique, regionally-limited, beach-compatible sand resources, and how the proposed pipeline route directly impacts these mineral resources, the DEIS is incomplete and unacceptable, as well as misleading to the layperson. 52

4.11 Mitigation and Minimization Measures and Monitoring

As described above, there are major impacts to Geologic Resources due to the siting of the preferred pipeline route. This route has significant impacts on scarce beach-compatible sands, both those currently identified and permitted as existing Longboat Key Borrow Area IX and 53

53. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

those resources identified as the sole beach-compatible source for future Anna Maria Island beach nourishment needs. As such, the Town believes "avoidance" should be addressed in the DEIS since there are no plausible options for mitigation, and minimization can be accomplished through avoiding the limited beach-compatible sediment resources. However, no discussion exists in the current DEIS to address the presence of the sediment resource off the north end of Anna Maria Island, or the offshore sand hills impacted by the proposed pipeline route. 53 54

While no mitigation measures exist for the impacts on sand resources, there are specific minimization efforts that can be employed. These efforts are described in detail in the comments provided above for section 2.1.1.3. Impacts to Geologic Resources can be minimized, or actually completely avoided, by rerouting that portion of the pipeline route which impacts the sediment resource. Viable options exist which can achieve avoidance. For example, one potential option would be to utilize the northern pipeline route in the area of the sediment resources, retaining the majority of the preferred pipeline route. Another option would be to connect via an offshore subsea interconnection to the Gulfstream Pipeline. The subsea interconnection valve already exists. This is also an alternative deemed viable by Gulfstream. By rerouting the pipeline to connect to the Gulfstream pipeline offshore, all impacts to mineral resources will be removed. The Town would have no further objection to the project (in regards to mineral resource impacts) as the one major impact that greatly affects the future of its beach-management plan will be eliminated with the rerouting of the pipeline through the northern route, or selecting the subsea interconnection of the Port Dolphin pipeline to the existing Gulfstream pipeline. 55 56

If this is not deemed possible, following an extensive alternatives analysis, then perhaps the second minimization effort involves rerouting the pipeline to be collocated with the existing Gulfstream Pipeline in Florida State waters. The existence of the Gulfstream pipeline already creates a corridor where sand resources are no longer available. As an alternative to the subsea Gulfstream connection, a parallel, collocated pipeline along the existing Gulfstream Pipeline 57

54. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

55. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

56. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

57. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

route would reduce and/or eliminate the impacts the current proposed route has to mineral resources. 57

The final potential minimization measure involves rerouting the pipeline entirely. This route could take the pipeline on a direct route from the offshore deepwater port, into the central portion of Southwest Passage, and onto its planned route in West-Central Lower Tampa Bay, where it would continue along its currently proposed route to Port Manatee. Another option within this alternative could be routing the pipeline from the deepwater port to a location near the subsea interconnection valve on the Gulfstream Pipeline, at which point the route would follow the proposed northern pipeline alternative through Southwest Passage to Port Manatee. 58

All four of these potential minimization measures would result in the elimination of impacts to geologic resources, specifically those that the Town of Longboat Key relies on for its beach-management plan. Avoidance is the only measure that would result in a minimization to the impacts on geologic resources the proposed pipeline route would have. As stated before, once the resources are removed as a sand source due to the construction of the proposed pipeline, there are no realistic mitigation options available. Beach-compatible sands on the west-coast of Florida are a very scarce resource. There are no mitigation measures that provide relief from the destruction of these valuable and limited resources. Without seriously addressing potential measures to completely avoid the beach-compatible sediment resource, and considering the lack of realistic mitigation available for these impacts, the Town will consider the DEIS to be incomplete.

Section 6: Cumulative and Other Impacts

The major impacts to the existing Geologic Resources described in the Town's comments for section 4.4 above would lead to a series of reasonably foreseeable cumulative impacts to other resources. These major and minor impacts, described in the sections below, are not presented

58. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

in the DEIS and are vital for evaluating the overall impact the proposed project would have on environmental resources.

6.2 Past, Present, and Reasonable Foreseeable Cumulative Actions

6.2.4 Oil and Gas Leasing/Mineral Leasing

The Town was able to identify major impacts to the future mineral leasing activities in Florida State waters due to the previously described direct impacts to the beach-compatible geologic resource off the northwestern tip of Anna Maria Island and offshore sand waves if the Port Dolphin natural gas pipeline were constructed along the preferred route (described under our comments for section 4.4).

The geologic resource off Anna Maria Island has been used multiple times for beach nourishment and has proven time and time again to be an optimal source of beach-compatible sand for beach-management plans. Sands of this high-quality are difficult to find due to their limited existence on the west coast of Florida. By removing access to these mineral resources by constructing a pipeline and safety buffer directly though them, Port Dolphin LLC would be further restricting the available beach-compatible mineral resources on the west-coast of Florida. This is not in the public interest of Longboat Key or Florida citizens. 59

Several large, local communities rely on regional beach-compatible sand resources to support their beach-management plans. These include Pinellas County, Manatee County, Sarasota County, and the Town of Longboat Key. By eliminating access to this one large, beach-compatible mineral resource, a significant increase in competition will result for the remaining limited beach-compatible mineral resources. The impact to regional mineral resources is further described below in our comments on section 6.3.4: Cumulative Impacts to Geologic Resources.

59. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

In addition, if the proposed pipeline route impacts promising offshore sediment deposit features (offshore sand hills shown in Figure 1) that may contain beach-compatible sand (as currently proposed), there is the potential from removing the hills as future sand resources. Removing these hills from the inventory of potential sand resources further limits the supply of potential beach-compatible sand resources, further increasing the long-term competition between regional communities for an already limited supply of beach-compatible mineral resources.

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After reviewing section 6.2.4 in the DEIS, the Town was surprised to see that there was no discussion of the impacts to State or Federal mineral resources. The discussion in this section focused solely on Oil and Gas leasing. There are no active Oil and Gas leases on Florida's west coast in the vicinity of the proposed project. In fact, there is currently a Congressional moratorium on Oil and Gas exploration within the immediate project area. Alternatively, there is a very long history of, and numerous active, mineral mining projects. All of the mineral mining projects focus on identifying and utilizing beach-compatible minerals sources for beach nourishment.

The fact that Oil and Gas issues are exclusively discussed within this section, and no discussion if offered on potential cumulative impacts to mineral resources, is a major oversight in the DEIS. The DEIS is incomplete without a discussion of the following items within section 6.2.4:

1. The extensive need for beach-compatible mineral resources for beach-nourishment projects along the west coast of Florida;
2. A discussion of the different regional beach-management plans (Pinellas County, Manatee County, the Town of Longboat Kay, and Sarasota County) and the specific mineral resource/leasing activities (present and future needs) of each program;

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60. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

3. A discussion of the regulatory authority of the MMS and FDEP BBCS to explore, define, and permit beach-compatible mineral resources for beach nourishment activities, including a detailed discussion on the effort required to explore and define these resources;
4. A discussion on the cumulative impacts to regional sand management issues caused by the removal of a large volume of beach-compatible mineral resources due to the construction of the proposed pipeline route and associated safety buffer.

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6.3 Overview of Cumulative Impacts

6.3.2 Biological Resources (Threatened and Endangered Species)

As described in the Town's comments to Section 4.4, construction of the proposed pipeline in its current configuration would result in the loss of all of Borrow Area IX and the loss of much of an optimal, proven, state-approved beach-compatible sand resource. This resource is highly limited, and primarily found only in relative close proximity to the barrier island, in shallower waters. The loss of this sediment resource due to establishment of the Port Dolphin pipeline will result in the Town having to attempt to locate a distant, less-compatible sand source elsewhere, assuming such a source would be permittable, or result in the potential reduction in scope or quality of the beach-management plan all together.

Threatened and endangered sea turtle species, specifically the threatened Loggerhead sea turtles, rely on the beaches of Longboat Key to reproduce. If the Town is forced to use a lesser-compatible sand source (i.e. darker and coarser), there could be cumulative impacts to endangered sea turtles. The less compatible beach material could impact the ability of nesting sea turtles to successfully construct nests and lay eggs on the beaches of Longboat Key. The increase in success of sea turtle hatchlings on a nourished beach environment is partially attributable to the type of sand fill used in the project.

61

61. Based on analysis of the revised pipeline route proposed by the Applicant, sufficient quantities of beach quality sand should be available as discussed in Section 4.4. Therefore, impacts to sea turtle nesting are not expected.

Characteristics such as color, grain size, compaction, and gas exchange in the nest are determinants in the success of nesting.

According to Mortimer (1990), conditions favoring hatchling production may rely heavily on moisture content. The idea that moisture content may play a role in the success of hatchlings is shown in evidence that suggests turtles may experience difficulties in constructing nests in coarse, dry sands. A positive correlation between mortality of clutches and the mean particle size of the sand has been found in studies conducted on nests of the endangered green sea turtle, which has nested on Longboat Key is small numbers. Typically, the coarser the sand is, the harder it is for the nesting female to dig the nest. The sand located in Borrow Area IX and the beach-compatible sediment resource located off the north end of Anna Maria Island, where the pipeline is proposed to be constructed, has been proven to be an ideal sand source for beach nourishment in terms of turtle nesting compatibility. If this sand becomes unavailable to future beach nourishment projects, then lesser-compatible material may have to be substituted for future projects, resulting in a potential cumulative impact to endangered sea turtles by reducing the quality of beach material (by having to use coarser, darker sand from a more distant source). 61

If the Longboat Key beach-management plan is eventually reduced or eliminated due to the cumulative impacts associated with the construction of the proposed pipeline through the beach-compatible sand source, then the shoreline will continue to erode until it begins to impact upland structures and infrastructure. This erosion will result in the direct loss of critical nesting habitat for endangered and threatened sea turtles. Without periodic beach nourishment, the beaches of Anna Maria Island and Longboat Key will disappear, leaving nowhere for engendered and threatened sea turtle species to nest. 62

62. Based on analysis of the revised pipeline route proposed by the Applicant, sufficient quantities of beach quality sand should be available as discussed in Section 4.4. Therefore, impacts to sea turtle nesting are not expected.

The DEIS lists biological resource impact evaluation criteria as follows:

1. Violate a legal standard for protection of a species or its critical habitat (major impact);
2. Degrade the commercial, recreational, ecological, or scientific importance of a biological resource or its critical habitat (minor to major impact depending on extent of degradation);
3. Measurably change the population size (density) or change the distribution of an important species in the region (minor to major depending on extent of change).

The cumulative impacts listed within the Town's comments above have the potential to satisfy all of these criteria over time. Without a discussion of the major cumulative impacts lesser-compatible beach sand and/or the lack of sands or funds to support a beach nourishment project on the ability of endangered and threatened sea turtles to successfully nest, the DEIS is incomplete.

62

6.3.4 Geological Resources

Locating the proposed pipeline in the only local native, white, beach-compatible sand resource available to Longboat Key and Manatee County, and thereby removing it from the inventory of optimal sand resources, will increase local competition for limited sand resources, assuming such resources can even be located at a distant location and would be available to Manatee County or the Town of Longboat Key. Secondly, by impacting offshore sand hills, the proposed pipeline route would further limit potential sand resources, removing them from availability to any future, regional beach-nourishment projects. In addition to increased local competition, regional sand management issues would arise, as the local communities are forced to look for beach-compatible sand further away from their own project areas, and closer to the project areas of neighboring communities.

63

63. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

In the case of west-central Florida, the removal of Borrow Area IX and the beach-compatible sediment source near Anna Maria Island from the inventory of beach-compatible sand resources, together with the partial removal of offshore sand hills of potential beach-compatibility, will result in Longboat Key having to explore further north and south to look for beach-compatible sand resources, which may not even be available for a variety of reasons. This takes Longboat Key into the local territories of Pinellas and Sarasota Counties, both of which have their own active beach-management plans requiring large amounts of beach-compatible sand. With the removal of up to 8,500,000 cy of beach-compatible material due to the construction and safety buffer associated with the proposed pipeline, competition for regional sand resources will be greatly increased among Pinellas County, Manatee County, Sarasota County, and the Town of Longboat Key, with each government trying to locate and develop beach-compatible sand resources from an ever shrinking pool of available material. 63

Without a discussion of how the removal of this sand source results in a cumulative effect to geologic resources by effecting regional sand management plans and multiple beach-management plans, the DEIS is incomplete and insufficient.

6.3.6 Recreation and Aesthetics

The discussion in this section focuses on recreational issues related almost exclusively to the marine environment, *i.e.* fishing, boating, etc. There is no mention of potential impacts to upland recreational facilities, in particular beaches. As explained in the Town's comments on Section 3.6.1 of the DEIS, little to no discussion exists in the DEIS on beaches immediately adjacent to the pipeline route. The beaches of Longboat Key are a major recreational resource, and are not mentioned as such in the DEIS. As explained in the comments on the sections above, significant cumulative impacts may arise due to the construction of the Port Dolphin pipeline in its proposed configuration. 64

64. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

As far as recreational resources are concerned, there is the potential of long-term, cumulative impacts on the health and accessibility of Longboat Key beaches (of which a significant portion is considered public beach), due to the proposed pipeline route. Specifically, if major impacts to the beach-compatible sand resource are realized by the construction of the pipeline and associated safety buffer, there could be significant impacts to the availability of beach-compatible mineral resources for the foreseeable future. If this were to happen, the viability of The Town of Longboat Key's beach-management plan would be in question. The beach-compatible sediments contained in Borrow Area IX and the sediment deposit off the north end of Anna Maria Island may not exist elsewhere in the needed volumes, or be permittable for use by the Town. Even if a sediment deposit of similar quality were discovered, a significant increase in cost, coupled with a significant decrease in available beach-compatible materials would conspire to reduce and/or eliminate the Town's ability to construct beach nourishment projects. If these projects are not constructed, then the beaches of Longboat Key will continue to erode, eating away at the public recreational beach along the entire coastline of Longboat Key. Without maintenance through beach nourishment, Longboat Key's public beach will eventually disappear, resulting in the loss of a major recreational resource for the general public. 65

65. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

The DEIS lists the following criteria for evaluating impacts to recreational resources:

1. Interference with access to coastal recreational shorelines or waterways (minor to moderate depending on extent of alteration);
2. Loss or displacement of an important recreational resource, such as impairment of recreational fishing activities and other water-dependent uses (minor to major depending on extent of alteration);
3. Degradation of recreational value (moderate);

66

66. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

4. Alter or impair a viewshed, scenic quality, or aesthetic value not consistent with applicable laws or regulations (minor to major depending on extent of alteration).

The construction of the Port Dolphin pipeline through Borrow Area IX and the adjacent beach-compatible sand resources, as currently proposed, could foreseeably result in cumulative adverse impacts to the Longboat Key shoreline as a recreational resource. These impacts, as described above, would satisfy all four of the decision criteria for evaluating impacts listed in the DEIS. Without a discussion of the cumulative impacts caused by the construction of the pipeline within beach-compatible mineral resources, and how these impacts relate to the decision criteria listed in the DEIS, the DEIS is incomplete. 66

6.3.9 Socioeconomics and Environmental Justice

Section 6.3.9 not only neglects to discuss potential major cumulative socioeconomic impacts, but misleads the reader by indicating that the impacts are mostly positive, with only some minor and isolated negative impacts. There is absolutely no discussion as to how cumulative impacts to the beach-compatible sand source for the Town of Longboat Key's beach-management plan, the potential degradation of future beach-nourishment projects, the potential implications to the tax structure, and potential long-term impacts to the tourism industry are related to the cumulative effects of construction of the pipeline (as it is currently proposed) directly through Borrow Area IX and the adjacent beach-compatible sand resource. 67

As described in the Town's comments on Section 3.9.1 above, a significant portion of the economy and tax base for The Town of Longboat Key revolves around the extensive tourism industry. This industry relies on healthy and accessible beaches as the main recreational draw for the tourism industry, and for the public in general (as described in 68

67. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9 and cumulative impacts are discussed in Section 6.

68. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9 and cumulative impacts are discussed in Section 6.

the Town's comments on Section 3.6.1). The cumulative socioeconomic impact as a result of the direct geologic impacts to Borrow Area IX and the beach-compatible sand resource offshore Anna Maria is not addressed in the DEIS. 68

This is a significant oversight, in that the direct impact to Borrow Area IX, a fully developed and permitted mineral resource, as described in the Town's comments on section 4.4 above, would significantly increase the cost of maintaining the Town of Longboat Key's beach-management plan via beach nourishment projects. The direct impacts to geologic beach-compatible sand resources (described in our comments on Section 4.4) due to the construction of the pipeline as currently proposed may result in an economic impact to Longboat Key's beach-management plan in the amount of at least $4,750,000 for the next beach nourishment project alone (at today's financial rates). This is a significant cost increase to the Town of Longboat Key Beach-management plan.

The funding for the Town of Longboat Key's Beach-management plan is generated through special assessments, State of Florida cost sharing, and the tourist development councils of Manatee and Sarasota Counties' "Bed Tax", which is generated from the large tourism industry within Manatee and Sarasota Counties. All of these funds are citizen derived, with the majority of them funded directly by the local tourism industry, or by the local businesses and property owners of Longboat Key who rely on the tourism industry to support their economy. If the Longboat Key Beach-management plan sustained significant cost increases due to the lack of availability of nearby, beach-compatible sands, or if Longboat Key had to rely on lesser-compatible material for future beach-nourishment projects, this could adversely affect both the tourism industry and, subsequently, the tax base and associated as valorem revenue. 69

69. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9 and cumulative impacts are discussed in Section 6.

As of June 1, 2007, the Town of Longboat Key had a property valuation of $6,606,809,366 ($4,732,518,406 within Sarasota County and $1,874,290,960 within Manatee County). This valuation is the base for the ad valorem tax revenue for both the Town and Sarasota and Manatee Counties. This tax base is greatly influenced by the continued viability of both the beaches and tourism industry of Longboat Key. If the natural environment of the beaches are degraded due to a reduced beach-management plan (due to a lack of available beach-compatible sand), the ad valorem tax base will decline significantly, resulting in reduced revenue for the Town, and impacts to the local and regional economy, inducing impacts to future school, fire, police, public safety, infrastructure, and other programs that are directly funded by the ad valorem tax assessment. It is important to recognize the interconnectivity of the shore-protection value of beach nourishment, to the tourism value of healthy and accessible beaches, to the revenue generated by the local tax base and tourism economy, that support the beach-nourishment projects of the Longboat Key Beach-management plan. If one of these interconnected components becomes weakened, then negative impacts will be felt by all the other components. 70

One of the evaluation criteria listed for determining potential impacts on socioeconomic resources states that "substantial change to the local or regional economy, population, housing, infrastructure (schools, police, and fire services), social conditions, or employment" would be considered a major impact. As described in the Town's comments on this section, the potential cumulative impacts to tourism and the property values and tax system of Longboat Key as a result of the impacts to Borrow Area IX and other regional beach-compatible sand resources due to the Port Dolphin pipeline route, as it is currently proposed, would satisfy this evaluation criterion as a major impact. The DEIS must include a detailed discussion of the potential socioeconomic impacts due to the cost increases associated with the removal of the beach-compatible sands from Borrow Area IX, from offshore of Anna Maria Island, and from offshore sand hills from 71

70. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9 and cumulative impacts are discussed in Section 6.

71. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

the inventory of available beach-compatible sands for future beach nourishment projects. Without this discussion, the DIES is incomplete and insufficient. The following specific items should be addressed in the DIES in terms of cumulative socioeconomic impacts:

1. The impacts to the socioeconomics of Longboat Key if significant changes to the current Longboat Key Beach-management plan funding structure are required to cover cost increases in future beach nourishment construction projects due to the removal of Borrow Area IX and the other beach-compatible sands in question, and exploration for, and use of, an as yet unknown more distant sand resource due to the construction of the Port Dolphin pipeline as currently proposed. This discussion should include both the option of increasing future taxes to cover the cost increase and the option of not increasing taxes, but cutting funding for existing programs in order to fund future beach nourishment projects.
2. The impacts to the socioeconomics of Longboat Key if the beach-management plan needs to be reduced and/or abandoned due to cost increases in future beach nourishment construction projects due to the removal of the beach-compatible sands in question, and exploration for, and use of, an as yet unknown more distant sand resource due to the construction of the Port Dolphin pipeline as currently proposed. This discussion should include a detailed analysis of the impacts this would have on the Tourism Industry, employment, and tax system (including the bed tax and property values).
3. The impacts to the socioeconomics of Longboat Key if the beach-management plan is forced to rely on lesser-compatible beach material due to the removal of the beach-compatible sands in question, and exploration for, and use of, an as yet unknown more distant sand resource due to the construction of the Port Dolphin pipeline as currently proposed. This discussion should include a detailed

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analysis of the impacts this would have on the Tourism Industry, employment, and tax system (including the bed tax and property values). 71

6.3.11 Public Safety

As described in the comments for Section 4.4, 6.3.2, 6.3.4, and 6.3.9, the direct and cumulative impacts on the proposed pipeline route on geologic resources available for beach nourishment could cause irreparable harm to the Town of Longboat Key's Beach-management plan. These impacts would stress the current tax-based funding structure for the program while significantly limiting the available mineral resources required to construct future beach nourishment projects. The cumulative effect of these impacts can lead to the foreseeable reduction or elimination of the beach-management plan in the future. Without periodic beach nourishment, Longboat Key will continue to erode. As the erosion continues, the shoreline will retreat and begin to threaten upland structures and infrastructure, potentially including portions of the major hurricane evacuation route for Longboat Key, Gulf of Mexico Drive. Public and private facilities will face destruction due to the forces of the retreating shoreline. 72

As a result of unchecked erosion, Gulf of Mexico Drive, which serves as the hurricane and emergency evacuation route, could become compromised in the event of a major storm. Of even greater concern is the fact that Longboat Key has many sections which are low in elevation. These areas are subject to flooding in the event of a major storm. Studies indicate that some of the population is likely to wait until the storm is fairly close before deciding to evacuate the island. For the general public living on and visiting Longboat Key, there are only two evacuation routes, with both of them running parallel to the beach along Longboat Key to one bridge at either end of the 10-mile long barrier island. The northern Longboat Key evacuation route crosses over Longboat Pass and runs along Coquina Beach on Anna Maria Island. This evacuation route is relatively close to the shoreline (less than 250 feet in some places), and without maintenance of the 73

72. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

73. Comment noted.

shoreline though beach nourishment, can quickly become undermined, resulting in the stranding of a significant number of residents and visitors on Longboat Key and Southern Anna Maria Island. There are also areas within the central part of the barrier islands that have experienced water overwash in storm events. The water has been pushed over Gulf of Mexico Drive and the entire barrier island, eventually draining back into the bay on the back side of the island. Without a beach, this phenomenon may increase, especially in a major storm event. The public on the southern end of Longboat Key must also rely on a beach-parallel evacuation route that runs south to the one bridge (over New Pass) connecting Longboat Key to Lido Key. Longboat Key has no evacuation routes directly to the mainland, both evacuation routes connect Longboat Key to neighboring barrier islands (Anna Maria Island and Lido Key), both of which require beach-compatible mineral resources to maintain their beaches through beach-nourishment for shore-protection and recreational needs.

In addition to the vital emergency evacuation routes, significant critical infrastructure exists along the coast of Longboat Key. These include extensive wastewater management systems, telephone utilities, electrical utilities, and storm water management systems (among others). Increased shoreline erosion, due to the lack of beach-compatible sands for beach nourishment, would result in the potential destruction of components of these systems, if not the entire systems themselves. This would cause irreparable economic and standard of living impacts to the residents and visitors of Longboat Key

Without the shore protection benefits provided by periodic beach nourishment with available, nearby, beach-compatible sand resources, the existing hurricane and evacuation routes and critical infrastructure for Longboat Key face the very real possibility of being flooded or undermined due to a reduced or eliminated beach-management plan. This results in a major cumulative impact to Public Safety due to the

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construction of the proposed pipeline in its current configuration. Without a discussion of the cumulative impact to Public Safety described above, the DEIS is incomplete. 73

In light of the information above, the Town feels that Table 6.3-1 of the DEIS (presented on pages 6-9 to 6-11) needs some major revisions. This table lists the different resources, past actions, background activities, the proposed action and alternatives, known future actions, and cumulative impacts. The past actions, known future actions, and cumulative impacts columns all need to be revised to include the shore-protection activities described above and the cumulative impacts to these resources (specifically the geologic, biologic, recreational, and socioeconomic resources) described in the Town comments for section 6.3. Without a detailed discussion of these major cumulative impacts and how they affect these resources, the DEIS is incomplete and inaccurate. 74

6.4 Unavoidable Impacts

6.4.4 Geological Resources

The DEIS describes unavoidable impacts as "those impacts that would result from the Proposed Action or any alternatives that cannot be mitigated." The complete DEIS entry for section 6.4.4 identifies "Unavoidable disturbance of surficial sediment or soils would occur during installation of the proposed Port and pipeline" (USCG and MARAD, 2008) as the only unavoidable geologic resource impact due to the proposed project or any presented alternatives. This statement is only true for one alternative proposed in the DEIS. The DEIS alternative of tapping into the Gulfstream subsea interconnection would result in only minor additional impacts to the surficial sediments and soils along the route of the proposed pipeline from the deepwater port to the interconnection site. 75

As proposed, the DEIS preferred pipeline route and associated buffer zone will cause direct and irreparable harm to the availability of already limited, beach-compatible mineral resources available for beach nourishment programs such as the Town's beach- 76

74. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9 and cumulative impacts are discussed in Section 6.

75. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

76. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

management plan. These impacts cannot be mitigated or avoided once the pipeline has been constructed through Borrow Area IX and the beach-compatible sediment resource off the north end of Anna Maria Island.

In order to assess "unavoidable impacts" the DEIS must comprehensively consider the impact to sediment resources for beach nourishment, and seriously address the Town's proposed alternatives (utilizing a portion of the northern route, rerouting the State portion of the pipeline to be collocated alongside the Gulfstream pipeline, or to reroute the entire pipeline to go straight through the Southwest Passage, possibly along the northern route alternative as it enters Tampa Bay). Without a more detailed discussion of all three alternatives proposed by the Town in the comments for section 2.1.1.3, section 6.4.4 needs to reflect the fact that, under the preferred alternative, unavoidable and unacceptable impacts will occur to geologic resources needed to support the beach-management plan of the Town of Longboat Key. These impacts will be major and could result in the expected reduction or elimination of the beach-management plan, leading to a series of cumulative impacts to geologic, biologic, recreational, and socioeconomic resources as well as public safety issues. 76

SUMMARY

The Town of Longboat Key manages an active beach-management plan for the entire coast of Longboat Key. This program is funded through Town revenue and the Tourist Development Council "Bed Tax" which is supported by the extensive tourism industry of Manatee and Sarasota Counties. The tourism industry, in turn, is highly dependent on the beaches within Manatee and Sarasota Counties, including those of Longboat Key. However, the beaches of Longboat Key are eroding and require maintenance through implementation of a comprehensive beach nourishment program. This beach-management plan relies on a proven, existing, native, white, beach-compatible Gulf of Mexico sand resource located off the

northwestern tip of Anna Maria Island as the ideal sand source for beach nourishment. The high similarity of this sand source with the native beach, coupled with its proximity to the project area, make it an invaluable resource ideally suited for the geologic, biologic, and recreational needs of Longboat Key's white sandy beaches. In addition, it is these white sandy beaches that support the tourism driven economy of Longboat Key, Manatee County, Sarasota County, and the State of Florida.

The Town of Longboat Key Beach-management plan, and ultimately the beaches of Longboat Key, are in jeopardy due to the proposed location of Port Dolphin LLC's preferred and southern alternative routes for the Port Dolphin natural gas pipeline. This pipeline is proposed to be built directly through a permitted, ideal sand source that supports the current and future beach nourishment projects of Longboat Key. The pipeline, as well as a large buffer zone which must be established along either side of the pipeline route, greatly impact sand available for the Town of Longboat Key Beach-management plan. Extraction of sand by dredging would be prohibited in the buffer zone effectively eliminating the sand for future beach nourishment use. Direct impacts to this sand resource revolve around the fact that a significant volume of these beach-compatible sands will become permanently unavailable for future beach nourishment projects depending on the extent of the required buffer zone which is provided to protect the gas pipeline. This direct impact, while extreme by itself, could lead to significant cumulative impacts to the economy, public safety and the environment of the Town of Longboat Key.

If this existing borrow area (permitted for use under FDEP Consolidated Joint Coastal Permit and Sovereign Submerged Lands Authorization Number 0202209-001-JC as "Borrow Area IX"), containing approximately 1,500,000 cy of beach-compatible sand, is impacted by the construction of the pipeline (as currently proposed) and an associated safety buffer of potentially up to 1,000 meters, significant programmatic issues would arise. Specifically, the Town will lose access to most, if not all, of the remaining sand in the borrow area. Not only would this represent a direct loss of the time, money, and effort spent developing this as a fully

permitted beach-compatible mineral source, but the Town would be forced to explore other as yet unknown sand resources to replace the remaining beach-compatible sand in Borrow Area IX. Assuming such high quality resources can be found, these resources will assuredly occur further away from the project area, causing an increase in the cost to construct future Longboat Key beach-nourishment projects. If this was to occur, the costs of future beach nourishment projects would increase substantially, up to a potential increase of $4,000,000 (or greater) depending on the final safety buffer imposed around the pipeline and the resulting additional distance to the new, as yet unknown replacement beach-compatible sand resource.

Additionally, the Town of Longboat Key has begun exploring offshore sand resources for potential as future, beach-compatible sand sources. The current proposed pipeline route crosses at least four of these individual sediment sources which occur in the form of underwater "hills", impacting not only the Town of Longboat Key's current beach-compatible sand resource, but potential regional sand resources needed for the viability of Longboat Key and other regional shore-protection programs for the foreseeable future.

By forcing the Town of Longboat Key to abandon its permitted, existing beach-compatible sand resource, by impacting the larger sediment deposit adjacent to the borrow area, and by removing several offshore sand hills from the inventory of future sand resources, the construction of the pipeline may result in the Town of Longboat Kay having to use a more distant, potentially lesser-compatible sand resource for future beach-nourishment projects, at an increased cost to the overall project. This could result in the reduced effectiveness of future projects and may present permitting difficulties at the State level.

A weakened beach-management plan, due to lesser-compatible beach materials and more costly, more distant sand sources, could result in the continued erosion of Longboat Key's white sandy beaches. If this were allowed to happen, significant cumulative impacts to biological,

recreational, and socioeconomic resources would occur, as well as the introduction of sensitive public safety issues, including:

1. A reduced or weakened beach-management plan could result in the increased erosion of Longboat Key's beaches resulting in the loss of the public beaches (a major public recreation resource) of Longboat Key;
2. A reduced or weakened beach-management plan could result in the erosion of Longboat Key's beaches resulting in the loss of tourists, effecting the local socioeconomic structure through a reduction in employment and tax revenues;
3. A reduced or weakened beach-management plan could result in the erosion of Longboat Key's beaches resulting in the loss of protection the beaches afford the island, resulting in the potential for increased flooding and undermining of vital hurricane and emergency evacuation routes for both Longboat Key and Anna Maria Island.
4. A reduced or eliminated shore protection program could result in the erosion of Longboat Key's beaches resulting in the loss of the beach as habitat, and loss of critical habitat needed for threatened sea turtle nesting;

These issues are vital to the continued well being of Longboat Key, yet none of these concerns are addressed in the Port Dolphin DEIS. Longboat Key believes that all of these issues need to be included and comprehensively addressed within the DEIS so that the USCG and MARAD, and the Governor of Florida (as a Governor of an adjacent coastal state) can make a fully informed decision on the Application for a Deepwater Port License submitted by Port Dolphin LLC.

The Town also feels that it important to state unequivocally that the Port Dolphin LLC Deepwater Port and associated pipeline and the Town of Longboat Key Beach-management plan are not mutually exclusive projects. In fact, several seemingly viable pipeline route alternatives exist that can allow the Port Dolphin project to be constructed without affecting the vital and highly limited sand resources required by Longboat Key for its beach-management plan.

These alternatives include:

1. Constructing the Port Dolphin pipeline from the deepwater port to an existing y-valve in the Gulfstream natural gas pipeline, where the Port Dolphin facility could then tie-into the existing pipeline. This option also eliminates many of the environmental impacts associated with the preferred route;
2. A new alternative that would construct the pipeline route from the proposed deepwater port site straight to a spot approximately 2,000 feet south of where the existing Gulfstream pipeline crosses the Federal/State Boundary, approximately nine miles west of Egmont Key. At this point, the new pipeline could be collocated, or constructed parallel to, the existing Gulfstream pipeline all the way into Port Manatee.
3. A new alternative that would construct the pipeline straight from the offshore deepwater port site, directly to Southwest Passage (not Passage Key Inlet), crossing the Gulfstream Pipeline, and then continuing straight to its planned location in West-Central Lower Tampa Bay (all in one straight line).
4. Follow the preferred pipeline route as it is proposed, from the deepwater port toward Southwest Passage, where the pipeline would then deviate to the proposed northern alternative route as it enters Tampa Bay through Southwest Passage. Once inside of Tampa Bay, the pipeline could then deviate back to the preferred route. The vast majority of the preferred pipeline route could be retained with this minor adjustment.

Each of these alternatives results in no impacts (direct or cumulative) to Borrow Area IX or the beach-compatible mineral resources off Anna Maria Island that are vital to The Town of Longboat Key's beach-management plan. With this in mind, the Town strongly believes that a more detailed alternatives analysis needs to be presented in the DEIS. This analysis needs to build on the previously described alternatives, while adding the new alternatives suggested by the Town. Each alternative needs to be critically evaluated in terms of direct and cumulative environmental resource impacts, with the greatest weight given to the alternative(s) that have

the least impacts to these environmental resources. In addition, the direct and cumulative impacts raised by the Town in these detailed comments need to be included and critically evaluated in the DEIS.

In its current form, the DEIS lacks a significant amount of essential information regarding alternatives and true resource impacts, and a revised DEIS needs to be issued that addresses these significant issues prior to going to the Final EIS stage.

While the Town of Longboat Key has strong objections to the way the project is currently proposed, the Town feels that there are seemingly minor changes that can be made by Port Dolphin LLC to the preferred pipeline route that would result in no impacts to vital beach-compatible mineral resources. With this in mind, the Town is willing to work directly with Port Dolphin LLC and/or the USCG and MARAD to explore these alternatives in order to design a route that is mutually beneficial to both Longboat Key and Port Dolphin LLC.

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Figure 2. Local bathymetry (water depth) map depicting the proposed pipeline location (black line), a potential 1,000 foot buffer (blue line), a potential 1,000 meter buffer (green line), together with the location of the previously permitted borrow area EX (light-blue line) and the location of mapped, beach-compatible sand resources (yellow line).

Figure 1. Regional bathymetry (water depth) map depicting the proposed pipeline location (black line), a potential 1,000 foot buffer (blue line), a potential 1,000 meter buffer (green line), together with the location of the previously permitted Longboat Key Borrow Area EX (light-blue line) and the location of mapped, beach-compatible sand resources (yellow line).

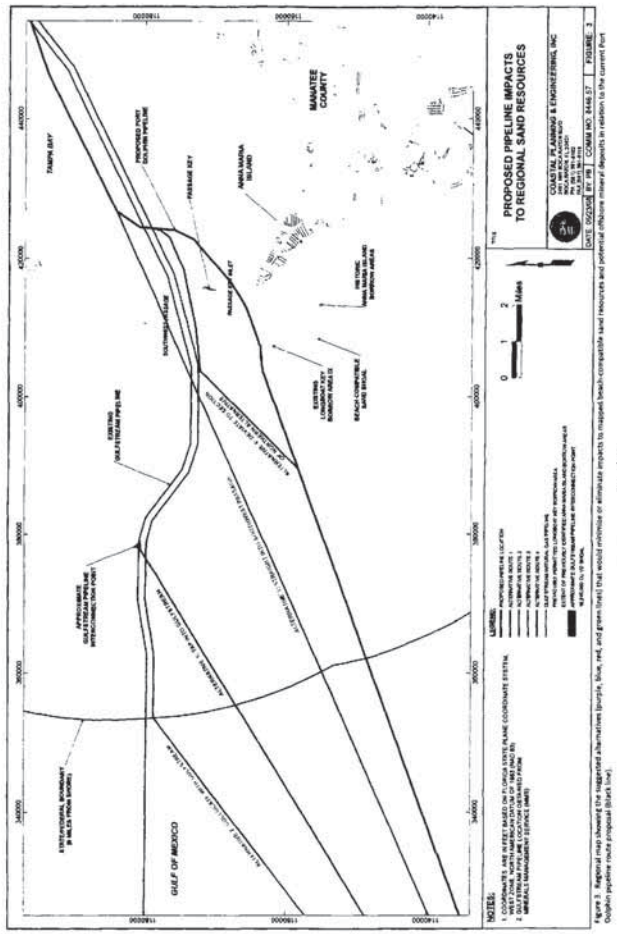

Figure 3. Regional map showing the suggested alternatives (purple, blue, red, and green lines) that would minimize or eliminate impacts to mapped beach-compatible sand resources and potential offshore mineral deposits in relation to the current Port Dolphin pipeline route proposal (black line).

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Legal Deficiencies in USCG Draft Environmental Impact Statement
For Port Dolphin LLC Liquefied Natural Gas Deepwater Port License Application

On behalf of our client, the Town of Longboat Key, Florida ("Longboat Key" or the "Town"), we are providing the following comments on the Draft Environmental Impact Statement ("DEIS") issued April 18, 2008, in connection with proposed major federal actions by the United States Coast Guard, the Maritime Administration, and other federal agencies to authorize the proposed Port Dolphin LNG project. These comments complement, and incorporate by reference, the extensive technical comments filed on behalf of Longboat Key by Coastal Planning & Engineering, Inc. ("CPE"). The purpose of our comments is to explain why the DEIS' examination of alternate methods for transporting gas from the proposed offshore terminal to an onshore interconnection in Port Manatee is legally inadequate under the standards of the National Environmental Policy Act ("NEPA"), the rules of the Council on Environmental Quality ("CEQ") on preparation of environmental impact statements, and the Department of Transportation's regulations on siting and environmental review of facilities for which a license is

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77. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

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sought under the Deepwater Port Act. The DEIS fails entirely to recognize a significant impact of the proposed pipeline, i.e., the fact that it would deprive Longboat Key and other local jurisdictions of access to proven and state-permitted reserves of near-shore white sand. This sand is an essential resource for the replenishment of beaches and the preservation of habitat for endangered and threatened species of sea turtles and shore birds.

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Legal Background

Section 102(2)(C) of NEPA requires all federal agencies to "include in every recommendation or report on proposals for . . . major Federal actions significantly affecting the quality of the human environment, a **detailed statement** by the responsible official **on** (i) the **environmental impact** of the proposed action, (ii) any **adverse environmental effects which cannot be avoided should the proposal be implemented**, (iii) **alternatives** to the proposed action, (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and (v) any **irreversible and irretrievable commitments of resources** which would be involved in the proposed action should it be implemented." 42 U.S.C. 4332(2)(C) (emphasis added). The purpose of this EIS requirement is to focus the government's and the public's attention on a proposed permit or other federal action so that the environmental consequences can be studied before the action is implemented. *Marsh v. Oregon Natural Res. Council*, 490 U.S. 360, 371 (1989). NEPA's mandate for the performance of an EIS for actions significantly affecting the environment is "to insure a

fully informed and well-considered decision." *Vermont Yankee Nuclear Power Corp. v. Natural Res. Def. Council*, 435 U.S. 519, 558 (1978). "Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA." 40 C.F.R. § 1500.1(b). Under CEQ regulations, NEPA requires federal agencies to analyze not only the direct impacts of a proposed action in an environmental impact statement, but also the **indirect** and **cumulative** environmental effects of that action. 40 C.F.R. §§ 1508.8, 1508.9(b), 1508.14 (including economic effects), 1508.25; *see also C.A.R.E. Now, Inc. v. F.A.A.*, 844 F.2d 1569, 1574 (11th Cir. 1988 (NEPA requires the consideration of cumulative impacts, including both direct and indirect effects); CEQ, Considering Cumulative Effects under the National Environmental Policy Act at 4, Jan. 1997.[1] If its action is reviewed by a court, a federal agency must show that the EIS took a "hard look" at the project, including impacts and alternatives, and including cumulative impacts. *Druid Hills Civic Ass'n, Inc. v. Federal Highway Admin.*, 772 F.2d 700, 709 (11th Cir. 1985) (agency must take a "hard look" at the environmental consequences before undertaking a major action); *see also* 40 C.F.R. § 1508.25.

The regulations that govern the Coast Guard's and MARAD's processing of licenses for deepwater ports provide additional more stringent requirements for consideration of environmental impacts in siting ports and their associated facilities. The regulations specify siting criteria under which "the deepwater port *and* reasonable alternatives" will be evaluated on the

[1] Available at http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm.

basis of among other factors, "how well *each* (a) optimizes location to prevent or minimize detrimental environmental effects, . . . (i) minimizes the environmental impact of . . . facilities and access routes, . . . [and] (l) minimizes the displacement of existing or potential mining . . . uses." 33 C.F.R. § 148.720. MARAD's environmental review must evaluate "the completeness of environmental information and quality of assessment, probable environmental impacts, and identification of procedures or technology that might mitigate probable environmental impacts through avoiding, minimizing, rectifying, reducing, eliminating, or compensating for those impacts." 33 C.F.R. § 148.715(a). Ultimately, MARAD can issue a license only if "the applicant has demonstrated that the deepwater port will be fabricated, constructed, operated and decommissioned using the best available technology to prevent or minimize adverse effects to the environment." 33 C.F.R. § 148.710(a)(2). Unless MARAD intends to conduct further environmental review under the deepwater port licensing regulations, these pipeline alternatives must be thoroughly examined in the DEIS.

Finally, section 4(f) of the Department of Transportation Act of 1996, codified at 49 U.S.C. § 303, forbids the Secretary from approving any program or project which requires the use of "publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of an historic site of national State or local significance (as determined by the Federal, State or local officials having jurisdiction over the park, area, refuge, or site)" unless "(1) there is no prudent and feasible alternative to using that

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land; and (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use." The deepwater port licensing regulations expressly incorporate Section 4(f). 33 C.F.R. § 148.737. Courts have confirmed that "4(f) lands," e.g., a local park or recreation area, need not be directly occupied or taken by a DOT-approved action in order to trigger section 4(f)'s rigorous requirements.

> [O]ff-site activities are included if they could create sufficiently serious impacts that would substantially impair the value of the site in terms of its prior significance and enjoyment. . . . In fact, the determination as to what constitutes a "use" under Section 4(f) is essentially the same as the determination as to what constitutes a "significant impact" under NEPA.

Mullin v Skinner, 756 F.Supp.904, 924 (E.D.N.C. 1990) (*citing Adler v Lewis*, 675 F.2d 1085, 1092(9th Cir. 1982); *see also Coalition Against a Raised Expressway v Dole*, 835 F.2d 803, 810 (11th Cir. 1988)("Section 4(f) is triggered if the [project] either directly or indirectly uses the protected land.").

Summary of Legal Deficiencies in the DEIS

The DEIS for the Port Dolphin project overlooks major environmental impacts that would unavoidably and irretrievably occur if the pipeline were routed, as proposed, through offshore white sand resources that Longboat Key and other jurisdictions use to maintain their beaches. The pipeline would bisect, and in conjunction with its "buffer zone," likely preclude

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78. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

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access to, sand reserves that the Florida Department of Environmental Protection ("FDEP") has approved as "beach-compatible sand" for use by Longboat Key. Longboat Key has invested substantial amounts of money and effort to identify and permit these sand resources. If the pipeline puts this specific, proven and permitted sand deposit off-limits for dredging, the impact of the lost resource on Longboat Key's beach protection program will be substantial and direct. 78

The pipeline also would be routed in the vicinity of promising future sand reserves for use by Longboat Key and other local jurisdictions. As a result, the pipeline may foreclose other locations at which the localities could otherwise obtain the kind of FDEP-approved sand that must be applied periodically to maintain beaches both for tourism and to protect critical habitat for endangered and threatened species of sea turtles and shore birds. The DEIS needs to be supplemented with further analysis of these impacts and republished for public comment before a final EIS can be issued. 79

Furthermore, the DEIS fails to identify, seek comment on, or adequately consider several alternatives to, or alternative routes for, the pipeline that would eliminate these impacts. *See Druid Hills Civic Ass'n, Inc., supra.*, 772 F.2d at 712 (alternatives analysis in EIS must provide sufficient information and reasoning to enable readers to consider and evaluate the comparative merits of the alternatives on their own and to comment on the EIS). It is not a commenter's obligation to identify and analyze alternatives to a proposed major federal action under NEPA; if, as, in this case, it is clear that alternatives exist, the federal agency must thoroughly examine them. 80

79. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

80. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

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For the proposed Port Dolphin pipeline, several obvious alternatives exist, including (1) connecting the Port Dolphin terminal to the existing offshore pipeline operated by Gulfstream Natural Gas System ("Gulfstream"), which connects to the same location onshore as would the proposed Port Dolphin pipeline, thereby eliminating the need for a new pipeline and (2) re-routing the pipeline to avoid the near-shore white sand resources on which Longboat Key relies, as well as the larger area of high-quality sand where other jurisdictions have approved deposits, and where, in the future, Longboat Key and other jurisdictions will explore, under FDEP supervision, for additional beach- and habitat-compatible sand deposits. The DEIS must be revised and supplemented with a detailed analysis of these alternatives and republished for public comment before an FEIS can be issued. *See* 40 C.F.R 1502.9(c)(1): "Agencies shall prepare supplements to . . . draft . . . environmental impact statements if: . . . .(ii) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." 80

The federal agencies also failed in preparing the DEIS to follow NEPA's admonition to consult with local governments regarding the impact of a proposed action on local plans and programs, such as Longboat Key's Comprehensive Beach Management Plan. Moreover, by depriving Longboat Key of the sand it needs to preserve its public beaches, the proposed pipeline approval would trigger section 4(f), requiring rejection of the proposed pipeline route in the face of prudent and feasible alternatives, i.e., offshore interconnection or re-routing. As a 81

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81. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

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matter of law, MARAD cannot issue a license to Port Dolphin for the project as currently planned. 81

Discussion

(1) The DEIS Fails to Examine Environmental Impacts Resulting From the Elimination of Known White Sand Resources Near Anna Maria Island and Nearby Potential Reserves.

Section 1502.16 of CEQ's regulations prescribes in detail the review of environmental impacts in an EIS that constitutes the "hard look" required under NEPA:

> The discussion will include the environmental impacts of . . . the proposed action, any adverse environmental effects which cannot be avoided should the proposal be implemented, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented.

40 C.F.R. § 1502.16. The discussion of environmental impacts must include both direct and indirect effects. *Id.* Importantly, the EIS must examine "[p] ossible conflicts between the proposed action and the objectives of . . . regional, State, and local land use plans, policies and controls for the area concerned." *Id.* The CEQ rules also require consideration of: "[n] atural or depletable resource requirements and conservation potential of various alternatives and mitigation measures." *Id.* 82

The DEIS reflects little understanding of the environmental impacts of the proposed pipeline from the offshore terminal to the proposed interconnection onshore in Port Manatee,

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82. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

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the conflicts that the pipeline will cause with Longboat Key's and other jurisdictions' plans and policies for beach preservation, or the degree to which the Town's ability to mine and utilize its current sand resources would be adversely affected. If constructed along the proposed alignment, this 36-inch pipeline and an associated no-dredge buffer zone would run through a shoal area just offshore from Anna Maria Island that serves Longboat Key and other jurisdictions as a source for the fine white sand that the State of Florida requires them to use in their beach nourishment programs. 82

As discussed in more detail in the DEIS comments submitted by CPE on behalf of Longboat Key[2], the Town's beaches have been eroding for some time. To address this problem, the Town adopted and implements a comprehensive beach nourishment program. This beach-management plan currently relies on a proven deposit of native white beach-compatible sand in a shallow shoal located in state waters of the Gulf of Mexico, just off the northwestern tip of Anna Maria Island. Longboat Key has previously defined, and secured an FDEP permit to use, sand from an area within the shoal designated as Borrow Area IX.[3] Longboat Key used sand from this area for the 2005/2006 beach nourishment project, but Borrow Area IX still contains some 83

[2] Potential Impacts of the Port Dolphin Pipeline on the Town of Longboat Key Comprehensive Beach Management Plan: Town Comments on the Draft Environmental Impact Statement on the Port Dolphin LLC Deepwater Port Licenses Application (hereinafter "CPE Comments").

[3] Borrow Area IX is permitted for use under FDEP Consolidated Joint Coastal Permit and Sovereign Submerged Lands Authorization Number 0202209-001-JC.

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83. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

1,500,000 cubic yards of beach-compatible material available to the Town for future beach-nourishment projects. Because this near-shore, shallow deposit of sand is highly similar to the native white beach sand, it is ideally suited to maintain the white sandy beaches that support the tourism-driven economy of Longboat Key, Manatee County, Sarasota County, and the State of Florida. Equally important, this mineral resource is ideally suited to maintain the fine white sand habitat that supports several threatened and endangered species of sea turtles.[4] Alternative sources of coarser brown sand are not an adequate substitute for beach maintenance or habitat protection.

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CPE has explained in detail how the proposed pipeline would jeopardize the Town of Longboat Key's beach management plan, and ultimately the beaches of Longboat Key. Under

[4] The DEIS reflects serious misinformation on the part of MARAD and USCG about offshore sand resources. It identifies an area of about 150-square miles offshore of Anna Maria Island and Longboat Key in State waters as "sand resources." *See, e.g.*, Figure 2.3-1 at 2-31. The DEIS discusses "avoidance of mapped sand resources" as a criterion for "pipeline route analysis," and notes that "siting a project in an identified sand resource would be difficult and likely would not be approved by Minerals Management Service (MMS)." DEIS at 2-17. This discussion is factually wrong -- the mapped sand resources shown in the DEIS are under the jurisdiction of FDEP, not MMS, and the proposed pipeline would in fact pass through the northern end of this "sand resources" area. More importantly, the DEIS ignores the fact that, within this large area lying in State waters, FDEP has issued permits for use of sand from only a few specific areas, including Longboat Key's current high-quality sand deposit, Borrow Area IX. In identifying the "sand resources" area, the DEIS authors apparently did not examine current FDEP records that identify Borrow Area IX. An agency violates NEPA when it relies upon outdated or incomplete data. *See, e.g., Lands Council v Powell*, 395 F.3d 1019, 1031 (9th Cir. 2005). "Accurate scientific analysis . . . [is] essential to implementing NEPA." 40 C.F.R. § 1500.1(b). Overlooking the proven sand resources that actually lie within the path of the pipeline route is not "accurate scientific analysis." *See also North Buckhead Civic Ass'n v Skinner*, 903 F.2d 1533, 1543 (11th Cir. 1990)(EIS may be invalidated if it relied on incomplete or inaccurate information).

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both the preferred and southern alternative routes, *see* DEIS Figure 2.1-10 at 2-14, for the Port Dolphin natural gas pipeline, the line would bisect Borrow Area IX. *See* CPE Comment Figure 3. Assuming dredging would be prohibited in a buffer zone extending between 1000 feet and 1000 meters from the pipeline, the pipeline's footprint could occupy up to 100 percent of Borrow Area IX. CPE Comments at 38. A 1000-foot buffer would still put half the sand off-limits, and would make dredging in the remaining parts of Borrow Area IX more difficult and costly. *Id.* The Town has invested upwards of $500,000 to explore, identify and permit Borrow Area IX. *Id.* at 39. This investment will be worth little or nothing if much and perhaps all of these beach-compatible sands become permanently unavailable for future beach nourishment projects. In that event, the Town would have to explore for other potential sand resources, with any such investigation likely to cost on the order of another $500,000. *Id.* Assuming deposits of high quality white sand could be found, these resources will necessarily be located further away from the near-shore area that encompasses Borrow Area IX and will cost more to dredge and transport, thereby causing an increase in the cost to construct future Longboat Key beach-nourishment projects. CPE puts the increased costs of using such an alternate, more distant sand resource (assuming one exists) for future beach nourishment project to Longboat Key at up to $3,750,000 (or greater), depending how far offshore Longboat Key would have to go to find replacement beach-compatible sand. *Id.* Indeed, the current proposed pipeline route crosses at least four promising sediment sources that occur in the form of underwater "hills," where

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Longboat Key hoped to find future beach-compatible sand. The proposed pipeline route would place these future or alternate sand sources off-limits, requiring Longboat Key and other jurisdictions to go farther afield to find sand that meets Bureau of Beaches and Coastal Systems ("BBCS") criteria for beach application.

Because the DEIS fails to recognize and assess these direct impacts on Longboat Key's beach protection program and policy, the document necessarily fails to consider associated important indirect impacts. A weakened beach-management plan, utilizing inferior or more costly sand from more distant sources, could result in less effective, more infrequent, or reduced application of sand to Longboat Key's beaches, resulting in increased erosion and degradation. If this happens, significant cumulative impacts to biological, recreational, and socioeconomic resources would occur, as well as potential compromise of public safety if serious erosion occurs. 83

First and foremost, perhaps, would be the impact of diminished beach nourishment on critical nesting habitat for the threatened loggerhead sea turtles that frequent Longboat Key's beaches, as well as for lesser numbers of the endangered green sea turtles and leatherback sea turtles. The native sand on the island's beaches is highly favorable for turtle nesting, reproduction and hatching. Incompatible sand from other locations with different mineralogy or particle size could adversely affect turtles and other species. Indeed, this is one reason why Florida law requires a permit from FDEP for any application of sand to beaches, where such sand must closely correspond to native sand. *See* Florida Administrative Code, Rule 62B-41.007(2)(j) (beach- 84

84. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9. In addition, impacts to threatened and endangered sea turtles are addressed in Section 4.2.1.3.

compatible fill material is required in order to "protect the environmental functions of Florida's beaches."). Clearly, the impact of the proposed pipeline on endangered species is a crucially important consideration that must be addressed in the DEIS and is specifically required in MARAD's review of the siting and environmental effects of the project. *See* 33 C.F.R. § 148.707(b)(1)(i) ("environmental evaluation will determine . . . the effect on the environment, including but not limited to . . . impacts on endangered species.").

Other indirect and cumulative impacts of a weakened beach protection program include adverse effects on tourism and, consequently, a reduction in employment and tax revenues, all of which must be identified and analyzed in the EIS process. *See* 40 C.F.R. § 1508.8; *see also* 40 C.F.R. § 1508.14; *see also* 33 C.F.R. § 148.707(b)(4) (MARAD environmental evaluation will determine . . . the effect on human health and welfare, including socioeconomic risks"). As explained in the CPE comments, erosion of Longboat Key's beaches due to inadequate replenishment could cause increased flooding and undermining of vital hurricane and emergency evacuation routes for Longboat Key and Anna Maria Island, as well as decreased capacity of the barrier island to buffer the impacts of hurricanes on infrastructure onshore. All these impacts on the white sand resource, and on the natural and human environment – direct, indirect and cumulative – must be addressed in a new or supplemental DEIS so that the public can comment on the adequacy of the information that is ultimately available to the federal decision makers who must approve the pipeline route under the Deepwater Port Act and other federal statutes.

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85. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

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(2) The DEIS Fails to Examine Apparently Feasible Alternatives to the Pipeline or its Route that Would Eliminate or Mitigate the Environmental Impacts on the White Sand Resources.

Identification and consideration of alternatives to the proposed action is a critical part of NEPA review. Section 102(2)(E) of NEPA requires an agency proposing major federal action to "study, develop, and describe appropriate alternatives to the recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(2)(E). CEQ rules require that: 'Federal agencies shall to the fullest extent possible: . . . (e) Use the NEPA process to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment." 40 C.F.R. § 1500.2. CEQ rules call the alternatives analysis "the heart of the environmental impact statement" and emphasize that the EIS "should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public." 40 C.F.R. § 1502.14(a). Under those rules, agencies must devote "substantial treatment" to and "rigorously explore and objectively evaluate all reasonable alternatives." 40 C.F.R. § 1502.14(a),(b). Any alternative that achieves the purpose and need of the agency's proposed action is "reasonable" and should be evaluated. *Sierra Club v. Lynn*, 502 F.2d 43, 62 (5th Cir. 1974).

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86. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

Moreover, NEPA requires the agency proposing a major federal action to shoulder the burden of studying and evaluating alternatives. *County of Suffolk v. Secretary of Interior*, 562 F.2d 1368, 1385 (2d Cir. 1977); *see also* Susannah T. French, *Judicial Review of the Administrative Record in NEPA Litigation*, 81 CAL. L. REV. 929, 977 (1993). Nothing in NEPA jurisprudence requires the public or commenters who may support an alternative to conduct a study of the alternative as a condition for its consideration by the agency – that is the federal agency's obligation.

It is apparent that several promising alternatives exist to running a new pipeline from Port Dolphin through the near-shore beach-compatible sand deposits adjacent to Anna Maria Island, or the nearby area that may contain additional beach-compatible sand. The most obvious alternative is to connect the Port Dolphin terminal to the existing offshore pipeline operated by Gulfstream Natural Gas System ("Gulfstream"), which connects to the same location onshore as would the proposed Port Dolphin pipeline, thereby eliminating the need for a new pipeline. In comments filed with the Federal Energy Regulatory Commission on or about April 21, 2008, with a copy to the Coast Guard and MARAD[5], Gulfstream strongly advocates this interconnection alternative due to what it says are safety concerns associated with the proposed routing of the Port Dolphin pipeline in proximity to the Gulfstream line onshore at Port Manatee. Gulfstream Comments at 8-11. The proposed interconnection would be located

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[5] *In re Port Dolphin Energy LLC*, Supplement to Protest and Additional Comments of Gulfstream Natural Gas System, L.L.C, FERC Docket Nos. CP07-191-001; CP7-192-000 (April 21, 2008) ("Gulfstream Comments").

approximately 26 miles upstream from the shoreline on the Gulfstream pipeline would utilize an existing piggable Y-fitting on the pipeline. Gulfstream states that:

> Port Dolphin readily can interconnect with Gulfstream at that point. The Port Dolphin 36-inch Offshore Pipeline had a maximum allowable operating pressure of 1750 psig and the maximum offloading pressure of the SRVs is 1740 psig. These pressures can be accommodated by Gulfstream to accept receipts of regasified LNG from Port Dolphin at Gulfstream's East Subsea Tie-In location.

Gulfstream Comments at 21-21.

The DEIS indicates that technical issues need to be resolved to evaluate this alternative, primarily relating to possible pressure differences between the regasified gas and the Gulfstream pipeline. The DEIS notes that the proposed maximum pressure for the vaporization and send-out system at Port Dolphin is 1643 psi and that the pressurization capability of Shuttle and Revaporization Vessels (SRVs) used in other offshore LNG projects does not exceed 1740 psig. According to the DEIS, the operating pressure of the Gulfstream pipeline is 2180 psi, regulated down to 1470 at an onshore location near its interconnection point. The DEIS concludes that it would not be possible for SRVs to pressurize revaporized gas to a high enough pressure to cause it to flow into the higher-pressure pipeline, absent permanent offshore auxiliary compression capability. DEIS at 2-18 through 2-19. However, nothing in the DEIS indicates whether there is compression anywhere on the Gulfstream line except where gas is introduced into the line some 400 miles upstream. If not, pressure in the line could be significantly lower than the initial 2180 psi – and possibly lower than the 1643-1740 range that SRVs achieve, thus making delivery of

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87. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

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revaporized gas by the SRVs into the Gulfstream line technically feasible. MARAD and the Coast Guard must resolve this issue of fact before they can simply reject interconnection as technically infeasible. 87

Similarly, the DEIS states that capacity does not exist in the Gulfstream pipeline to accommodate deliveries of gas from Port Dolphin, at least at the maximum eventual throughput of 1.2 billion cubic feet per day. DEIS at 2-19. Gulfstream's Comments do not indicate any such constraint. But even if, as the DEIS suggests, the Gulfstream pipeline would have to be expanded eventually to transport all the gas delivered by Port Dolphin, the DEIS incorrectly rejects this alternative as having environmental impacts "that would most likely be similar to the Port Dolphin pipeline." *Id.* This is not correct. The existing Gulfstream line lies well north of the white beach-compatible sand deposits that are vital to the environment and to turtle habitat on Longboat Key and the other affected islands. The existing pipeline does not impede access to these sand resources and neither would an expanded pipeline or a second Gulfstream pipeline adjacent to the existing one. Thus, the DEIS is fundamentally incorrect in equating the environmental impact of an expanded Gulfstream pipeline with the proposed Port Dolphin pipeline. 88

Other alternatives, discussed in more detail in CPE's comments, would re-route the proposed pipeline away from the Anna Maria Island sand deposits, and from other promising near-shore deposits. One alternate route would run from the proposed terminal location 89

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88. An evaluation of a pipeline route paralleling Gulfstream has been added to Section 2.1. An offshore interconnection with the Gulfstream Pipeline has been added in Section 2.1 and its impacts evaluated in Section 4.

89. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

northeast toward the Gulfstream pipeline and then turn east and parallel the existing pipeline all the way into Port Manatee. Another alternate route would run from the terminal location and enter Tampa Bay through Southwest Passage, approximately a mile north of the existing location through Passage Key Inlet. Relocation of the pipeline clearly is the sort of alternative that must be considered in this situation, not only under NEPA, but under the Deepwater Port Act's siting and environmental review regulations. As noted, under these rules MARAD requires consideration of how well the proposed location "optimizes location to prevent or minimize detrimental environmental effects," "minimizes the environmental impact of . . . facilities and access routes," and "minimizes the displacement of existing or potential mining . . . uses." 33 C.F.R. §§ 148.720(a), (i), (j), (l). Clearly, there are any number of alternate paths that a pipeline could take from the Port Dolphin terminal to an entry to Tampa Bay, including many that would "mitigate probable environmental impacts [to sand resources and local governments' beach protection programs] through avoiding, minimizing, rectifying, reducing, eliminating, or compensating for those impacts." *See* 33 C.F.R. § 148.715(a). Moreover, MARAD can issue a license only if "the applicant has demonstrated that the deepwater port will be fabricated, constructed, operated and decommissioned using the best available technology to prevent or minimize adverse effects to the environment." 33 C.F.R. § 148.710(a)(2). "Best available technology" may involve other means to avoid white sand resources, such as deep burial of the

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line at those locations. All reasonable alternatives to the presently proposed pipeline must be identified and evaluated. 89

3) The Federal Agencies Did Not Comply With NEPA's Requirements for Consultation With Local Governments.

The DEIS's failure to discuss the impact of the proposed pipeline on the white sand resources utilized by Longboat Key and other jurisdictions, to evaluate alternative routes for the pipeline, or adequately to analyze the feasibility of the Gulfstream interconnection alternative, reflects Port Dolphin, MARAD or the Coast Guard's failure to communicate with local governments (including Longboat Key). The DEIS falls far short of NEPA's requirement that federal agencies prepare NEPA analyses and documentation "in cooperation with State and local governments." 42 U.S.C. § 4331(a). CEQ rules require federal agencies specifically to harmonize their actions with local plans, such as the Longboat Key Comprehensive Beach Management Plan: 90

> To better integrate environmental impact statements into State or local planning processes, statements shall discuss any inconsistency of a proposed action with any approved State or local plan and laws (whether or not federally sanctioned). Where an inconsistency exists, the statement should describe the extent to which the agency would reconcile its proposed action with the plan or law.

40 C.F.R. §1506.2(d). CEQ's regulations stress the importance of cooperation with State and local governments early in the NEPA process, particularly when they have "*special expertise with respect to all reasonable alternatives or significant environmental, social or economic impacts*[.]" *See* January

90. The USCG and the Maritime Administration initiated the public scoping process on July 12, 2007, with the publication of a Notice of Intent (NOI) to prepare an EIS in the *Federal Register*. The NOI included information on public meetings and informational open houses; requested public comments on the scope of the EIS; and provided information on how the public could submit comments by mail, hand delivery, facsimile, or electronic means. In addition, an Interested Party Letter, the *Federal Register* NOI, and a fact sheet describing the Project were sent to approximately 190 Federal, state, and local agency representatives, and other potentially interested parties (see Appendix A of the Final EIS).

30, 2002 Memorandum from James Connaughton to Heads of Federal Agencies, Subject: Cooperating Agencies in Implementing the *Procedural Requirements* of the National Environmental Policy Act at 1 (emphasis added) [attached hereto as Attachment 1]. These coordination regulations impose *mandatory* obligations. *See id.* Had Port Dolphin, MARAD or the Coast Guard consulted with Longboat Key well in advance of preparing the DEIS, it would have become clear that, by interfering with the Town's proven beach-compatible white sand resource, the proposed pipeline would be seriously inconsistent with the Longboat Key comprehensive beach management plan and with Florida DEP's beach protection program. Port Dolphin's failure to consult or perform due diligence regarding Longboat Key's plan, the Anna Maria Island shallow-shoal sand resource, and Longboat Key's state-permitted Borrow Area IX does not alter the legal requirement that the Port Dolphin license must be reconciled with the Longboat Key plan by evaluating reasonable alternatives and selecting a feasible one. 40 C.F.R. §1506.2(d). 90

(4) The DEIS Contains No Section 4(f) Determination for the Pipeline, Nor Could Such A Determination Properly Be Made For the Current Proposal.

As discussed above and explained in detail in the CPE Comments, the proposed pipeline will eliminate Longboat Key's proven, FDEP-approved white sand reserves, making that sand unavailable for application to Longboat Key's beaches, consequently interfering with Longboat Key's beach sand replenishment plan and degrading its beaches, both esthetically and environmentally. It appears beyond question that Longboat Key's beaches are 4(f) lands, inasmuch as the beaches are publicly owned and open to the public as "recreation areas." *See* 91

91. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1 and sand resources are described in Section 3.4, impacts are discussed in Section 4.4, and socioeconomic impacts on tourism are discussed in Section 4.9.

CPE Comments at 30-31. When BBCS establishes an Erosion Control Line ("ECL") based on the mean highwater line, for beaches with approved shore protection programs, all lands seaward of ECL become public property of the State with right of public access. Longboat Key has an ECL, which precludes private ownership of its beaches and establishes their character as public recreation areas. Nor could there be any dispute that local officials have determined the beaches to be of "local significance," both by adopting and periodically updating an official Comprehensive Beach Management Plan[6] (under which Longboat Key contributes to the cost of implementing the plan) and otherwise.

Longboat Key's beaches would be "used" by the pipeline because of the significant adverse impact the current route would have on the sand resource and, indirectly, on the beaches, on sea turtle habitat, on tourism, and on public safety. These impacts will substantially impair the environmental and economic values of the beaches, are "significant" under NEPA, and therefore are "uses" of the beaches. *Mullin v. Skinner*, *supra*, 756 F.Supp. at 924. MARAD cannot approve the Port Dolphin license unless and until it determines "there is no prudent and feasible alternative to using that land" and "the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use." The DEIS does not appear to discuss Section 4(f)'s application to the

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[6] Longboat Key adopted its Comprehensive Beach Management Plan in 1995. The Town adopted updates to the Comprehensive Beach Management Plan in 1999 and 2008.

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Port Dolphin pipeline in any detail (if at all). Given promising alternatives to the proposed pipeline, it clearly does not contain information upon which MARAD could reasonably base a Section 4(f) approval for the proposed pipeline. Clearly, for the reasons discussed above, the proposed pipeline's interference with Longboat Key's sand resources for the replenishment of the island's beach recreation areas triggers Section 4(f)'s requirements for selection of an alternative to the pipeline. 91

Respectfully submitted,

Duane A. Siler
Carolina L. Mederos
PATTON BOGGS LLP.

Attachment

4961384

Attachment

January 30, 2002

MEMORANDUM FOR THE HEADS OF FEDERAL AGENCIES

FROM: JAMES CONNAUGHTON, Chair

SUBJECT: COOPERATING AGENCIES IN IMPLEMENTING THE PROCEDURAL REQUIREMENTS OF THE NATIONAL ENVIRONMENTAL POLICY ACT

The purpose of this Memorandum is to ensure that all Federal agencies are actively considering designation of Federal and non-federal cooperating agencies in the preparation of analyses and documentation required by the National Environmental Policy Act (NEPA), and to ensure that Federal agencies actively participate as cooperating agencies in other agency's NEPA processes. The CEQ regulations addressing cooperating agencies status (40 C.F.R. §§ 1501.6 & 1508.5) implement the NEPA mandate that Federal agencies responsible for preparing NEPA analyses and documentation do so "in cooperation with State and local governments" and other agencies with jurisdiction by law or special expertise. (42 U.S.C. §§ 4331(a), 4332(2)). Despite previous memoranda and guidance from CEQ, some agencies remain reluctant to engage other Federal and non-federal agencies as a cooperating agency. In addition, some Federal agencies remain reluctant to assume the role of a cooperating agency, resulting in an inconsistent implementation of NEPA.

Studies regarding the efficiency, effectiveness, and value of NEPA analyses conclude that stakeholder involvement is important in ensuring decisionmakers have the environmental information necessary to make informed and timely decisions efficiently. Cooperating agency status is a major component of agency stakeholder involvement that neither enlarges nor diminishes the decisionmaking authority of any agency involved in the NEPA process. This memo does not expand requirements or responsibilities beyond those found in current laws and regulations, nor does it require an agency to provide financial assistance to a cooperating agency.

The benefits of enhanced cooperating agency participation in the preparation of NEPA analyses include: disclosing relevant information early in the analytical process; applying available technical expertise and staff support; avoiding duplication with other Federal, State, Tribal and local procedures; and establishing a mechanism for addressing intergovernmental issues. Other benefits of enhanced cooperating agency participation include fostering intra- and intergovernmental trust (e.g., partnerships at the community level) and a common understanding and appreciation for various governmental roles in the NEPA process, as well as enhancing agencies' ability to adopt environmental documents. It is incumbent on Federal agency officials to identify as early as practicable in the environmental planning process those Federal, State, Tribal and local government agencies that have jurisdiction by law and special expertise with respect to all reasonable alternatives or significant environmental, social or economic impacts associated with a proposed action that requires NEPA analysis.

The Federal agency responsible for the NEPA analysis should determine whether such agencies are interested and appear capable of assuming the responsibilities of becoming a cooperating agency under 40 C.F.R. §

1501.6. Whenever invited Federal, State, Tribal and local agencies elect not to become cooperating agencies, they should still be considered for inclusion in interdisciplinary teams engaged in the NEPA process and on distribution lists for review and comment on the NEPA documents. Federal agencies declining to accept cooperating agency status in whole or in part are obligated to respond to the request and provide a copy of their response to the Council. (40 C.F.R. § 1501.6(c)).

In order to assure that the NEPA process proceeds efficiently, agencies responsible for NEPA analysis are urged to set time limits, identify milestones, assign responsibilities for analysis and documentation, specify the scope and detail of the cooperating agency's contribution, and establish other appropriate ground-rules addressing issues such as availability of pre-decisional information. Agencies are encouraged in appropriate cases to consider documenting their expectations, roles and responsibilities (e.g., Memorandum of Agreement or correspondence). Establishing such a relationship neither creates a requirement nor constitutes a presumption that a lead agency provides financial assistance to a cooperating agency.

Once cooperating agency status has been extended and accepted, circumstances may arise when it is appropriate for either the lead or cooperating agency to consider ending cooperating agency status. This Memorandum provides factors to consider when deciding whether to invite, accept or end cooperating agency status. These factors are neither intended to be all-inclusive nor a rote test. Each determination should be made on a case-by-case basis considering all relevant information and factors, including requirements imposed on State, Tribal and local governments by their governing statutes and authorities. We rely upon you to ensure the reasoned use of agency discretion and to articulate and document the bases for extending, declining or ending cooperating agency status. The basis and determination should be included in the administrative record.

CEQ regulations do not explicitly discuss cooperating agencies in the context of Environmental Assessments (EAs) because of the expectation that EAs will normally be brief, concise documents that would not warrant use of formal cooperating agency status. However, agencies do at times – particularly in the context of integrating compliance with other environmental review laws – develop EAs of greater length and complexity than those required under the CEQ regulations. While we continue to be concerned about needlessly lengthy EAs (that may, at times, indicate the need to prepare an Environmental Impact Statement (EIS)), we recognize that there are times when cooperating agencies will be useful in the context of EAs. For this reason, this guidance is recommended for preparing EAs. However, this guidance does not change the basic distinction between EISs and EAs set forth in the regulations or prior guidance.

To measure our progress in addressing the issue of cooperating agency status, by October 31, 2002 agencies of the Federal government responsible for preparing NEPA analyses (e.g., the lead agency) shall provide the first bi-annual report regarding all EISs and EAs begun during the six-month period between March 1, 2002 and August 31, 2002. This is a periodic reporting requirement with the next report covering the September 2002 – February 2003 period due on April 30, 2003. For EISs, the report shall identify: the title; potential cooperating agencies; agencies invited to participate as cooperating agencies; agencies that requested cooperating agency status; agencies which accepted cooperating agency status; agencies whose cooperating agency status ended; and the current status of the EIS. A sample reporting form is at attachment 2. For EAs, the report shall provide the number of EAs and those involving cooperating agency(s)

as described in attachment 2. States, Tribes, and units of local governments that have received authority by Federal law to assume the responsibilities for preparing NEPA analyses are encouraged to comply with these reporting requirements.

If you have any questions concerning this memorandum, please contact Horst G. Greczmiel, Associate Director for NEPA Oversight at 202-395-5750, Horst_Greczmiel@ceq.eop.gov, or 202-456-0753 (fax).

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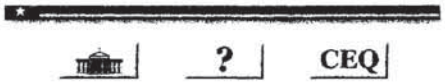

To submit questions and comments about CEQ NEPAnet, please use the NEPAnet Feedback System.

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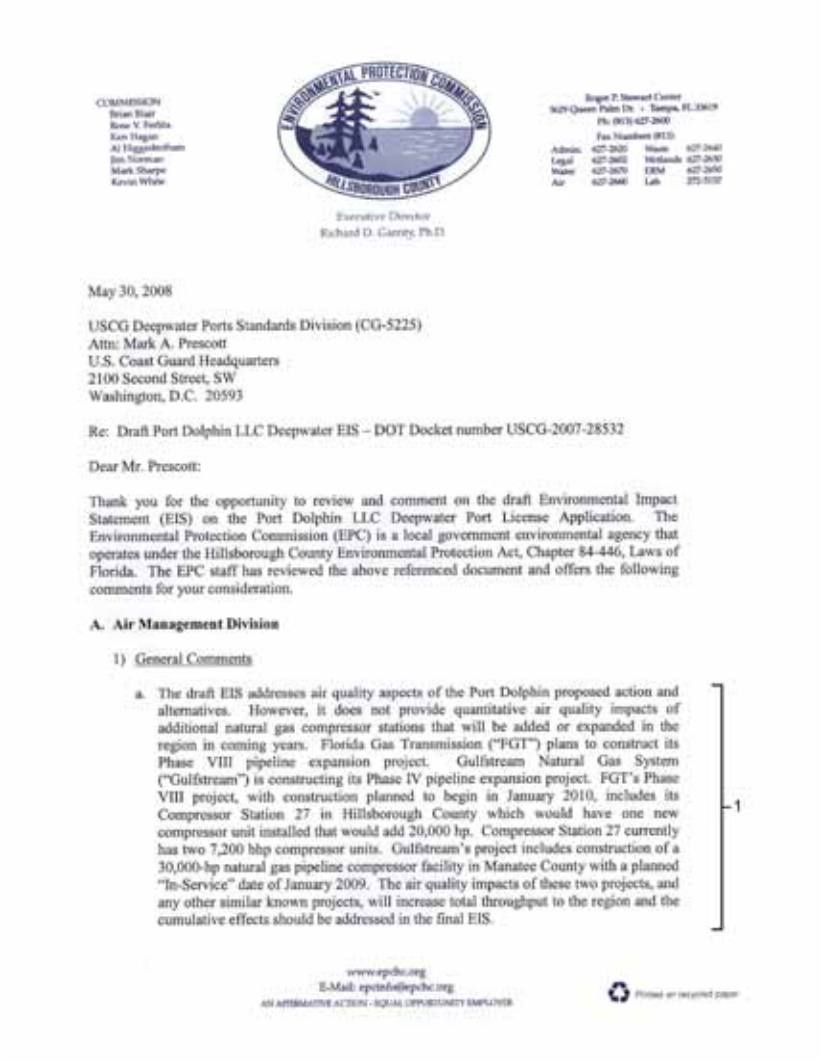

COMMISSION
Brian Blair
Rose V. Ferlita
Ken Hagan
Al Higginbotham
Jim Norman
Mark Sharpe
Kevin White

ENVIRONMENTAL PROTECTION COMMISSION
HILLSBOROUGH COUNTY

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Legal 627-2602 Wetlands 627-2630
Water 627-2670 ERM 627-2650
Air 627-2660 Lab 272-5157

Executive Director
Richard D. Garrity, Ph.D.

May 30, 2008

USCG Deepwater Ports Standards Division (CG-5225)
Attn: Mark A. Prescott
U.S. Coast Guard Headquarters
2100 Second Street, SW
Washington, D.C. 20593

Re: Draft Port Dolphin LLC Deepwater EIS – DOT Docket number USCG-2007-28532

Dear Mr. Prescott:

Thank you for the opportunity to review and comment on the draft Environmental Impact Statement (EIS) on the Port Dolphin LLC Deepwater Port License Application. The Environmental Protection Commission (EPC) is a local government environmental agency that operates under the Hillsborough County Environmental Protection Act, Chapter 84-446, Laws of Florida. The EPC staff has reviewed the above referenced document and offers the following comments for your consideration.

A. Air Management Division

1) General Comments

a. The draft EIS addresses air quality aspects of the Port Dolphin proposed action and alternatives. However, it does not provide quantitative air quality impacts of additional natural gas compressor stations that will be added or expanded in the region in coming years. Florida Gas Transmission ("FGT") plans to construct its Phase VIII pipeline expansion project. Gulfstream Natural Gas System ("Gulfstream") is constructing its Phase IV pipeline expansion project. FGT's Phase VIII project, with construction planned to begin in January 2010, includes its Compressor Station 27 in Hillsborough County which would have one new compressor unit installed that would add 20,000 hp. Compressor Station 27 currently has two 7,200 bhp compressor units. Gulfstream's project includes construction of a 30,000-hp natural gas pipeline compressor facility in Manatee County with a planned "In-Service" date of January 2009. The air quality impacts of these two projects, and any other similar known projects, will increase total throughput to the region and the cumulative effects should be addressed in the final EIS. 1

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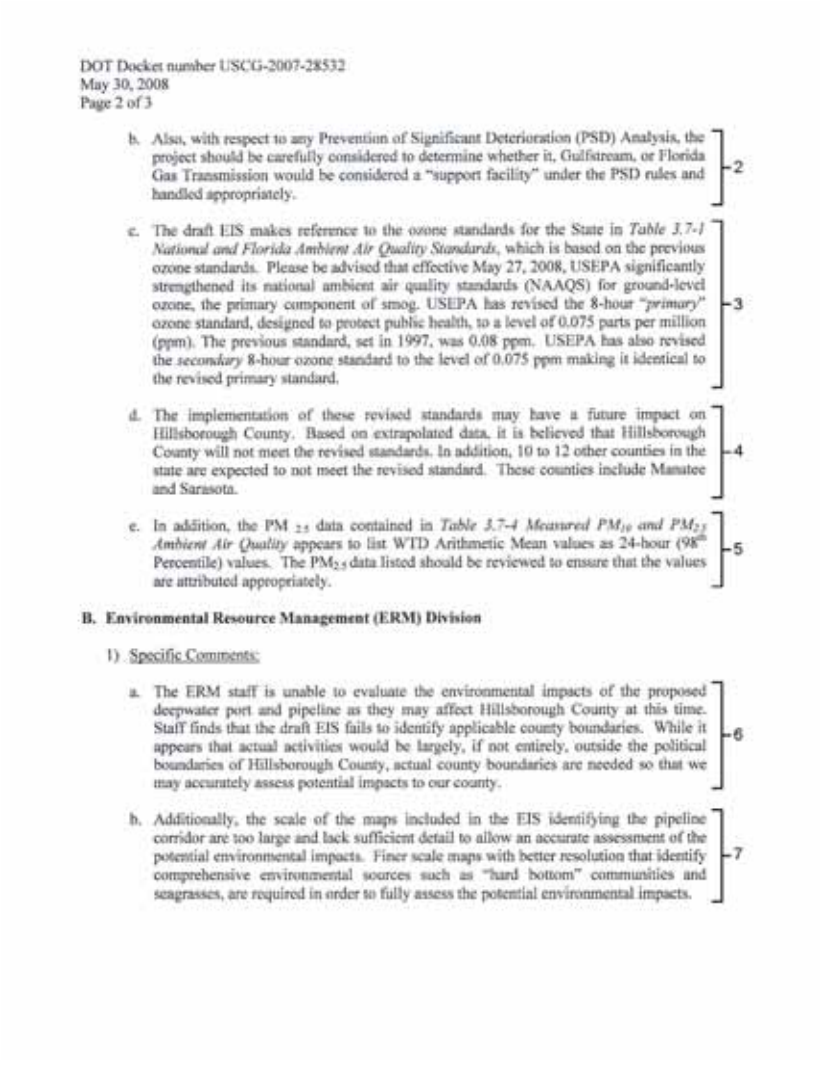
1. Text added to Section 6.3.7 to address cumulative air impacts resulting from additional compression from other projects discussed in Section 6.2.2. However, quantitative air impacts from those projects would be discussed in the regulatory documents required for those actions, and outline mitigation measures for their additive impacts to regional air quality.



DOT Docket number USCG-2007-28532
May 30, 2008
Page 2 of 3

b. Also, with respect to any Prevention of Significant Deterioration (PSD) Analysis, the project should be carefully considered to determine whether it, Gulfstream, or Florida Gas Transmission would be considered a "support facility" under the PSD rules and handled appropriately. -2

c. The draft EIS makes reference to the ozone standards for the State in *Table 3.7-1 National and Florida Ambient Air Quality Standards*, which is based on the previous ozone standards. Please be advised that effective May 27, 2008, USEPA significantly strengthened its national ambient air quality standards (NAAQS) for ground-level ozone, the primary component of smog. USEPA has revised the 8-hour "*primary*" ozone standard, designed to protect public health, to a level of 0.075 parts per million (ppm). The previous standard, set in 1997, was 0.08 ppm. USEPA has also revised the *secondary* 8-hour ozone standard to the level of 0.075 ppm making it identical to the revised primary standard. -3

d. The implementation of these revised standards may have a future impact on Hillsborough County. Based on extrapolated data, it is believed that Hillsborough County will not meet the revised standards. In addition, 10 to 12 other counties in the state are expected to not meet the revised standard. These counties include Manatee and Sarasota. -4

e. In addition, the PM $_{2.5}$ data contained in *Table 3.7-4 Measured PM_{10} and $PM_{2.5}$ Ambient Air Quality* appears to list WTD Arithmetic Mean values as 24-hour (98th Percentile) values. The $PM_{2.5}$ data listed should be reviewed to ensure that the values are attributed appropriately. -5

B. Environmental Resource Management (ERM) Division

1) Specific Comments:

a. The ERM staff is unable to evaluate the environmental impacts of the proposed deepwater port and pipeline as they may affect Hillsborough County at this time. Staff finds that the draft EIS fails to identify applicable county boundaries. While it appears that actual activities would be largely, if not entirely, outside the political boundaries of Hillsborough County, actual county boundaries are needed so that we may accurately assess potential impacts to our county. -6

b. Additionally, the scale of the maps included in the EIS identifying the pipeline corridor are too large and lack sufficient detail to allow an accurate assessment of the potential environmental impacts. Finer scale maps with better resolution that identify comprehensive environmental sources such as "hard bottom" communities and seagrasses, are required in order to fully assess the potential environmental impacts. -7

2. We have characterized the regulatory requirements for the Port Dolphin onshore station under PSD as discussed in Section 4.7.1. From a PSD permitting standpoint, FGT and Gulfstream are completely separate entities from Port Dolphin.

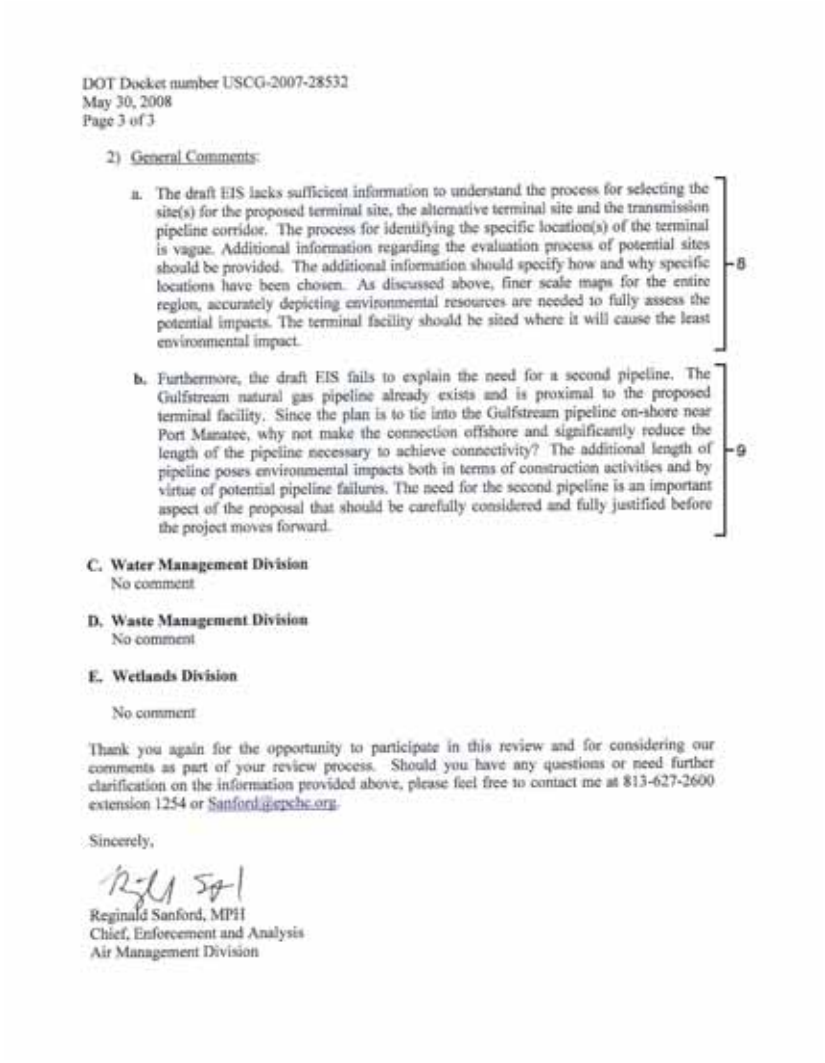
3. Table 3.7-1 revised to discuss the changes.

4. Ozone levels in Hillsborough, Manatee and Sarasota Counties are currently classified as attainment, and PSD permitting would conform to this classification until the State Implementation Plan is revised to address the new limits. The regulatory background in Section 1.6 discussion in Section 1.6 was changed to address the recent EPA classification changes.

5. The heading was revised per the comment on the bottom section of Table 3.7-4 (below "$PM_{2.5}$ (continued)" from "24-hour (98th percentile)" to "Annual Average."

6. The maps have been clarified so boundaries are visible.

7. The maps have been enlarged.



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Page 3 of 3

2) General Comments:

a. The draft EIS lacks sufficient information to understand the process for selecting the site(s) for the proposed terminal site, the alternative terminal site and the transmission pipeline corridor. The process for identifying the specific location(s) of the terminal is vague. Additional information regarding the evaluation process of potential sites should be provided. The additional information should specify how and why specific locations have been chosen. As discussed above, finer scale maps for the entire region, accurately depicting environmental resources are needed to fully assess the potential impacts. The terminal facility should be sited where it will cause the least environmental impact. 8

b. Furthermore, the draft EIS fails to explain the need for a second pipeline. The Gulfstream natural gas pipeline already exists and is proximal to the proposed terminal facility. Since the plan is to tie into the Gulfstream pipeline on-shore near Port Manatee, why not make the connection offshore and significantly reduce the length of the pipeline necessary to achieve connectivity? The additional length of pipeline poses environmental impacts both in terms of construction activities and by virtue of potential pipeline failures. The need for the second pipeline is an important aspect of the proposal that should be carefully considered and fully justified before the project moves forward. 9

C. Water Management Division
No comment

D. Waste Management Division
No comment

E. Wetlands Division

No comment

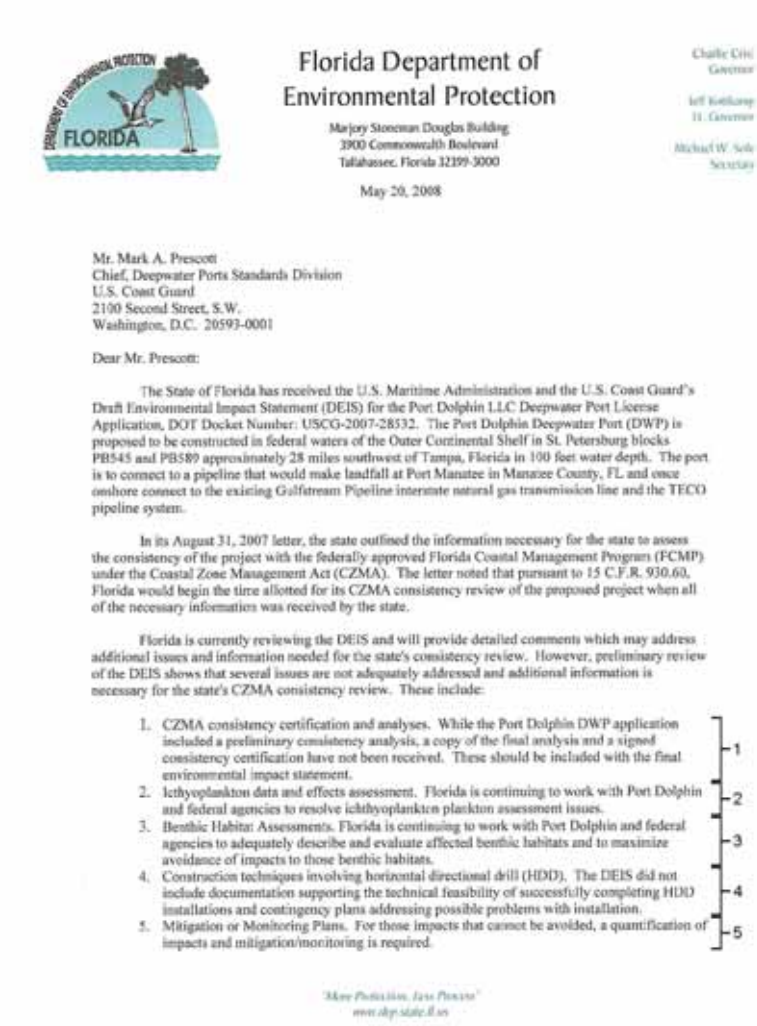
Thank you again for the opportunity to participate in this review and for considering our comments as part of your review process. Should you have any questions or need further clarification on the information provided above, please feel free to contact me at 813-627-2600 extension 1254 or Sanford@epchc.org.

Sincerely,

Reginald Sanford, MPH
Chief, Enforcement and Analysis
Air Management Division

8. The EIS describes the process of evaluating the sites proposed by the Applicant and identifying the viable sites reviewed in detail. More detailed figures for near shore areas have been included in the Final EIS in Section 2.1, and Appendix F to clarify the restrictions on landfall locations.

9. The discussion of an offshore interconnection with the Gulfstream Pipeline is included in Section 2.1.1.3. An alternative pipeline interconnection to the Gulfstream Pipeline has been added and its impacts discussed in Section 4.



Florida Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

May 20, 2008

Mr. Mark A. Prescott
Chief, Deepwater Ports Standards Division
U.S. Coast Guard
2100 Second Street, S.W.
Washington, D.C. 20593-0001

Dear Mr. Prescott:

The State of Florida has received the U.S. Maritime Administration and the U.S. Coast Guard's Draft Environmental Impact Statement (DEIS) for the Port Dolphin LLC Deepwater Port License Application, DOT Docket Number: USCG-2007-28532. The Port Dolphin Deepwater Port (DWP) is proposed to be constructed in federal waters of the Outer Continental Shelf in St. Petersburg blocks PB545 and PB589 approximately 28 miles southwest of Tampa, Florida in 100 feet water depth. The port is to connect to a pipeline that would make landfall at Port Manatee in Manatee County, FL and once onshore connect to the existing Gulfstream Pipeline interstate natural gas transmission line and the TECO pipeline system.

In its August 31, 2007 letter, the state outlined the information necessary for the state to assess the consistency of the project with the federally approved Florida Coastal Management Program (FCMP) under the Coastal Zone Management Act (CZMA). The letter noted that pursuant to 15 C.F.R. 930.60, Florida would begin the time allotted for its CZMA consistency review of the proposed project when all of the necessary information was received by the state.

Florida is currently reviewing the DEIS and will provide detailed comments which may address additional issues and information needed for the state's consistency review. However, preliminary review of the DEIS shows that several issues are not adequately addressed and additional information is necessary for the state's CZMA consistency review. These include:

1. CZMA consistency certification and analyses. While the Port Dolphin DWP application included a preliminary consistency analysis, a copy of the final analysis and a signed consistency certification have not been received. These should be included with the final environmental impact statement. — 1
2. Icthyoplankton data and effects assessment. Florida is continuing to work with Port Dolphin and federal agencies to resolve ichthyoplankton plankton assessment issues. — 2
3. Benthic Habitat Assessments. Florida is continuing to work with Port Dolphin and federal agencies to adequately describe and evaluate affected benthic habitats and to maximize avoidance of impacts to those benthic habitats. — 3
4. Construction techniques involving horizontal directional drill (HDD). The DEIS did not include documentation supporting the technical feasibility of successfully completing HDD installations and contingency plans addressing possible problems with installation. — 4
5. Mitigation or Monitoring Plans. For those impacts that cannot be avoided, a quantification of impacts and mitigation/monitoring is required. — 5

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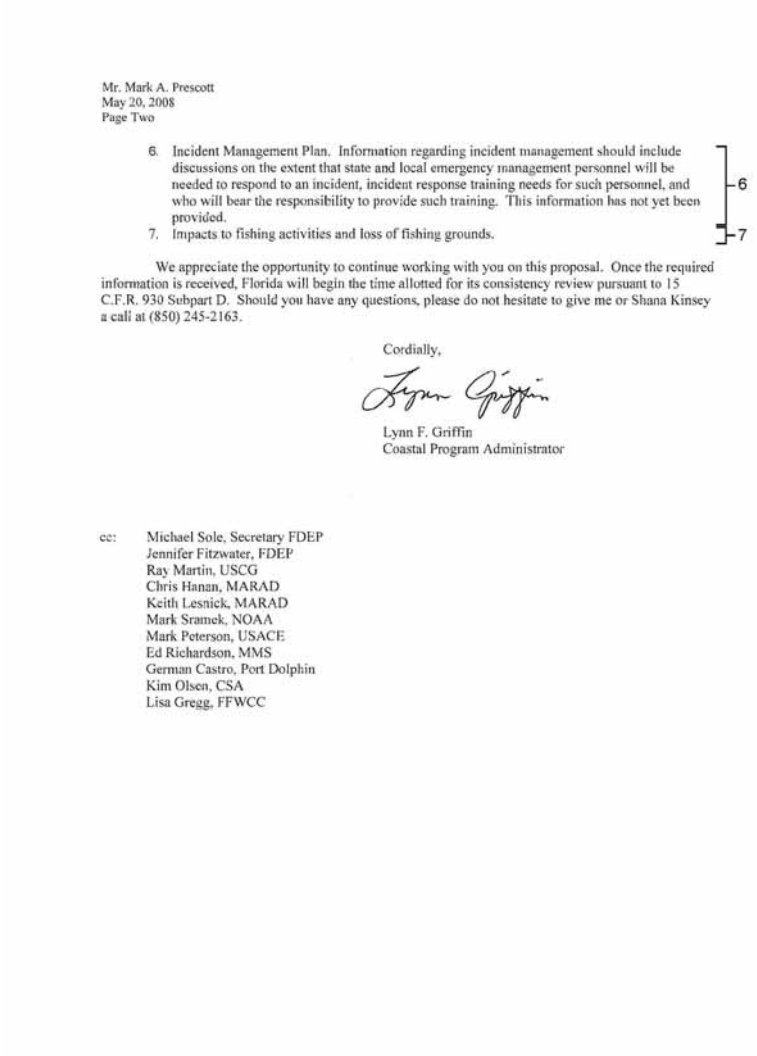
1. It is the responsibility of the Applicant to complete the consistency determination. The status of the Applicant's actions and an assessment of the Project's consistency with Florida's CZM Program is included in Section 3.5.3.

2. Comment noted.

3. Comment noted.

4. Potential impacts of HDD are discussed in Section 4 of the Final EIS. The Application describes the HDD techniques in Section 10 Volume II and is available electronically via the Federal Docket Management System (*www.regulations.gov*), Docket No. USCG-2007-28532.

5. Quantification of potential impacts has been discussed in Section 4 when sufficient information is available to quantify the impacts. Otherwise, qualitative discussions are included. Proposed mitigation and monitoring is discussed in Section 4.11.



Mr. Mark A. Prescott
May 20, 2008
Page Two

6. Incident Management Plan. Information regarding incident management should include discussions on the extent that state and local emergency management personnel will be needed to respond to an incident, incident response training needs for such personnel, and who will bear the responsibility to provide such training. This information has not yet been provided. 6
7. Impacts to fishing activities and loss of fishing grounds. 7

We appreciate the opportunity to continue working with you on this proposal. Once the required information is received, Florida will begin the time allotted for its consistency review pursuant to 15 C.F.R. 930 Subpart D. Should you have any questions, please do not hesitate to give me or Shana Kinsey a call at (850) 245-2163.

Cordially,

Lynn F. Griffin
Coastal Program Administrator

cc: Michael Sole, Secretary FDEP
Jennifer Fitzwater, FDEP
Ray Martin, USCG
Chris Hanan, MARAD
Keith Lesnick, MARAD
Mark Sramek, NOAA
Mark Peterson, USACE
Ed Richardson, MMS
German Castro, Port Dolphin
Kim Olsen, CSA
Lisa Gregg, FFWCC

6. Incident management would be discussed in detail in the Project's Operations Manual, which would be required by a condition in the license, if issued. USCG would coordinate with state and local officials during the development and approval of the Operations Manual.

7. Impacts to fishing and loss of fishing grounds are addressed in Section 4.2 and Section 4.8 of the Final EIS.

Florida Department of
Environmental Protection
Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

June 2, 2008

Mr. Mark A. Prescott
Chief, Deepwater Ports Standards
U. S. Coast Guard
2100 Second Street, S.W.
Washington, D.C. 20593-0001

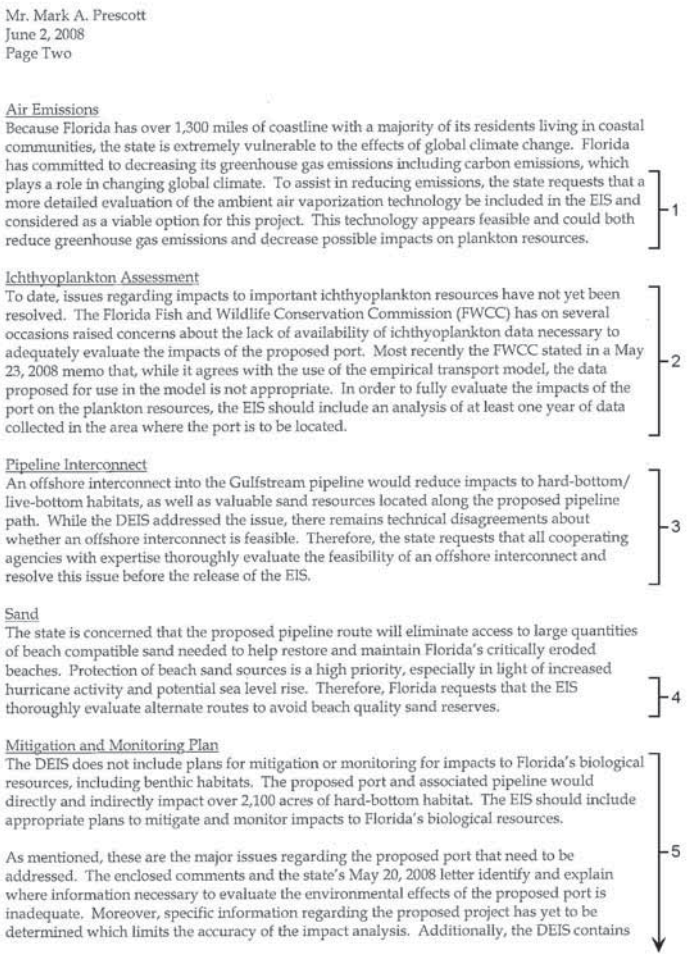
RE: Port Dolphin LNG LLC Deepwater Port License Application – Docket number USCG-2007-28532: Draft Environmental Impact Statement – April 2008

Dear Mr. Prescott:

The Florida Department of Environmental Protection has coordinated the State's review of the above-referenced Draft Environmental Impact Statement (DEIS) under the National Environmental Policy Act (NEPA). 42 U.S.C. §§ 4321, 4331-4335, as amended. The DEIS was prepared by the U.S. Coast Guard and the U.S. Maritime Administration, in cooperation with other federal agencies, to satisfy the NEPA requirements regarding the Port Dolphin LNG LLC's (Port Dolphin) application to own, construct and operate a deepwater port offshore southwest Florida. Governor Crist will have 45 days from the last public hearing to approve or disapprove the proposed deepwater port. In addition, the federal permits to construct and operate the proposed deepwater port require the concurrence of the State of Florida for consistency with the enforceable policies of the federally approved Florida Coastal Management Program, pursuant to section 307 of the Coastal Zone Management Act (CZMA).

The Port Dolphin Deepwater Port (port) is proposed to be constructed in federal waters of the Outer Continental Shelf in areas designated by the U.S. Department of the Interior Mineral Management Service as Lease Blocks St. Petersburg (PB) 546 and PB 589 approximately 28 miles southwest of Tampa, Florida in 100 feet water depth. The pipeline from the port would make landfall at Port Manatee in Manatee County, FL. Once onshore the pipeline would interconnect with the existing Gulfstream Pipeline interstate natural gas transmission line and the Tampa Electric Company pipeline system. As proposed, gas will be fed to the pipeline directly from closed-loop shuttle and regasification vessels through a turret-and-buoy system. Port Dolphin would have an average throughput capacity of approximately 800 million standard cubic feet of gas per day (Mmscfd) with peak capacity of 1,200 Mmscfd.

Outlined below are major issues regarding the proposed port that must be resolved and/or adequately addressed in the environmental impact statement (EIS). A more detailed discussion of all of our comments is attached.



Mr. Mark A. Prescott
June 2, 2008
Page Two

Air Emissions
Because Florida has over 1,300 miles of coastline with a majority of its residents living in coastal communities, the state is extremely vulnerable to the effects of global climate change. Florida has committed to decreasing its greenhouse gas emissions including carbon emissions, which plays a role in changing global climate. To assist in reducing emissions, the state requests that a more detailed evaluation of the ambient air vaporization technology be included in the EIS and considered as a viable option for this project. This technology appears feasible and could both reduce greenhouse gas emissions and decrease possible impacts on plankton resources. 1

Ichthyoplankton Assessment
To date, issues regarding impacts to important ichthyoplankton resources have not yet been resolved. The Florida Fish and Wildlife Conservation Commission (FWCC) has on several occasions raised concerns about the lack of availability of ichthyoplankton data necessary to adequately evaluate the impacts of the proposed port. Most recently the FWCC stated in a May 23, 2008 memo that, while it agrees with the use of the empirical transport model, the data proposed for use in the model is not appropriate. In order to fully evaluate the impacts of the port on the plankton resources, the EIS should include an analysis of at least one year of data collected in the area where the port is to be located. 2

Pipeline Interconnect
An offshore interconnect into the Gulfstream pipeline would reduce impacts to hard-bottom/ live-bottom habitats, as well as valuable sand resources located along the proposed pipeline path. While the DEIS addressed the issue, there remains technical disagreements about whether an offshore interconnect is feasible. Therefore, the state requests that all cooperating agencies with expertise thoroughly evaluate the feasibility of an offshore interconnect and resolve this issue before the release of the EIS. 3

Sand
The state is concerned that the proposed pipeline route will eliminate access to large quantities of beach compatible sand needed to help restore and maintain Florida's critically eroded beaches. Protection of beach sand sources is a high priority, especially in light of increased hurricane activity and potential sea level rise. Therefore, Florida requests that the EIS thoroughly evaluate alternate routes to avoid beach quality sand reserves. 4

Mitigation and Monitoring Plan
The DEIS does not include plans for mitigation or monitoring for impacts to Florida's biological resources, including benthic habitats. The proposed port and associated pipeline would directly and indirectly impact over 2,100 acres of hard-bottom habitat. The EIS should include appropriate plans to mitigate and monitor impacts to Florida's biological resources.

As mentioned, these are the major issues regarding the proposed port that need to be addressed. The enclosed comments and the state's May 20, 2008 letter identify and explain where information necessary to evaluate the environmental effects of the proposed port is inadequate. Moreover, specific information regarding the proposed project has yet to be determined which limits the accuracy of the impact analysis. Additionally, the DEIS contains 5

1. AAV technology has been added as an alternative Section 2.1 and impacts addressed in Section 4 of the Final EIS.

2. Limitations on SEAMAP data and the adjustments made to accommodate those limitations are detailed in Section 4.1.2.12 and Appendix G of the Final EIS. Use of closed-loop vaporization technology was identified by NMFS as the principal mitigation for ichthyoplankton impacts, and the Applicant has proposed a closed-loop system. The impacts modeled for the Project are extremely low. Therefore, additional data is not considered necessary for the EIS. However, if a license is issued, a sampling program will be required as a condition of the license. If ichthyoplankton data demonstrates the need for additional mitigation, appropriate plans would be developed then.

3. An offshore interconnection with the Gulfstream Pipeline has been included in Section 2.1, Alternatives Analysis.

4. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.

5. Based on additional geophysical and geotechnical evaluations, the benthic impacts discussion has been revised (see Section 4.2.1.6.). Additional mitigation has been included in Section 4.11.

numerous inconsistencies in the information presented which results in a document that is difficult to analyze and often inadequate for assessing impacts. Therefore, you may wish to consider developing a revised NEPA document for public review prior to finalizing the EIS.

Florida requests that the applicant work to obtain necessary data and coordinate with agency staff as information is developed and any modifications to the proposed port plan and operations are made. This will allow accurate assessment of potential impacts and acceptable preferred alternatives to be proposed in the EIS and allow the federal consistency review under the CZMA to be completed in a timely manner. 5

We appreciate the opportunity to review the DEIS and look forward to continue working with you, Port Dolphin and other federal agencies on this proposal. Please address any questions regarding the enclosed comments to Lynn Griffin or Shana Kinsey at (850) 245-2163.

Sincerely,

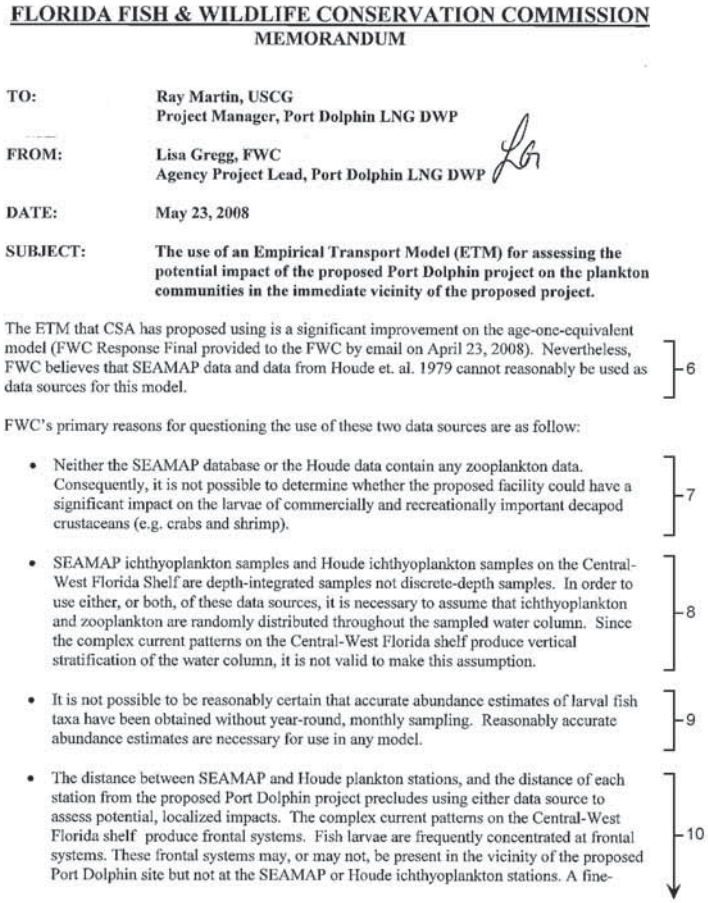
Jennifer L. Fitzwater

Jennifer L. Fitzwater
Deputy Secretary
Policy & Planning

JLF/sk

Enclosures

cc: Mr. Keith Lesnick, Senior Transportation Specialist, MARAD, Encs.
Mr. Rob Whitney, Special Assistant, MARAD, Encs.
Mr. Chris Hanan, Transporation Industry Analyst, MARAD, Encs.
Mr. Ray Martin, Project Manager, USCG, Encs.
Mr. Ken Haddad, Executive Director, FWCC, Encs.
Mr. Frederick Gaske, Director/State Historic Preservation Officer, FDOS, Encs.
German Castro, Project Development Manager, Port Dolphin, Encs.



FLORIDA FISH & WILDLIFE CONSERVATION COMMISSION
MEMORANDUM

TO: Ray Martin, USCG
Project Manager, Port Dolphin LNG DWP

FROM: Lisa Gregg, FWC
Agency Project Lead, Port Dolphin LNG DWP

DATE: May 23, 2008

SUBJECT: **The use of an Empirical Transport Model (ETM) for assessing the potential impact of the proposed Port Dolphin project on the plankton communities in the immediate vicinity of the proposed project.**

The ETM that CSA has proposed using is a significant improvement on the age-one-equivalent model (FWC Response Final provided to the FWC by email on April 23, 2008). Nevertheless, FWC believes that SEAMAP data and data from Houde et. al. 1979 cannot reasonably be used as data sources for this model. 6

FWC's primary reasons for questioning the use of these two data sources are as follow:

- Neither the SEAMAP database or the Houde data contain any zooplankton data. Consequently, it is not possible to determine whether the proposed facility could have a significant impact on the larvae of commercially and recreationally important decapod crustaceans (e.g. crabs and shrimp). 7
- SEAMAP ichthyoplankton samples and Houde ichthyoplankton samples on the Central-West Florida Shelf are depth-integrated samples not discrete-depth samples. In order to use either, or both, of these data sources, it is necessary to assume that ichthyoplankton and zooplankton are randomly distributed throughout the sampled water column. Since the complex current patterns on the Central-West Florida shelf produce vertical stratification of the water column, it is not valid to make this assumption. 8
- It is not possible to be reasonably certain that accurate abundance estimates of larval fish taxa have been obtained without year-round, monthly sampling. Reasonably accurate abundance estimates are necessary for use in any model. 9
- The distance between SEAMAP and Houde plankton stations, and the distance of each station from the proposed Port Dolphin project precludes using either data source to assess potential, localized impacts. The complex current patterns on the Central-West Florida shelf produce frontal systems. Fish larvae are frequently concentrated at frontal systems. These frontal systems may, or may not, be present in the vicinity of the proposed Port Dolphin site but not at the SEAMAP or Houde ichthyoplankton stations. A fine- 10

6. In September 2008 FWC rejected the ETM proposed by the Applicant. Therefore, modeling was not performed.

7. Comment noted. Section 4.2.1.11 of the EIS qualitatively evaluates impacts on crustaceans. If a license is issued, a sampling program will be required as a condition of the license. If zooplankton data demonstrates the need for additional mitigation, appropriate plans would be developed then.

8. Limitations on SEAMAP data and the adjustments made to accommodate those limitations are detailed in Section 4.1.2.12 and Appendix G of the Final EIS. Use of closed-loop vaporization technology was identified by NMFS in prior LNG deepwater port projects as the principal mitigation for ichthyoplankton impacts, and the Applicant has proposed a closed-loop system. The impacts modeled for the Project are extremely low. Therefore, additional data is not considered necessary for the EIS. However, if a license is issued, a sampling program will be required as a condition of the license. If ichthyoplankton data demonstrates the need for additional mitigation, appropriate plans would be developed then.

9. Limitations on SEAMAP data and the adjustments made to accommodate those limitations are detailed in Section 4.1.2.12 and Appendix G of the Final EIS. Use of closed-loop vaporization technology was identified by NMFS as the principal mitigation for ichthyoplankton impacts in prior LNG deepwater port projects, and the Applicant has proposed a closed-loop system. The impacts modeled for the Project are extremely low. Therefore, additional data is not considered necessary for the EIS. However, if a license is issued, a sampling program will be required as a condition of the license. If ichthyoplankton data demonstrates the need for additional mitigation, appropriate plans would be developed then.

10. In September 2008 FWC rejected the ETM proposed by the Applicant. Therefore, modeling was not performed.

    Limitations on SEAMAP data and the adjustments made to accommodate those limitations are detailed in Section 4.1.2.12 and Appendix G of the Final EIS. Use of closed-loop vaporization technology was identified by NMFS as the principal mitigation for ichthyoplankton impacts in prior LNG deepwater port projects, and the Applicant has proposed a closed-loop system. The impacts modeled for the Project are extremely low. Therefore, additional data is not considered necessary for the EIS. However, if a license is issued, a sampling program will be required as a condition of the license. If ichthyoplankton data demonstrates the need for additional mitigation, appropriate plans would be developed then.

scale sampling grid centered on all of the proposed Port Dolphin deep-water port site alternatives is necessary to obtain sufficient, reasonably accurate, plankton data for analysis.

10

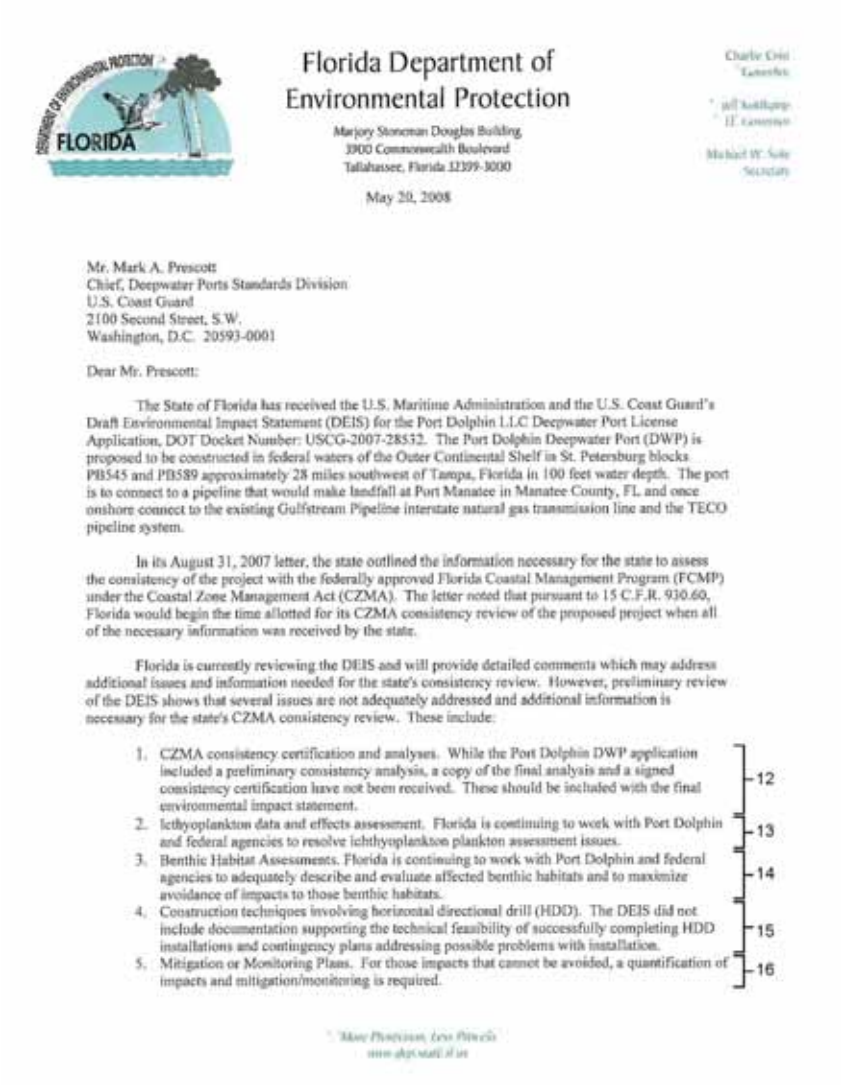
Conclusions:

FWC agrees that the ETM, as detailed in the CSA memo, is a suitable model for assessing Port Dolphin's potential environmental impacts. FWC does not agree that SEAMAP or Houde et. al. data are suitable data sources for the model.

The FWC maintains that, to our knowledge, a plankton sampling program similar to the one outlined in our December 11, 2006 email regarding the Ichthyoplankton Data Synthesis, is the only suitable source of data adequate for use in the proposed Empirical Transport Model. For FWC to determine if this project would be consistent under the Florida Coastal Management Program/Coastal Zone Consistency Act, we would require at least one year's worth of data collected by the above-referenced sampling program used in conjunction with the Empirical Transport Model to determine potential project impacts to plankton communities, and this information would need to be included in the Final Environmental Impact Statement for the Port Dolphin project.

11

11. Limitations on SEAMAP data and the adjustments made to accommodate those limitations are detailed in Section 4.1.2.12 and Appendix G of the Final EIS. Use of closed-loop vaporization technology was identified by NMFS as the principal mitigation for ichthyoplankton impacts in prior LNG deepwater port projects, and the Applicant has proposed a closed-loop system. The impacts modeled for the Project are extremely low. Therefore, additional data is not considered necessary for the EIS. However, if a license is issued, a sampling program will be required as a condition of the license. If ichthyoplankton data demonstrates the need for additional mitigation, appropriate plans would be developed then.



Florida Department of
Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

May 20, 2008

Mr. Mark A. Prescott
Chief, Deepwater Ports Standards Division
U.S. Coast Guard
2100 Second Street, S.W.
Washington, D.C. 20593-0001

Dear Mr. Prescott:

The State of Florida has received the U.S. Maritime Administration and the U.S. Coast Guard's Draft Environmental Impact Statement (DEIS) for the Port Dolphin LLC Deepwater Port License Application, DOT Docket Number: USCG-2007-28532. The Port Dolphin Deepwater Port (DWP) is proposed to be constructed in federal waters of the Outer Continental Shelf in St. Petersburg blocks PB545 and PB589 approximately 28 miles southwest of Tampa, Florida in 100 feet water depth. The port is to connect to a pipeline that would make landfall at Port Manatee in Manatee County, FL and once onshore connect to the existing Gulfstream Pipeline interstate natural gas transmission line and the TECO pipeline system.

In its August 31, 2007 letter, the state outlined the information necessary for the state to assess the consistency of the project with the federally approved Florida Coastal Management Program (FCMP) under the Coastal Zone Management Act (CZMA). The letter noted that pursuant to 15 C.F.R. 930.60, Florida would begin the time allotted for its CZMA consistency review of the proposed project when all of the necessary information was received by the state.

Florida is currently reviewing the DEIS and will provide detailed comments which may address additional issues and information needed for the state's consistency review. However, preliminary review of the DEIS shows that several issues are not adequately addressed and additional information is necessary for the state's CZMA consistency review. These include:

1. CZMA consistency certification and analyses. While the Port Dolphin DWP application included a preliminary consistency analysis, a copy of the final analysis and a signed consistency certification have not been received. These should be included with the final environmental impact statement. 12
2. Ichthyoplankton data and effects assessment. Florida is continuing to work with Port Dolphin and federal agencies to resolve ichthyoplankton plankton assessment issues. 13
3. Benthic Habitat Assessments. Florida is continuing to work with Port Dolphin and federal agencies to adequately describe and evaluate affected benthic habitats and to maximize avoidance of impacts to those benthic habitats. 14
4. Construction techniques involving horizontal directional drill (HDD). The DEIS did not include documentation supporting the technical feasibility of successfully completing HDD installations and contingency plans addressing possible problems with installation. 15
5. Mitigation or Monitoring Plans. For those impacts that cannot be avoided, a quantification of impacts and mitigation/monitoring is required. 16

12. The Applicant is responsible for processing the CZM consistency determination. An assessment of environmental impacts to coastal resources in included in Section 4.2.1 of the Final EIS.

13. Comment Noted. USCG and the Maritime Administration appreciate FDEP's continuing cooperation in this effort.

14. Comment Noted. USCG and the Maritime Administration appreciate FDEP's continuing cooperation in this effort.

15. HDD technology has been used in pipeline construction for years. Evaluations of potential problems, such as frac-out of drilling mud, are included in Section 2 of the Final EIS.

16. Unavoidable impacts are discussed in Section 4 and Section 6.4 of the Final EIS. Mitigation measures are discussed throughout Section 4 and compiled in Section 4.11.

Mr. Mark A. Prescott
May 20, 2008
Page Two

6. Incident Management Plan. Information regarding incident management should include discussions on the extent that state and local emergency management personnel will be needed to respond to an incident, incident response training needs for such personnel, and who will bear the responsibility to provide such training. This information has not yet been provided. 17
7. Impacts to fishing activities and loss of fishing grounds. 18

We appreciate the opportunity to continue working with you on this proposal. Once the required information is received, Florida will begin the time allotted for its consistency review pursuant to 15 C.F.R. 930 Subpart D. Should you have any questions, please do not hesitate to give me or Shana Kinsey a call at (850) 245-2163.

Cordially,



Lynn F. Griffin
Coastal Program Administrator

cc: Michael Sole, Secretary FDEP
Jennifer Fitzwater, FDEP
Ray Martin, USCG
Chris Hanan, MARAD
Keith Lesnick, MARAD
Mark Sramek, NOAA
Mark Peterson, USACE
Ed Richardson, MMS
German Castro, Port Dolphin
Kim Olsen, CSA
Lisa Gregg, FFWCC

17. Incident management would be included in the Operations Manual that would be developed and approved by the USCG if a license is issued.

18. Impacts to fishing and loss of fishing grounds are discussed in Section 4.9, Socioeconomics and Environmental Justice.

STATE OF FLORIDA
COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT
PORT DOLPHIN LNG DEEPWATER PORT (DWP) LICENSE APPLICATION

Comments received by the Florida Department of State; the Fish and Wildlife Conservation Commission; and the Department of Environmental Protection: Southwest District, Bureau of Beaches and Coastal Systems, Division of Air Resource Management and Florida Geological Survey are attached and should be considered in developing the EIS.

Please note that the use of "the proposed project" in the discussions below refers to the deepwater port (DWP) and associated pipelines.

Organization of the Draft Environmental Impact Statement (DEIS) – The overall organization of the DEIS makes it difficult to follow and accurately determine the potential for and level of impacts. A complete description of the project as proposed, before alternatives are discussed would allow the reader to fully understand the project and evaluate impacts against alternatives discussed. In addition, many sections in the document include technical descriptions that would be made clearer with the use of maps, diagrams, and figures to assist in explanations. 19

Data Gaps Analysis – In several areas of the DEIS, summary information is cited back to information supplied by the applicant to fill data gaps at the request of the Unites States Coast Guard (USGC). More specific information, including actual data, figures, maps, and diagrams taken from the data gap information supplied should be incorporated into the EIS to more accurately describe the proposal and potential effects. 20

Impact Assessment – The DEIS defines impacts as:

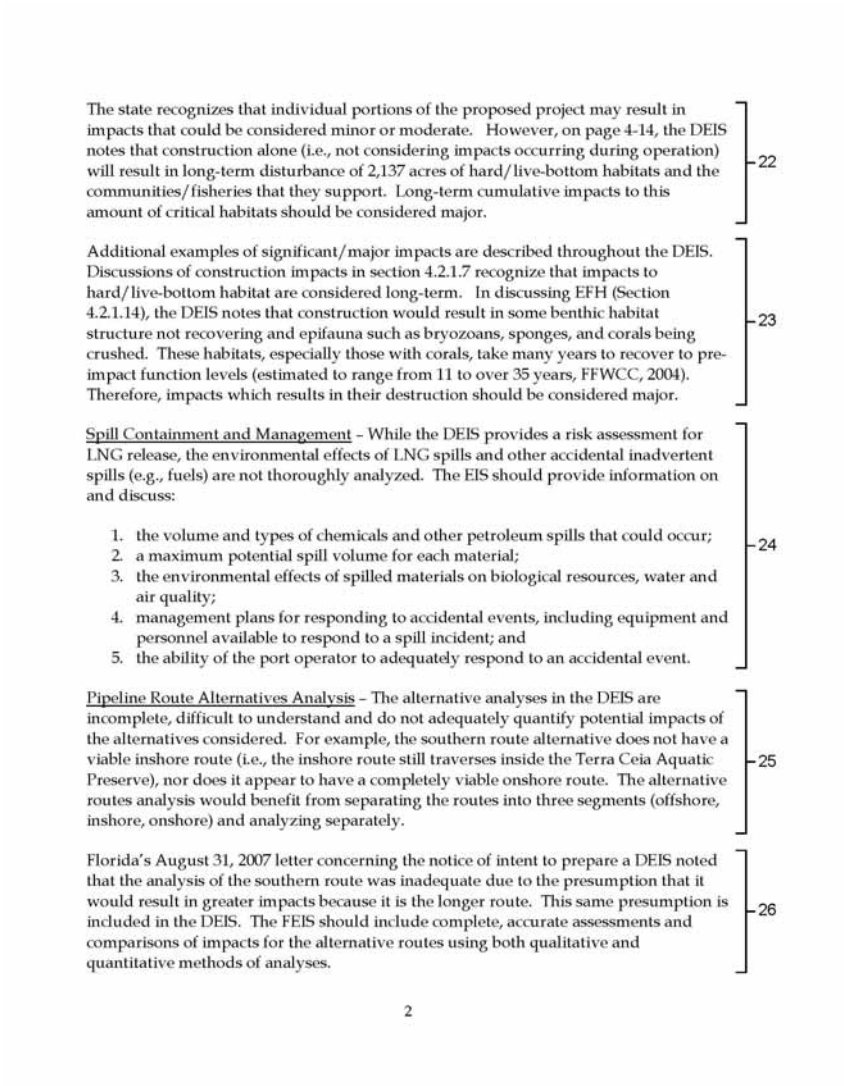
> minor - impacts that might be perceptible, but generally cannot be measured;
> moderate - impacts that are more perceptible and more amenable to quantification and measurement; and
> major - impacts due to their severity have the potential to meet thresholds for significance as set forth in 40 CFR 1508.27.

The state is concerned that almost all of the impacts described in the DEIS are rated at a minor to moderate level. Impacts described, should in some cases, be defined as major based on their significance to local area habitats and the communities that they support. Hard/live-bottom habitats located in the area of the proposed project support important benthic communities/species and are essential fish habitats (EFH) supporting local fisheries. Impacts to these hard/live-bottom habitats resulting from the construction and operation of the proposed project seem to meet significance thresholds described in NEPA regulations to be considered major impacts. 21

19. The project description is placed after the alternatives analysis to ensure that the proposed project is not given undue consideration in the selection of alternatives for review. The same organization is used for the Final EIS.

20. Data gap responses are available electronically via the Federal Docket Management System (*www.regulations.gov*), Docket No. USCG-2007-28532.

21. Based on the evaluations described in Section 4 and mitigations discussed in Section 4 and compiled in Section 4.11, impact assessments are considered to be accurate.



The state recognizes that individual portions of the proposed project may result in impacts that could be considered minor or moderate. However, on page 4-14, the DEIS notes that construction alone (i.e., not considering impacts occurring during operation) will result in long-term disturbance of 2,137 acres of hard/live-bottom habitats and the communities/fisheries that they support. Long-term cumulative impacts to this amount of critical habitats should be considered major. 22

Additional examples of significant/major impacts are described throughout the DEIS. Discussions of construction impacts in section 4.2.1.7 recognize that impacts to hard/live-bottom habitat are considered long-term. In discussing EFH (Section 4.2.1.14), the DEIS notes that construction would result in some benthic habitat structure not recovering and epifauna such as bryozoans, sponges, and corals being crushed. These habitats, especially those with corals, take many years to recover to pre-impact function levels (estimated to range from 11 to over 35 years, FFWCC, 2004). Therefore, impacts which results in their destruction should be considered major. 23

Spill Containment and Management – While the DEIS provides a risk assessment for LNG release, the environmental effects of LNG spills and other accidental inadvertent spills (e.g., fuels) are not thoroughly analyzed. The EIS should provide information on and discuss: 24

1. the volume and types of chemicals and other petroleum spills that could occur;
2. a maximum potential spill volume for each material;
3. the environmental effects of spilled materials on biological resources, water and air quality;
4. management plans for responding to accidental events, including equipment and personnel available to respond to a spill incident; and
5. the ability of the port operator to adequately respond to an accidental event.

Pipeline Route Alternatives Analysis – The alternative analyses in the DEIS are incomplete, difficult to understand and do not adequately quantify potential impacts of the alternatives considered. For example, the southern route alternative does not have a viable inshore route (i.e., the inshore route still traverses inside the Terra Ceia Aquatic Preserve), nor does it appear to have a completely viable onshore route. The alternative routes analysis would benefit from separating the routes into three segments (offshore, inshore, onshore) and analyzing separately. 25

Florida's August 31, 2007 letter concerning the notice of intent to prepare a DEIS noted that the analysis of the southern route was inadequate due to the presumption that it would result in greater impacts because it is the longer route. This same presumption is included in the DEIS. The FEIS should include complete, accurate assessments and comparisons of impacts for the alternative routes using both qualitative and quantitative methods of analyses. 26

2

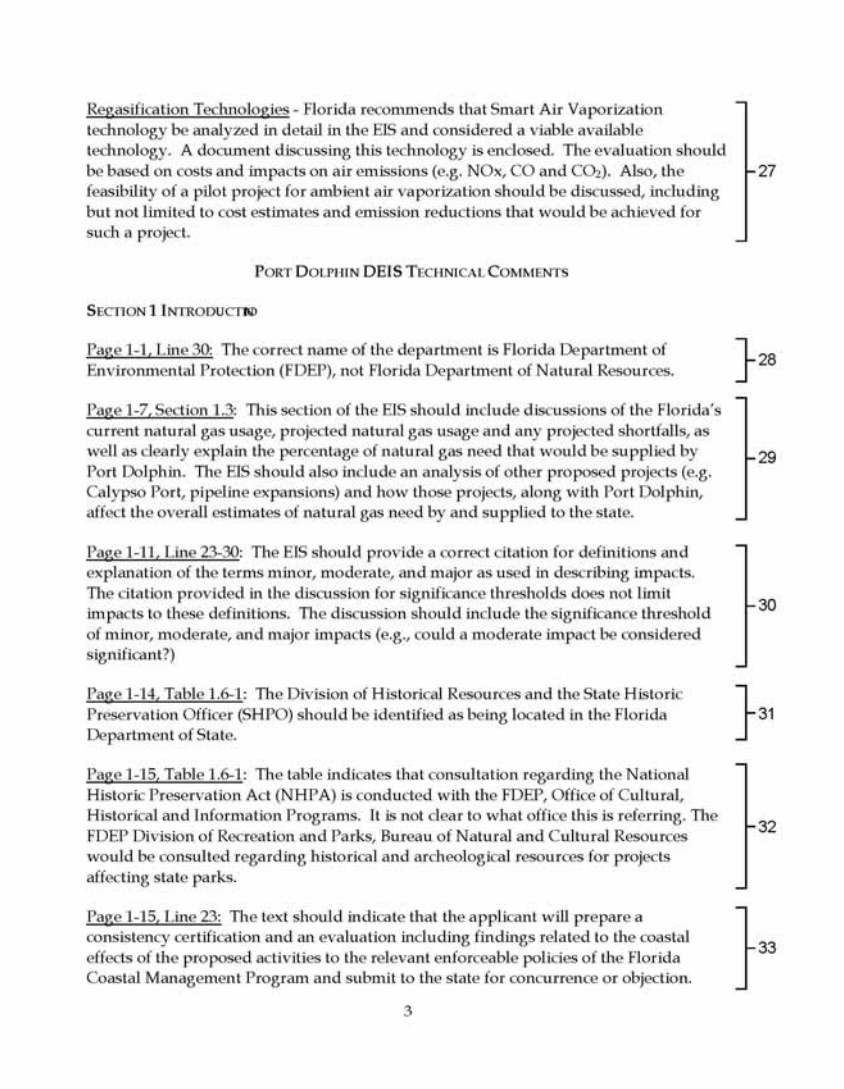
22. Based on additional geophysical and geotechnical evaluations, the benthic impacts discussion in Section 4.2.1.6 has been revised. Additional mitigation has been included in Section 4.11.

23. Based on additional geophysical and geotechnical evaluations, the benthic impacts discussion in Section 4.2.1.6 has been revised. Additional mitigation has been included in Section 4.11.

24. Potential impacts from spills of petroleum products and chemicals are discussed in appropriate sections of Section 4. Incident management would be included in the Operations Manual that would be developed and approved by the USCG if a license is issued.

25. Comment noted.

26. Assessment of impacts based on geophysical surveys has been included in the Final EIS. Survey data provided by the Applicant in response to data gap questions are available electronically via the Federal Docket Management System (*www.regulations.gov*), Docket No. USCG-2007-28532.



Regasification Technologies - Florida recommends that Smart Air Vaporization technology be analyzed in detail in the EIS and considered a viable available technology. A document discussing this technology is enclosed. The evaluation should be based on costs and impacts on air emissions (e.g. NOx, CO and CO_2). Also, the feasibility of a pilot project for ambient air vaporization should be discussed, including but not limited to cost estimates and emission reductions that would be achieved for such a project. 27

PORT DOLPHIN DEIS TECHNICAL COMMENTS

SECTION 1 INTRODUCTION

Page 1-1, Line 30: The correct name of the department is Florida Department of Environmental Protection (FDEP), not Florida Department of Natural Resources. 28

Page 1-7, Section 1.3: This section of the EIS should include discussions of the Florida's current natural gas usage, projected natural gas usage and any projected shortfalls, as well as clearly explain the percentage of natural gas need that would be supplied by Port Dolphin. The EIS should also include an analysis of other proposed projects (e.g. Calypso Port, pipeline expansions) and how those projects, along with Port Dolphin, affect the overall estimates of natural gas need by and supplied to the state. 29

Page 1-11, Line 23-30: The EIS should provide a correct citation for definitions and explanation of the terms minor, moderate, and major as used in describing impacts. The citation provided in the discussion for significance thresholds does not limit impacts to these definitions. The discussion should include the significance threshold of minor, moderate, and major impacts (e.g., could a moderate impact be considered significant?) 30

Page 1-14, Table 1.6-1: The Division of Historical Resources and the State Historic Preservation Officer (SHPO) should be identified as being located in the Florida Department of State. 31

Page 1-15, Table 1.6-1: The table indicates that consultation regarding the National Historic Preservation Act (NHPA) is conducted with the FDEP, Office of Cultural, Historical and Information Programs. It is not clear to what office this is referring. The FDEP Division of Recreation and Parks, Bureau of Natural and Cultural Resources would be consulted regarding historical and archeological resources for projects affecting state parks. 32

Page 1-15, Line 23: The text should indicate that the applicant will prepare a consistency certification and an evaluation including findings related to the coastal effects of the proposed activities to the relevant enforceable policies of the Florida Coastal Management Program and submit to the state for concurrence or objection. 33

3

27. AAV technology has been added as an alternative Section 2.1 and impacts addressed in Section 4 of the Final EIS.

28. Text revised per comment.

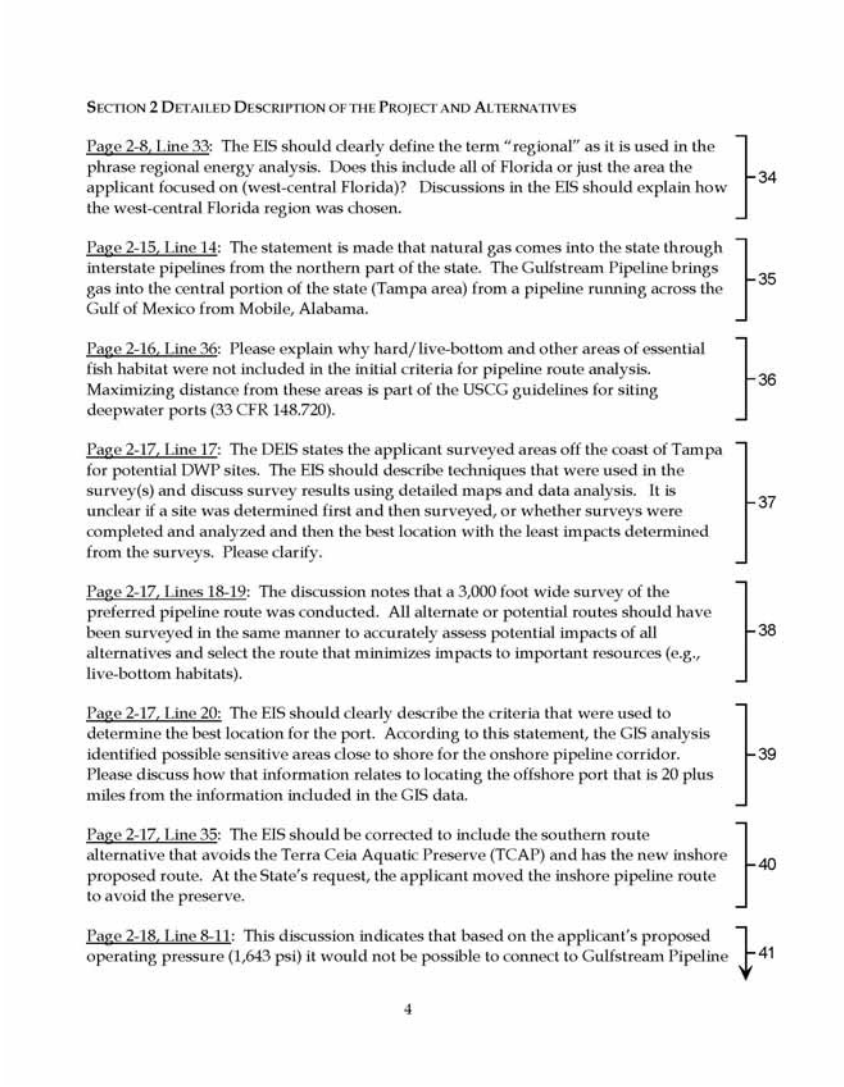
29. Florida usage of natural gas and other energy sources are discussed in Section 2.1. Other potential sources of natural gas, including the Calypso Project and expansion of existing natural gas pipelines are included in the discussion. Since the proposed project is independent of other projects, estimates of the total potential supply are not appropriate to the evaluation of this project. As demonstrated by the recent withdrawal of the license application for the Calypso Project, each project should be evaluated on its own merits.

30. The definitions supplied are based upon best professional judgment for the information of the reader on evaluation criteria used in the EIS to ensure consistent descriptions in all resource areas. Evaluation criteria for determining environmental consequences are further defined by resource area in Table 4.0-1 in Section 4.

31. Text revised per comment.

32. Text revised per comment.

33. Text revised per comment.



SECTION 2 DETAILED DESCRIPTION OF THE PROJECT AND ALTERNATIVES

Page 2-8, Line 33: The EIS should clearly define the term "regional" as it is used in the phrase regional energy analysis. Does this include all of Florida or just the area the applicant focused on (west-central Florida)? Discussions in the EIS should explain how the west-central Florida region was chosen. 34

Page 2-15, Line 14: The statement is made that natural gas comes into the state through interstate pipelines from the northern part of the state. The Gulfstream Pipeline brings gas into the central portion of the state (Tampa area) from a pipeline running across the Gulf of Mexico from Mobile, Alabama. 35

Page 2-16, Line 36: Please explain why hard/live-bottom and other areas of essential fish habitat were not included in the initial criteria for pipeline route analysis. Maximizing distance from these areas is part of the USCG guidelines for siting deepwater ports (33 CFR 148.720). 36

Page 2-17, Line 17: The DEIS states the applicant surveyed areas off the coast of Tampa for potential DWP sites. The EIS should describe techniques that were used in the survey(s) and discuss survey results using detailed maps and data analysis. It is unclear if a site was determined first and then surveyed, or whether surveys were completed and analyzed and then the best location with the least impacts determined from the surveys. Please clarify. 37

Page 2-17, Lines 18-19: The discussion notes that a 3,000 foot wide survey of the preferred pipeline route was conducted. All alternate or potential routes should have been surveyed in the same manner to accurately assess potential impacts of all alternatives and select the route that minimizes impacts to important resources (e.g., live-bottom habitats). 38

Page 2-17, Line 20: The EIS should clearly describe the criteria that were used to determine the best location for the port. According to this statement, the GIS analysis identified possible sensitive areas close to shore for the onshore pipeline corridor. Please discuss how that information relates to locating the offshore port that is 20 plus miles from the information included in the GIS data. 39

Page 2-17, Line 35: The EIS should be corrected to include the southern route alternative that avoids the Terra Ceia Aquatic Preserve (TCAP) and has the new inshore proposed route. At the State's request, the applicant moved the inshore pipeline route to avoid the preserve. 40

Page 2-18, Line 8-11: This discussion indicates that based on the applicant's proposed operating pressure (1,643 psi) it would not be possible to connect to Gulfstream Pipeline 41

4

34. The west central Florida region was identified by the Applicant as their intended market. A reference to Section 1.2 was added for clarity. The text in Section 2.1.1.3 clearly identifies proximity to an existing pipeline as an essential screening criterion and identifies the existing pipelines.

35. Text revised per comment.

36. The criteria of 33 CFR 148.720 are listed on pages 2-10 and 2-15 of the Draft EIS. Avoiding hard/live bottom areas is not specifically included in the criteria; however, avoiding impacts to EFH is included in the criteria, and EFH includes hard/live bottom areas.

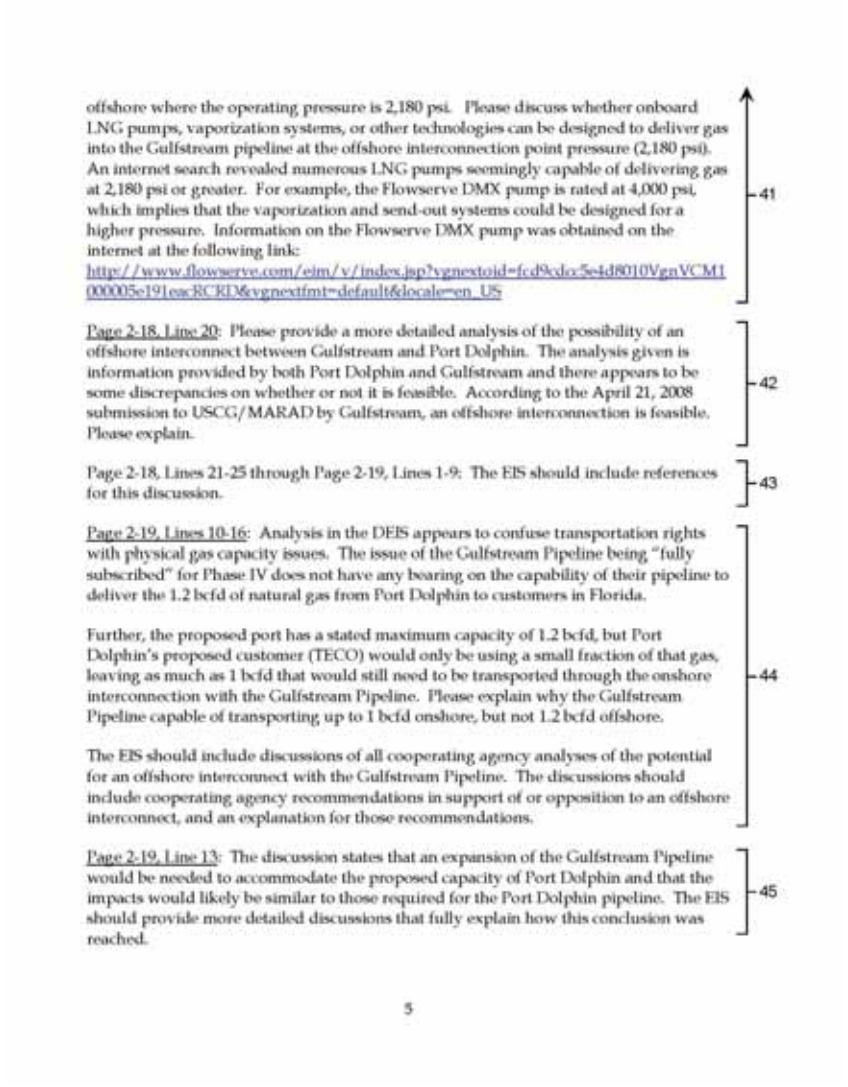
37. Details of the Applicant's surveys are available in the Application that is available electronically via the Federal Docket Management System (*www.regulations.gov*), Docket No. USCG-2007-28532

38. The 2 alternative routes have been surveyed in a similar manner as addressed in Section 4.5.1 of the Final EIS.

39. The discussion of screening has been revised to clarify the selection of potential port locations.

40. The pipeline alternatives have been changed to reflect new pipeline routes proposed by the Applicant.

41. An offshore interconnection with the Gulfstream Pipeline has been included in Section 2.1, Alternatives Analysis.



offshore where the operating pressure is 2,180 psi. Please discuss whether onboard LNG pumps, vaporization systems, or other technologies can be designed to deliver gas into the Gulfstream pipeline at the offshore interconnection point pressure (2,180 psi). An internet search revealed numerous LNG pumps seemingly capable of delivering gas at 2,180 psi or greater. For example, the Flowserve DMX pump is rated at 4,000 psi, which implies that the vaporization and send-out systems could be designed for a higher pressure. Information on the Flowserve DMX pump was obtained on the internet at the following link:
http://www.flowserve.com/eim/v/index.jsp?vgnextoid=fcd9cdcc5e4d8010VgnVCM1000005e191eacRCRD&vgnextfmt=default&locale=en_US

41

Page 2-18, Line 20: Please provide a more detailed analysis of the possibility of an offshore interconnect between Gulfstream and Port Dolphin. The analysis given is information provided by both Port Dolphin and Gulfstream and there appears to be some discrepancies on whether or not it is feasible. According to the April 21, 2008 submission to USCG/MARAD by Gulfstream, an offshore interconnection is feasible. Please explain.

42

Page 2-18, Lines 21-25 through Page 2-19, Lines 1-9: The EIS should include references for this discussion.

43

Page 2-19, Lines 10-16: Analysis in the DEIS appears to confuse transportation rights with physical gas capacity issues. The issue of the Gulfstream Pipeline being "fully subscribed" for Phase IV does not have any bearing on the capability of their pipeline to deliver the 1.2 bcfd of natural gas from Port Dolphin to customers in Florida.

Further, the proposed port has a stated maximum capacity of 1.2 bcfd, but Port Dolphin's proposed customer (TECO) would only be using a small fraction of that gas, leaving as much as 1 bcfd that would still need to be transported through the onshore interconnection with the Gulfstream Pipeline. Please explain why the Gulfstream Pipeline capable of transporting up to 1 bcfd onshore, but not 1.2 bcfd offshore.

The EIS should include discussions of all cooperating agency analyses of the potential for an offshore interconnect with the Gulfstream Pipeline. The discussions should include cooperating agency recommendations in support of or opposition to an offshore interconnect, and an explanation for those recommendations.

44

Page 2-19, Line 13: The discussion states that an expansion of the Gulfstream Pipeline would be needed to accommodate the proposed capacity of Port Dolphin and that the impacts would likely be similar to those required for the Port Dolphin pipeline. The EIS should provide more detailed discussions that fully explain how this conclusion was reached.

45

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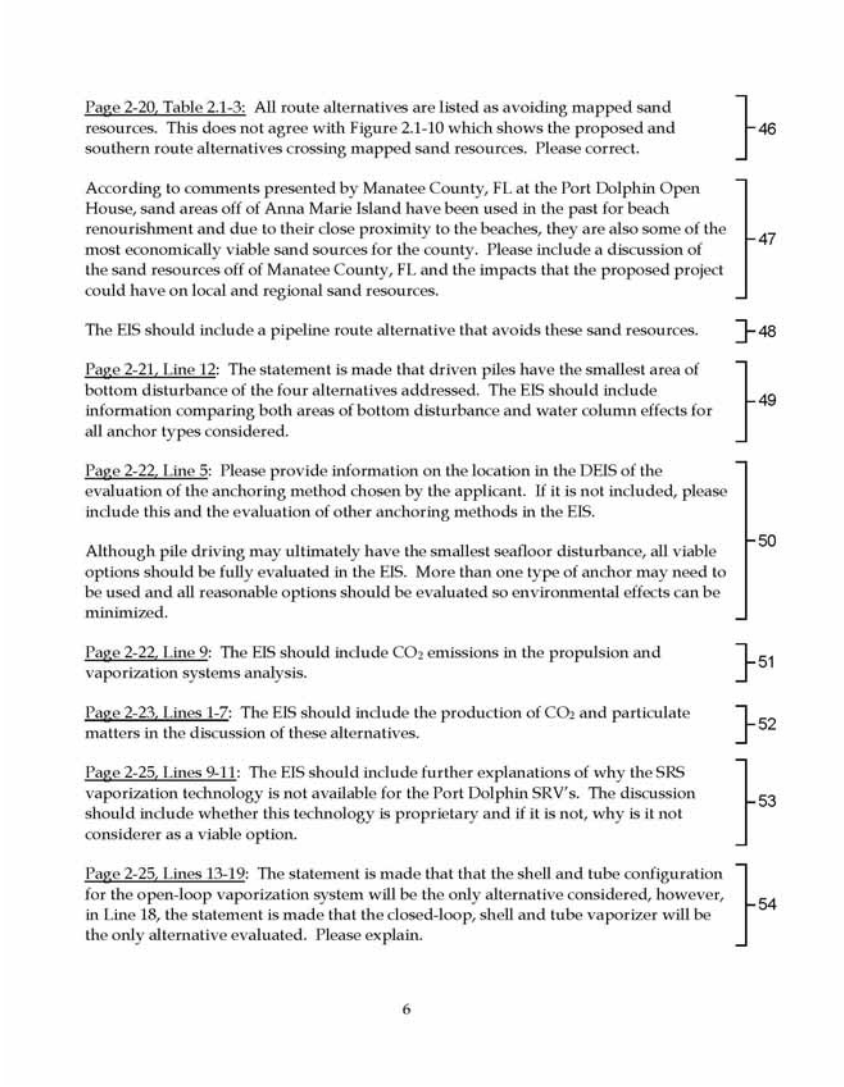
42. An offshore interconnection with the Gulfstream Pipeline has been included in Section 2.1, Alternatives Analysis.

43. The subject text has been deleted from the Final EIS.

44. The subject text has been deleted from the Final EIS.

45. The subject text has been deleted from the Final EIS.



Page 2-20, Table 2.1-3: All route alternatives are listed as avoiding mapped sand resources. This does not agree with Figure 2.1-10 which shows the proposed and southern route alternatives crossing mapped sand resources. Please correct. 46

According to comments presented by Manatee County, FL at the Port Dolphin Open House, sand areas off of Anna Marie Island have been used in the past for beach renourishment and due to their close proximity to the beaches, they are also some of the most economically viable sand sources for the county. Please include a discussion of the sand resources off of Manatee County, FL and the impacts that the proposed project could have on local and regional sand resources. 47

The EIS should include a pipeline route alternative that avoids these sand resources. 48

Page 2-21, Line 12: The statement is made that driven piles have the smallest area of bottom disturbance of the four alternatives addressed. The EIS should include information comparing both areas of bottom disturbance and water column effects for all anchor types considered. 49

Page 2-22, Line 5: Please provide information on the location in the DEIS of the evaluation of the anchoring method chosen by the applicant. If it is not included, please include this and the evaluation of other anchoring methods in the EIS.

Although pile driving may ultimately have the smallest seafloor disturbance, all viable options should be fully evaluated in the EIS. More than one type of anchor may need to be used and all reasonable options should be evaluated so environmental effects can be minimized. 50

Page 2-22, Line 9: The EIS should include CO_2 emissions in the propulsion and vaporization systems analysis. 51

Page 2-23, Lines 1-7: The EIS should include the production of CO_2 and particulate matters in the discussion of these alternatives. 52

Page 2-25, Lines 9-11: The EIS should include further explanations of why the SRS vaporization technology is not available for the Port Dolphin SRV's. The discussion should include whether this technology is proprietary and if it is not, why is it not considerer as a viable option. 53

Page 2-25, Lines 13-19: The statement is made that that the shell and tube configuration for the open-loop vaporization system will be the only alternative considered, however, in Line 18, the statement is made that the closed-loop, shell and tube vaporizer will be the only alternative evaluated. Please explain. 54

6

46. Text revised per comment.

47. Additional discussion of sand resources has been added to Section 3.4 and 4.4.

48. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.

49. Alternative anchoring methods are compared in Section 2.1.1.4 and in Section 4 as appropriate using the information that is available.

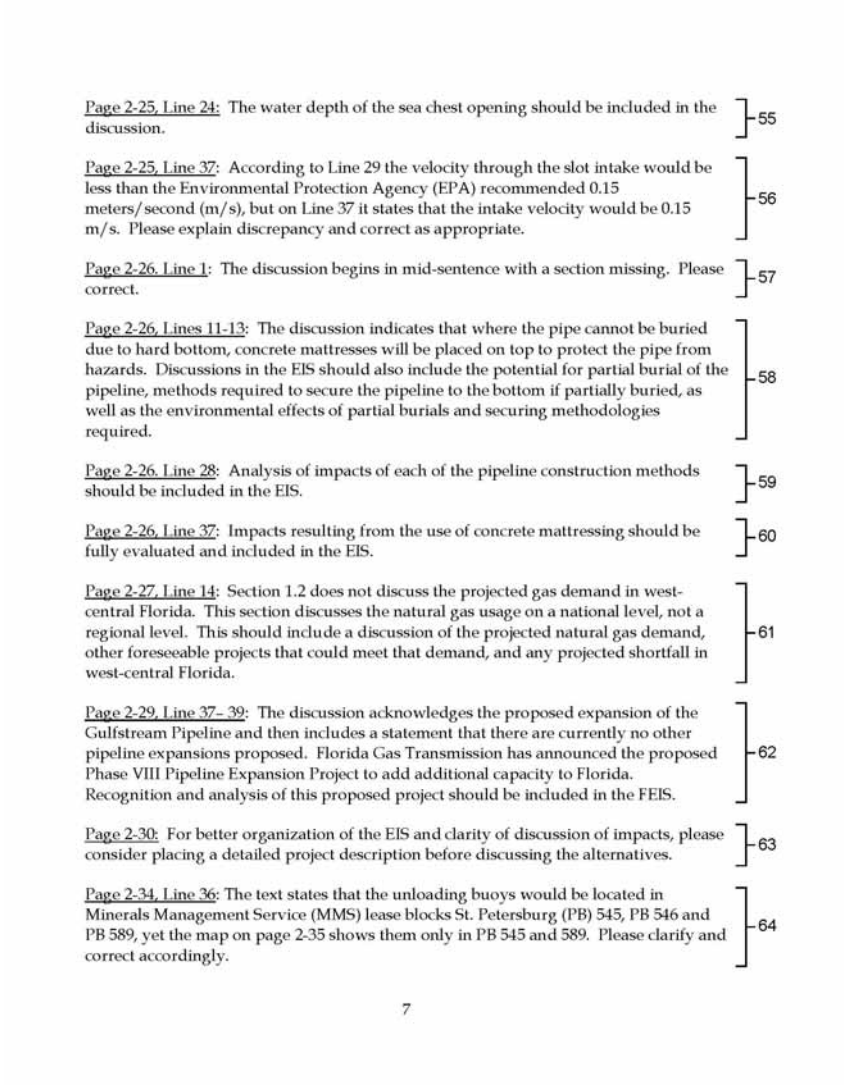
50. The anchoring method used by the applicant is driven piles. Impacts of alternative anchoring methods are discussed in appropriate sections of Section 4. Additional clarification on selection of the anchoring method evaluated has been added to Section 2.1.2.4.

51. CO_2 emissions are considered Section 7, Greenhouse Gasses.

52. See response to comment 51. Particulate emissions are evaluated in Section 4.7.

53. The SRS vaporization technology design presented in the Calypso Project is not available for the Port Dolphin SRVs and, therefore, SRS vaporization technology is not a viable alternative for the SRV design. However, the closed engine cooling system option has been added as an alternative for the FSRU port design and is discussed in Section 2.1.7.4.

54. The text has been corrected to identify the closed-loop shell and tube vaporizer as one alternative that is evaluated in detail.



Page 2-25, Line 24: The water depth of the sea chest opening should be included in the discussion. 55

Page 2-25, Line 37: According to Line 29 the velocity through the slot intake would be less than the Environmental Protection Agency (EPA) recommended 0.15 meters/second (m/s), but on Line 37 it states that the intake velocity would be 0.15 m/s. Please explain discrepancy and correct as appropriate. 56

Page 2-26, Line 1: The discussion begins in mid-sentence with a section missing. Please correct. 57

Page 2-26, Lines 11-13: The discussion indicates that where the pipe cannot be buried due to hard bottom, concrete mattresses will be placed on top to protect the pipe from hazards. Discussions in the EIS should also include the potential for partial burial of the pipeline, methods required to secure the pipeline to the bottom if partially buried, as well as the environmental effects of partial burials and securing methodologies required. 58

Page 2-26, Line 28: Analysis of impacts of each of the pipeline construction methods should be included in the EIS. 59

Page 2-26, Line 37: Impacts resulting from the use of concrete mattressing should be fully evaluated and included in the EIS. 60

Page 2-27, Line 14: Section 1.2 does not discuss the projected gas demand in west-central Florida. This section discusses the natural gas usage on a national level, not a regional level. This should include a discussion of the projected natural gas demand, other foreseeable projects that could meet that demand, and any projected shortfall in west-central Florida. 61

Page 2-29, Line 37 – 39: The discussion acknowledges the proposed expansion of the Gulfstream Pipeline and then includes a statement that there are currently no other pipeline expansions proposed. Florida Gas Transmission has announced the proposed Phase VIII Pipeline Expansion Project to add additional capacity to Florida. Recognition and analysis of this proposed project should be included in the FEIS. 62

Page 2-30: For better organization of the EIS and clarity of discussion of impacts, please consider placing a detailed project description before discussing the alternatives. 63

Page 2-34, Line 36: The text states that the unloading buoys would be located in Minerals Management Service (MMS) lease blocks St. Petersburg (PB) 545, PB 546 and PB 589, yet the map on page 2-35 shows them only in PB 545 and 589. Please clarify and correct accordingly. 64

7

55. The sea chest depths have been added to Section 2.1.8 and 2.3.4.

56. Text revised to "less than or equal to" in both places.

57. The missing section heading and text has been restored.

58. Burial methods and associated impacts are discussed in Sections 4.1.1, 4.2.1, and 4.4.1.

59. Impact analysis based on pipeline construction methods is included in Section 4.5.1.

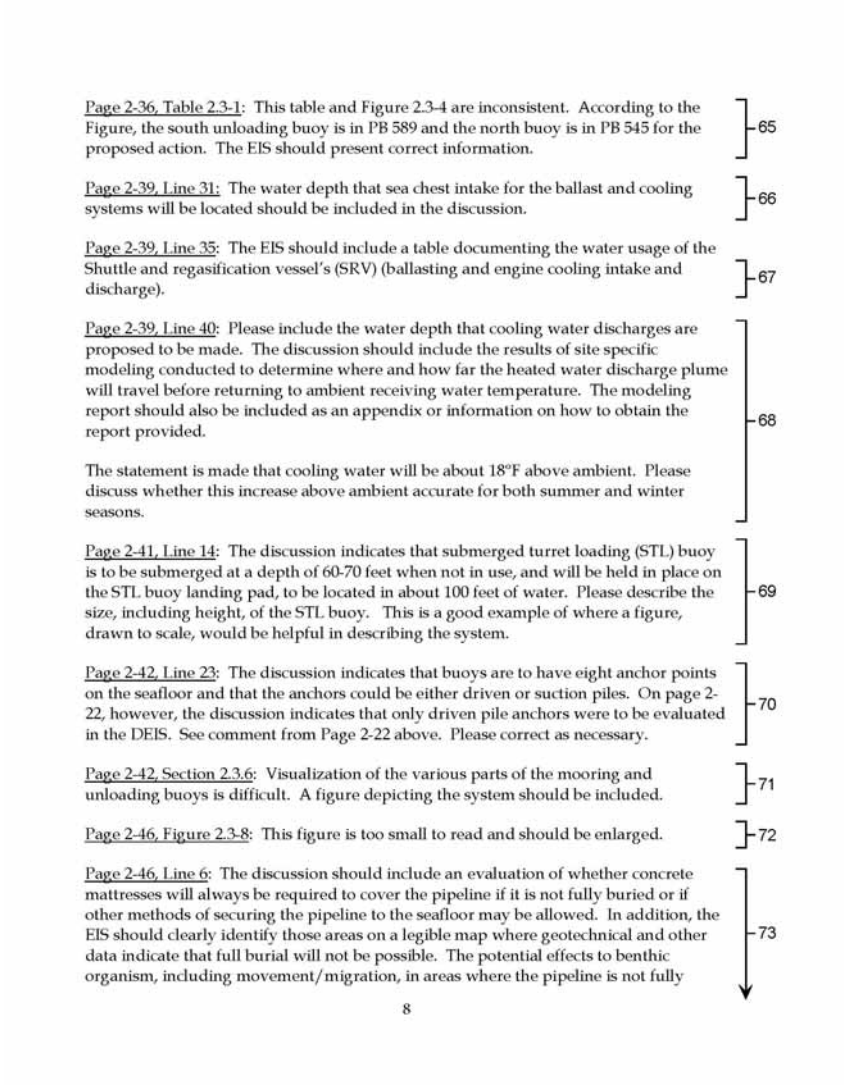
60. Burial methods and associated impacts are discussed in Sections 4.1.1, 4.2.1, and 4.4.1.

61. Florida usage of natural gas and other energy sources are discussed in Section 2.1. Other potential sources of natural gas, including the Calypso Project and expansion of existing natural gas pipelines are included in the discussion. Since the proposed project is independent of other projects, estimates of the total potential supply are not appropriate to the evaluation of this project. As demonstrated by the recent withdrawal of the license application for the Calypso Project, each project should be evaluated on its own merits.

62. The Final EIS has been updated to include developments since the Draft EIS was published (see Section 6.2).

63. The project description is placed after the alternatives analysis to ensure that the proposed project is not given undue consideration in the selection of alternatives for review. The same organization is used for the Final EIS.

64. Text revised per comment.



Page 2-36, Table 2.3-1: This table and Figure 2.3-4 are inconsistent. According to the Figure, the south unloading buoy is in PB 589 and the north buoy is in PB 545 for the proposed action. The EIS should present correct information. 65

Page 2-39, Line 31: The water depth that sea chest intake for the ballast and cooling systems will be located should be included in the discussion. 66

Page 2-39, Line 35: The EIS should include a table documenting the water usage of the Shuttle and regasification vessel's (SRV) (ballasting and engine cooling intake and discharge). 67

Page 2-39, Line 40: Please include the water depth that cooling water discharges are proposed to be made. The discussion should include the results of site specific modeling conducted to determine where and how far the heated water discharge plume will travel before returning to ambient receiving water temperature. The modeling report should also be included as an appendix or information on how to obtain the report provided.

The statement is made that cooling water will be about 18°F above ambient. Please discuss whether this increase above ambient accurate for both summer and winter seasons. 68

Page 2-41, Line 14: The discussion indicates that submerged turret loading (STL) buoy is to be submerged at a depth of 60-70 feet when not in use, and will be held in place on the STL buoy landing pad, to be located in about 100 feet of water. Please describe the size, including height, of the STL buoy. This is a good example of where a figure, drawn to scale, would be helpful in describing the system. 69

Page 2-42, Line 23: The discussion indicates that buoys are to have eight anchor points on the seafloor and that the anchors could be either driven or suction piles. On page 2-22, however, the discussion indicates that only driven pile anchors were to be evaluated in the DEIS. See comment from Page 2-22 above. Please correct as necessary. 70

Page 2-42, Section 2.3.6: Visualization of the various parts of the mooring and unloading buoys is difficult. A figure depicting the system should be included. 71

Page 2-46, Figure 2.3-8: This figure is too small to read and should be enlarged. 72

Page 2-46, Line 6: The discussion should include an evaluation of whether concrete mattresses will always be required to cover the pipeline if it is not fully buried or if other methods of securing the pipeline to the seafloor may be allowed. In addition, the EIS should clearly identify those areas on a legible map where geotechnical and other data indicate that full burial will not be possible. The potential effects to benthic organism, including movement/migration, in areas where the pipeline is not fully 73

8

65. Text revised per comment.

66. The sea chest depths have been added to Section 2.1.8 and 2.3.4.

67. There are only 2 numbers involved; ballast water intake (no discharge), and cooling water intake and discharge (which are the same) (see Section 2.3.4).

68. Details of the water discharge are included in Sections 4.1.2.1, 4.2.1.7, and 4.2.1.11.

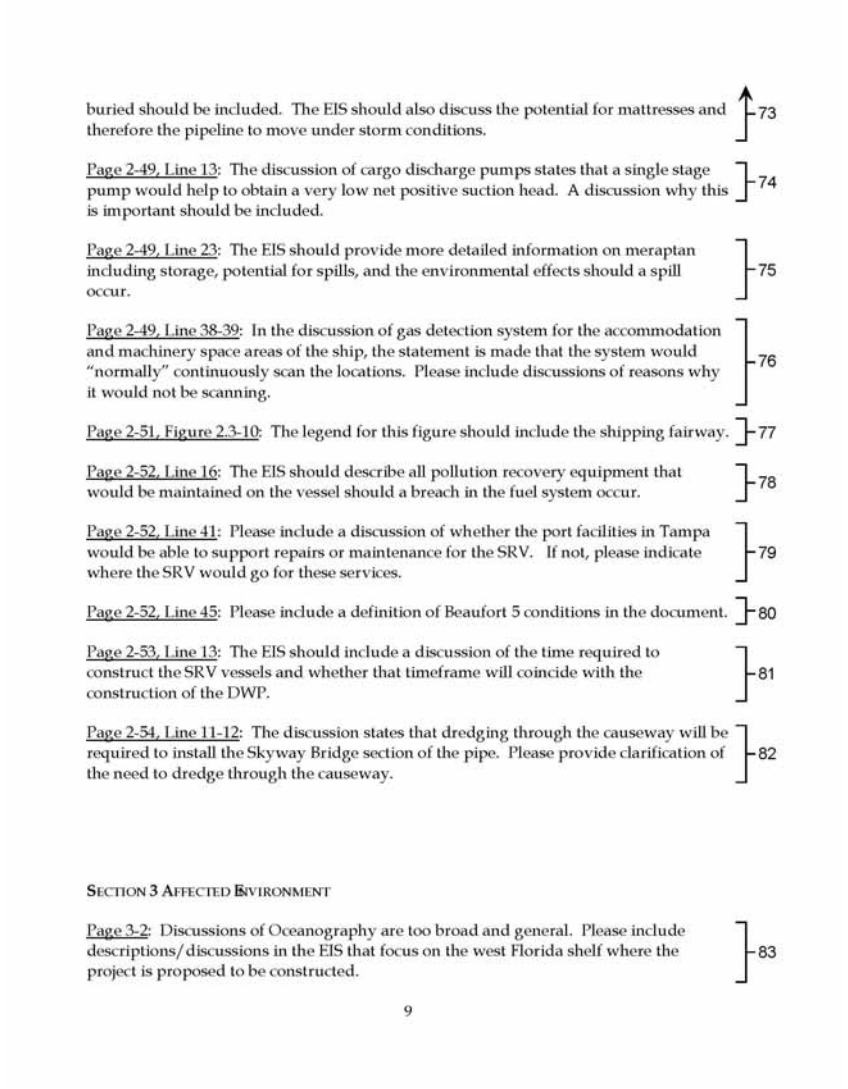
69. A figure of the STL buoy has been added (see Figure 2.1-6).

70. Suction piles have been evaluated as an alternative anchoring method in Section 2.1.5 and throughout Section 4 as appropriate.

71. A figure of the STL buoy has been added (see Figure 2.1-6).

72. The figure has been replaced for clarity.

73. Discussion of burial methods and impacts are included in Section 4.5.1.



buried should be included. The EIS should also discuss the potential for mattresses and therefore the pipeline to move under storm conditions. 73

Page 2-49, Line 13: The discussion of cargo discharge pumps states that a single stage pump would help to obtain a very low net positive suction head. A discussion why this is important should be included. 74

Page 2-49, Line 23: The EIS should provide more detailed information on meraptan including storage, potential for spills, and the environmental effects should a spill occur. 75

Page 2-49, Line 38-39: In the discussion of gas detection system for the accommodation and machinery space areas of the ship, the statement is made that the system would "normally" continuously scan the locations. Please include discussions of reasons why it would not be scanning. 76

Page 2-51, Figure 2.3-10: The legend for this figure should include the shipping fairway. 77

Page 2-52, Line 16: The EIS should describe all pollution recovery equipment that would be maintained on the vessel should a breach in the fuel system occur. 78

Page 2-52, Line 41: Please include a discussion of whether the port facilities in Tampa would be able to support repairs or maintenance for the SRV. If not, please indicate where the SRV would go for these services. 79

Page 2-52, Line 45: Please include a definition of Beaufort 5 conditions in the document. 80

Page 2-53, Line 13: The EIS should include a discussion of the time required to construct the SRV vessels and whether that timeframe will coincide with the construction of the DWP. 81

Page 2-54, Line 11-12: The discussion states that dredging through the causeway will be required to install the Skyway Bridge section of the pipe. Please provide clarification of the need to dredge through the causeway. 82

SECTION 3 AFFECTED ENVIRONMENT

Page 3-2: Discussions of Oceanography are too broad and general. Please include descriptions/discussions in the EIS that focus on the west Florida shelf where the project is proposed to be constructed. 83

9

74. Low NPSH is necessary to minimize vapor formation. Text added.

75. Odorization will not be used on the SRVs. Text deleted.

76. During times of system maintenance or outage, the system would not continuously scan. Details of the allowable downtimes and alternative monitoring would be included in the operations Manual that would be developed if a license is issued. This level of detail is not required for environmental analysis.

77. Text added to legend.

78. Fixed shipboard systems are described in the discussion of Pollution Prevention Equipment and Waste Treatment Equipment. Other spill response equipment would be identified during permit development or in the Operations Manual.

79. The SRVs will be contracted by the Applicant to deliver cargoes to the Port by 3rd party operators who will be responsible for their maintenance and repair.

80. It is not possible to include all details in the EIS and maintain a reasonable length. Beaufort scale definitions can be readily referenced.
See *http://www.spc.noaa.gov/faq/tornado/beaufort.html*.

81. SRV construction activities are outside the scope of this EIS. The SRVs will be contracted by the Applicant to deliver cargoes to the Port by 3rd party operators who will be responsible for their construction.

82. Construction of the pipeline under the bridge will be done using a clam shell dredge.

83. A general discussion of the Gulf of Mexico oceanography is included in Section 3.1.2.1 and a more specific discussion of regional/Tampa Bay oceanography is included in Section 3.1.2.2. Impacts to seafloor topography are discussed in Sections 4.4.1 and 4.4.2.

Page 3-6, Lines 24-25: The discussion indicates that there is no data on parameters such as metals in the project area of the Gulf of Mexico. While it is older data, the Department of the Interior sponsored Mississippi-Alabama-Florida (MAFLA) study had a transect just north of the proposed DWP and one south of the DWP that collected sediment and epifauna trace metal data. 84

Page 3-6: The EIS should be updated to include results of geotechnical data collected for the project. 85

Page 3-7, Line 40: The text in the EIS should be expanded to include a thorough discussion of the contaminated area or "hot spot" off of Anna Maria Island, including specific contaminants that are expected to be disturbed by the proposed project. The EIS should include a discussion of the results of modeling of the deposition of contaminated sediments and include deposition maps overlaying habitats impacted. 86

Page 3-9, Lines 25-26: The reference to 30 CFR 250.130 appears to be incorrect. While 30 CFR 250.103 defines Notices to Lessees (NTL), it does not directly speak to restricting outer continental shelf activities in biologically sensitive areas less than 400 m water depth. Please verify and correct accordingly. 87

Page 3-9, Lines 38-40: The discussion states that determining habitats and species occurring in the project area was accomplished through literature reviews and coordination with federal and state experts. Biological surveys conducted for the project should provide the most accurate and site-specific information available and should be used in describing the affected environment, as well as, acknowledged in providing this information. 88

Page 3-11, Figure 3.2-1: This map is supposed to depict Marine Protected Areas (MPA); however, with all of the other information presented on the map, it is difficult to ascertain which areas are actually the MPA's. The EIS should provide clear visuals. 89

Page 3-13, Line 4: The discussion indicates that the Reef Fish Stressed Area is delineated in Figure 3.2-1; however, it does not appear to be included. The EIS should include an appropriate figure. 90

Page 3-13, Line 35: Please confirm that the date of December 22, 2005 for initiating information consultation with U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) is correct. 91

Page 3-13, Line 36: Has a determination been made on whether or not the proposed port and associate pipeline would adversely affect federally listed species and their critical habitat? If not, when is a determination expected? Results of the determination and any recommended conditions and/or mitigation should be included in the EIS. 92

10

84. Comment noted.

85. The Final EIS has been updated with new geotechnical data.

86. The text regarding the hot spot off of Anna Maria Island has been removed, based on more recent information obtained from the Tampa Bay Estuary Program (see Section 3.1.3.4).

87. Text revised to clarify.

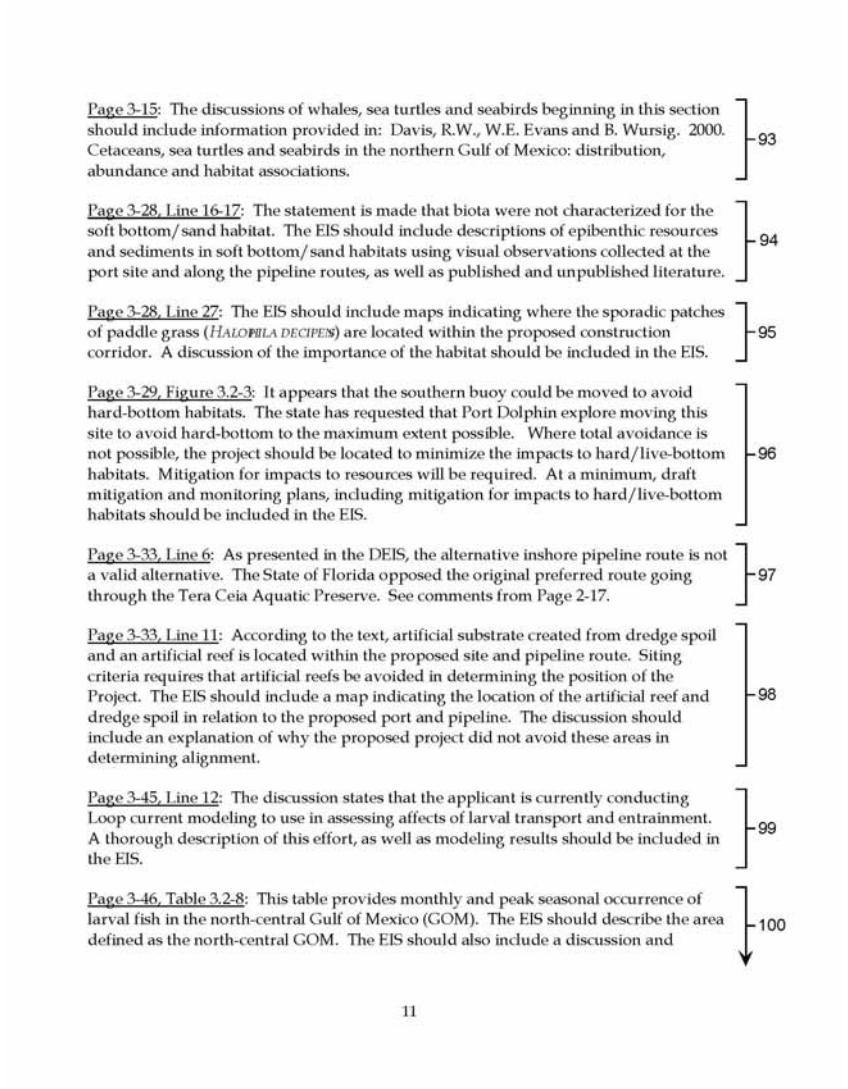
88. Comment noted.

89. Map has been updated to increase visibility of MPAs.

90. Text revised per comment.

91. Text revised per comment.

92. Text revised per comment.



Page 3-15: The discussions of whales, sea turtles and seabirds beginning in this section should include information provided in: Davis, R.W., W.E. Evans and B. Wursig. 2000. Cetaceans, sea turtles and seabirds in the northern Gulf of Mexico: distribution, abundance and habitat associations. 93

Page 3-28, Line 16-17: The statement is made that biota were not characterized for the soft bottom/sand habitat. The EIS should include descriptions of epibenthic resources and sediments in soft bottom/sand habitats using visual observations collected at the port site and along the pipeline routes, as well as published and unpublished literature. 94

Page 3-28, Line 27: The EIS should include maps indicating where the sporadic patches of paddle grass (*HALOPHILA DECIPENS*) are located within the proposed construction corridor. A discussion of the importance of the habitat should be included in the EIS. 95

Page 3-29, Figure 3.2-3: It appears that the southern buoy could be moved to avoid hard-bottom habitats. The state has requested that Port Dolphin explore moving this site to avoid hard-bottom to the maximum extent possible. Where total avoidance is not possible, the project should be located to minimize the impacts to hard/live-bottom habitats. Mitigation for impacts to resources will be required. At a minimum, draft mitigation and monitoring plans, including mitigation for impacts to hard/live-bottom habitats should be included in the EIS. 96

Page 3-33, Line 6: As presented in the DEIS, the alternative inshore pipeline route is not a valid alternative. The State of Florida opposed the original preferred route going through the Tera Ceia Aquatic Preserve. See comments from Page 2-17. 97

Page 3-33, Line 11: According to the text, artificial substrate created from dredge spoil and an artificial reef is located within the proposed site and pipeline route. Siting criteria requires that artificial reefs be avoided in determining the position of the Project. The EIS should include a map indicating the location of the artificial reef and dredge spoil in relation to the proposed port and pipeline. The discussion should include an explanation of why the proposed project did not avoid these areas in determining alignment. 98

Page 3-45, Line 12: The discussion states that the applicant is currently conducting Loop current modeling to use in assessing affects of larval transport and entrainment. A thorough description of this effort, as well as modeling results should be included in the EIS. 99

Page 3-46, Table 3.2-8: This table provides monthly and peak seasonal occurrence of larval fish in the north-central Gulf of Mexico (GOM). The EIS should describe the area defined as the north-central GOM. The EIS should also include a discussion and 100

11

93. The suggested reference was used in Section 3.2.4.2.

94. A table of species (Table 3.2-4) identified during the survey was added to the subsection, "Benthic Community Survey in Section 3.2.5." A description of species associated with soft sediments is provided 3 paragraphs above the "Benthic Community Survey" subsection.

95. Paddlegrass maps are not available. Discussions of paddlegrass have been added to Section 4.2.1.3 and 4.2.1.6.

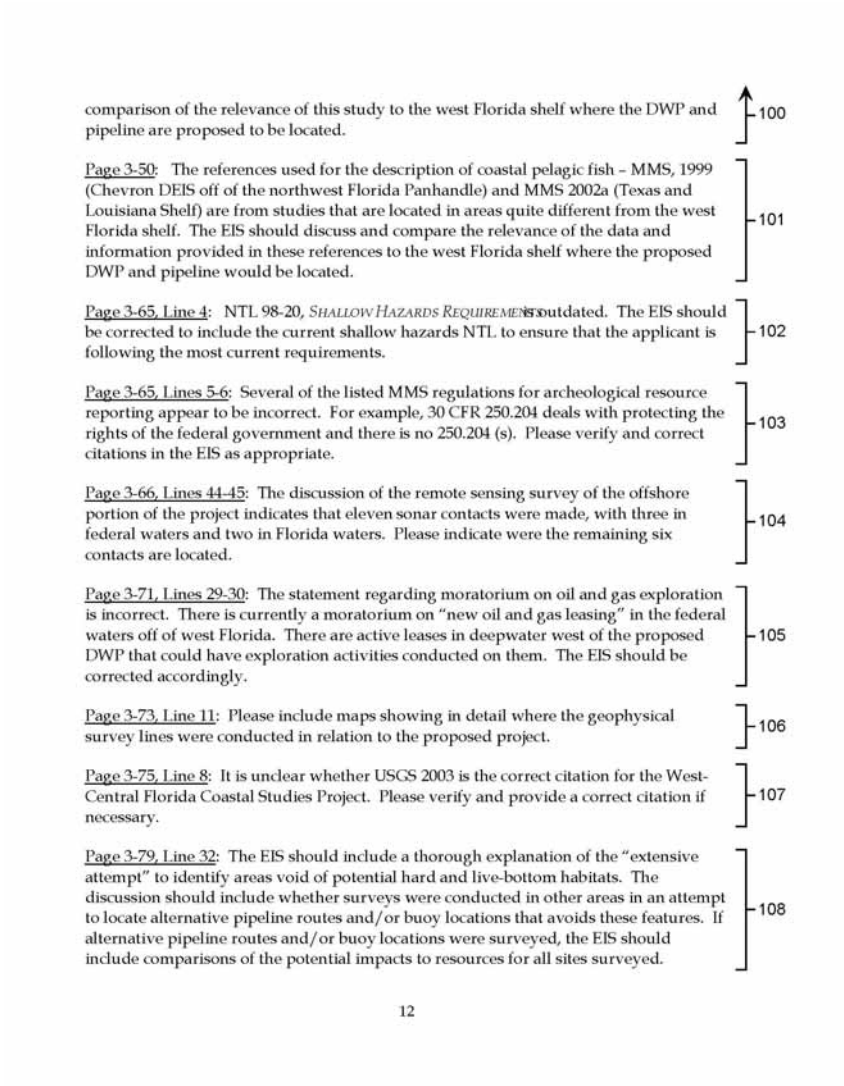
96. The Applicant has altered their Proposed Action to include the revised mooring scheme discussed in the December 2008 addendum, and has altered the preferred pipeline route to balance Federal, state, and local concerns for various natural resources including benthic resource areas. The Proposed Action and alternatives are discussed in Section 2.3, and the discussion is carried throughout the EIS. Development of compensatory mitigation for unavoidable impacts on seagrasses and live- and hard- bottom habitats is discussed in Section 4.11 and would be developed during the permitting process.

97. Based on comments on the initial site and route evaluation discussed in the Draft EIS, additional alternatives have been considered (see Section 2.1.4.6).

98. Artificial reefs and spoils areas are indicated on Figure 3.2-1.

99. In June of 2008, the Applicant proposed the use of an Empirical Transport Model (ETM) to strengthen the Ichthyoplankton Assessment, but FWC did not think the ETM would be meaningful without preconstruction modeling to verify data from that model. Therefore it was not carried forward. If a license is issued, the USCG and the Maritime Administration would require the Applicant develop a site specific monitoring plan. The details of would be designed in consultation with the FWCC, NOAA/NMFS, and USEPA.

100. Text revised per comment.



comparison of the relevance of this study to the west Florida shelf where the DWP and pipeline are proposed to be located. 100

Page 3-50: The references used for the description of coastal pelagic fish – MMS, 1999 (Chevron DEIS off of the northwest Florida Panhandle) and MMS 2002a (Texas and Louisiana Shelf) are from studies that are located in areas quite different from the west Florida shelf. The EIS should discuss and compare the relevance of the data and information provided in these references to the west Florida shelf where the proposed DWP and pipeline would be located. 101

Page 3-65, Line 4: NTL 98-20, *Shallow Hazards Requirements* is outdated. The EIS should be corrected to include the current shallow hazards NTL to ensure that the applicant is following the most current requirements. 102

Page 3-65, Lines 5-6: Several of the listed MMS regulations for archeological resource reporting appear to be incorrect. For example, 30 CFR 250.204 deals with protecting the rights of the federal government and there is no 250.204 (s). Please verify and correct citations in the EIS as appropriate. 103

Page 3-66, Lines 44-45: The discussion of the remote sensing survey of the offshore portion of the project indicates that eleven sonar contacts were made, with three in federal waters and two in Florida waters. Please indicate were the remaining six contacts are located. 104

Page 3-71, Lines 29-30: The statement regarding moratorium on oil and gas exploration is incorrect. There is currently a moratorium on "new oil and gas leasing" in the federal waters off of west Florida. There are active leases in deepwater west of the proposed DWP that could have exploration activities conducted on them. The EIS should be corrected accordingly. 105

Page 3-73, Line 11: Please include maps showing in detail where the geophysical survey lines were conducted in relation to the proposed project. 106

Page 3-75, Line 8: It is unclear whether USGS 2003 is the correct citation for the West-Central Florida Coastal Studies Project. Please verify and provide a correct citation if necessary. 107

Page 3-79, Line 32: The EIS should include a thorough explanation of the "extensive attempt" to identify areas void of potential hard and live-bottom habitats. The discussion should include whether surveys were conducted in other areas in an attempt to locate alternative pipeline routes and/or buoy locations that avoids these features. If alternative pipeline routes and/or buoy locations were surveyed, the EIS should include comparisons of the potential impacts to resources for all sites surveyed. 108

12

101. References revised per comment.

102. The most current requirements are included in the document.

103. Text revised per comment.

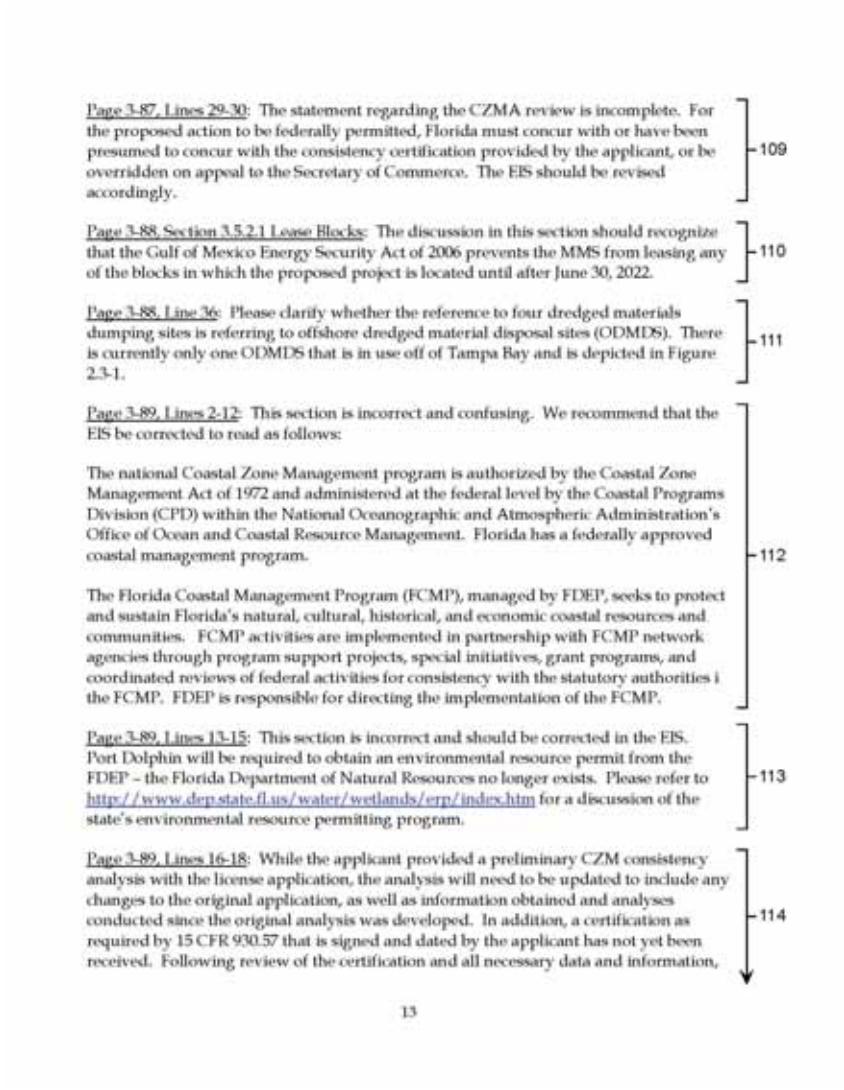
104. Text revised per comment.

105. Text revised per comment.

106. Map revised per comment.

107. Citation included per comment.

108. Geophysical and geotechnical studies were conducted to identify live/hard bottom habitats. The studies are available electronically via the Federal Docket Management System (*www.regulations.gov*), Docket No. USCG-2007-28532. Benthic habitats are discussed in sections 3.2 and 4.2. Mitigation measures are discussed in Section 4.11.



Page 3-87, Lines 29-30: The statement regarding the CZMA review is incomplete. For the proposed action to be federally permitted, Florida must concur with or have been presumed to concur with the consistency certification provided by the applicant, or be overridden on appeal to the Secretary of Commerce. The EIS should be revised accordingly. — 109

Page 3-88, Section 3.5.2.1 Lease Blocks: The discussion in this section should recognize that the Gulf of Mexico Energy Security Act of 2006 prevents the MMS from leasing any of the blocks in which the proposed project is located until after June 30, 2022. — 110

Page 3-88, Line 36: Please clarify whether the reference to four dredged materials dumping sites is referring to offshore dredged material disposal sites (ODMDS). There is currently only one ODMDS that is in use off of Tampa Bay and is depicted in Figure 2.3-1. — 111

Page 3-89, Lines 2-12: This section is incorrect and confusing. We recommend that the EIS be corrected to read as follows:

The national Coastal Zone Management program is authorized by the Coastal Zone Management Act of 1972 and administered at the federal level by the Coastal Programs Division (CPD) within the National Oceanographic and Atmospheric Administration's Office of Ocean and Coastal Resource Management. Florida has a federally approved coastal management program.

The Florida Coastal Management Program (FCMP), managed by FDEP, seeks to protect and sustain Florida's natural, cultural, historical, and economic coastal resources and communities. FCMP activities are implemented in partnership with FCMP network agencies through program support projects, special initiatives, grant programs, and coordinated reviews of federal activities for consistency with the statutory authorities i the FCMP. FDEP is responsible for directing the implementation of the FCMP. — 112

Page 3-89, Lines 13-15: This section is incorrect and should be corrected in the EIS. Port Dolphin will be required to obtain an environmental resource permit from the FDEP – the Florida Department of Natural Resources no longer exists. Please refer to http://www.dep.state.fl.us/water/wetlands/erp/index.htm for a discussion of the state's environmental resource permitting program. — 113

Page 3-89, Lines 16-18: While the applicant provided a preliminary CZM consistency analysis with the license application, the analysis will need to be updated to include any changes to the original application, as well as information obtained and analyses conducted since the original analysis was developed. In addition, a certification as required by 15 CFR 930.57 that is signed and dated by the applicant has not yet been received. Following review of the certification and all necessary data and information, — 114

13

109. The Applicant is responsible for processing the CZM consistency determination. An assessment of environmental impacts to coastal resources in included in Section 4.2.1 of the Final EIS.

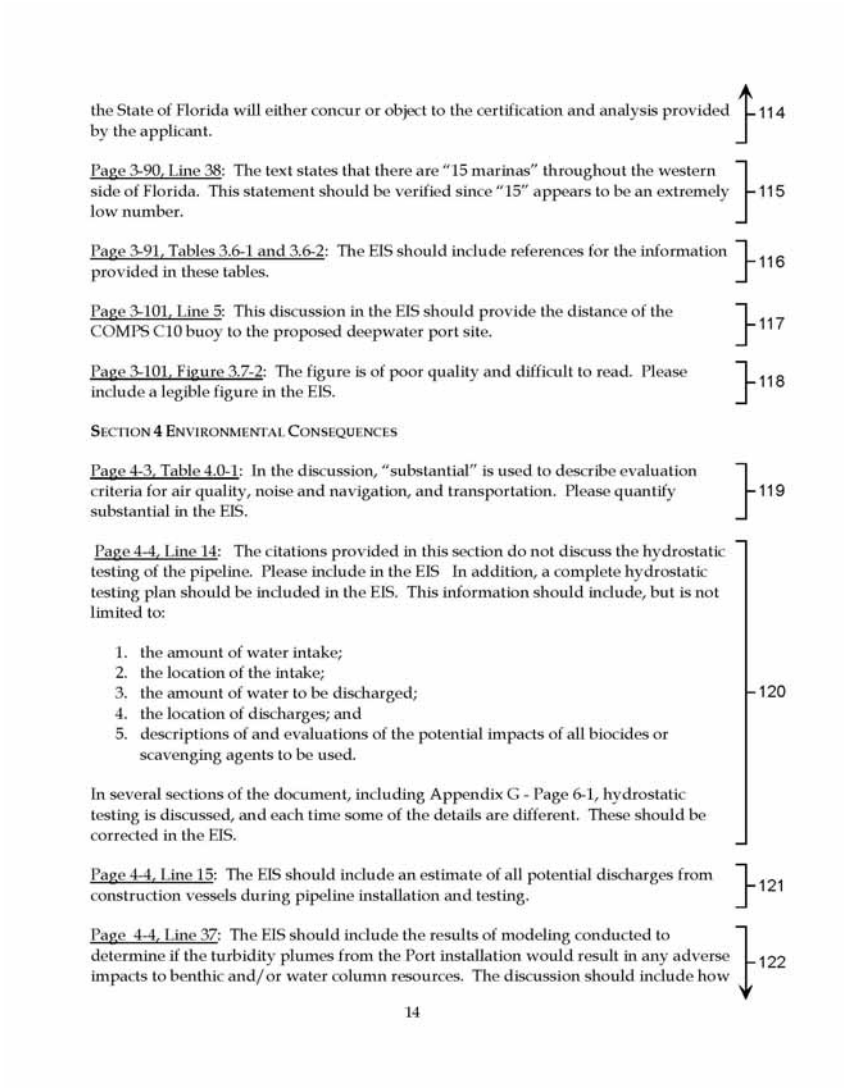
110. Text revised per comment.

111. Text revised per comment.

112. Text revised per comment.

113. Text revised per comment.

114. The Applicant is responsible for processing the CZM consistency determination. An assessment of environmental impacts to coastal resources in included in Section 4.2.1 of the Final EIS.



the State of Florida will either concur or object to the certification and analysis provided by the applicant. 114

Page 3-90, Line 38: The text states that there are "15 marinas" throughout the western side of Florida. This statement should be verified since "15" appears to be an extremely low number. 115

Page 3-91, Tables 3.6-1 and 3.6-2: The EIS should include references for the information provided in these tables. 116

Page 3-101, Line 5: This discussion in the EIS should provide the distance of the COMPS C10 buoy to the proposed deepwater port site. 117

Page 3-101, Figure 3.7-2: The figure is of poor quality and difficult to read. Please include a legible figure in the EIS. 118

SECTION 4 ENVIRONMENTAL CONSEQUENCES

Page 4-3, Table 4.0-1: In the discussion, "substantial" is used to describe evaluation criteria for air quality, noise and navigation, and transportation. Please quantify substantial in the EIS. 119

Page 4-4, Line 14: The citations provided in this section do not discuss the hydrostatic testing of the pipeline. Please include in the EIS In addition, a complete hydrostatic testing plan should be included in the EIS. This information should include, but is not limited to:

1. the amount of water intake;
2. the location of the intake;
3. the amount of water to be discharged;
4. the location of discharges; and
5. descriptions of and evaluations of the potential impacts of all biocides or scavenging agents to be used.

In several sections of the document, including Appendix G - Page 6-1, hydrostatic testing is discussed, and each time some of the details are different. These should be corrected in the EIS. 120

Page 4-4, Line 15: The EIS should include an estimate of all potential discharges from construction vessels during pipeline installation and testing. 121

Page 4-4, Line 37: The EIS should include the results of modeling conducted to determine if the turbidity plumes from the Port installation would result in any adverse impacts to benthic and/or water column resources. The discussion should include how 122

14

115. Text revised per comment.

116. Reference added per comment.

117. The distance has been added to the EIS.

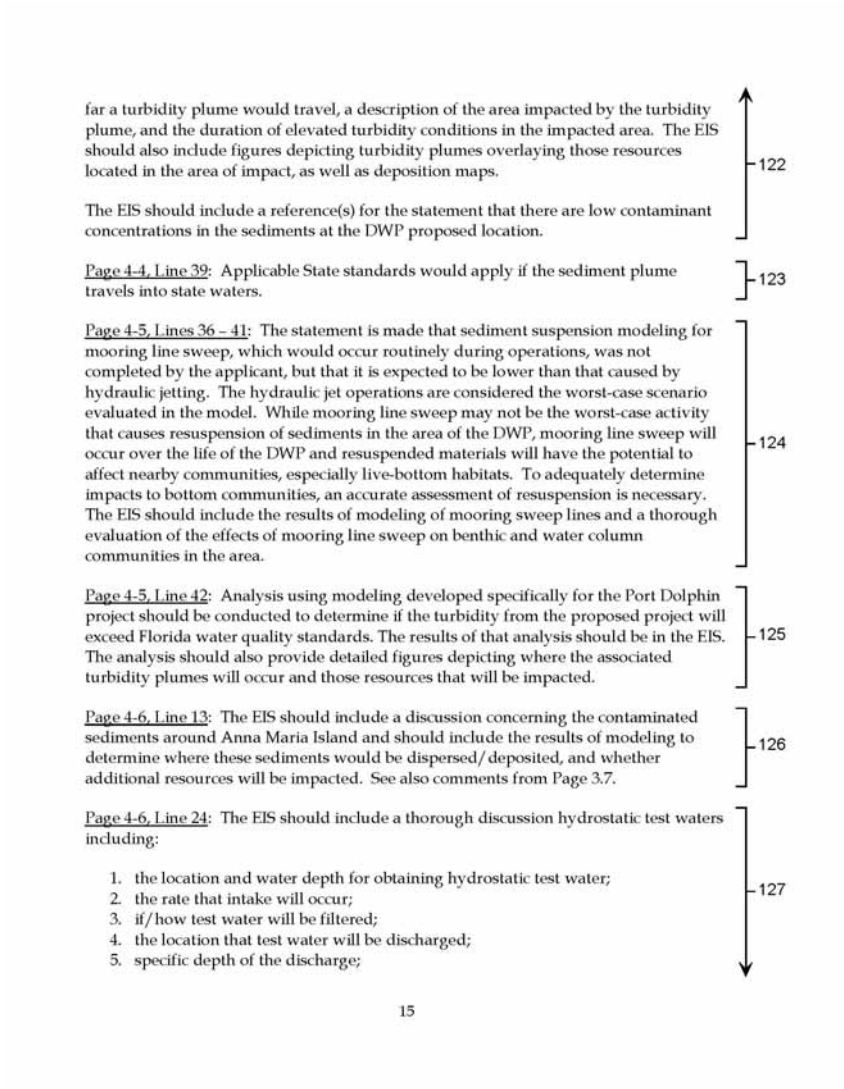
118. Figure changed per comment.

119. Text revised per comment.

120. The information requested is included in the Final EIS, but a complete hydrostatic test plan is beyond the level of detail necessary for the EIS analysis. Data for the hydrostatic tests have been made consistent throughout the EIS (see Sections 2.3.11 and 4.2.1.7).

121. The discharges are described in Table 4.1-1.

122. The text has been changed to include information on the modeling of sediment disturbance due to pipeline construction.



far a turbidity plume would travel, a description of the area impacted by the turbidity plume, and the duration of elevated turbidity conditions in the impacted area. The EIS should also include figures depicting turbidity plumes overlaying those resources located in the area of impact, as well as deposition maps.

The EIS should include a reference(s) for the statement that there are low contaminant concentrations in the sediments at the DWP proposed location. 122

Page 4-4, Line 39: Applicable State standards would apply if the sediment plume travels into state waters. 123

Page 4-5, Lines 36 – 41: The statement is made that sediment suspension modeling for mooring line sweep, which would occur routinely during operations, was not completed by the applicant, but that it is expected to be lower than that caused by hydraulic jetting. The hydraulic jet operations are considered the worst-case scenario evaluated in the model. While mooring line sweep may not be the worst-case activity that causes resuspension of sediments in the area of the DWP, mooring line sweep will occur over the life of the DWP and resuspended materials will have the potential to affect nearby communities, especially live-bottom habitats. To adequately determine impacts to bottom communities, an accurate assessment of resuspension is necessary. The EIS should include the results of modeling of mooring sweep lines and a thorough evaluation of the effects of mooring line sweep on benthic and water column communities in the area. 124

Page 4-5, Line 42: Analysis using modeling developed specifically for the Port Dolphin project should be conducted to determine if the turbidity from the proposed project will exceed Florida water quality standards. The results of that analysis should be in the EIS. The analysis should also provide detailed figures depicting where the associated turbidity plumes will occur and those resources that will be impacted. 125

Page 4-6, Line 13: The EIS should include a discussion concerning the contaminated sediments around Anna Maria Island and should include the results of modeling to determine where these sediments would be dispersed/deposited, and whether additional resources will be impacted. See also comments from Page 3.7. 126

Page 4-6, Line 24: The EIS should include a thorough discussion hydrostatic test waters including:

1. the location and water depth for obtaining hydrostatic test water;
2. the rate that intake will occur;
3. if/how test water will be filtered;
4. the location that test water will be discharged;
5. specific depth of the discharge; 127

15

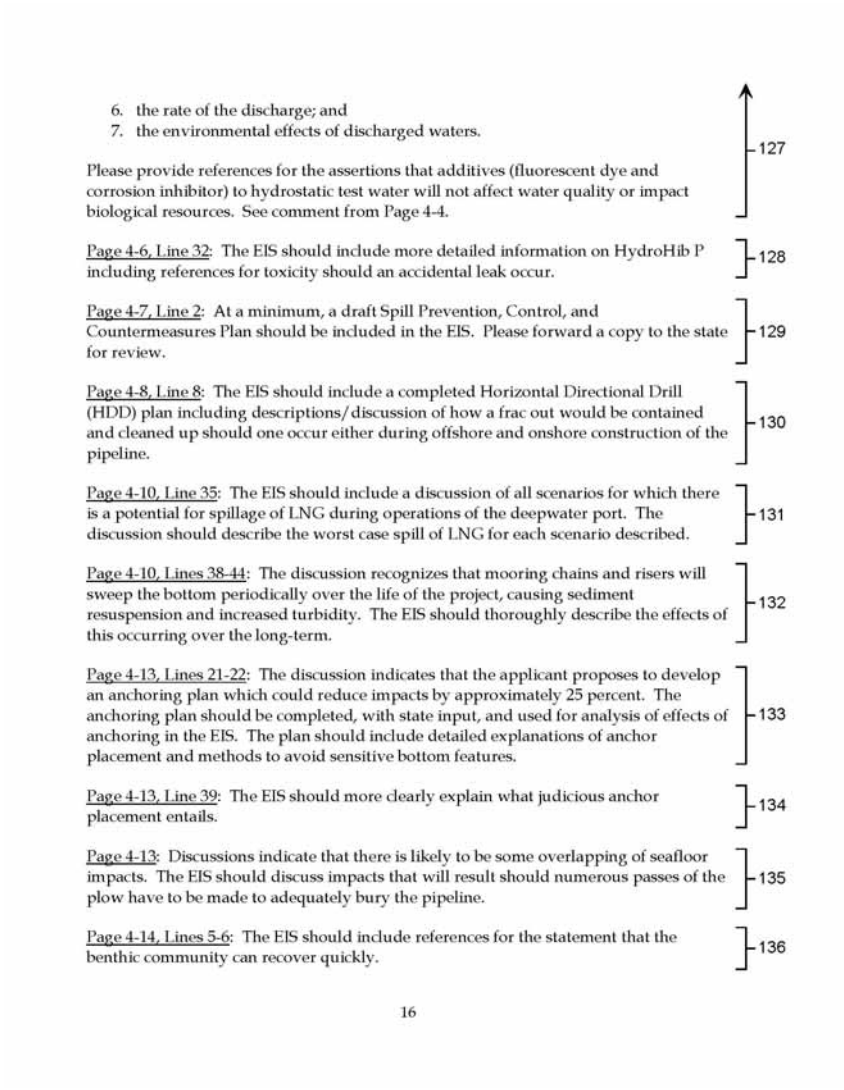
123. Text revised per comment.

124. Text revised per comment. The mooring sweep modeling has been obtained and incorporated.

125. The modeling and qualitative analysis in the text show that Florida turbidity standards will be exceeded, but in a localized area and for a short period of time. Based on that analysis, the impact is concluded to be minor. No changes have been made in the text.

126. The text regarding the hot spot off of Anna Maria Island has been modified

127. The information requested is included in the Final EIS, but a complete hydrostatic test plan is beyond the level of detail necessary for the EIS analysis. Data for the hydrostatic tests have been made consistent throughout the EIS (see Sections 2.3.11 and 4.2.1.7).



6. the rate of the discharge; and
7. the environmental effects of discharged waters.

Please provide references for the assertions that additives (fluorescent dye and corrosion inhibitor) to hydrostatic test water will not affect water quality or impact biological resources. See comment from Page 4-4. 127

Page 4-6, Line 32: The EIS should include more detailed information on HydroHib P including references for toxicity should an accidental leak occur. 128

Page 4-7, Line 2: At a minimum, a draft Spill Prevention, Control, and Countermeasures Plan should be included in the EIS. Please forward a copy to the state for review. 129

Page 4-8, Line 8: The EIS should include a completed Horizontal Directional Drill (HDD) plan including descriptions/discussion of how a frac out would be contained and cleaned up should one occur either during offshore and onshore construction of the pipeline. 130

Page 4-10, Line 35: The EIS should include a discussion of all scenarios for which there is a potential for spillage of LNG during operations of the deepwater port. The discussion should describe the worst case spill of LNG for each scenario described. 131

Page 4-10, Lines 38-44: The discussion recognizes that mooring chains and risers will sweep the bottom periodically over the life of the project, causing sediment resuspension and increased turbidity. The EIS should thoroughly describe the effects of this occurring over the long-term. 132

Page 4-13, Lines 21-22: The discussion indicates that the applicant proposes to develop an anchoring plan which could reduce impacts by approximately 25 percent. The anchoring plan should be completed, with state input, and used for analysis of effects of anchoring in the EIS. The plan should include detailed explanations of anchor placement and methods to avoid sensitive bottom features. 133

Page 4-13, Line 39: The EIS should more clearly explain what judicious anchor placement entails. 134

Page 4-13: Discussions indicate that there is likely to be some overlapping of seafloor impacts. The EIS should discuss impacts that will result should numerous passes of the plow have to be made to adequately bury the pipeline. 135

Page 4-14, Lines 5-6: The EIS should include references for the statement that the benthic community can recover quickly. 136

16

128. Detailed information on chemicals to be used for the project would be included within the post licensing reviews of the Operations Manual, if a license is issued.

129. Development of a Spill Prevention, Control, and Countermeasures Plan and the ability of the Applicant to respond to spills will be included in the post licensing reviews of the Operations Manual, if a license is issued.

130. The HDD plan referred to would be included in the Operations Manual, which would be developed and reviewed post-license, if a license is issued.

131. A detailed discussion of potential LNG spillage scenarios is presented in Section 5.

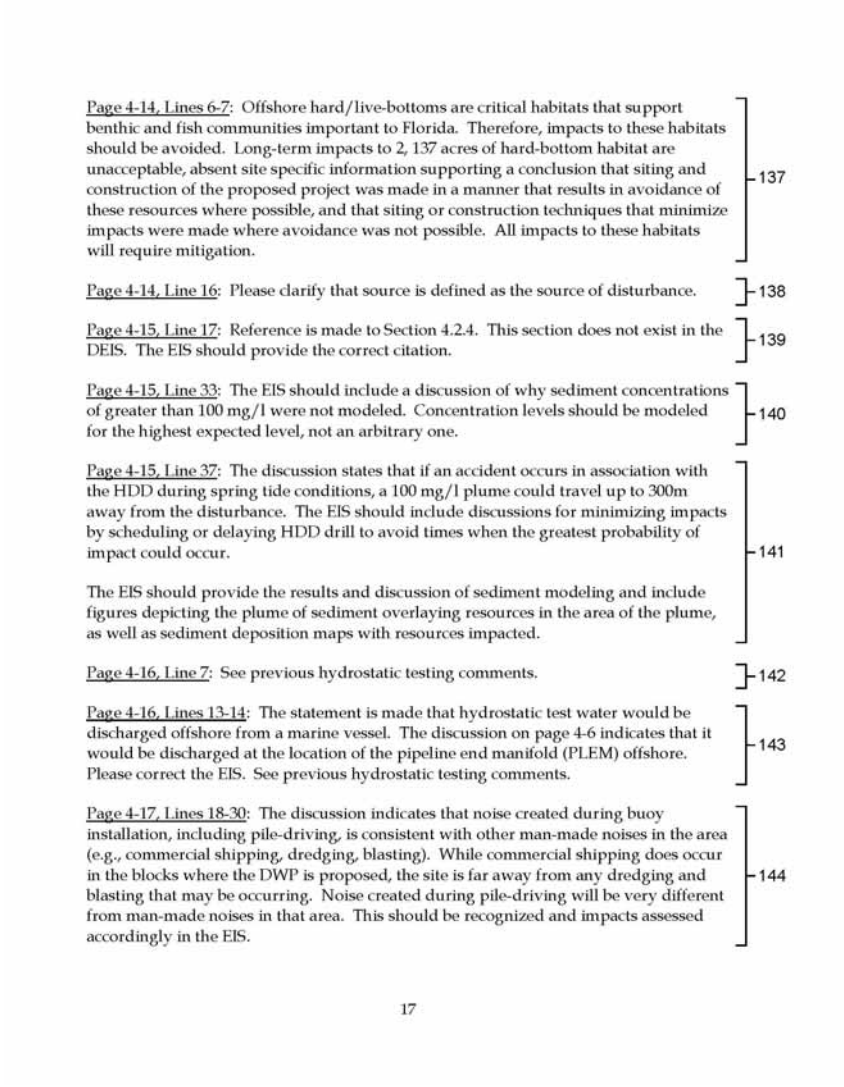
132. Text revised per comment. The mooring sweep modeling has been obtained and incorporated.

133. Text revised per comment

134. The Applicant performed additional surveys and analysis to optimize anchor placement and minimize benthic impacts. The revised anchor configuration was described in detail in Application Addendum II filed in December 2008. The Final EIS was updated to reflect this configuration.

135. Text revised per comment.

136. Added “soft” prior to substrate to improve accuracy of statement.



Page 4-14, Lines 6-7: Offshore hard/live-bottoms are critical habitats that support benthic and fish communities important to Florida. Therefore, impacts to these habitats should be avoided. Long-term impacts to 2, 137 acres of hard-bottom habitat are unacceptable, absent site specific information supporting a conclusion that siting and construction of the proposed project was made in a manner that results in avoidance of these resources where possible, and that siting or construction techniques that minimize impacts were made where avoidance was not possible. All impacts to these habitats will require mitigation. 137

Page 4-14, Line 16: Please clarify that source is defined as the source of disturbance. 138

Page 4-15, Line 17: Reference is made to Section 4.2.4. This section does not exist in the DEIS. The EIS should provide the correct citation. 139

Page 4-15, Line 33: The EIS should include a discussion of why sediment concentrations of greater than 100 mg/l were not modeled. Concentration levels should be modeled for the highest expected level, not an arbitrary one. 140

Page 4-15, Line 37: The discussion states that if an accident occurs in association with the HDD during spring tide conditions, a 100 mg/l plume could travel up to 300m away from the disturbance. The EIS should include discussions for minimizing impacts by scheduling or delaying HDD drill to avoid times when the greatest probability of impact could occur. 141

The EIS should provide the results and discussion of sediment modeling and include figures depicting the plume of sediment overlaying resources in the area of the plume, as well as sediment deposition maps with resources impacted.

Page 4-16, Line 7: See previous hydrostatic testing comments. 142

Page 4-16, Lines 13-14: The statement is made that hydrostatic test water would be discharged offshore from a marine vessel. The discussion on page 4-6 indicates that it would be discharged at the location of the pipeline end manifold (PLEM) offshore. Please correct the EIS. See previous hydrostatic testing comments. 143

Page 4-17, Lines 18-30: The discussion indicates that noise created during buoy installation, including pile-driving, is consistent with other man-made noises in the area (e.g., commercial shipping, dredging, blasting). While commercial shipping does occur in the blocks where the DWP is proposed, the site is far away from any dredging and blasting that may be occurring. Noise created during pile-driving will be very different from man-made noises in that area. This should be recognized and impacts assessed accordingly in the EIS. 144

17

137. Based on additional geophysical and geotechnical evaluations, the benthic impacts discussion has been revised. Additional mitigation has been included in Section 4.11.

138. Text revised per comment

139. The reference was deleted.

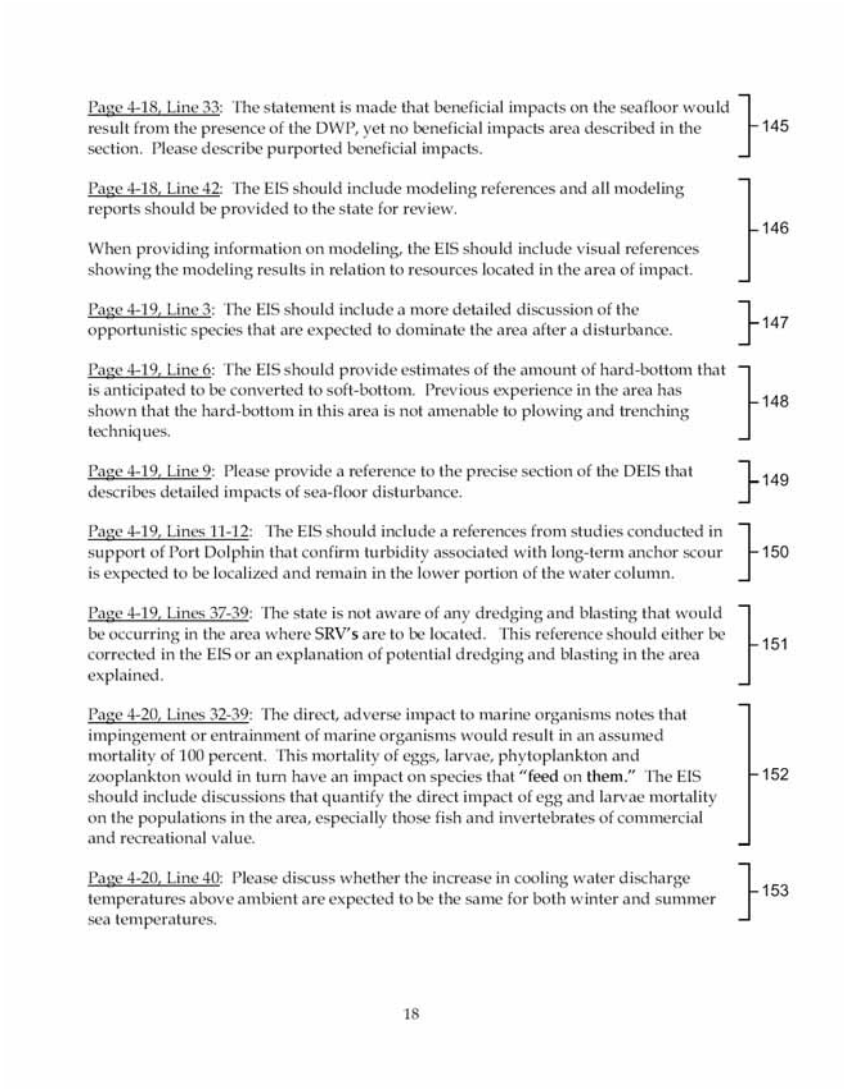
140. Sediment concentrations greater than 100mg/l are unlikely to travel in the water column through a turbidity curtain or other spill containment material should a frac-out occur (see Section 4.2.1).

141. The FERC procedures (see **Section 2.3.9**) require the Applicant to develop an HDD Plan that includes a description of how a frac-out would be contained and cleaned up. The Applicant would file all HDD plans with the FERC staff prior to construction.

142. Text has been made consistent throughout the EIS.

143. Text has been made consistent throughout the EIS.

144. Text has been made consistent throughout the EIS



Page 4-18, Line 33: The statement is made that beneficial impacts on the seafloor would result from the presence of the DWP, yet no beneficial impacts area described in the section. Please describe purported beneficial impacts. 145

Page 4-18, Line 42: The EIS should include modeling references and all modeling reports should be provided to the state for review.

When providing information on modeling, the EIS should include visual references showing the modeling results in relation to resources located in the area of impact. 146

Page 4-19, Line 3: The EIS should include a more detailed discussion of the opportunistic species that are expected to dominate the area after a disturbance. 147

Page 4-19, Line 6: The EIS should provide estimates of the amount of hard-bottom that is anticipated to be converted to soft-bottom. Previous experience in the area has shown that the hard-bottom in this area is not amenable to plowing and trenching techniques. 148

Page 4-19, Line 9: Please provide a reference to the precise section of the DEIS that describes detailed impacts of sea-floor disturbance. 149

Page 4-19, Lines 11-12: The EIS should include a references from studies conducted in support of Port Dolphin that confirm turbidity associated with long-term anchor scour is expected to be localized and remain in the lower portion of the water column. 150

Page 4-19, Lines 37-39: The state is not aware of any dredging and blasting that would be occurring in the area where SRV's are to be located. This reference should either be corrected in the EIS or an explanation of potential dredging and blasting in the area explained. 151

Page 4-20, Lines 32-39: The direct, adverse impact to marine organisms notes that impingement or entrainment of marine organisms would result in an assumed mortality of 100 percent. This mortality of eggs, larvae, phytoplankton and zooplankton would in turn have an impact on species that "feed on them." The EIS should include discussions that quantify the direct impact of egg and larvae mortality on the populations in the area, especially those fish and invertebrates of commercial and recreational value. 152

Page 4-20, Line 40: Please discuss whether the increase in cooling water discharge temperatures above ambient are expected to be the same for both winter and summer sea temperatures. 153

18

145. Deleted "beneficial impacts" from statement.

146. Noise modeling is included in section 4.8.

147. Text revised per comment.

148. Text revised per comment (see Section 4.2.1.6.1).

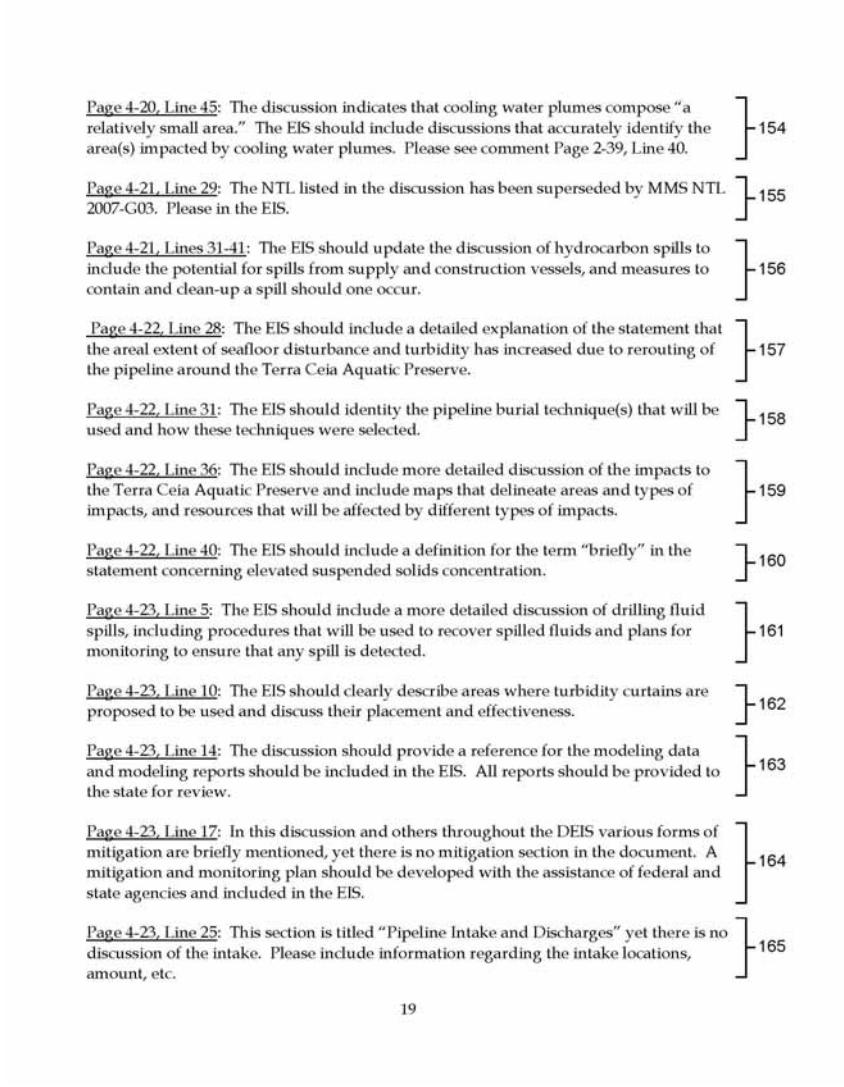
149. Text revised per comment. Benthic resources are discussed in Section 4.2.1.7.

150. Text revised per comment (include reference to turbidity modeling).

151. Deleted all references of blasting throughout biological resources. Blasting is not proposed as part of the project.

152. Impacts are quantified in Section 4.2.1.12

153. The increase in cooling water temperature is dependent on the system load. The maximum temperature rise, which is the condition analyzed in the EIS, is expected to be the same in summer and winter. See Section 4.1.1.



Page 4-20, Line 45: The discussion indicates that cooling water plumes compose "a relatively small area." The EIS should include discussions that accurately identify the area(s) impacted by cooling water plumes. Please see comment Page 2-39, Line 40. 154

Page 4-21, Line 29: The NTL listed in the discussion has been superseded by MMS NTL 2007-G03. Please in the EIS. 155

Page 4-21, Lines 31-41: The EIS should update the discussion of hydrocarbon spills to include the potential for spills from supply and construction vessels, and measures to contain and clean-up a spill should one occur. 156

Page 4-22, Line 28: The EIS should include a detailed explanation of the statement that the areal extent of seafloor disturbance and turbidity has increased due to rerouting of the pipeline around the Terra Ceia Aquatic Preserve. 157

Page 4-22, Line 31: The EIS should identity the pipeline burial technique(s) that will be used and how these techniques were selected. 158

Page 4-22, Line 36: The EIS should include more detailed discussion of the impacts to the Terra Ceia Aquatic Preserve and include maps that delineate areas and types of impacts, and resources that will be affected by different types of impacts. 159

Page 4-22, Line 40: The EIS should include a definition for the term "briefly" in the statement concerning elevated suspended solids concentration. 160

Page 4-23, Line 5: The EIS should include a more detailed discussion of drilling fluid spills, including procedures that will be used to recover spilled fluids and plans for monitoring to ensure that any spill is detected. 161

Page 4-23, Line 10: The EIS should clearly describe areas where turbidity curtains are proposed to be used and discuss their placement and effectiveness. 162

Page 4-23, Line 14: The discussion should provide a reference for the modeling data and modeling reports should be included in the EIS. All reports should be provided to the state for review. 163

Page 4-23, Line 17: In this discussion and others throughout the DEIS various forms of mitigation are briefly mentioned, yet there is no mitigation section in the document. A mitigation and monitoring plan should be developed with the assistance of federal and state agencies and included in the EIS. 164

Page 4-23, Line 25: This section is titled "Pipeline Intake and Discharges" yet there is no discussion of the intake. Please include information regarding the intake locations, amount, etc. 165

19

154. Text revised per comment.

155. Text revised per comment.

156. Text revised per comment.

157. At 80.4 km, the Southern Route Alternative is approximately the same length as the Proposed Route, and therefore the total area impacted would be the same. Text revised to reflect comment.

158. Pipeline burial techniques are discussed in Section 2.1.1.9.

159. The proposed pipeline route does not pass through Terra Ceia Aquatic Preserve. See Figure 3.2-1.

160. Text revised to reflect comment.

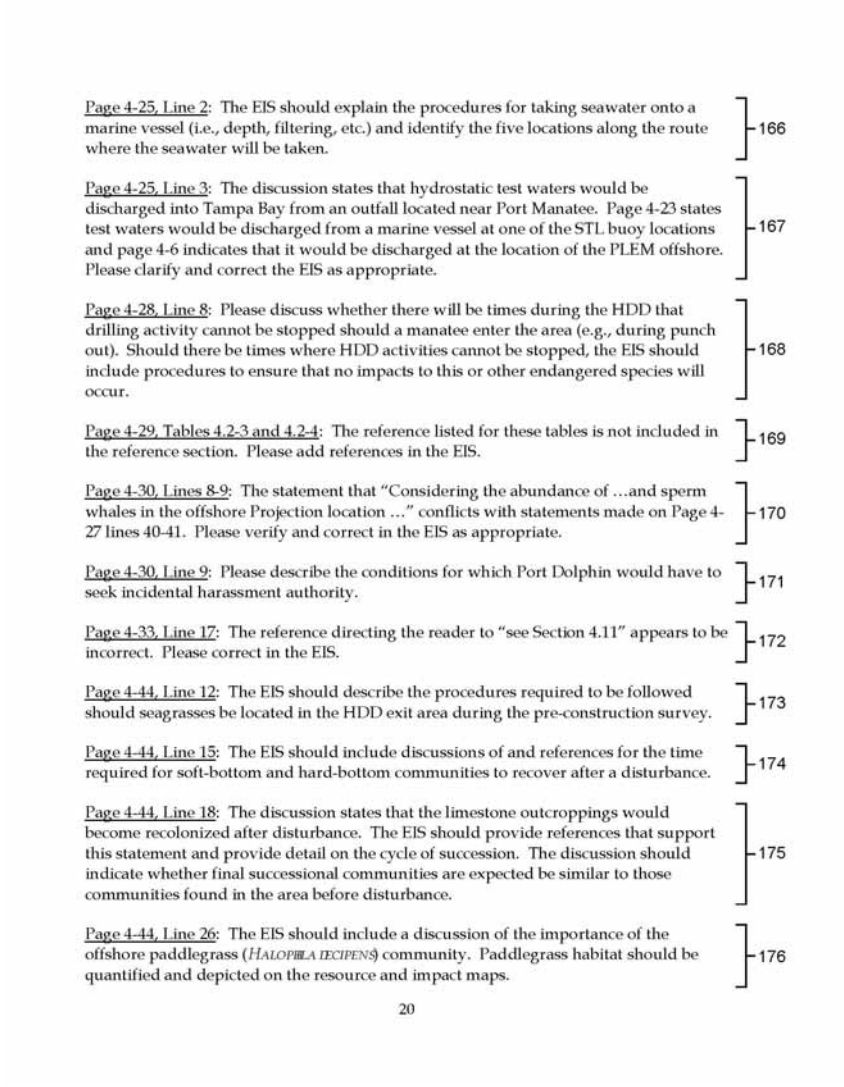
161. A contingency plan will be developed for potential loss of drilling fluids. See minimization measures and BMPs in Section 4.11.1. Text revised to reflect comment.

162. Turbidity curtains will be used when installation is performed by clam shell dredge under the Skyway Bridge and during HDD. See minimization measures and BMPs in Section 4.11.1.

163. Modeling reports will not be included in the EIS.

164. Mitigation and Minimization Measures and Monitoring are identified in Section 4.11.

165. Pipeline Intakes and Discharges are discussed in Section 4.2.1.1. The text for general impacts will be carried throughout the section for Marine Mammals. Text revised to reflect comment.



Page 4-25, Line 2: The EIS should explain the procedures for taking seawater onto a marine vessel (i.e., depth, filtering, etc.) and identify the five locations along the route where the seawater will be taken. 166

Page 4-25, Line 3: The discussion states that hydrostatic test waters would be discharged into Tampa Bay from an outfall located near Port Manatee. Page 4-23 states test waters would be discharged from a marine vessel at one of the STL buoy locations and page 4-6 indicates that it would be discharged at the location of the PLEM offshore. Please clarify and correct the EIS as appropriate. 167

Page 4-28, Line 8: Please discuss whether there will be times during the HDD that drilling activity cannot be stopped should a manatee enter the area (e.g., during punch out). Should there be times where HDD activities cannot be stopped, the EIS should include procedures to ensure that no impacts to this or other endangered species will occur. 168

Page 4-29, Tables 4.2-3 and 4.2-4: The reference listed for these tables is not included in the reference section. Please add references in the EIS. 169

Page 4-30, Lines 8-9: The statement that "Considering the abundance of …and sperm whales in the offshore Projection location …" conflicts with statements made on Page 4-27 lines 40-41. Please verify and correct in the EIS as appropriate. 170

Page 4-30, Line 9: Please describe the conditions for which Port Dolphin would have to seek incidental harassment authority. 171

Page 4-33, Line 17: The reference directing the reader to "see Section 4.11" appears to be incorrect. Please correct in the EIS. 172

Page 4-44, Line 12: The EIS should describe the procedures required to be followed should seagrasses be located in the HDD exit area during the pre-construction survey. 173

Page 4-44, Line 15: The EIS should include discussions of and references for the time required for soft-bottom and hard-bottom communities to recover after a disturbance. 174

Page 4-44, Line 18: The discussion states that the limestone outcroppings would become recolonized after disturbance. The EIS should provide references that support this statement and provide detail on the cycle of succession. The discussion should indicate whether final successional communities are expected be similar to those communities found in the area before disturbance. 175

Page 4-44, Line 26: The EIS should include a discussion of the importance of the offshore paddlegrass (*HALOPHILA DECIPENS*) community. Paddlegrass habitat should be quantified and depicted on the resource and impact maps. 176

20

166. Pipeline Intakes and Discharges are discussed in Section 4.2.1.1. The test waters will be discharged offshore from a marine vessel. Text revised to reflect comment.

167. No seawater intake will be discharged near Port Manatee. The test waters will be discharged offshore from a marine vessel. Text revised to reflect comment.

168. Text revised per comment.

169. Table changed to reflect comment.

170. Text revised per comment.

171. Text revised per comment.

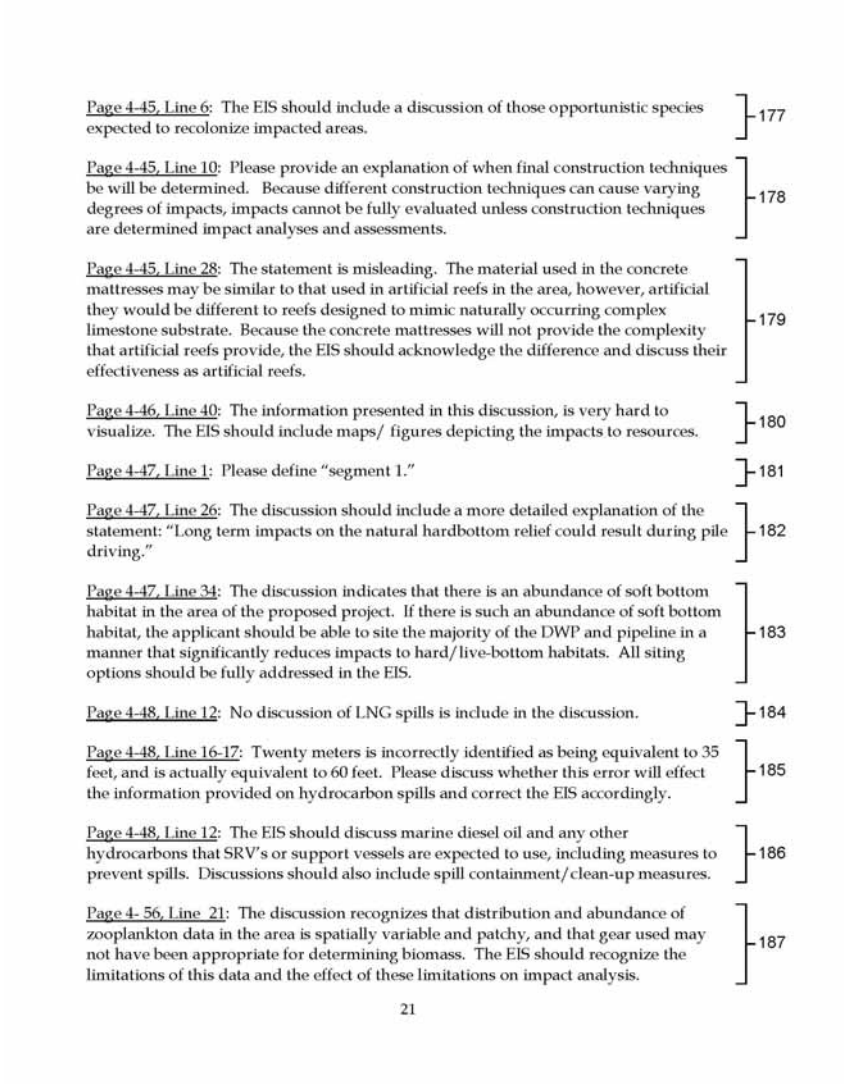
172. The section number is correct for the Final EIS.

173. This mitigation information has been added to the list of mitigation measures in Section 4.11. The Applicant would conduct surveys just prior to construction to identify SAV that may have not been present during the original SAV surveys. A Mitigation Plan to compensate for unavoidable impacts on seagrasses and live- and hard- bottom habitats would be developed during the permitting process.

174. Text revised per comment.

175. Additional detail has been added to Section 4.2.1.6.

176. Text revised per comment.



Page 4-45, Line 6: The EIS should include a discussion of those opportunistic species expected to recolonize impacted areas. 177

Page 4-45, Line 10: Please provide an explanation of when final construction techniques be will be determined. Because different construction techniques can cause varying degrees of impacts, impacts cannot be fully evaluated unless construction techniques are determined impact analyses and assessments. 178

Page 4-45, Line 28: The statement is misleading. The material used in the concrete mattresses may be similar to that used in artificial reefs in the area, however, artificial they would be different to reefs designed to mimic naturally occurring complex limestone substrate. Because the concrete mattresses will not provide the complexity that artificial reefs provide, the EIS should acknowledge the difference and discuss their effectiveness as artificial reefs. 179

Page 4-46, Line 40: The information presented in this discussion, is very hard to visualize. The EIS should include maps/ figures depicting the impacts to resources. 180

Page 4-47, Line 1: Please define "segment 1." 181

Page 4-47, Line 26: The discussion should include a more detailed explanation of the statement: "Long term impacts on the natural hardbottom relief could result during pile driving." 182

Page 4-47, Line 34: The discussion indicates that there is an abundance of soft bottom habitat in the area of the proposed project. If there is such an abundance of soft bottom habitat, the applicant should be able to site the majority of the DWP and pipeline in a manner that significantly reduces impacts to hard/live-bottom habitats. All siting options should be fully addressed in the EIS. 183

Page 4-48, Line 12: No discussion of LNG spills is include in the discussion. 184

Page 4-48, Line 16-17: Twenty meters is incorrectly identified as being equivalent to 35 feet, and is actually equivalent to 60 feet. Please discuss whether this error will effect the information provided on hydrocarbon spills and correct the EIS accordingly. 185

Page 4-48, Line 12: The EIS should discuss marine diesel oil and any other hydrocarbons that SRV's or support vessels are expected to use, including measures to prevent spills. Discussions should also include spill containment/clean-up measures. 186

Page 4- 56, Line 21: The discussion recognizes that distribution and abundance of zooplankton data in the area is spatially variable and patchy, and that gear used may not have been appropriate for determining biomass. The EIS should recognize the limitations of this data and the effect of these limitations on impact analysis. 187

21

177. Text revised per comment.

178. Text revised per comment.

179. Additional discussion per comment was added to Section 4.2.1.6.

180. Text revised per comment.

181. Text revised per comment.

182. Text deleted.

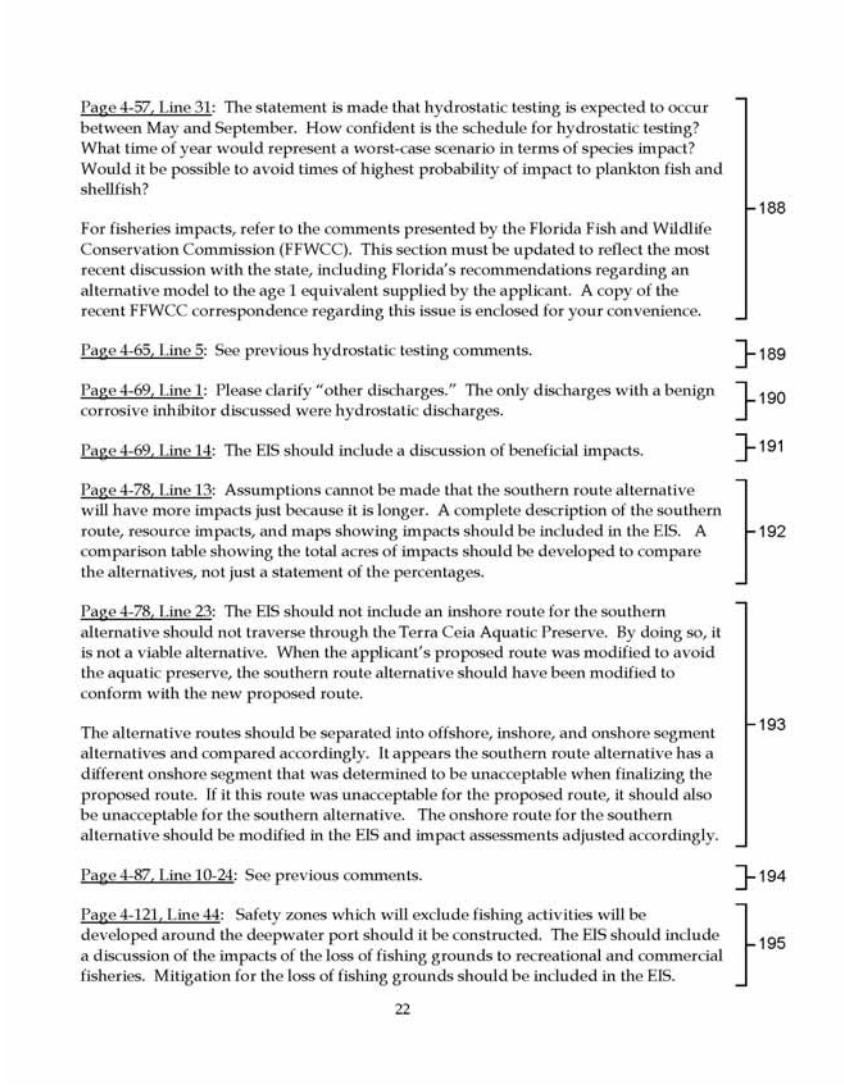
183. Text has been added.

184. Text revised to reflect comment.

185. Text revised to reflect comment.

186. Comment noted.

187. Limitations of the SEAMAP data are discussed in Section 4.2.1.11 and appendix G of the Final EIS.



Page 4-57, Line 31: The statement is made that hydrostatic testing is expected to occur between May and September. How confident is the schedule for hydrostatic testing? What time of year would represent a worst-case scenario in terms of species impact? Would it be possible to avoid times of highest probability of impact to plankton fish and shellfish?

For fisheries impacts, refer to the comments presented by the Florida Fish and Wildlife Conservation Commission (FFWCC). This section must be updated to reflect the most recent discussion with the state, including Florida's recommendations regarding an alternative model to the age 1 equivalent supplied by the applicant. A copy of the recent FFWCC correspondence regarding this issue is enclosed for your convenience. 188

Page 4-65, Line 5: See previous hydrostatic testing comments. 189

Page 4-69, Line 1: Please clarify "other discharges." The only discharges with a benign corrosive inhibitor discussed were hydrostatic discharges. 190

Page 4-69, Line 14: The EIS should include a discussion of beneficial impacts. 191

Page 4-78, Line 13: Assumptions cannot be made that the southern route alternative will have more impacts just because it is longer. A complete description of the southern route, resource impacts, and maps showing impacts should be included in the EIS. A comparison table showing the total acres of impacts should be developed to compare the alternatives, not just a statement of the percentages. 192

Page 4-78, Line 23: The EIS should not include an inshore route for the southern alternative should not traverse through the Terra Ceia Aquatic Preserve. By doing so, it is not a viable alternative. When the applicant's proposed route was modified to avoid the aquatic preserve, the southern route alternative should have been modified to conform with the new proposed route.

The alternative routes should be separated into offshore, inshore, and onshore segment alternatives and compared accordingly. It appears the southern route alternative has a different onshore segment that was determined to be unacceptable when finalizing the proposed route. If it this route was unacceptable for the proposed route, it should also be unacceptable for the southern alternative. The onshore route for the southern alternative should be modified in the EIS and impact assessments adjusted accordingly. 193

Page 4-87, Line 10-24: See previous comments. 194

Page 4-121, Line 44: Safety zones which will exclude fishing activities will be developed around the deepwater port should it be constructed. The EIS should include a discussion of the impacts of the loss of fishing grounds to recreational and commercial fisheries. Mitigation for the loss of fishing grounds should be included in the EIS. 195

22

188. The Applicant maintains that hydrostatic testing is expected to occur between May and September during the construction of the proposed pipeline, however specific construction schedules have not been set. However, if a license is issued, a sampling program will be required as a condition of the license. If ichthyoplankton data demonstrates the need for additional mitigation, appropriate plans would be developed then. Discussions with FWC are reflected the analyses in Section 4.2.1.11. Responses to FWC comments are included in this Appendix.

189. Comment noted.

190. Text revised per comment.

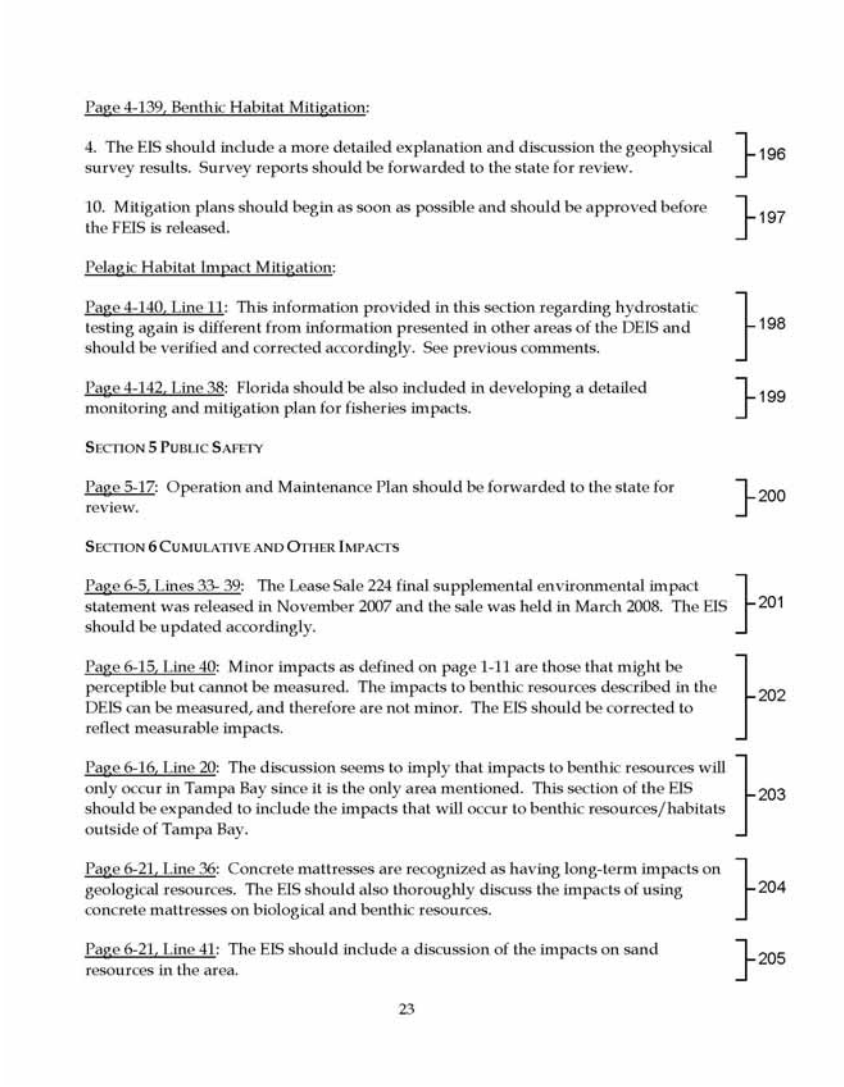
191. Comment noted.

192. The southern route is analyzed in Section 2.1.4.6.

193. At 80.4 km, the Southern Route Alternative is approximately the same length as the Proposed Route, and therefore the total area impacted would be the same. Text revised to reflect comment. The Southern Route Alternative would potentially impact the Terra Ceia Aquatic Preserve and a mapped sand resource. However, it will be carried forward for detailed review to determine the extent of these impacts.

194. Comment noted.

195. In Section 4.9 the impacts to commercial and recreational fisheries are analyzed. Safety Zones are discussed in Section 5.5.



Page 4-139, Benthic Habitat Mitigation:

4. The EIS should include a more detailed explanation and discussion the geophysical survey results. Survey reports should be forwarded to the state for review. 196

10. Mitigation plans should begin as soon as possible and should be approved before the FEIS is released. 197

Pelagic Habitat Impact Mitigation:

Page 4-140, Line 11: This information provided in this section regarding hydrostatic testing again is different from information presented in other areas of the DEIS and should be verified and corrected accordingly. See previous comments. 198

Page 4-142, Line 38: Florida should be also included in developing a detailed monitoring and mitigation plan for fisheries impacts. 199

SECTION 5 PUBLIC SAFETY

Page 5-17: Operation and Maintenance Plan should be forwarded to the state for review. 200

SECTION 6 CUMULATIVE AND OTHER IMPACTS

Page 6-5, Lines 33- 39: The Lease Sale 224 final supplemental environmental impact statement was released in November 2007 and the sale was held in March 2008. The EIS should be updated accordingly. 201

Page 6-15, Line 40: Minor impacts as defined on page 1-11 are those that might be perceptible but cannot be measured. The impacts to benthic resources described in the DEIS can be measured, and therefore are not minor. The EIS should be corrected to reflect measurable impacts. 202

Page 6-16, Line 20: The discussion seems to imply that impacts to benthic resources will only occur in Tampa Bay since it is the only area mentioned. This section of the EIS should be expanded to include the impacts that will occur to benthic resources/habitats outside of Tampa Bay. 203

Page 6-21, Line 36: Concrete mattresses are recognized as having long-term impacts on geological resources. The EIS should also thoroughly discuss the impacts of using concrete mattresses on biological and benthic resources. 204

Page 6-21, Line 41: The EIS should include a discussion of the impacts on sand resources in the area. 205

23

196. Geophysical survey results are discussed in Sections 4.3.1 and 4.5.1.1.

197. Please see Section 4.9.1.

198. Text deleted.

199. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies (see Section 4.11). Specific monitoring requirements would be developed after a license is issued.

200. The Operations Manual is approved by the USCG. Operations Manual will be available to the state agencies, but not the facility Security Plan that contains Sensitive Security Information.

201. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies (see Section 4.11). Specific monitoring requirements would be developed after a license is issued.

202. Discussion of impacts to benthic resources has been refined with the incorporation of new geophysical and geotechnical data, and some impact categories have been changed (see Section 4.2.1.6).

203. Text revised per comment.

204. Additional discussion per comment was added to Section 4.2.1.6.

205. The discussion of sand resources in sections 3.4 and 4.4 has been revised.

Page 6-22, Line 5: According to the section, the impact to recreational and commercial fisheries during construction of Port Dolphin would be minor, short-term and adverse. What impact will the permanent avoidance area that that will be established around the Port Dolphin DWP have on recreational boaters, recreational fisheries, and commercial fisheries in terms of possible loss of fishing grounds? 206

24

206. Impacts to fishing due to operations are discussed in Section 4.9.

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

April 25, 2008

RECEIVED
APR 30 2008
F.C.M.P.

Ms. Debby Tucker
Department of Environmental Protection
Office of Intergovernmental Programs
Mail Station 47
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Re: SAI#: FL200804184178C US Coast Guard and US Maritime Administration – Draft Environmental Impact Statement – Port Dolphin LNG Deepwater Port License Application / Offshore and Manatee County / DHR Project File No. 2008-2374

Dear Ms. Tucker:

The review of the above referenced document was carried out in accordance with the provisions of Florida's Coastal Zone Management Act and Chapter 267: the Historical Resources Act (*Florida Statutes*), as well as Section 106 of the National Historic Preservation Act of 1966 (Public Law 102-575), as amended in 1992, and 36 C.F.R., Part 800: Protection of Historic Properties. The State Historic Preservation Officer is to advise and assist federal agencies or their designees when identifying historic properties, assessing effects upon them, and considering alternatives to avoid or reduce a project's effect on them.

We reviewed the Draft Environmental Impact Statement and find that historic resource concerns have been adequately addressed. We note that both terrestrial and underwater cultural resource assessment surveys have been conducted for areas of potential impact by this project. Any areas not yet surveyed should be a condition of any permitting. Onshore cultural resources surveys did not locate any historic resources meeting the criteria for National Register eligibility. Offshore cultural resource surveys identified multiple side-scan sonar contacts and unidentified magnetic anomalies. Avoidance requirements of offshore archaeologically sensitive areas is adequately described in Chapter 3 Affected Environmental, under section 3.3.2, Port Site and Offshore Routes. 207

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☐ Director's Office (850) 245-6300 • FAX: 245-6436
☐ Archaeological Research (850) 245-6444 • FAX: 245-6452
✓ Historic Preservation (850) 245-6333 • FAX: 245-6437
☐ Historical Museums (850) 245-6400 • FAX: 245-6433
☐ South Regional Office (561) 416-2115 • FAX: 416-2149
☐ North Regional Office (850) 245-6445 • FAX: 245-6435
☐ Central Regional Office (813) 272-3843 • FAX: 272-2340

207. Comment noted.

Ms. Tucker
April 25, 2008
Page 2

Thus, conditioned upon the completion of the required onshore survey work including the avoidance of any significant historic resources should any be encountered in future surveys, and the avoidance of referenced sensitive offshore areas, it is the opinion of this office that the proposed project will have no effect on historic properties listed, or eligible for listing in the *National Register of Historic Places*, or otherwise of historical or archaeological value. 208

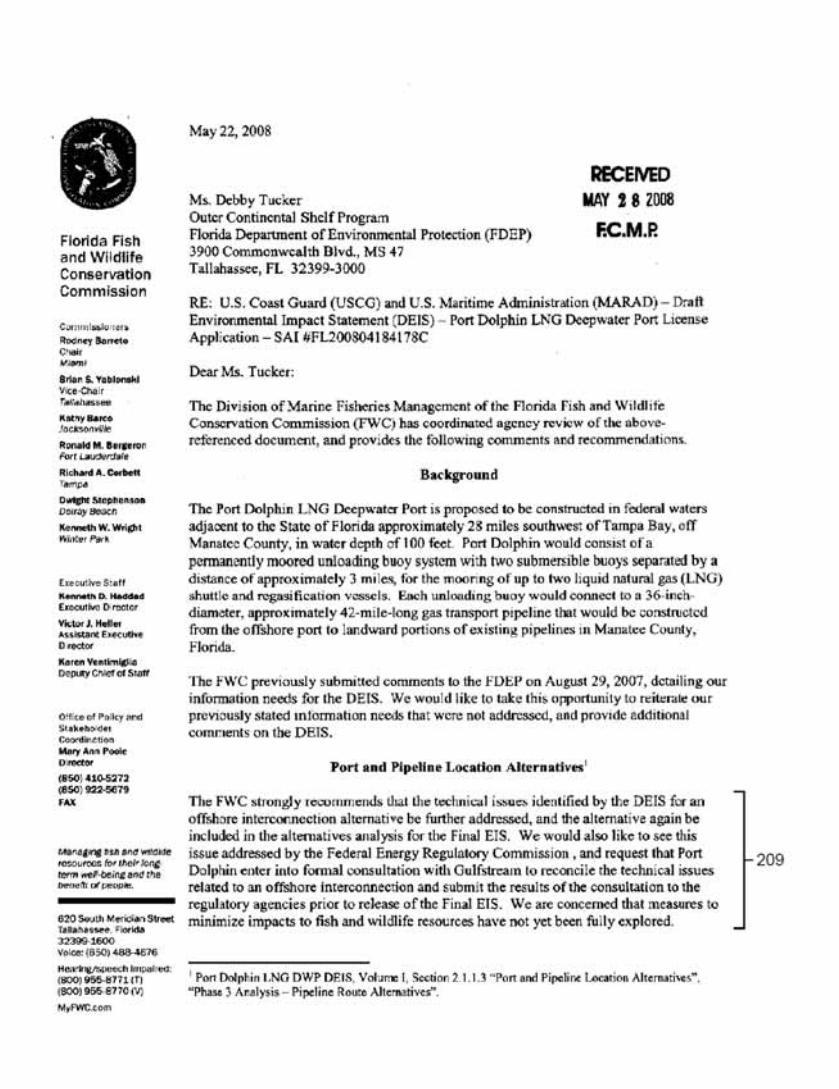
If you have any questions concerning our comments, please do not hesitate to contact Susan Harp at (850) 245-6333. Thank you for your interest in protecting Florida's historic resources.

Sincerely,

Frederick P. Gaske

Frederick P. Gaske, Director, and
State Historic Preservation Officer

208. Comment noted.



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Managing fish and wildlife resources for their long-term well-being and the benefit of people.

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May 22, 2008

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Ms. Debby Tucker
Outer Continental Shelf Program
Florida Department of Environmental Protection (FDEP)
3900 Commonwealth Blvd., MS 47
Tallahassee, FL 32399-3000

RE: U.S. Coast Guard (USCG) and U.S. Maritime Administration (MARAD) – Draft Environmental Impact Statement (DEIS) – Port Dolphin LNG Deepwater Port License Application – SAI #FL200804184178C

Dear Ms. Tucker:

The Division of Marine Fisheries Management of the Florida Fish and Wildlife Conservation Commission (FWC) has coordinated agency review of the above-referenced document, and provides the following comments and recommendations.

Background

The Port Dolphin LNG Deepwater Port is proposed to be constructed in federal waters adjacent to the State of Florida approximately 28 miles southwest of Tampa Bay, off Manatee County, in water depth of 100 feet. Port Dolphin would consist of a permanently moored unloading buoy system with two submersible buoys separated by a distance of approximately 3 miles, for the mooring of up to two liquid natural gas (LNG) shuttle and regasification vessels. Each unloading buoy would connect to a 36-inch-diameter, approximately 42-mile-long gas transport pipeline that would be constructed from the offshore port to landward portions of existing pipelines in Manatee County, Florida.

The FWC previously submitted comments to the FDEP on August 29, 2007, detailing our information needs for the DEIS. We would like to take this opportunity to reiterate our previously stated information needs that were not addressed, and provide additional comments on the DEIS.

Port and Pipeline Location Alternatives[1]

The FWC strongly recommends that the technical issues identified by the DEIS for an offshore interconnection alternative be further addressed, and the alternative again be included in the alternatives analysis for the Final EIS. We would also like to see this issue addressed by the Federal Energy Regulatory Commission , and request that Port Dolphin enter into formal consultation with Gulfstream to reconcile the technical issues related to an offshore interconnection and submit the results of the consultation to the regulatory agencies prior to release of the Final EIS. We are concerned that measures to minimize impacts to fish and wildlife resources have not yet been fully explored. 209

[1] Port Dolphin LNG DWP DEIS, Volume I, Section 2.1.1.3 "Port and Pipeline Location Alternatives", "Phase 3 Analysis – Pipeline Route Alternatives".

209. An offshore interconnection with the Gulfstream Pipeline has been included in Section 2.1, Alternatives Analysis.

Fish and Fisheries Resources[2]

Minerals Management Service regulations require that pipelines in less than 200 feet of water must be buried at least 3 feet under grade. From past experience with the Gulfstream Pipeline project, we understand that all of the Port Dolphin pipeline may not be able to be buried to this depth due to the density of the substrate. In addition, the DEIS states in Section 4.2.1.7 that concrete mattresses would also be placed in some soft bottom areas. The information that is missing from the DEIS for us to be able to evaluate potential impacts on horseshoe crab spawning activities/juvenile development, and hardbottom resources is as follows: 210

1) How much of the pipeline and in which locations will not be able to be buried to this depth?
2) Will all of the pipeline areas that cannot be buried to this depth be mattressed, and if not, what are the alternative anchoring methods that will be used to secure the pipeline?
3) We would like to see evidence that the proposed concrete mats have functioned as suggested in previous pipeline projects. There is evidence in coral restoration projects that concrete mats have moved during storm events resulting in damage to nearby hardbottom resources. 211

Horseshoe Crabs

The FWC is concerned with the potential for loss of beach habitat for spawning horseshoe crabs due to pipeline placement and orientation, and use of concrete mattresses. If a concrete mattress is to be placed over sandy beach area, it will certainly affect spawning through the reduction of spawning habitat. Horseshoe crabs nest in the upper-tidal areas of sandy beaches along the high-tide line, and the FWC has received reports of them using even small beach areas throughout Tampa Bay. Staff has also witnessed horseshoe crabs coming up on boat ramps looking for beach area. 212

If the pipeline is oriented perpendicular to the beach, the crabs should be able to enter the beach from either side; however, in areas such as Anna Maria Island, where the pipeline is proposed to be oriented parallel to the beach, concrete mattressing could serve as a barrier for both mating and mate selection. For spawning, a male horseshoe crab attaches to the rear of the carapace of a female and they walk into the beach together. It would be very difficult for them to walk over a concrete barrier that is raised 12 inches above grade. If the concrete was as level to the sediments as possible and if the sides were sloped to allow easy portage across, mattressing would not likely present a barrier. 213

Another potential concern with parallel orientation is how close to the shore the pipeline would be located. Although male and female horseshoe crabs are paired when they move up to the beach to spawn, single males called satellites cruise along in the shallow waters parallel to the beach searching for mating pairs. A nesting pair may accumulate quite a few satellite males, which basically join the pair and also release sperm when the female releases her eggs. Research has shown multiple paternity for horseshoe crab eggs, so this is a viable strategy for satellite males but it does depend on them having access to 214

[2] Port Dolphin LNG DWP DEIS, Volume I, Section 3.2.8 "Fish and Fisheries Resources".

210. The proposed project is under the Deepwater Port Act, not the OCSA administered by MMS, therefore, the MMS requirements do not apply. However, the Applicant has committed to bury the pipeline to a depth of 3 feet. In areas that burial is not possible, the pipeline will be covered with concrete mattresses as discussed in the Final EIS.

211. Details of pipeline construction based on geotechnical surveys are included in Sections 4.3.1 and 4.5.1.1. Mattress covers are the only alternative burial method proposed.

212. The proposed pipeline will be installed using HDD from onshore to offshore as described in Section 4.4.1. The landing area is adjacent to a seawall so no beach impacts would occur.

213. The offshore pipeline would be perpendicular to the seawall and buried, therefore no barrier would be created.

214. The proposed pipeline will be installed using HDD from onshore to offshore as described in Section 4.4.1. The landing area is adjacent to a seawall so no beach impacts would occur.

The offshore pipeline would be perpendicular to the seawall and buried, therefore no barrier would be created.

shallow waters parallel to the beaches. A pipeline covered with a concrete mattress in deeper waters and again sloped to allow easy passage over it, would not likely present a barrier. 214

The final concern with placement and orientation of the pipeline and concrete mattressing is that juvenile horseshoe crabs leave their nests on the beaches and move onto adjacent flats to grow for several years. Concrete mattresses have the potential to reduce juvenile habitat and act as a barrier for juvenile passage to the flats. 215

Mitigation, Minimization and Monitoring[3]

Biological Resources
The DEIS does not provide mitigation or monitoring plans for impacts to biological resources (including benthic habitats). The FWC strongly recommends that mitigation and monitoring plans are included in the Final EIS to ensure that such plans will be acceptable and appropriate to mitigate for impacts to biological resources managed by the State of Florida. 216

Impacts to Fishing Activities
In our August 29 letter, we recommended that the DEIS provide mitigation alternatives for loss of fishing grounds to the fishing community due to safety zones and Areas to be Avoided (ATBA). Mitigation for the loss of fishing grounds was not addressed in the DEIS. The FWC strongly recommends that the applicant include mitigation alternatives for the loss of fishing grounds in the Final EIS. 217

Incident Management Plan
In our August 29 letter, we recommended that the DEIS provide information that outlined the extent of obligation on FWC Law Enforcement to respond to an incident. Such information was referred to in the DEIS by the statement that "*Spill response plan and emergency response plans would be implemented,*" but was not included in the DEIS and remains a primary concern for the FWC. 218

Seawater Intake
The DEIS states that "*An intake rate of 9.5 MGD of seawater for engine-cooling purposes would substantially reduce the potential for entrainment of plankton individuals compared to open-loop vaporization systems, which can use five times more volume*". It is unclear if this rate is calculated per vessel, and it does not include intake amounts for ballast. We would request that the applicant provide a tabular summary and a comprehensive description of water intake and discharge volume for the project. This information should specify the maximum and average water volume (ballast and engine cooling) for all vessels that will utilize the deepwater port (including SRVs and LNG carriers). It should also describe the anticipated frequency of each vessel at the port, and the frequency of vaporization operations versus open-loop operations. Similar tables may be found in the Calypso LNG Data Gaps document dated October 27, 2007 (docket 219

[3] Port Dolphin LNG DWP DEIS, Volume I, Section 4.11 "Mitigation, Minimization and Monitoring", 4.11.1 "Applicant-Proposed BMPs and Minimization Measures", "Benthic Habitat Impact Mitigation" and "Pelagic Habitat Impact Mitigation".

215. The proposed pipeline will be installed using HDD from onshore to offshore as described in Section 4.4.1. The landing area is adjacent to a seawall so no beach impacts would occur.

The offshore pipeline would be perpendicular to the seawall and buried, therefore no barrier would be created.

216. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies (see Section 4.11). Specific monitoring requirements would be developed after a license is issued.

217. It is anticipated that fishing activities would be allowed in the ATBA, and therefore there would be no loss of fishing grounds associated with the ATBA. Please see Section 4.9.1 for discussion of fishing impacts.

218. If a License is issued by the Maritime Administration, the USCG would require development and approval of an Operating Plan that would include security provisions. The plan would be coordinated with Federal, state and local officials responsible for enforcement or response.

219. Seawater intake volumes are discussed in Section 2.1.7.4 for SRV and FSRU alternatives. The data are used on the Ichthyoplankton Impact Assessment as discussed in section 4.2.1.12 and Appendix G.

#26009 at www.Regulations.gov), specifically data gap #29. This information may be more appropriate for inclusion in Volume I, Section 4.2.1.12 "Planktonic Fish and Invertebrates." 219

We request clarification that Port Dolphin would only allow vessels to utilize the port if they are closed-loop for vaporization purposes, and we would also request that the applicant address the issue as to why they are not utilizing vessels that are closed-loop for engine cooling purposes. 220

Benthic Resources[4]

In our August 29 letter, we identified that the primary benthic communities expected to be affected by this project are hard bottom with both hard and soft corals, shallow and deep-water seagrasses, and live-bottom communities. Adverse effects to these benthic resources include impacts due to plowing and burial of the pipeline or covering the pipeline with concrete mats. Additional benthic impacts may occur from the construction of the shuttle and regasification vessel anchoring system, as well as the Standard Triangulation Language buoy landing pad.

We also stated in our letter that although the application materials were substantial, almost all of the information was directed at the proposed route, with little or no marine resource information provided for the alternate northern and southern routes. Although it may be presumed that the proposed preferred pipeline route would result in fewer adverse effects because it has the least amount of impacts based on the selection criteria and it is the shortest route, without some level of reconnaissance information of the resources present in the other two pipeline routes, this presumption cannot be confirmed. In order to determine if adverse effects would be greater or less to the resources of Florida, additional information verifying that the northern and southern routes are less desirable is necessary. 221

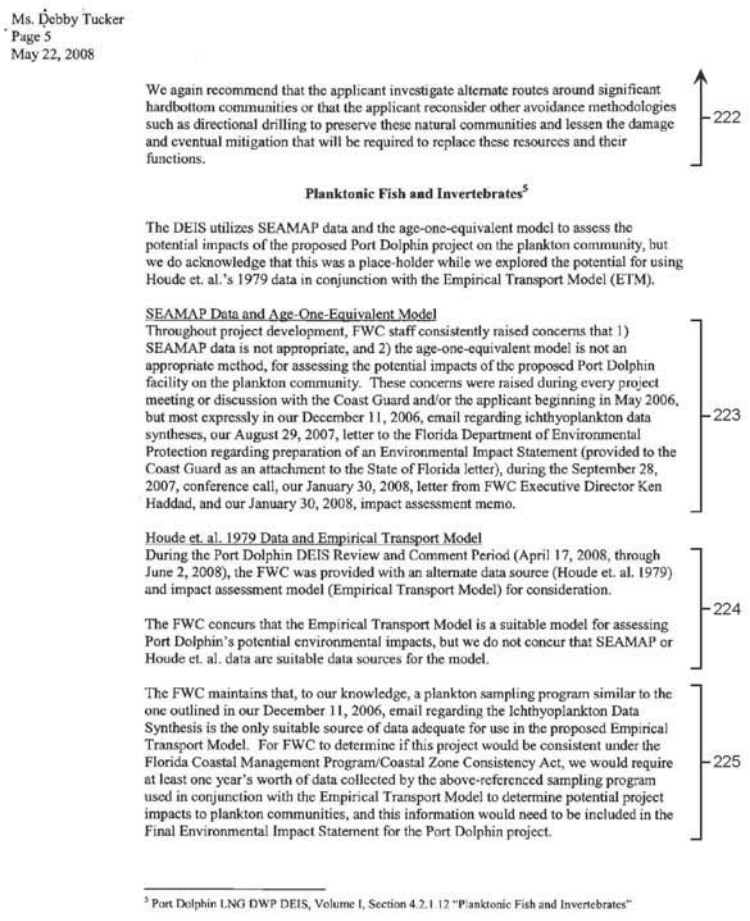
This issue has not been clearly resolved in the DEIS. The applicant states that there would be an eight-acre increase in the project footprint for the southern route alternative causing an increase in the adverse affects; however, the applicant also states that the proposed alternative would affect five benthic habitat types with Type A = 5%, Type B = 18% and Type D = 9%, of the affected areas, while in the southern alternative adverse affects would be proportioned as follows: Type A = 4%, Type B = 5% and Type D = 28%. The southern alternative does affect more benthic habitat as stated by the applicant, but it also appears to affect almost 50% less hard bottom habitat Types A and B. The significant increase in habitat impacts comes in Type D habitat, which is sand and soft substrate in proximity to reef/hard bottom areas. This is not to suggest that Type D habitat is less important than the other habitats described, only that it is more prevalent and due to that, it is not as limiting to obligate species as habitat Types A and B. At this time we are not convinced that the proposed alternative is the best alternative to minimize adverse affects to benthic communities when other criteria, other than total area affected, are considered. 222

[4] Port Dolphin LNG DWP DEIS, Volume I, Section 4.2.1.7 "Benthic Resources".

220. A complete discussion of the proposed vaporization alternatives is included in Section 2.1.7.

221. The Final EIS has been updated with geophysical survey data on the Southern Route Alternative. See resource discussions in Section 4.

222. Based on additional geophysical and geotechnical evaluations, the benthic impacts discussion has been revised. Additional mitigation has been included in Section 4.11.



Ms. Debby Tucker
Page 5
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We again recommend that the applicant investigate alternate routes around significant hardbottom communities or that the applicant reconsider other avoidance methodologies such as directional drilling to preserve these natural communities and lessen the damage and eventual mitigation that will be required to replace these resources and their functions. 222

Planktonic Fish and Invertebrates[5]

The DEIS utilizes SEAMAP data and the age-one-equivalent model to assess the potential impacts of the proposed Port Dolphin project on the plankton community, but we do acknowledge that this was a place-holder while we explored the potential for using Houde et. al.'s 1979 data in conjunction with the Empirical Transport Model (ETM).

SEAMAP Data and Age-One-Equivalent Model

Throughout project development, FWC staff consistently raised concerns that 1) SEAMAP data is not appropriate, and 2) the age-one-equivalent model is not an appropriate method, for assessing the potential impacts of the proposed Port Dolphin facility on the plankton community. These concerns were raised during every project meeting or discussion with the Coast Guard and/or the applicant beginning in May 2006, but most expressly in our December 11, 2006, email regarding ichthyoplankton data syntheses, our August 29, 2007, letter to the Florida Department of Environmental Protection regarding preparation of an Environmental Impact Statement (provided to the Coast Guard as an attachment to the State of Florida letter), during the September 28, 2007, conference call, our January 30, 2008, letter from FWC Executive Director Ken Haddad, and our January 30, 2008, impact assessment memo. 223

Houde et. al. 1979 Data and Empirical Transport Model

During the Port Dolphin DEIS Review and Comment Period (April 17, 2008, through June 2, 2008), the FWC was provided with an alternate data source (Houde et. al. 1979) and impact assessment model (Empirical Transport Model) for consideration.

The FWC concurs that the Empirical Transport Model is a suitable model for assessing Port Dolphin's potential environmental impacts, but we do not concur that SEAMAP or Houde et. al. data are suitable data sources for the model. 224

The FWC maintains that, to our knowledge, a plankton sampling program similar to the one outlined in our December 11, 2006, email regarding the Ichthyoplankton Data Synthesis is the only suitable source of data adequate for use in the proposed Empirical Transport Model. For FWC to determine if this project would be consistent under the Florida Coastal Management Program/Coastal Zone Consistency Act, we would require at least one year's worth of data collected by the above-referenced sampling program used in conjunction with the Empirical Transport Model to determine potential project impacts to plankton communities, and this information would need to be included in the Final Environmental Impact Statement for the Port Dolphin project. 225

[5] Port Dolphin LNG DWP DEIS, Volume I, Section 4.2.1.12 "Planktonic Fish and Invertebrates"

223. The Draft EIS disclosed data adequacy issues, and agrees that there are deficiencies in the available data. However, the USCG and Maritime Administration feel that available data are sufficient to describe impacts under NEPA and the DWPA in a manner consistent with impact analyses of prior LNG deepwater port projects. The license, if issued, will contain a condition requiring additional monitoring and appropriate mitigation if data demonstrate ichthyoplankton densities that exceed those used in the estimates.

224. In September 2008 FWC rejected the ETM proposed by the Applicant. Therefore, modeling was not performed.

225. Limitations on SEAMAP data and the adjustments made to accommodate those limitations are detailed in Section 4.1.2.12 and Appendix G of the Final EIS. Use of closed-loop vaporization technology was identified by NMFS as the principal mitigation for ichthyoplankton impacts for prior LNG deepwater port projects, and the Applicant has proposed a closed-loop system. The impacts modeled for the Project are extremely low. Therefore, additional data is not considered necessary for the EIS. However, if a license is issued, a sampling program will be required as a condition of the license. If ichthyoplankton data demonstrates the need for additional mitigation, appropriate plans would be developed then.

We appreciate the opportunity to provide comments on the DEIS for the Port Dolphin LNG DWP project. Should you require additional assistance regarding our comments, please contact Lisa Gregg at (850) 487-0554 or lisa.gregg@myfwc.com.

Sincerely,

Mary Ann Poole

Mary Ann Poole, Director
Office of Policy and Stakeholder Coordination

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Port Dolphin DEIS Comments
FL DEP SW District

Comments to the Draft Environmental Impact Statement on the Port Dolphin LLC Deepwater Port License Application

(ichthyoplankton, hard-bottom, sand)

Volume I

Abstract lines 21, 22, 29, and 30:
Which SRV class and natural gas throughput were ichthyoplankton impact and/or any other impact calculations based upon? 226

ES-1, line 10:
The new pipeline route was intended to avoid the Terra Ceia Aquatic Preserve rather than sensitive biological resource areas, as sensitive biological resource areas were not mapped in the new pipeline route prior, correct? 227

ES-1, line 24:
Florida Department of Natural Resources is now Florida Department of Environmental Protection. 228

ES-7, lines 19-22:
What area of benthic habitat lies in the footprint of the pipeline and what area of hard-bottom, including that covered by a shifting sand veneer, lies in the footprint of the pipeline? 229

ES-7, lines 25-30 and 36-37:
Provide documentation of approval from the NMFS and USCG for both the assessment methodology developed and for limitation of the evaluation to only six species. 230

ES-7, lines 43-44:
Provide rationale for the assumption that impacts to all other species would be similar to the six species identified as representative. 231

ES-8, lines 1-2:
Define equivalent yield and describe from what data average landings in Florida was calculated. Describe what is indicated by placing "gag grouper" in parenthesis after "any species". 232

ES-8, lines 11-12:
Provide an estimate for the percentage of increase in vessel traffic associated with construction and operation of the pipeline/port and how a probability of risk of collision cannot be quantified. If the risk of collision cannot be quantified, provide why it could also not be estimated based on known numbers and general locations of manatee within the project area? 233

ES-8, line 26:
For what percentage of waterbodies in proximity to and including Tampa Bay would usage be limited for the life of the Port? 234

226. Impacts were analyzed using the maximum throughput of the 217,000 m^3 SRVs.

227. Correct; the new pipeline route was intended to avoid the Terra Ceia Aquatic Preserve.

228. Text changed per document.

229. The Final EIS has been updated with information from additional geophysical and geotechnical surveys. See resource discussion in Section 4

230. Documentation of consultation can be found in Appendix B, *Agency Consultation.*

231. As stated in the Executive Summary and in Section 4.2.1.11.1, the representative species were selected (in cooperation with NMFS) based on economic and ecological importance, availability of life history data, and the similarity to other population types.

232. Definition provided. Text revised to clarify per comment in section 4.2.1.12 App. G.

233. Text added to clarify per comment.

234. Usage would be limited only in the Safety Zone and No Anchoring Area, if designated, around the Port. The area involved is discussed in Section 2.3.10.



Port Dolphin DEIS Comments
FL DEP SW District

ES-9, LINES 21-23:
Is the hard-bottom to be impacted, considered essential fish habitat, protected? Do the proposed facilities traverse any conditionally approved or approved shellfish harvesting areas? 235

ES-9, LINES 27-28:
Provide how it was determined that operation of the Port will not reduce any commercially or recreationally important species, and provide the level of or degree of uncertainty in making this determination. 236

ES-9, LINES 29-30:
Will the pipeline exclude any areas or routes used by recreational vessels or commercial fisherman? 237

ES-10, LINES 6-7:
What amount of greenhouse gas will the construction of the Port and pipeline produce as a percentage of greenhouse gas produced for the Tampa Bay region? What is the percent of the Tampa Bay region's greenhouse gas that will be imported as opposed to the national or statewide percent? 238

ES-11, LINES 35-36:
What is the percent loss of fishing area for the Tampa Bay region as opposed to the GOM? 239

ES-11, LINE 37:
Define benthic substrata. 240

3-2, LINES 25-29:
Describe how the location of the pipeline was selected to avoid wind and tidal currents for minimization of water quality impacts from turbidity during construction, particularly for shallow areas, including impacts to shallow areas stemming from activity in deeper areas. 241

3-3, LINES 6-7:
Describe how it was determined that the presence of the pipeline in near-shore waters will not affect erosion to any beach or island in its vicinity, particularly during storm events, and particularly to national wildlife refuges and critical erosion control areas or areas in need of erosion control management. 242

3-7, LINES 38, AND 41-42:
Describe how contaminants from the sediment 'hot spot' near Anna Maria Island will not be released into the water column during construction of the pipeline through this area, or data used to determine that this would not be of concern. 243

3-9, LINES 37-38:
Were mollusks, cephalopoda, and crustaceans included in the fisheries resources evaluated – as species from these genera are later identified as "commercially important shellfish species on the western Florida shelf" (*3-44, LINES 16-19*)? 244

235. Discussion of impacts to EFH is included in section 4.2.1.13. The proposed facilities do not traverse shellfish harvesting areas.

236. See discussion in Section 4.2.1.11 and Appendix G.

237. During construction of the pipeline access to the active construction zone (not the entire pipeline route) would be restricted. There would be no restrictions during operations. Please refer to discussion in Section 4.9.

238. Greenhouse gas is discussed in Section 7.

239. Information added to Executive Summary and Section 4.9.1.

240. Section 3 identifies existing conditions. Potential impacts to water quality including turbidity modeling are discussed in Section 4.1.

241. Section 3 identifies existing conditions. Impacts to soils and sediments are discussed in Section 4.3.

242. Section 3 identifies existing conditions. Impacts to soils and sediments are discussed in Section 4.3.

243. After receiving revised data, the original map was incorrect, and there are no "hot spots" near Anna Maria Island. Text revised to clarify.

244. Discussion of impacts to commercial and recreational fisheries including, shellfish is included in Section 4.9.



Port Dolphin DEIS Comments
FL DEP SW District

3-27, LINES14-16 AND 22-34:
Please provide as to why in-fauna, or organisms living within rocky substrate, was not listed for Rocky bottom or limestone in nearshore benthic habitat or hard-bottom habitats in Tampa Bay. 245

3-28, LINES 6-10:
Describe the reliability of the side scan sonar used and any other surveys method used to accurately detect hard bottom. How was the survey reliability verified? Describe the quantity and methodology of the diver surveys performed. 246

3-28, LINES18-29:
Habitat types do not include situations where there is >20% cover and less than 0.25 m relief, and <5% cover or >20% cover with < 0.25 m relief and no sand veneer – describe why the habitat types listed need not include these situations. 247

3-43, LINES12-16 AND 34:
Please clarify that meroplankton include nektonic as well as benthic invertebrates and vertebrates, and that zooplankton include meroplankton. 248

3-44, LINES 7-8:
How are meroplankton considered to be more important in estuaries of western Florida than in shelf waters, as much reference is made to ichthyoplankton in particular in shelf waters (*3-45, LINES 5-34*)? Is the general quantity of meroplankton compared to zooplankton in shelf waters versus estuaries of western Florida known, and if so what is it? 249

3-44, LINE 45 AND 3-45, LINES 1-2:
Explain why larval densities are greatest for planktonic fish and shellfish (meroplankton) during the summer, when zooplankton was reported to be more abundant in cooler upwelled water than warmer surface water (*3-43, LINES 40-41*). 250

3-45, LINES 35-36:
In what proximity to the proposed Port Dolphin Terminal are plankton survey data obtained, and is an alternative Port location in closer proximity? 251

3-45, LINES 35-36:
Describe how the measurement of ichthyoplankton will or will not account for the presence of the commercially important mollusk, cephalopoda, and crustacean plankton species identified (*3-44, LINES 16-19*). 252

3-48, LINE 5:
Figure 3.2-3 does not indicate any SEAMAP locations or information. 253

3-48, LINES 2-4:
If species likely to occur in the project area are distributed in depths less than 100 feet, what percentage of these species (particularly those of recreational and commercial importance) is at risk of not being accurately represented by survey data obtained in depths greater than 120 feet. 254

245. Text revised to clarify per comment.

246. Text added per comment.

247. Text added per comment.

248. Text added to clarify per comment.

249. Text added to clarify per comment.

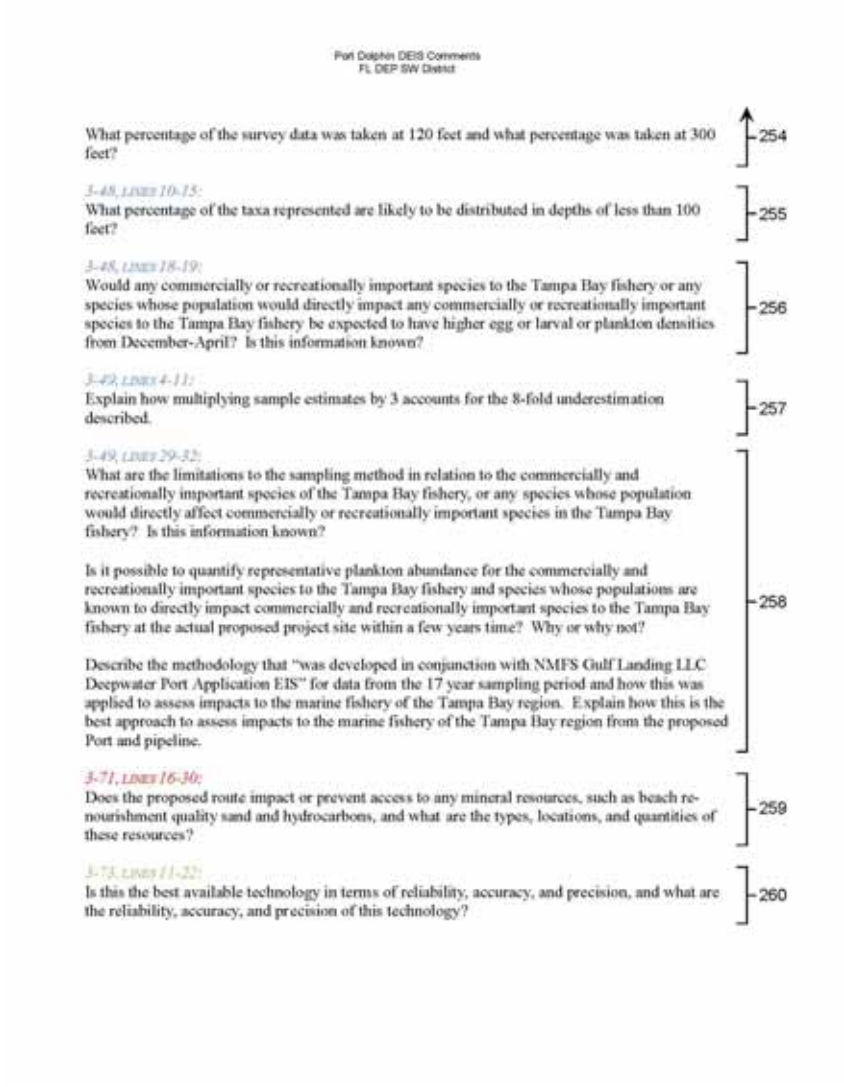
250. Text revised to clarify per comment.

251. Text added per comment.

252. Text revised per comment.

253. Figure added per comment.

254. Text added per comment.



Port Dolphin DEIS Comments
FL DEP SW District

What percentage of the survey data was taken at 120 feet and what percentage was taken at 300 feet? 254

3-48, LINES 10-15:
What percentage of the taxa represented are likely to be distributed in depths of less than 100 feet? 255

3-48, LINES 18-19:
Would any commercially or recreationally important species to the Tampa Bay fishery or any species whose population would directly impact any commercially or recreationally important species to the Tampa Bay fishery be expected to have higher egg or larval or plankton densities from December-April? Is this information known? 256

3-49, LINES 4-11:
Explain how multiplying sample estimates by 3 accounts for the 8-fold underestimation described. 257

3-49, LINES 29-32:
What are the limitations to the sampling method in relation to the commercially and recreationally important species of the Tampa Bay fishery, or any species whose population would directly affect commercially or recreationally important species in the Tampa Bay fishery? Is this information known?

Is it possible to quantify representative plankton abundance for the commercially and recreationally important species to the Tampa Bay fishery and species whose populations are known to directly impact commercially and recreationally important species to the Tampa Bay fishery at the actual proposed project site within a few years time? Why or why not? 258

Describe the methodology that "was developed in conjunction with NMFS Gulf Landing LLC Deepwater Port Application EIS" for data from the 17 year sampling period and how this was applied to assess impacts to the marine fishery of the Tampa Bay region. Explain how this is the best approach to assess impacts to the marine fishery of the Tampa Bay region from the proposed Port and pipeline.

3-71, LINES 16-30:
Does the proposed route impact or prevent access to any mineral resources, such as beach re-nourishment quality sand and hydrocarbons, and what are the types, locations, and quantities of these resources? 259

3-73, LINES 11-22:
Is this the best available technology in terms of reliability, accuracy, and precision, and what are the reliability, accuracy, and precision of this technology? 260

255. Text added per comment.

256. Text added per comment.

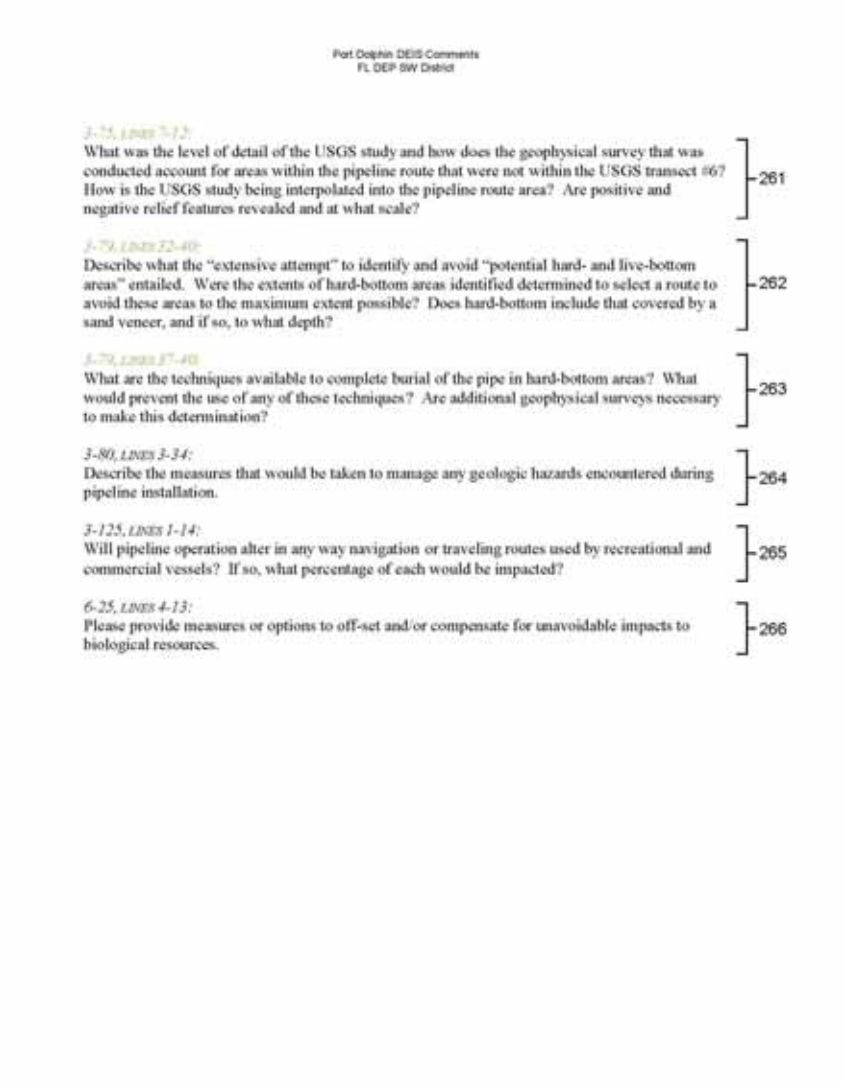
257. Text added to clarify per comment.

258. Limitations are described in Appendix G.

USCG requested input from FDEP and FWC to identify species "whose populations are known to directly affect commercially and recreationally important species." In January 2008, FWC submitted a list of 4 species, and two of those species were included in an expanded ichthyoplankton impact assessment, as described in the EIS. An additional species was added in response to comments on the Draft EIS. The revised ichthyoplankton analysis can be found in Section 4.2.1.11 and Appendix G. The methodology is described in Appendix G.

259. Yes. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route is described in Section 2.1 and sand resources are discussed in Sections 3.4 and 4.4.

260. Surveys were conducted in accordance with MMS criteria.



Port Dolphin DEIS Comments
FL DEP SW District

3-75, LINES 7-12:
What was the level of detail of the USGS study and how does the geophysical survey that was conducted account for areas within the pipeline route that were not within the USGS transect #6? How is the USGS study being interpolated into the pipeline route area? Are positive and negative relief features revealed and at what scale? 261

3-79, LINES 32-40:
Describe what the "extensive attempt" to identify and avoid "potential hard- and live-bottom areas" entailed. Were the extents of hard-bottom areas identified determined to select a route to avoid these areas to the maximum extent possible? Does hard-bottom include that covered by a sand veneer, and if so, to what depth? 262

3-79, LINES 37-40:
What are the techniques available to complete burial of the pipe in hard-bottom areas? What would prevent the use of any of these techniques? Are additional geophysical surveys necessary to make this determination? 263

3-80, LINES 3-34:
Describe the measures that would be taken to manage any geologic hazards encountered during pipeline installation. 264

3-125, LINES 1-14:
Will pipeline operation alter in any way navigation or traveling routes used by recreational and commercial vessels? If so, what percentage of each would be impacted? 265

6-25, LINES 4-13:
Please provide measures or options to off-set and/or compensate for unavoidable impacts to biological resources. 266

261. The geophysical survey information are discussed in Sections 4.3.1 and 4.5.1.1 and available electronically via the Federal Docket Management System (*www.regulations.gov*), Docket No. USCG-2007-28532.

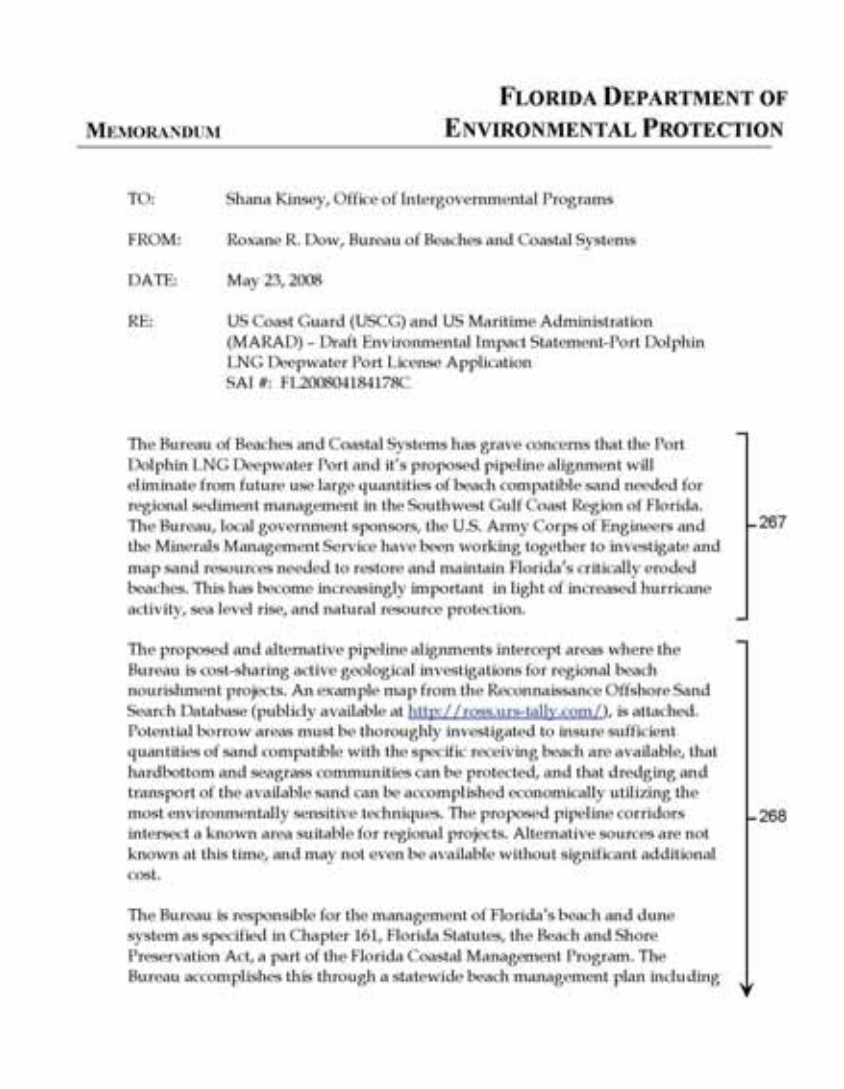
262. Text added per comment

263. Burial techniques are discussed in the Application and the Final EIS in Section 2.2.11.

264. Text added to reflect comment.

265. No, pipeline operation will not impact vessel operation.

266. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements would be developed after a license is issued.



MEMORANDUM **FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION**

TO: Shana Kinsey, Office of Intergovernmental Programs

FROM: Roxane R. Dow, Bureau of Beaches and Coastal Systems

DATE: May 23, 2008

RE: US Coast Guard (USCG) and US Maritime Administration (MARAD) – Draft Environmental Impact Statement-Port Dolphin LNG Deepwater Port License Application
SAI #: FL200804184178C

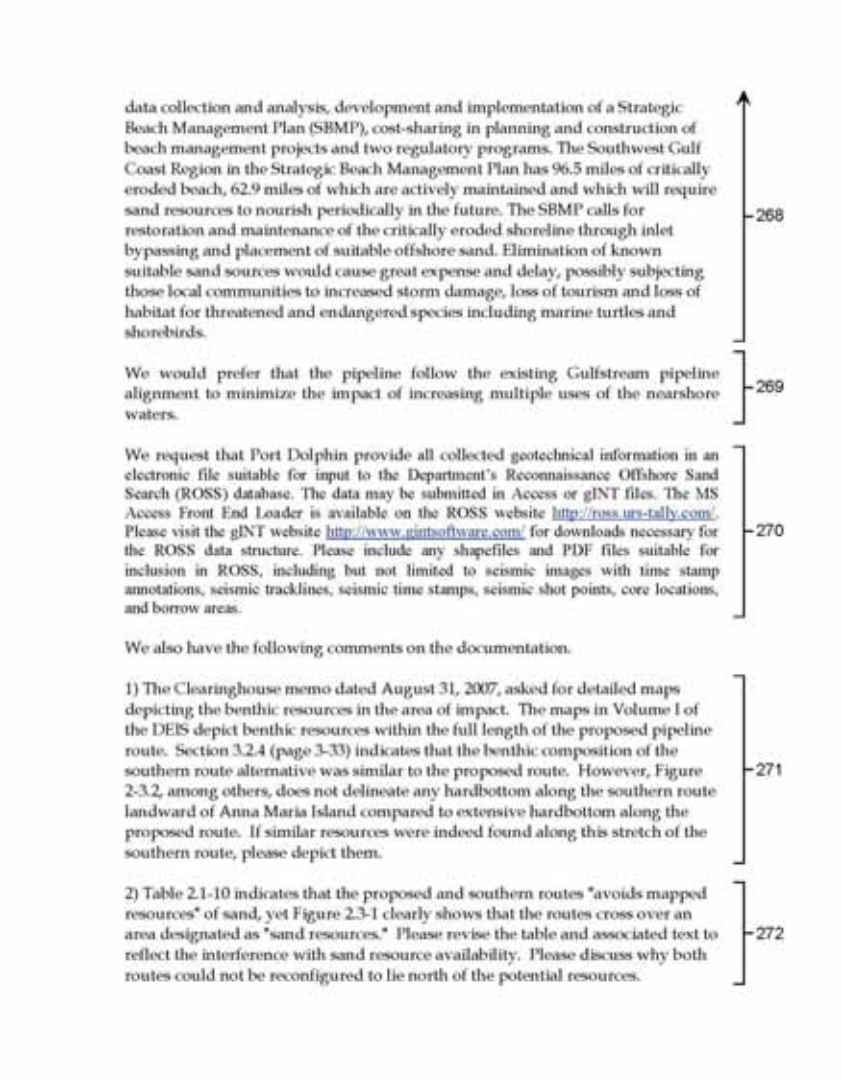
The Bureau of Beaches and Coastal Systems has grave concerns that the Port Dolphin LNG Deepwater Port and it's proposed pipeline alignment will eliminate from future use large quantities of beach compatible sand needed for regional sediment management in the Southwest Gulf Coast Region of Florida. The Bureau, local government sponsors, the U.S. Army Corps of Engineers and the Minerals Management Service have been working together to investigate and map sand resources needed to restore and maintain Florida's critically eroded beaches. This has become increasingly important in light of increased hurricane activity, sea level rise, and natural resource protection. 267

The proposed and alternative pipeline alignments intercept areas where the Bureau is cost-sharing active geological investigations for regional beach nourishment projects. An example map from the Reconnaissance Offshore Sand Search Database (publicly available at http://ross.urs-tally.com/), is attached. Potential borrow areas must be thoroughly investigated to insure sufficient quantities of sand compatible with the specific receiving beach are available, that hardbottom and seagrass communities can be protected, and that dredging and transport of the available sand can be accomplished economically utilizing the most environmentally sensitive techniques. The proposed pipeline corridors intersect a known area suitable for regional projects. Alternative sources are not known at this time, and may not even be available without significant additional cost. 268

The Bureau is responsible for the management of Florida's beach and dune system as specified in Chapter 161, Florida Statutes, the Beach and Shore Preservation Act, a part of the Florida Coastal Management Program. The Bureau accomplishes this through a statewide beach management plan including

267. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route is described in Section 2.1 and sand resources are discussed in Sections 3.4 and 4.4.

268. In response to public comments the Applicant revised the proposed pipeline route to avoid permitted sand resources. Please see the discussion in Sections 2.1.4.6, 3.3 and 4.3.



data collection and analysis, development and implementation of a Strategic Beach Management Plan (SBMP), cost-sharing in planning and construction of beach management projects and two regulatory programs. The Southwest Gulf Coast Region in the Strategic Beach Management Plan has 96.5 miles of critically eroded beach, 62.9 miles of which are actively maintained and which will require sand resources to nourish periodically in the future. The SBMP calls for restoration and maintenance of the critically eroded shoreline through inlet bypassing and placement of suitable offshore sand. Elimination of known suitable sand sources would cause great expense and delay, possibly subjecting those local communities to increased storm damage, loss of tourism and loss of habitat for threatened and endangered species including marine turtles and shorebirds.

268

We would prefer that the pipeline follow the existing Gulfstream pipeline alignment to minimize the impact of increasing multiple uses of the nearshore waters.

269

We request that Port Dolphin provide all collected geotechnical information in an electronic file suitable for input to the Department's Reconnaissance Offshore Sand Search (ROSS) database. The data may be submitted in Access or gINT files. The MS Access Front End Loader is available on the ROSS website http://ross.urs-tally.com/. Please visit the gINT website http://www.gintsoftware.com/ for downloads necessary for the ROSS data structure. Please include any shapefiles and PDF files suitable for inclusion in ROSS, including but not limited to seismic images with time stamp annotations, seismic tracklines, seismic time stamps, seismic shot points, core locations, and borrow areas.

270

We also have the following comments on the documentation.

1) The Clearinghouse memo dated August 31, 2007, asked for detailed maps depicting the benthic resources in the area of impact. The maps in Volume I of the DEIS depict benthic resources within the full length of the proposed pipeline route. Section 3.2.4 (page 3-33) indicates that the benthic composition of the southern route alternative was similar to the proposed route. However, Figure 2-3.2, among others, does not delineate any hardbottom along the southern route landward of Anna Maria Island compared to extensive hardbottom along the proposed route. If similar resources were indeed found along this stretch of the southern route, please depict them.

271

2) Table 2.1-10 indicates that the proposed and southern routes "avoids mapped resources" of sand, yet Figure 2.3-1 clearly shows that the routes cross over an area designated as "sand resources." Please revise the table and associated text to reflect the interference with sand resource availability. Please discuss why both routes could not be reconfigured to lie north of the potential resources.

272

269. Evaluation of an alternative route parallel to the Gulfstream Pipeline is included in Section 2.1.4.6.

270. This request should be made directly to the Applicant. All publicly available data submitted to USCG is available electronically via the Federal Docket Management System (*www.regulations.gov*), Docket No. USCG-2007-28532.

271. Updated detailed maps have been added to the Final EIS.

272. Table revised per comment. Discussion of alternative pipeline routes is included in Section 2.1.4.6.

3) The DEIS notes that directional drilling (HDD) will be used to avoid resources at the land-approach, but would be impractical to utilize for most of the route. However, Section 2.1.1.8 (page 2-26) says "as with the nearshore to onshore transition that the Applicant has proposed to directional drill, some pipeline segments could be installed using direction drillling if particularly sensitive habitat areas would be traversed." Based on the Applicant's benthic survey, please identify the sections that might be considered particularly sensitive and/or help reduce the most substantial portion of impact to exposed hardbottom resources. The results of this analysis could be included in the "Benthic Habitat Impact Mitigation" section on pages 4-139 — 273

4) The Clearinghouse memo dated August 31, 2007, recommends that the DEIS discuss mitigation for unavoidable habitat. The "Benthic Habitat Impact Mitigation" section on page 4-139 discusses minimization and avoidance efforts, but only loosely states that "A Mitigation Plan to compensate for unavoidable impacts on hard bottom would be developed during the permitting process." More specific alternatives should be developed prior to submittal of the permit application, perhaps in conjunction with a pre-application meeting. When eveloping mitigation strategies, be advised that newly exposed hardbottom in the Tampa area may facilitate colonization by the invasive, exotic green mussel, which could reduce or negate the value of some mitigation strategies. — 274

5) References to the Department of Natural Resources should be corrected to the Department of Environmental Protection. — 275

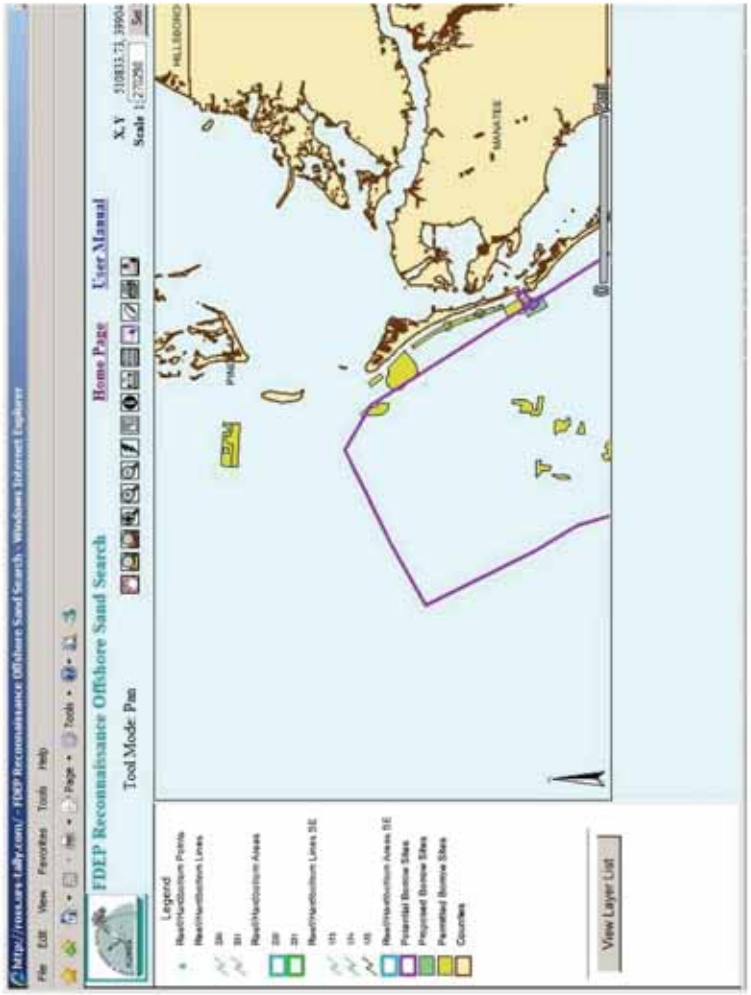
Thank you for the opportunity to comment. Should you have any questions, please do not hesitate to call.

cc. Michael Barnett
Paden Woodruff
Jennifer Koch
Steve MacLeod
Catherine Florko

273. Text revised to clarify. Because hard bottom areas are dispersed along the proposed pipeline route, it would not be practical to use HDD to avoid impacts to hard bottom areas (See Section 4.2.1.6). Construction methods proposed by the applicant have been evaluated based on geotechnical data and impacts to hard bottom areas have been minimized. The values in Section 4.2.1.7 and the BA have been made consistent.

274. If a License is issued by the Maritime Administration and USCG, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies (see Section 4.11). Specific mitigation and monitoring requirements would be developed after a license is issued.

275. Text changed per comment.


FDEP Reconnaissance Offshore Sand Search
Home Page
User Manual
Tool Mode: Pan
X,Y
Scale
Legend
Potential Borrow Sites
Proposed Borrow Sites
Permitted Borrow Sites
Counties
View Layer List
MANATEE
HILLSBORO

From: Arthur, Jonathan
To: Kinsey, Shana; Tucker, Debby;
cc: Hoenstine, Ron (FGS); Scott, Thomas;
Subject: RE: SAI#: FL200804184178C -- Port Dolphin LNG Deepwater Port Draft Environmental Impact Statement
Date: Sunday, May 18, 2008 3:53:59 PM

Shana and Debbie,

Here is the FGS staff review of the EIS:

In response to FGS's prior concern for the potential impact of the proposed pipeline route: The draft EIS states that "Minor direct adverse impacts from port and offshore pipeline installation would be expected. Impacts would be localized and short-term. Subsea sediments are the primary geological resource that would be affected by the Project." It also states that "No sensitive geological resources were identified."
"The potential sand source area located to the south of the Tampa Bay Inlet identified as a 'potential borrow site' is based on information derived from an earlier study conducted by the Reconnaissance Offshore Sand Search (ROSS) project (Hatchett et al. 2006). The preferred pipeline route crosses the extreme northern edge of this potential sand resource. Assuming that the northern boundary of the sandy area is precise, the proposed pipeline route 'footprint' would only affect an extremely negligible area when compared with the overall sand harvest areas ..."
Specifically, "The total area of sequestered sand from the Port Dolphin pipeline passing through this potential sand source area was calculated by measuring the length of the route multiplied by a 50 feet wide corridor. This allows for a 25 feet buffer zone on either side of the pipeline, which would be unavailable as a sand resource area for the operating lifetime of the proposed pipeline system. This impact area was determined to be 2,219,650 sq. ft. (50.9 acres). When compared with a total available sand source area of 7,471,689,697 sq. ft. or 171,526 acres, the proposed pipeline route would only impact 0.03% of these potential sand source areas."
They provided the following estimate of the volume of sequestered sediments that potentially could be used for beach restoration, "...395,576 cubic yards of the potential 901,863,600 cubic yards available, or 0.04% of the potential volume available within the entire potential area." These estimates indicate that the volume of beach restoration quality sediments potentially sequestered by the project would be considered "de minimis", i.e. insignificant.
The other FGS issue concerning the impact on potential submarine springs that may be present along the pipeline route was addressed in the EIS in a review of the sub-bottom profiler data. Specifically, the FGS suggested that the investigators look for occurrences that might match or perhaps resemble a panhandle sub-bottom profiler data example of a suspected occurrence the FGS provided. Concerning the possible presence of fresh water submarine springs, the contractor (T. Baker Smith Inc) has stated that an examination of the sub-bottom data shows no evidence supporting the existence of fresh water submarine springs.
While it is not indicated that the investigators revisited the side scan sonar and bathymetric data collected prior to responding to FGS's second set of comments, it is reasonable to assume that any feature potentially associated with a submarine spring evidenced on those data would have been significant enough in areal extent to have been noted in their initial data review and investigated by them at that time.
We have no additional unresolved issues regarding the draft EIS. FGS would request that any additional geological and geophysical data collected in support of the Project be made available for the FGS Data Repository and to be contacted when such data as has been supplied is no longer considered proprietary. 276

276. Comment noted.

Please contact Dr. Ron Hoenstine if you have any questions about the review.

Thanks,

Jon Arthur
Acting Director, Florida Geological Survey
Florida Department of Environmental Protection

From: Kinsey, Shana
Sent: Tuesday, April 22, 2008 3:09 PM
To: Arthur, Jonathan; Ballenson, Stephanie; 'Bob Stetler'; Brian Teeple; Brown, Tiana D.; Dow, Roxane; Downs, Mike; Erin McDevitt; Farley, Mike; fgaske@dos.state.fl.us; Garrett, Ed; GEORGE.HENDERSON@FWC.STATE.FL.US; Getzoff, Deborah; 'Gil Mcrae'; Gregg, Lisa; Harvey, Taryn; 'Holly Greening'; Johansson, Ilsa; Johnna.Mattson@dca.state.fl.us; 'Jonathan Steverson'; Kahn, Joseph; 'Keisha Rice'; Kendall, Donna; Kovach, Charles; 'Laura Kammerer'; 'Lisa Stone'; MacLeod, Steven; Manny Pumariega; Mark Leiby; 'Mary Ann Poole'; Michaels, Harry; Pierson, Dennis; 'Ray Eubanks'; 'Richard Garrity'; Runnels, Randy; Schmidt, Walt; 'Sherman Wilhelm'; Susac, Jeremy; Ted Forsgren; 'Terri Behling'; Vorstadt, Bill; 'Wayne Swingle'; Wieczynski, Phil; Woodruff, Paden
Cc: Fitzwater, Jennifer; Griffin, Lynn; Tucker, Debby; Palmer, Mollie; Milligan, Lauren
Subject: SAI#: FL200804184178C -- Port Dolphin LNG Deepwater Port Draft Environmental Impact Statement
Importance: High

All

Please see attached memo concerning the availability of the draft environmental impact statement for the Port Dolphin Liquefied Natural Gas Deepwater Port that is proposed off of Florida, approximately 28 miles southwest of Tampa Bay. Please note, the deadline for comments is **Tuesday, May 20, 2008.**

If you have any trouble reading the attached memo or any further questions, please contact me.

Thank you for your assistance.

Shana Kinsey

Shana Kinsey
Environmental Specialist II
Office of Intergovernmental Programs
Florida Dept. of Environmental Protection
3900 Commonwealth Blvd. M.S. 47
Tallahassee, FL 32399-3000
Phone: (850) 245-2163
Fax: (850) 245-2191

From: Kahn, Joseph
To: Kinsey, Shana;
cc: Gaskin, Carla A.;
Subject: RE: Port Dolphin DEIS comments
Date: Wednesday, May 21, 2008 6:02:07 PM
Attachments: FW Comments on Dolphin LNG.msg

Shana,

Thank you for the reminder message. We put together some short comments from the air division and forwarded them to Carla on May 12. I've attached that message with our comments. The division's comments are really just items 1 and 2, with the related attachment to which item 1 refers. Please let me know if you have any questions.

Joe

From: Kinsey, Shana
Sent: Wednesday, May 21, 2008 1:18 PM
To: Kahn, Joseph
Subject: Port Dolphin DEIS comments

Joe
I was wondering if your section had any comments on the Port Dolphin DEIS. I fyou do I will need the asap. I am trying to put together the letter and it will have to be approved before sending it off to MARAD/Coast Guard.

If you have any questions let me know.
Thanks
Shana

Shana Kinsey
Environmental Specialist II
Office of Intergovernmental Programs
Florida Dept. of Environmental Protection
3900 Commonwealth Blvd. M.S. 47
Tallahassee, FL 32399-3000
Phone: (850) 245-2163

From: Kahn, Joseph
To: Gaskin, Carla A.;
cc: Drew, Mimi; Pennington, Judith A.; Fillingim, Mary; Vielhauer, Trina;
Subject: FW: Comments on Dolphin LNG
Date: Monday, May 12, 2008 9:51:07 AM
Attachments: Comments on Dolphin LNG.msg

Carla,

Attached are comments from DARM on the Dolphin LNG proposal. Basically, we are asking the project's developer to completely evaluate the use of ambient air vaporization, and to consider a pilot project to demonstrate the technology. Are you consolidating regulatory comments to pass on to the Office of Intergovernmental Programs? Please let me or Trina know if you have any questions. Thanks.

Joe

From: Vielhauer, Trina
To: Kahn, Joseph; Ferris, Julie;
cc: Fillingim, Mary;
Subject: Comments on Dolphin LNG
Date: Monday, May 12, 2008 9:02:33 AM
Attachments: Mustang - Smart Air Vaporization Presentation_05May08.pdf

Joe,

The CO2 emission projections from the Dolphin project are 900,000 metric tons/ year. We don't have concerns on the BACT proposal.

The email below is an estimate for ambient air vaporization for the Calypso project. We should ask the Dolphin folks about this as well:

1. Attached, please find a presentation about an ambient air vaporization technology called smart air vaporization. This technology appears to be technically feasible. Please evaluate the use of this technology, costs and its impact on air emissions (e.g. NOx, CO and CO2) for this project.

2. Please explain the feasibility of a pilot project for ambient air vaporization. Please provide cost estimates and emission reductions that would be achieved for such a project (e.g. NOx, CO and CO2).

This is the discussion contained in the Dolphin application if you wanted to read it:

AAV technology blows ambient air down through finned tubes that contain LNG to regasify the liquid.

Large surface areas are needed to achieve the required heat transfer rates. Because of space constraints on

SRVs, air vaporization is not technically feasible without supplemental heating in addition to the ambient

air. Supplemental heating would require either open- or closed-loop vaporization, reducing some of the

benefits of using AAV as the vaporization system. The applicant for the Ocean Way Project in California

has proposed to use purpose built vessels called Regasification LNG

Carriers (RLNGCs) that would use

AAV as the principal heat source for vaporization. Each vessel would have AAV modules installed to

supplement heat available from the propulsion and power generation waste heat systems. The AAV and

waste heat recovery would be capable of providing 90 percent of the energy required to vaporize the LNG

at rates comparable to those required for Port Dolphin. Supplemental heating from combustion of boil-off

gas would also be necessary. However, the Ocean Way vessels would be designed for operation at or

near the port site. LNG would be transported from its origination points to the port site in conventional

LNGCs and transferred to the RLNGC. The RLNGC would then moor with an unloading buoy, vaporize,

and send out the natural gas. The RLNGC would be limited to a top speed of 15 knots, and it is not clear

from available information if it would be capable of open ocean crossings during heavy weather

conditions because of the heavy topside structures required to house the AAV modules (OceanWay

2007). The RLNGC has not been commercially proven for applications that require a vessel that can

transport LNG from an overseas liquefaction facility to the port and vaporize the LNG using onboard

equipment. Therefore, air vaporization is not considered further.

FROM: Linero, Alvaro
SENT: Sunday, May 11, 2008 9:10 AM
TO: Ferris, Julie; Veazey, Sandra; Wong, Robert; Arif, Syed; Vielhauer, Trina
SUBJECT: FW: Mustang Smart Air Vaporization Process, SAV

Julie.

Here is the cost estimate for the pilot LNG system that we included in the items for mitigation on the Calypso project.

Trina, Sandra, Robert.

This may also relate to the Dolphin application (that I have simply not read) and which requires comment by May 20.

Will need an updated asssessment regarding the feasibility of air varization so Trina/Sandra/Julie will know from whom to collect comments when our Intergovernmental Afaairs people ask for them.

Thanks.

Al.

-----Original Message-----
FROM: Hubbard, Brad [mailto:Brad.Hubbard@mustangeng.com]
SENT: Mon 5/5/2008 4:33 PM
TO: Linero, Alvaro; Arif, Syed
CC: Mariott, Carol; Trocquet, Bryan; Franklin, David; Baudat, Ned
SUBJECT: Mustang Smart Air Vaporization Process, SAV

Dear Sayed,

Thank-you for taking our call today. Al Linero and Bryan Trocquet have been trading emails on the idea of a pilot plant test with Mustang's Smart Air Vaporization (SAV) on an offshore LNG FSRU and asked that we respond by mid-May.

As discussed in our telecom a pilot plant test is feasible and the cost for the installed facilities would be on the order of $2 mm. We made this high level

estimate on the following basis:

- 1 each 2-fan air heater unit good for vaporizing 20 mmscfd of LNG
- 1 each vaporizer, shell and tube
- 1 each potassium formate (KF) pump to circulate the KF intermediate fluid
- 1 each KF surge tank

The Mustang Smart Air Vaporization is presently being installed in the Trunkline LNG regas terminal in Lake Charles for a vaporization capacity of 2.1 bcfd. The primary advantage of the SAV is that heat for LNG vaporization is taken from the air which eliminates the need to burn gas for heat and avoids the cost and air emissions associated with that. Attached is a presentation that explains SAV. We have proposed SAV for several floating applications and we know it will work on a LNG FSRU.

We would be pleased to meet with you and explain our technology.

We have a small SAV demonstration plant here in Houston that we have used to test performance over the past few years and have developed confidence that we can predict the SAV behavior for any site onshore or offshore. All we need is the historical air temperature and relative humidity for the location. It is very likely that 100% of the heat of vaporization could be obtained from the air for the Florida east coast and west coast offshore locations.

Please call if we can be of further assistance.

Brad Hubbard
Director Technology Dev., Midstream
Mustang Engineering
Off. 713 215 8384
Cell 713 294 2898

Mustang in Midstream



LNG Smart®
Air Vaporization

Outline

- Mustang & Wood Group - An Overview
- LNG Smart® Technologies
- LNG Smart® Air Vaporization (SAV)
- SAV Offshore
- Our Team

Who is Mustang?

- Founded 1987 in Houston, Texas
- Joined Wood Group in 2000
- Business focus – Engineering and Project Management services for the petroleum, chemical, and manufacturing industries worldwide.

Mustang can take your project from Concept to Operations Support

MUSTANG Growth - Personnel



6500 projects for over 350 clients

20 consecutive years of growth

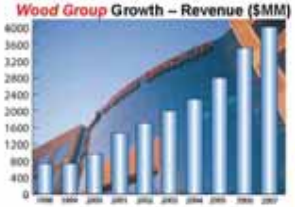
4300+ Personnel

Mustang in the Wood Group



- Headquarters: Aberdeen, Scotland
- 2007 Revenues: $4.4 billion
- Successful IPO in June 2002
- World-Wide Employment over 24,000
- Operations in 46 countries
- Primary Markets: Oil & Gas and Power Industries

Wood Group Growth – Revenue ($MM)






MUSTANG
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WG Corporate HQ
Aberdeen, Scotland
JIX
KCI
SIMCO
MEAL & MASSY
Sigma3
Rolls Wood Group


MUSTANG
Mustang Business Units
We provide Engineering Design and Project Management services and technology to the global petroleum industry.
Upstream Oil & Gas
Midstream
Process Plants
Pipeline
Process & Industrial
Automation


MUSTANG
Midstream Scope of Services
• Conceptual / Economic Studies
• Technical Evaluations
• Front End Engineering Design
• Process Packages for Proprietary Technologies
• Equipment Procurement, Construction Management
• Commissioning and Start-up
• Owner's Engineer


MUSTANG
LNG Smart®
Technologies

Mustang LNG Smart® Technologies

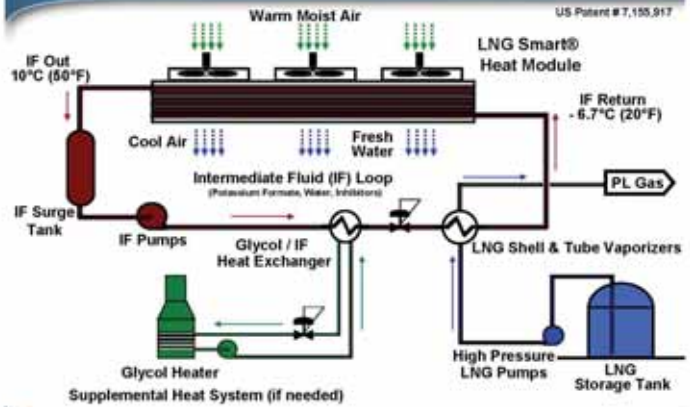
1. **Smart Air Vaporization (SAV)** (Patent #7,155,917)
   - Minimum fuel gas usage
   - Minimum air emissions, NOx, CO, CO_2
   - No seawater usage
   - Better life cycle value compared to gas fired
2. **Horizontal LNG Tanks** (Patent #7,146,817)
   - Competitive small scale option
   - Schedule and cost advantages
3. **LNG Liquefaction Processes** (Patent # 7,225,636)
   - Open-cycle turbo-expander
   - Inlet gas used as refrigerant
   - Simplicity and flexibility of operation
4. **Floating LNG Regas & Liq.** (Patent #7,318, 319)
   - Small Scale, Short Haul business model
   - Near shore and offshore applications
5. **NGL Recovery Integrated with LNG Regas**
   - Controls BTU content, created additional revenue stream
   - Saves gas compressor equipment costs
   - Saves compression OPEX, emissions & vaporization duty



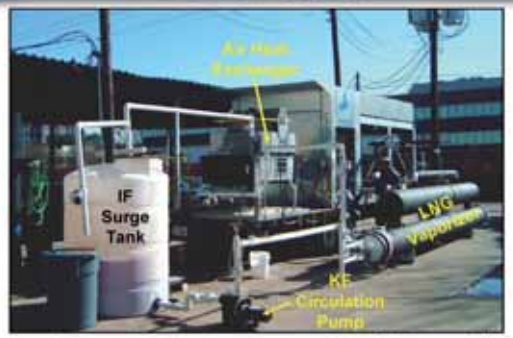


LNG Smart®
Air Vaporization (SAV)

LNG Smart® - SAV System



Technology Assurance – SAV Pilot Plant



- ΔP across coils same for full scale
- Fin fan unit size scale factor = 1/23
- Uses same intermediate fluid (IF)
- Same intermediate fluid flow rate per tube
- Same air flow per tube
- Same coil configuration / arrangement
- Same coil diameter and length

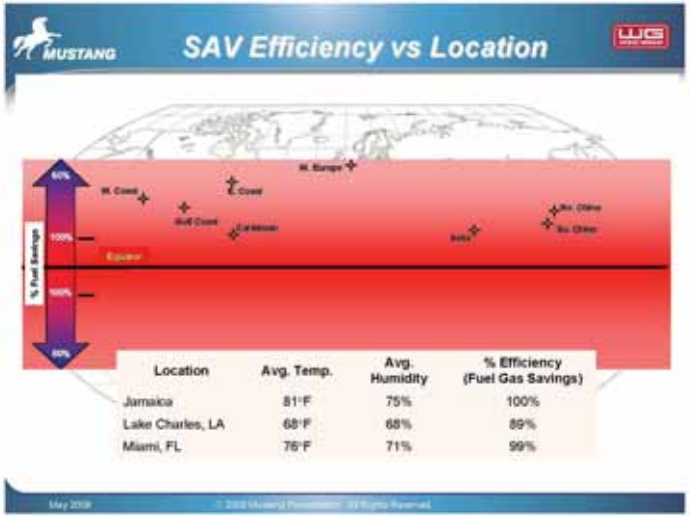


SAV vs SCV Emissions

Vaporization System	Gas Burned to Vaporize LNG	NOx Tons/yr	CO Tons/yr	CO_2 Tons/yr
Gas Burning System (SCV)	100%	68	207	299,510
LNG Smart® Air Vaporization	13%	5.4	6.3	65,370
Total Emissions Savings	-	62.6	200.7	234,140

Basis: *1.0 bscfd Gas Send-Out Rate*
600 mmbtu/hr Heat Rate to Vaporize LNG

Example for 87% Annual Composite Efficiency with SAV



Regas Technology Comparison

1bscfd (28.32million m³/day)		ORVs	AAV	SCVs	LNG Smart®
Number of Units		6	9	6	32
Total Installed Cost		$70MM	$67MM	$61MM	$52MM
Fuel Gas Consumption (1.3% to 1.5% of send out)		0	0	13 mmscfd	0
Horse Power Required		6,500	4,750	4,100	6,840
Power / Fuel Cost (Cost of gas basis $6/mmBtu)		$3.6MM	$3.4MM	$30.7MM	$3.8MM
Water Flow Rate	gpm	130,000	380	140	690
	m³/min	492	1.43	0.53	2.6
Total Plot Area	ft²	23,500	25,000	26,950	45,400
	m²	2,160	2,322	2,513	4,140

- *For 100% back up heat for the LNG Smart® Vaporization System add $17MM*
- *Source: Hydrocarbon Processing Magazine (Jan 06)*

Trunkline LNG Infrastructure Enhancement

Mustang is performing engineering, procurement, and construction management services

1st commercialization of the SAV process with NGL extraction

- 2.1 bscfd natural gas send-out rate
- 90% of heat duty from ambient air
- 90% reduction in air emissions
- 80,000 bpd ethane+ NGL recovery unit, BTU control
- Scheduled start-up Q4 2008



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SAV Offshore

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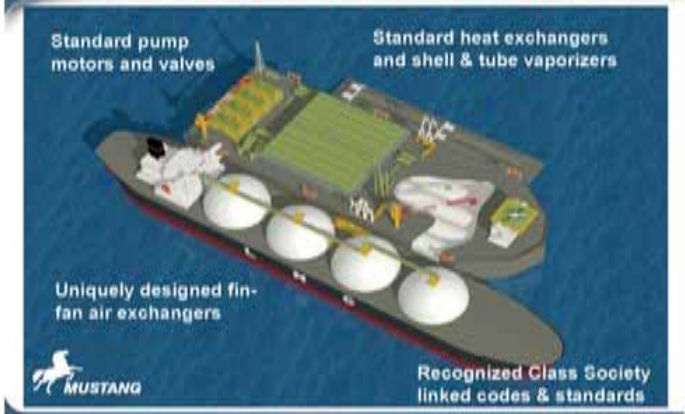
SAV Offshore - Equipment Industry Proven



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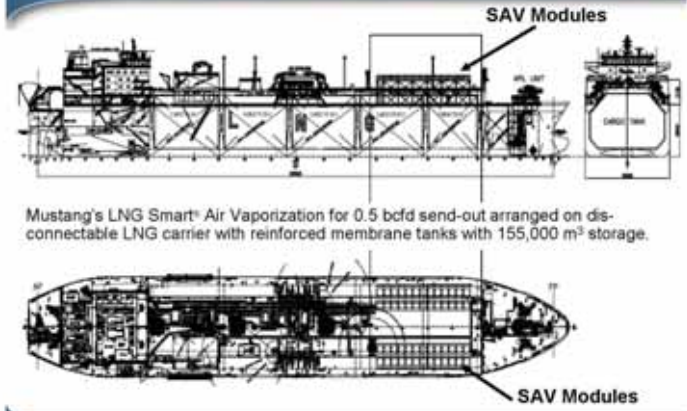
LNG Smart® Air Vaporization (SAV) on LNG Carrier – Reinforced Membrane Tank



Mustang's LNG Smart® Air Vaporization for 0.5 bcfd send-out arranged on dis-connectable LNG carrier with reinforced membrane tanks with 155,000 m³ storage.

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LNG Smart® - DNV AIP



Det Norske Veritas'
Approval in Principle certificate
for the LNG Smart®
Air Vaporization process

Det Norske Veritas' General Manager-Offshore Classification, Antony D'Souza, presenting Mustang's Scott Worthington, Midstream Vice President, with the AIP Certificate.

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SAV Benefits Summary

- Cost savings over fuel gas burning systems
- Reduces air emissions significantly
- Uses no sea water
- Horsepower requirements comparable to SCV and ORV
- Area requirements comparable to SCV
- Suitable for onshore or offshore facilities
- Condenses moisture from air – dehumidifier, defogger
- Allows for NGL extraction integration and flexible BTU control

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Contact Information



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Mustang is a wholly owned subsidiary of international energy services company John Wood Group PLC. Mustang has offices in Houston TX, Birmingham AL, Savannah GA, Monroe LA, Martinez CA, Philadelphia PA, Greenville SC, Wilmington DE, and international offices in Perth, Melbourne, Mumbai, and London.

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or visit our website at:
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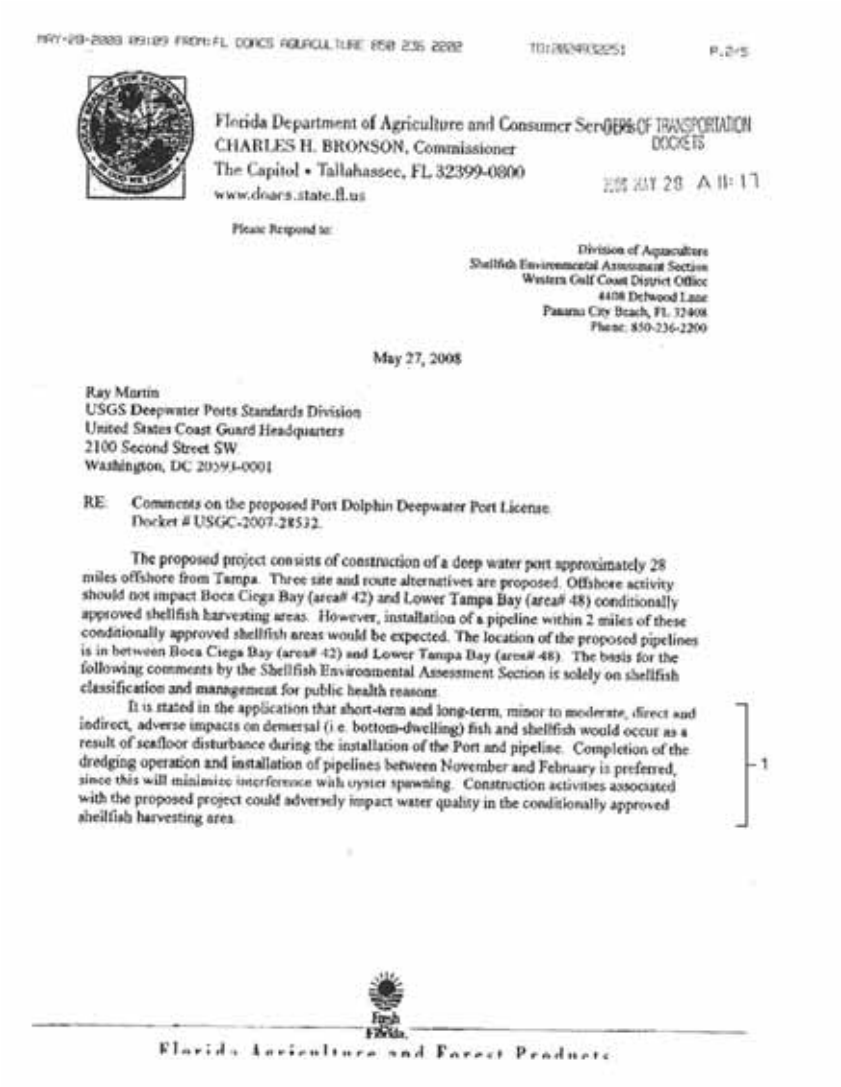


MAY-28-2008 09:09 FROM:FL DOACS AQUACULTURE 850 236 2202 TO:2024932251 P.2/5

Florida Department of Agriculture and Consumer Services
CHARLES H. BRONSON, Commissioner
The Capitol • Tallahassee, FL 32399-0800
www.doacs.state.fl.us

OFFICE OF TRANSPORTATION DOCKETS
2008 MAY 28 A 11:17

Please Respond to:

Division of Aquaculture
Shellfish Environmental Assessment Section
Western Gulf Coast District Office
4408 Delwood Lane
Panama City Beach, FL 32408
Phone: 850-236-2200

May 27, 2008

Ray Martin
USGS Deepwater Ports Standards Division
United States Coast Guard Headquarters
2100 Second Street SW
Washington, DC 20593-0001

RE: Comments on the proposed Port Dolphin Deepwater Port License
Docket # USGC-2007-28532.

The proposed project consists of construction of a deep water port approximately 28 miles offshore from Tampa. Three site and route alternatives are proposed. Offshore activity should not impact Boca Ciega Bay (area# 42) and Lower Tampa Bay (area# 48) conditionally approved shellfish harvesting areas. However, installation of a pipeline within 2 miles of these conditionally approved shellfish areas would be expected. The location of the proposed pipelines is in between Boca Ciega Bay (area# 42) and Lower Tampa Bay (area# 48). The basis for the following comments by the Shellfish Environmental Assessment Section is solely on shellfish classification and management for public health reasons.

It is stated in the application that short-term and long-term, minor to moderate, direct and indirect, adverse impacts on demersal (i.e. bottom-dwelling) fish and shellfish would occur as a result of seafloor disturbance during the installation of the Port and pipeline. Completion of the dredging operation and installation of pipelines between November and February is preferred, since this will minimize interference with oyster spawning. Construction activities associated with the proposed project could adversely impact water quality in the conditionally approved shellfish harvesting area. 1

Fresh Florida.

Florida Agriculture and Forest Products

1. Construction of the deepwater port components would be expected to take 11 months, with operations planned to commence in the second quarter of 2011. Under this timetable, the months of November through February would be utilized for construction activities, which would include dredging and installation of pipelines. Geophysical investigations, including video photography of the proposed pipeline route, did not reveal any shellfish beds in the vicinity of the proposed route (see Section 4.2). Turbidity modeling confirmed that impacts to benthic communities would be short-term and minor.

Please specify in the permit that an adequate number of self-contained sanitary facilities are required in upland areas to prevent contamination of nearby conditionally approved waters. Thank you for the opportunity to comment.]-2

Sincerely,

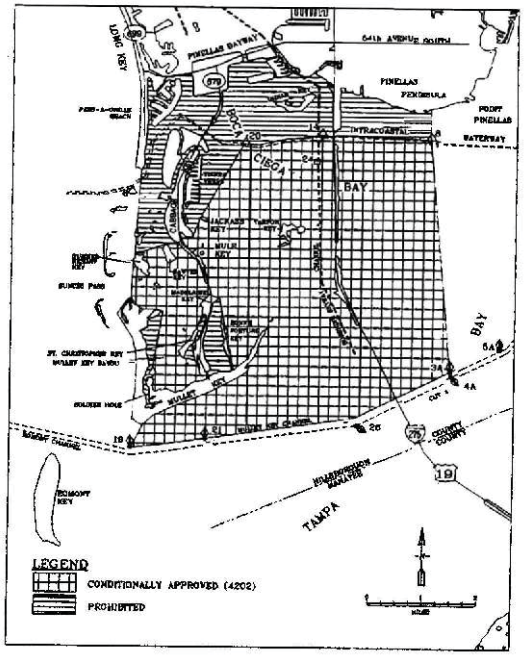
Jill Fleiger
Environmental Specialist II

cc: Chris Brooks

2. FERC would require the contractor to have an Environmental Inspector (EI) as discussed in Section 4.11.3, to monitor water quality during construction. Compliance with state and local sanitary and local sanitary facility regulations would be required.

MAY-28-2008 09:09 FROM:FL DOACS AQUACULTURE 850 236 2202 TO:2024932251 P.4/5

SHELLFISH HARVESTING AREA CLASSIFICATION MAP #42 (Effective, September 28, 2004)
Boca Ciega Bay (#42) Shellfish Harvesting Area in Pinellas and Hillsborough Counties



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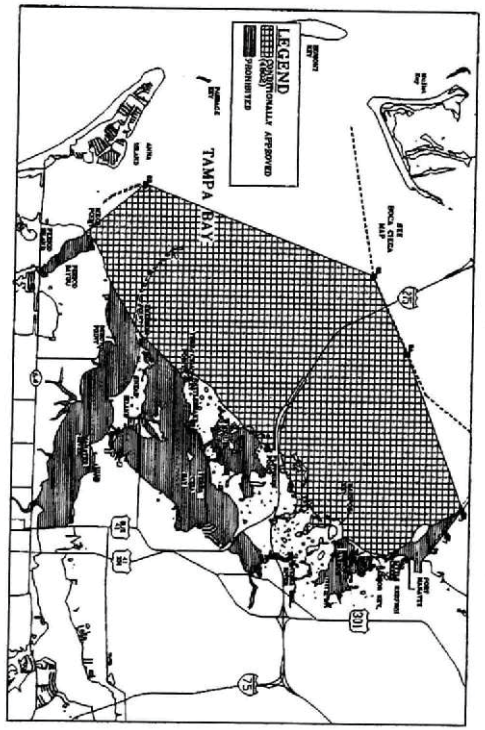


SHELLFISH HARVESTING AREA CLASSIFICATION MAP #48 (Effective: September 28, 2004)
Lower Tampa Bay (#48) Shellfish Harvesting Area #1 Manatee and Hillsborough Counties

GULF STATES MARINE FISHERIES COMMISSION
P.O. Box 726 Ocean Springs MS 39566-0726
(228) 875-5912 • (228) 875-6604 Fax
www.gsmfc.org

Larry B. Simpson
Executive Director

June 2, 2008

Commander Mark A. Prescott
Chief, Deepwater Ports Standards Division
U.S. Coast Guard
2100 Second Street, SW
Washington, DC 20593-0001

Dear Commander Prescott:

The Gulf States Marine Fisheries Commission (Commission) has reviewed the Draft Environmental Impact Statement (DEIS) for license application USCG-2006-28532 for the Port Dolphin Energy Liquefied Natural Gas Deepwater Port. Port Dolphin Energy, LLC proposes to construct a permanently moored unloading buoy system with two submersible buoys along with 42 miles of 36-inch diameter pipeline that would connect the deepwater port with the Gulfstream Natural Gas pipeline in Port Manatee, Florida. The deepwater port would be approximately 28 miles west of Tampa, Florida in 100 feet of water. After careful deliberation, the Commission remains concerned over potential impacts such a project will have on marine fish habitat.]-1

The Commission is an organization of the five states whose coastal waters are the Gulf of Mexico. Established in 1949 by state statutes and authorized under Public Law 81-66, the principal objective of the Commission is the conservation, development, and full utilization of the fishery resources of the Gulf of Mexico to provide food, employment, income, and recreation to the people of the United States. Fifteen commissioners, three from each state, work to set Commission policy related to the conservation and management of fisheries resources in the Gulf of Mexico. One of the most important functions of the Commission is to serve as a forum for the discussion of various estuarine and marine problems and to develop a coordinated policy to address those issues for the betterment of these resources and the public that enjoys them.

Port Dolphin would consist of a permanently moored unloading buoy system with two submersible buoys separated by a distance of approximately 3 miles. The buoys would

-Alabama- -Florida- -Louisiana- -Mississippi- -Texas-

1. Comment Noted. The EFH discussion has been expanded in Appendix H, and impacts to Essential Fish Habitat are discussed in Final EIS Section 4.2.1.13 and in Section 6.2. The Maritime Administration and USCG would require the Applicant conduct monitoring of impacts with regards to EFH and alter operations to mitigate to predicted level of impacts as discussed in the EIS.

be designed to moor a specialized type of liquefied natural gas (LNG) vessel called a Shuttle and Regasification Vessel. A closed-loop, glycol/water-brine heat transfer system would be used to vaporize the liquefied natural gas (LNG). Over the past several years, the Commission has shown concern over LNG facilities proposing to use seawater as heat source in open loop vaporization systems because of their potential impacts on marine fisheries. The Commission is pleased to see that Port Dolphin Energy, LLC has decided to not use seawater as a heat source for their LNG vaporization system. Impacts to marine fisheries should therefore be reduced. -2

The Commission does have concerns about the proposed pipeline route from the deepwater port into Port Manatee. The applicant's benthic survey of the pipeline route indicated that approximately 2,137 acres of hard bottom or live bottom habitat would be impacted by pipeline installation. The benthic survey also indicates that approximately 195 acres of seagrass were located in the pipeline route near Port Manatee. Hard bottom and seagrass serve as high quality habitat for a variety of commercially and recreationally important species. Therefore, the Commission recommends that all impacts to hard bottom and seagrass habitats resulting from pipeline installation be avoided. If impacts are unavoidable, they should be minimized to the extent practicable and be fully mitigated. Long-term monitoring of all mitigation areas should be required to make sure that the mitigation projects are successful. -3

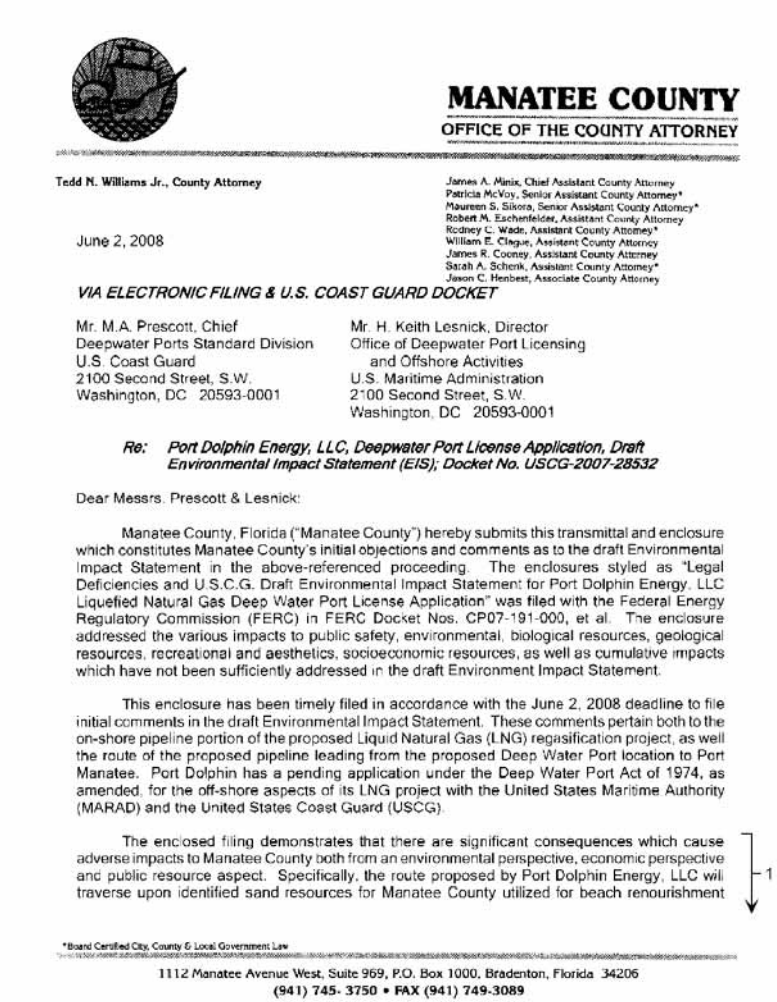
The Commission appreciates the opportunity to provide comments on the DEIS for the Port Dolphin Energy LNG Deepwater Port. If you have any questions regarding our comments, please do not hesitate to contact us.

Sincerely,

Joe Gill
Commission Chairman

2. Comment noted.

3. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements would be developed after a license is issued.



MANATEE COUNTY
OFFICE OF THE COUNTY ATTORNEY

Tedd N. Williams Jr., County Attorney

James A. Minix, Chief Assistant County Attorney
Patricia McVoy, Senior Assistant County Attorney*
Maureen S. Sikora, Senior Assistant County Attorney*
Robert M. Eschenfelder, Assistant County Attorney
Rodney C. Wade, Assistant County Attorney*
William E. Clague, Assistant County Attorney
James R. Cooney, Assistant County Attorney
Sarah A. Schenk, Assistant County Attorney*
Jason C. Henbest, Associate County Attorney

June 2, 2008

VIA ELECTRONIC FILING & U.S. COAST GUARD DOCKET

Mr. M.A. Prescott, Chief
Deepwater Ports Standard Division
U.S. Coast Guard
2100 Second Street, S.W.
Washington, DC 20593-0001

Mr. H. Keith Lesnick, Director
Office of Deepwater Port Licensing
and Offshore Activities
U.S. Maritime Administration
2100 Second Street, S.W.
Washington, DC 20593-0001

Re: Port Dolphin Energy, LLC, Deepwater Port License Application, Draft Environmental Impact Statement (EIS); Docket No. USCG-2007-28532

Dear Messrs. Prescott & Lesnick:

Manatee County, Florida ("Manatee County") hereby submits this transmittal and enclosure which constitutes Manatee County's initial objections and comments as to the draft Environmental Impact Statement in the above-referenced proceeding. The enclosures styled as "Legal Deficiencies and U.S.C.G. Draft Environmental Impact Statement for Port Dolphin Energy, LLC Liquefied Natural Gas Deep Water Port License Application" was filed with the Federal Energy Regulatory Commission (FERC) in FERC Docket Nos. CP07-191-000, et al. The enclosure addressed the various impacts to public safety, environmental, biological resources, geological resources, recreational and aesthetics, socioeconomic resources, as well as cumulative impacts which have not been sufficiently addressed in the draft Environment Impact Statement.

This enclosure has been timely filed in accordance with the June 2, 2008 deadline to file initial comments in the draft Environmental Impact Statement. These comments pertain both to the on-shore pipeline portion of the proposed Liquid Natural Gas (LNG) regasification project, as well the route of the proposed pipeline leading from the proposed Deep Water Port location to Port Manatee. Port Dolphin has a pending application under the Deep Water Port Act of 1974, as amended, for the off-shore aspects of its LNG project with the United States Maritime Authority (MARAD) and the United States Coast Guard (USCG).

The enclosed filing demonstrates that there are significant consequences which cause adverse impacts to Manatee County both from an environmental perspective, economic perspective and public resource aspect. Specifically, the route proposed by Port Dolphin Energy, LLC will traverse upon identified sand resources for Manatee County utilized for beach renourishment

1

*Board Certified City, County & Local Government Law

1112 Manatee Avenue West, Suite 969, P.O. Box 1000, Bradenton, Florida 34206
(941) 745-3750 • FAX (941) 749-3089

1. Alternatives that avoid/reduce impacts on sand resources are discussed in Sections 2.1.4.5 and 2.1.4.6 of the EIS. Impacts from these alternatives are discussed in Sections 4.2.1.6.1, 4.4.1, 4.4.2, 4.5.1, 4.5.2, and 4.9.1.

projects on coastal islands such as Anna Maria Island and specifically public beaches. There are maps attached to the appendix of the enclosure delineating the location of identified mapped sand resources and alternative routes which have not been addressed by Port Dolphin in the draft Environmental Impact Statement. These alternate routes would avoid entirely the identified mapped sand resources and require additional analysis in the draft Environmental Impact Statement. The MARAD/USCG should consider the alternate routes as part of its overall review of the Port Dolphin project and these alternate routes should be addressed in the draft Environmental Impact Statement as required by the National Environmental Policy Act. 1

Manatee County requests that it be served with copies of all communication, notices and issuances associated with the pending proceeding. In this regard, it is requested that such copies be sent to the undersigned:

Sarah A. Schenk, Assistant County Attorney
Manatee County Attorney's Office
1112 Manatee Avenue West, Suite 969
P.O. Box 100
Bradenton, FL 34206
941-745-3750
941-749-3089 (Fax)
sarah.schenk@mymanatee.org

Thank you for your consideration of this transmittal and enclosure. Please let me know if there are any questions.

Respectfully submitted,

Sarah A. Schenk
Assistant County Attorney
Manatee County Attorney's Office
1112 Manatee Avenue West, Suite 969
P.O. Box 100
Bradenton, FL 34206
941-745-3750
941-749-3089 (Fax)
sarah.schenk@mymanatee.org

SAS:mz
Enclosure

cc: Mr. Raymond Martin, U.S. Coast Guard
U.S. Coast Guard Administrative Law Center, Hearing Docket Clerk, Baltimore, MD

DOT Docket No. USCG-2007-28532
ATTN: Ray Martin (CG-5225)
United States Coast Guard
2100 Second Street, S.W.
Washington, DC 20583-0001

-and-

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

In the Matter of:	§	Docket Nos. CP07-191-000
	§	CP07-191-001
Port Dolphin Energy LLC	§	

LEGAL DEFICIENCIES AND U.S.C.G. DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR PORT DOLPHIN ENERGY, LLC LIQUEFIED NATURAL GAS DEEP WATER PORT LICENSE APPLICATION

Manatee County, Florida ("Manatee County") hereby submits this pleading as comments and list of legal insufficiencies in the United States Coast Guard draft Environmental Impact Statement for Port Dolphin LLC Liquefied Natural Gas Deep Water Port License Application. The draft Environmental Impact Statement (DEIS), dated April 2008, pertains both to the off-shore route of the proposed gas line and deep water port as well as the on-shore route entering Manatee County by way of Port Manatee and terminating at a point on-shore within Manatee County, Florida to interconnect with the existing Gulfstream Natural Gas System Pipeline. Manatee County's comments address both the off-shore and the on-shore portions of the proposed pipeline since they are interdependent.

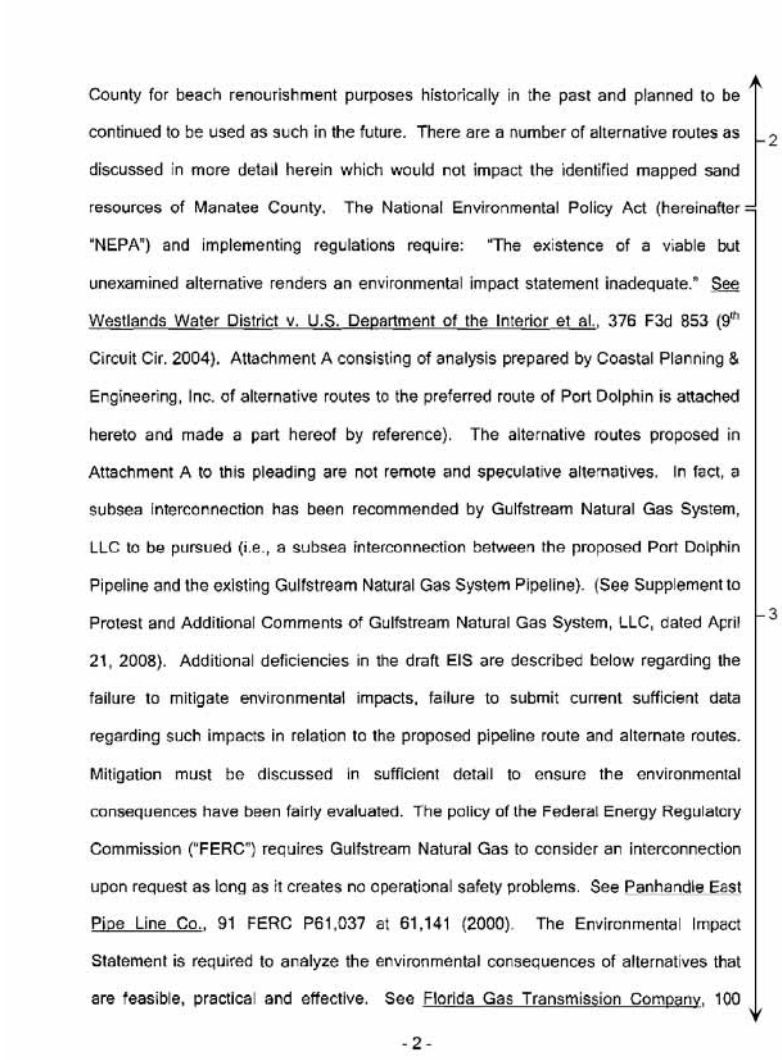
I. **Executive Summary:**

The DEIS is legally insufficient and deficient principally because it fails to address reasonable alternative routes for the pipeline off-shore. Specifically as proposed, the off-shore pipeline route bisects an identified mapped sand resource utilized by Manatee

2

- 1 -

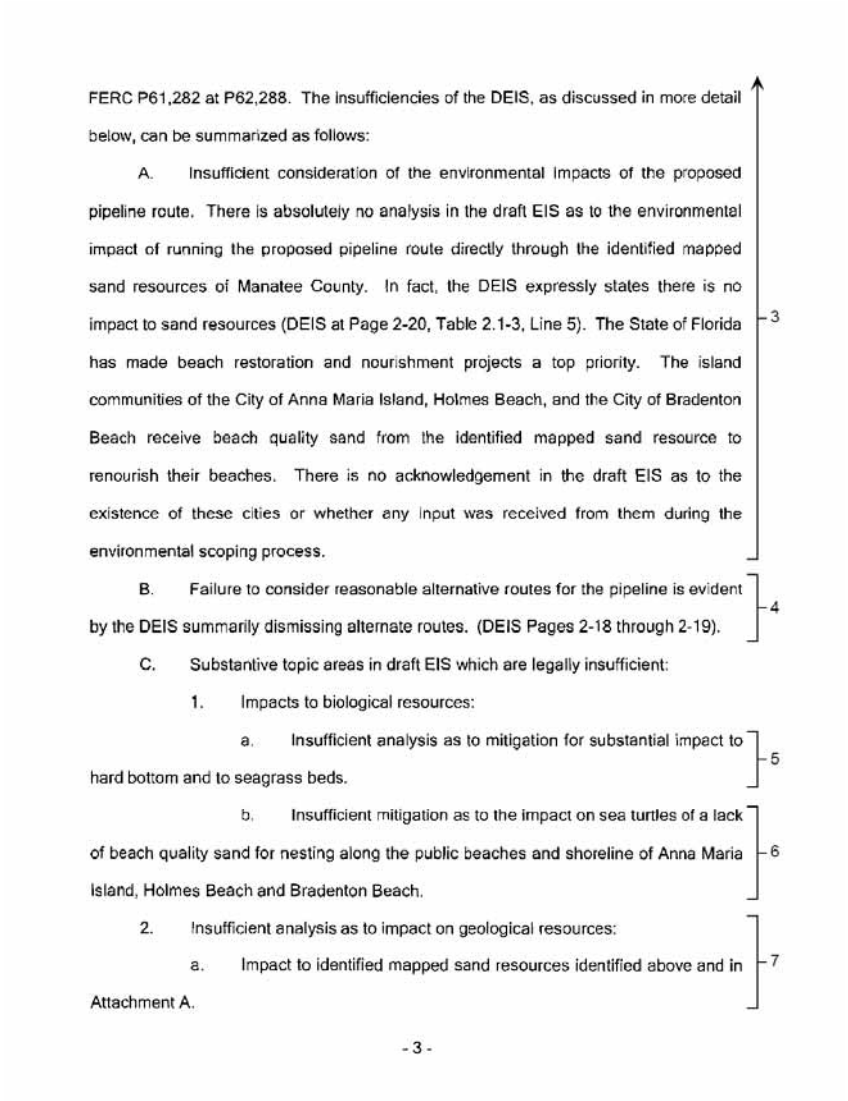
2. Section 2.1 addresses several possible alternatives for the project including three pipeline alternatives, an offshore interconnection to the Gulfstream Interstate Pipeline, and the route proposed by Longboat Key during the public comment period. Furthermore, the Applicant revised the proposed pipeline route to avoid sand resource areas. See the revised pipeline description in Section 2.1.4 of the Final EIS. Sand resources are discussed in Sections 3.4 and 4.4.



County for beach renourishment purposes historically in the past and planned to be continued to be used as such in the future. There are a number of alternative routes as discussed in more detail herein which would not impact the identified mapped sand resources of Manatee County. The National Environmental Policy Act (hereinafter "NEPA") and implementing regulations require: "The existence of a viable but unexamined alternative renders an environmental impact statement inadequate." See Westlands Water District v. U.S. Department of the Interior et al., 376 F3d 853 (9th Circuit Cir. 2004). Attachment A consisting of analysis prepared by Coastal Planning & Engineering, Inc. of alternative routes to the preferred route of Port Dolphin is attached hereto and made a part hereof by reference). The alternative routes proposed in Attachment A to this pleading are not remote and speculative alternatives. In fact, a subsea interconnection has been recommended by Gulfstream Natural Gas System, LLC to be pursued (i.e., a subsea interconnection between the proposed Port Dolphin Pipeline and the existing Gulfstream Natural Gas System Pipeline). (See Supplement to Protest and Additional Comments of Gulfstream Natural Gas System, LLC, dated April 21, 2008). Additional deficiencies in the draft EIS are described below regarding the failure to mitigate environmental impacts, failure to submit current sufficient data regarding such impacts in relation to the proposed pipeline route and alternate routes. Mitigation must be discussed in sufficient detail to ensure the environmental consequences have been fairly evaluated. The policy of the Federal Energy Regulatory Commission ("FERC") requires Gulfstream Natural Gas to consider an interconnection upon request as long as it creates no operational safety problems. See Panhandle East Pipe Line Co., 91 FERC P61,037 at 61,141 (2000). The Environmental Impact Statement is required to analyze the environmental consequences of alternatives that are feasible, practical and effective. See Florida Gas Transmission Company, 100

- 2 -

3. Section 2.1 addresses several possible alternatives for the project including three pipeline alternatives, an offshore interconnection to the Gulfstream Interstate Pipeline, and the route proposed by Longboat Key during the public comment period. Furthermore, the Applicant revised the proposed pipeline route to avoid sand resource areas. See the revised pipeline description in Section 2.1.4 of the Final EIS. Sand resources are discussed in Sections 3.4 and 4.4.



FERC P61,282 at P62,288. The insufficiencies of the DEIS, as discussed in more detail below, can be summarized as follows:

A. Insufficient consideration of the environmental impacts of the proposed pipeline route. There is absolutely no analysis in the draft EIS as to the environmental impact of running the proposed pipeline route directly through the identified mapped sand resources of Manatee County. In fact, the DEIS expressly states there is no impact to sand resources (DEIS at Page 2-20, Table 2.1-3, Line 5). The State of Florida has made beach restoration and nourishment projects a top priority. The island communities of the City of Anna Maria Island, Holmes Beach, and the City of Bradenton Beach receive beach quality sand from the identified mapped sand resource to renourish their beaches. There is no acknowledgement in the draft EIS as to the existence of these cities or whether any input was received from them during the environmental scoping process. 3

B. Failure to consider reasonable alternative routes for the pipeline is evident by the DEIS summarily dismissing alternate routes. (DEIS Pages 2-18 through 2-19). 4

C. Substantive topic areas in draft EIS which are legally insufficient:

1. Impacts to biological resources:

a. Insufficient analysis as to mitigation for substantial impact to hard bottom and to seagrass beds. 5

b. Insufficient mitigation as to the impact on sea turtles of a lack of beach quality sand for nesting along the public beaches and shoreline of Anna Maria Island, Holmes Beach and Bradenton Beach. 6

2. Insufficient analysis as to impact on geological resources:

a. Impact to identified mapped sand resources identified above and in Attachment A. 7

- 3 -

4. Additional information on the review of alternative pipeline routes has been added to Section 2.1.4.6.

5. Mitigation measures have been added to Section 4.11. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements not listed in Section 4.11 would be developed after a license is issued.

6. Mitigation measures have been added to Section 4.11. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements not listed in Section 4.11 would be developed after a license is issued.

7. Section 2.1 addresses several possible alternatives for the project including three pipeline alternatives, an offshore interconnection to the Gulfstream Interstate Pipeline, and the route proposed by Longboat Key during the public comment period. Furthermore, the Applicant revised the proposed pipeline route to avoid sand resource areas. See the revised pipeline description in Section 2.1.4 of the Final EIS. Sand resources are discussed in Sections 3.4 and 4.4.

3. Insufficient analysis of the impact of a State required buffer between gas pipeline and identified sand resources on beach restoration projects. 8

4. Recreation and aesthetics:

a. No analysis upon impact of lack of lack of beach-quality sand on the beaches resulting in insufficient public beach access. (Refer to map of Anna Maria Island in Appendix B for location of public beaches). 9

5. Lack of analysis of socioeconomic issues and environmental justice concerns:

a. There is no analysis of the economic impact as to the tourism industry if beach quality standards are not maintained such that the quality of the public beaches of the island cities of Holmes Beach, Bradenton Beach and Anna Maria Island are neglected. In fact, the application for the Deep Water Port states there is no economic benefit to the proposed pipeline route to Manatee County. Thus, there is no economic benefit to offset the economic loss to the tourism industry. See amended Application for Deep Water Port, Page E-9 of Volume as follows: "Overall economic benefit to Manatee County would be minor." See Appendix A, Page 33, indicating estimated cost increase for beach renourishment due to running the pipeline route through Manatee County's identified mapped sand resource estimated to be approximately $38 million to $53.2 million. The cost benefit analysis of the proposed pipeline route versus impact to identified mapped sand resources is clearly weighted against Manatee County and its island cities of Anna Marie, Holmes Beach and Bradenton Beach. 10

6. Cumulative impacts ignored in DEIS:

a. There is no "avoidance" analysis and no plausible options for mitigation of lost identified mapped sand resource. 11

- 4 -

8. Section 2.1 addresses several possible alternatives for the project including three pipeline alternatives, an offshore interconnection to the Gulfstream Interstate Pipeline, and the route proposed by Longboat Key during the public comment period. Furthermore, the Applicant revised the proposed pipeline route to avoid sand resource areas. See the revised pipeline description in Section 2.1.4 of the Final EIS. Sand resources are discussed in Sections 3.4 and 4.4.

9. Section 2.1 addresses several possible alternatives for the project including three pipeline alternatives, an offshore interconnection to the Gulfstream Interstate Pipeline, and the route proposed by Longboat Key during the public comment period. Furthermore, the Applicant revised the proposed pipeline route to avoid sand resource areas. See the revised pipeline description in Section 2.1.4 of the Final EIS. Sand resources are discussed in Sections 3.4 and 4.4.

10. This is outside the scope of the EIS. The Applicant revised the proposed pipeline route to avoid sand resource areas. See the revised pipeline description in Section 2.1.4 of the Final EIS. Sand resources are discussed in Sections 3.4 and 4.4.

11. This is outside the scope of the EIS. The Applicant revised the proposed pipeline route to avoid sand resource areas. See the revised pipeline description in Section 2.1.4 of the Final EIS. Sand resources are discussed in Sections 3.4 and 4.4.

7. Adverse affect to public safety not analyzed in draft EIS:

a. Gulfstream Natural Gas System raises in its responsive pleading, dated April 21, 2008, public safety issues regarding the close proximity of the on-shore pipeline route to the existing Gulfstream Pipeline in Manatee County. Insufficient analysis of the impacts upon the existing utility lines in close proximity to the proposed pipeline route. 12

b. Insufficient analysis for homeland security issues cited in more detail herein. 13

8. The on-shore pipeline route within Manatee County lacks the following analysis in the DEIS:

a. Environmental Impact: No seagrass mitigation is proposed; no wetland mitigation is proposed; the Coastal Element in the Manatee County Comprehensive Plan is ignored; Issues are raised regarding passing a pipeline route beneath the existing FP&L tank farm. No mitigation to hard bottom impact and benethic mitigation. Seabird nesting impacts and impacts upon Bean Point are ignored. 14

b. Transportation Issues: There are transportation issues not addressed in the DEIS regarding the close proximity of proposed pipeline route of Port Dolphin to planned improvements to roads within both the boundaries of Port Manatee and outside the boundaries of Port Manatee within Manatee County as further detailed herein. 15

c. Local permits required for Manatee County for the on-shore portion of the route are ignored. 16

II. BACKGROUND:

A. In regard to the Amended Application filed by Port Dolphin on January 18, 2008, Manatee County filed a Motion to Intervene in the FERC proceeding on February

- 5 -

12. Comment noted. Pipeline safety for construction and operations is discussed in Section 5. FERC and PHSMA would require the pipeline be constructed and operated in a manner that meets Federal regulations for pipeline safety.

13. See responses to detailed comments.

14. Mitigation measures have been added to Section 4.11. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements not listed in Section 4.11 would be developed after a license is issued.

15. See responses to detailed comments.

16. All local ordinances would be compiled with by the Applicant if a license is issued.

21, 2008. Manatee County had previously filed a Motion to Intervene in Docket Nos. CP07-191-000 and CP07-192-000 on May 30, 2007. The Manatee County Port Authority ("Port Authority") is a dependent Special District of the State of Florida, and has filed a Motion to Intervene in these proceedings on February 27, 2008 and is represented by separate legal counsel. On February 4, 2008, the Commission issued its request for scoping comments regarding environmental issues and established a comment deadline of March 5, 2008. Manatee County submitted substantive scoping comments on the Amended Application in the FERC proceeding on March 4, 2008. Manatee County's scoping comments raised environmental issues known to Manatee County at the time of filing the comments and the pleading expressly stated: "The comments in Exhibit A are limited to the proposed on-shore pipeline and related facilities and are based upon a preliminary review of the Amended Application submitted within the limited period of time allowed for comment."

III. INSUFFICIENCIES OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT REGARDING THE OFF-SHORE PORTION OF THE PROPOSED PORT DOLPHIN PIPELINE ROUTE:

A. Port Dolphin's preferred route for its natural gas pipeline runs directly through the ideal sand source which supports the current and future beach nourishment projects of Anna Maria Island. A significant volume of beach compatible sands will become permanently unavailable for future beach nourishment projects dependent upon the size of the required buffer zone to protect the gas pipeline. 17

Manatee County does not dispute the Purpose and Need set forth in the DEIS on Pages ES-2 and ES-3 expressly stating that the Purpose is to "provide a reliable and timely supply of natural gas to increase energy diversity while considering impacts on the environment and serve the growing demand for natural gas, residential,

- 6 -

17. Section 2.1 addresses several possible alternatives for the project including three pipeline alternatives, an offshore interconnection to the Gulfstream Interstate Pipeline, and the route proposed by Longboat Key during the public comment period. Furthermore, the Applicant revised the proposed pipeline route to avoid sand resource areas. See the revised pipeline description in Section 2.1.4 of the Final EIS. Sand resources are discussed in Sections 3.4 and 4.4.

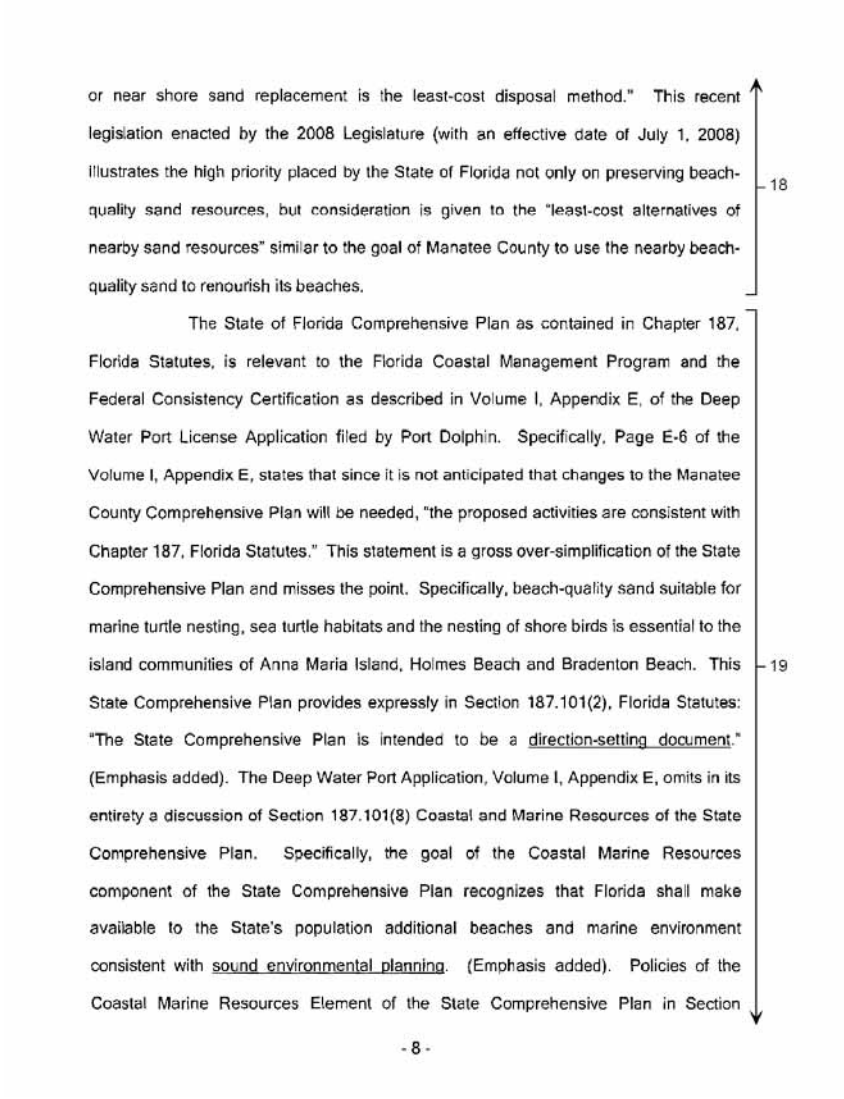
industrial and electric generation within West-Central Florida." The Need statement is summarized in the DEIS on Page ES-3 as: "The Port Dolphin Project will provide a source of natural gas to Western Florida that is independent of both the Gulf of Mexico supply disruptions and the pipeline constraints of existing interstate pipelines."

However, as stated in All Indian Pueblo Council v. United States of America 975 F.2d 1437 at 1444 (10th Cir.): "The discussion of alternatives that Section 42 U.S.C. 4332(2)(C)(iii) requires is 'the heart of the environmental impact statement.' " NEPA requires a "detailed" EIS to "ensure that each agency decision maker has before him and takes into proper account all possible approaches to a particular project (including total abandonment of the project) which would alter the environmental impact and the cost-benefit balance." Calvert Cliffs' Coordinating Comm. Inc. v. U.S. Atomic Energy Comm'n. 449 F.2d 1109. "As another court observed, [i]t is absolutely essential to the NEPA process that the decisionmaker be provided with a detailed and careful analysis of the relative environmental merits and demerits of the proposed action and possible alternatives, a requirement that we have characterized as 'the linch-pin of the entire impact statement.' " 17

Legislation recently enacted by the 2008 Legislature (CS/HB-1427) states a legislative public policy in Section 161.142, Florida Statutes, to "ensure that beach-quality sand is placed on adjacent eroding beaches" when referring to the interference with the natural drift of sand interrupted or altered by inlets. The Legislative goal is stated: "To extend the life of proximate beach-restoration projects so that periodic nourishment is needed less frequently." CS/HB-1427 further creates Section 163.142(5), Florida Statutes, to state: "The State recognizes that due to the growing demand for beach-quality sand resources for beach restoration and nourishment projects, the limited supply of such sand resources and the cost of such projects, beach 18

- 7 -

18. Section 2.1 addresses several possible alternatives for the project including three pipeline alternatives, an offshore interconnection to the Gulfstream Interstate Pipeline, and the route proposed by Longboat Key during the public comment period. Furthermore, the Applicant revised the proposed pipeline route to avoid sand resource areas. See the revised pipeline description in Section 2.1.4 of the Final EIS. Sand resources are discussed in Sections 3.4 and 4.4.



or near shore sand replacement is the least-cost disposal method." This recent legislation enacted by the 2008 Legislature (with an effective date of July 1, 2008) illustrates the high priority placed by the State of Florida not only on preserving beach-quality sand resources, but consideration is given to the "least-cost alternatives of nearby sand resources" similar to the goal of Manatee County to use the nearby beach-quality sand to renourish its beaches. 18

The State of Florida Comprehensive Plan as contained in Chapter 187, Florida Statutes, is relevant to the Florida Coastal Management Program and the Federal Consistency Certification as described in Volume I, Appendix E, of the Deep Water Port License Application filed by Port Dolphin. Specifically, Page E-6 of the Volume I, Appendix E, states that since it is not anticipated that changes to the Manatee County Comprehensive Plan will be needed, "the proposed activities are consistent with Chapter 187, Florida Statutes." This statement is a gross over-simplification of the State Comprehensive Plan and misses the point. Specifically, beach-quality sand suitable for marine turtle nesting, sea turtle habitats and the nesting of shore birds is essential to the island communities of Anna Maria Island, Holmes Beach and Bradenton Beach. This 19
State Comprehensive Plan provides expressly in Section 187.101(2), Florida Statutes: "The State Comprehensive Plan is intended to be a direction-setting document." (Emphasis added). The Deep Water Port Application, Volume I, Appendix E, omits in its entirety a discussion of Section 187.101(8) Coastal and Marine Resources of the State Comprehensive Plan. Specifically, the goal of the Coastal Marine Resources component of the State Comprehensive Plan recognizes that Florida shall make available to the State's population additional beaches and marine environment consistent with sound environmental planning. (Emphasis added). Policies of the Coastal Marine Resources Element of the State Comprehensive Plan in Section

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19. Section 2.1 addresses several possible alternatives for the project including three pipeline alternatives, an offshore interconnection to the Gulfstream Interstate Pipeline, and the route proposed by Longboat Key during the public comment period. Furthermore, the Applicant revised the proposed pipeline route to avoid sand resource areas. See the revised pipeline description in Section 2.1.4 of the Final EIS. Sand resources are discussed in Sections 3.4 and 4.4.

187.101(8)(b)(6), Florida Statutes, provide: "Encourage land and water uses which are compatible with the protection of sensitive coastal resources" and in Subparagraph (8): "Avoid the exploration and development of mineral resources which threaten marine aquatic and estuarine resources."

Additional policies in the Natural Systems and Recreational Lands component of the State Comprehensive Plan (Section 187.101(9)), Florida Statutes, provides: "Conserve forests, wetlands, fish, marine life, and wildlife to maintain their environmental, economic, aesthetic and recreational values." Section 187.101(9)(b)(6), Florida Statutes, Natural Systems and Recreational Lands, also refers to the importance of erosion control.

The Manatee County Comprehensive Plan, Coastal Element, Policy 4.4.2.5 provides: "Minimize the disturbance of natural shore line resources that provides shore line stabilization and protect landward areas from the affects of storm events." 19
The impact to the sole identified mapped sand resource of Manatee County to nourish the beaches of Anna Maria Island, Holmes Beach and Bradenton Beach needs to be addressed in the context of the above-cited goals and policies of the Florida Legislature, the State Comprehensive Plan and the Manatee County Comprehensive Plan. This is particularly important because the Governor of an adjacent coastal state, in this instance the State of Florida, will be relying upon the analysis performed by the Florida Department of Environmental Protection (FDEP) as to consistency with the Florida Coastal Management Program. The analysis prepared by Coastal Planning Engineering, Inc., entitled: "Potential Impacts of the Port Dolphin Pipeline on the Manatee County Shore-Protection Program, dated May 29, 2008, is labeled Attachment A. Figures 1 and 2 of Attachment A delineate the boundaries of the historic Anna Maria Island Borrow areas and illustrate how the proposed Port Dolphin Pipeline route (noted

in black on the maps) bifurcates the sand resources. This is especially true when the possible buffers of 1,000 foot safety buffer and 1,000 meter safety buffers are indicated on Figures 1 and 2. Attachment B provides a larger map of the island of Anna Maria with specific locations of Coquina Public Beach, the City of Bradenton Beach, Manatee County Public Beach, the City of Holmes Beach, the City of Anna Maria, Bayfront Park, Bean Point and Bradenton Beach City Pier. The unique geographic location of these beaches and island communities, in close proximity to each other, make it cost effective to share the same nearby beach compatible sand resource. 19

IV. The DEIS is insufficient and legally deficient due to its lack of analysis regarding alternate routes having less of an environmental impact on identified sand resources than the proposed pipeline route:

The Coastal Planning & Engineering Report, at Attachment A, Page 4, states there are at least 4 possible alternate routes for the proposed pipeline to travel subsea toward Port Manatee. All of these viable pipeline route alternatives are available with no impact (direct or cumulative) to the beach-compatible mineral resources off Anna Maria Island utilized by Manatee County's Shore Protection Program. A more detailed analysis of the alternatives described on Page 4 of Attachment A need to be addressed 20

in the DEIS. One option would be to require a second DEIS be prepared such that all concerned members of the public, the island communities of Anna Maria Island, Holmes Beach and Bradenton Beach, in Manatee County, Longboat Key and environmental organizations could all review and comment on all of the alternative routes being considered. Transparency and public comments are at the heart of the requirements of the National Environmental Protection Act (NEPA) and are vital to preserve the integrity of the process. It should be noted that the Board of County Commissioners in Manatee County have not taken a position as to which of these alternate routes are preferred as 21

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20. Additional off shore pipeline route alternatives have been analyzed in Section 2.1.4 of the Final EIS.

21. Comment noted.

that determination would need to await the detailed data and analysis required to be submitted by Port Dolphin in a supplemental draft of the Environmental Impact Statement. At least one of the viable alternatives, consisting of a subsea connection to the existing Gulfstream Natural Pipeline, has been supported as an alternate route in pleadings filed by Gulfstream Natural Gasline, LLC.

Maps of these detailed alternate routes are contained in Attachment A, report prepared by Coastal Planning & Engineering, as Figure 3, and are labeled respectively: 21

1. Potential Alternative: Co-locate with Gulfstream;
2. Potential Alternative: Tap into Gulfstream;
3. Potential Alternative: Straight into Southwest Passage;
4. Potential Alternative: Deviate to Section of Northern Alternate.

The four alternative routes detailed in Attachment A, report of Coastal Planning & Engineering, Inc. are overlooked in the DEIS, a fatal legal flaw in the process. See All Indian Pueblo Council, 975 F2d 1437, 1444.

V. The DEIS is insufficient as to its analysis of the environmental impacts of the proposed pipeline route both off-shore and on-shore as to biological resources:

A. Based on the results of the geotechnical survey detailed in Volume I, Appendix E, of the Deep Water Port License Application, there are benthic communities present along the pipeline corridor. Volume I, Appendix E, of the Deep Water Port License Application states at Page E-10 that it was determined that 36.5% of the seafloor area was classified as hard/live bottom. At Page E-10, Line1, Appendix E, the Deep Water Port Application states there would be long-term impacts to approximately 55.91 acres of benthic habitat along the pipeline route as a result of the pipeline construction. There is no discussion in the DEIS as to what the methods are to avoid impacting hard bottom/benthic communities. There is no discussion in the DEIS as to a 22 23

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22. Comment noted. Geotechnical information has been added to the discussion of the EIS. The Applicant would bury the pipeline under concrete mattresses in hard bottom areas resulting in a net increase of hardbottom habitat.

23. Mitigation measures have been added to Section 4.11. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements not listed in Section 4.11 would be developed after a license is issued.

mitigation plan regarding the impact to the hard bottom. If such impacts to the hard bottom are unavoidable, what is the minimization plan to minimize the impacts? A plan to mitigate needs to be described in detail and the mitigation alternatives evaluated in the draft EIS. These issues regarding benthic habitat assessments, mitigation and monitoring plans and the technological feasibility of using horizontal directional drill as a construction technique regarding these communities are appropriately raised by the Florida Department of Environmental Protection by way of letter filed in the Coast Guard docket in this case, dated May 20, 2008. 23

B. Impacts to seagrasses near the shore of Port Manatee need to be addressed in the DEIS. Detailed maps need to be prepared that demonstrate the location of the impact of seagrasses both with respect to areas previously enhanced , preserved or restored either by the Port Authority or Gulfstream Natural Gas, LLC as valuable seagrass mitigation areas nearing the area where the proposed pipeline route enters Port Manatee. If there is impact to the seagrass mitigation areas, what alternatives are proposed by Port Dolphin to mitigate seagrass impact? These issues need to be addressed in the DEIS as part of an analysis of the proposed pipeline route, particularly if the preferred alternative route of Port Dolphin is pursued as a separate pipeline entering Port Manatee in lieu of a subsea tie into the existing Gulfstream pipeline. 24

C. Impacts to wetland areas on-shore within Manatee County with particular reference to an area running north and south to the west of US41, along the proposed on-shore pipeline route. Is there an avoidance plan as to these wetlands? Is there wetland mitigation proposed? These issues need data and analysis in the DEIS. 25

D. Page E-10, Volume I, Appendix E, of the Deep Water Port License Application states that: "It is expected that the sound produced from the proposed Port 26

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24. Impacts to seagrass are discussed in Section 4.2 of the EIS. Section 2.1 addresses several possible alternatives for the project including three pipeline alternatives, an offshore interconnection to the Gulfstream Interstate Pipeline, and the route proposed by Longboat Key during the public comment period. Furthermore, the Applicant revised the proposed pipeline route to avoid sand resource areas. See the revised pipeline description in Section 2.1.4 of the Final EIS. Specific monitoring requirements not listed in Section 4.11 would be developed after a license is issued.

25. Wetland impacts are discussed in Section 4.2 of the EIS. Mitigation measures have been added to Section 4.11. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements not listed in Section 4.11 would be developed after a license is issued.

26. Noise impacts to marine species are addressed in Section 4.2 of the EIS.

Dolphin Energy, LLC Project would likely pose no acoustic impacts to marine mammals." However, the draft DEIS states that there are no specific data on ambient underwater sound levels for the area of the proposed port and pipeline route. (DEIS at Page 3-111). The DEIS needs to address the fact that marine mammals and many fishes are highly dependent on sound for communication, navigation, foraging and predatory avoidance. The DEIS should address the on-going studies by the NOAA National Marine Fisheries Service to help develop a global monitoring network for ocean noise. The DEIS should address the monitoring of the noise budget within this urbanized highly productive ecosystem.[1] 26

E. Hard bottom and seagrasses serve as high quality habitat for a variety of commercially and recreational important species. A compensatory mitigation plan for impacts due to hard bottom marine habitats should include elements such as those noted by comments submitted in this proceeding by the Gulf of Mexico Fishery Management Council.[2] These mitigation measures include materials and methods to be used to achieve intended mitigation and a comprehensive monitoring schedule with contingency plans if the proposed mitigation fails. 27

F. Impacts to geological resources are insufficiently analyzed by data analysis in the DEIS. See Attachment A, report prepared by Coastal Planning & Engineering, Inc. regarding impact on the geological resources of identified mapped sand resources for Manatee County and a required buffer area around the pipeline. 28

V. Recreational and aesthetic impacts as well as socioeconomic issues are insufficiently addressed by the DEIS.

[1] NOAA National Marine Fisheries Service "Researches to Develop Ocean Sensory 'Noise Budget' to Evaluate Potential Impact of Marine Mammals" Press Release dated April 1, 2008 a copy attached hereto as Attachment C for reference.

[2] See letter dated May 28, 2008 from the Gulf of Mexico Fishery Management Council to Commander Prescott.

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27. Mitigation measures have been added to Section 4.11. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements not listed in Section 4.11 would be developed after a license is issued.

28. Comment noted. Project alternatives are discussed in detail in Sections 2 of the EIS.

A. As noted in Attachment A (Page 26) of the report by Coastal Planning & Engineering, Inc., the public park system of Manatee County includes the beach front on Anna Maria Island known as Cortez Beach Park, Coquina Beach Park, Manatee Beach Park and Bayfront Park. All these parks provide public access to the beach without being walled off by tall buildings. This is a unique characteristic within the State of Florida given the high growth the State has experienced along its coastal shores. To supplement statements made in Attachment A, the public beach access is important not only as a major recreational and economic engine for Manatee County and the State of Florida, but also serves as an important free recreational resource. Specifically, the DEIS is required to address socioeconomic issues and environmental justice issues. This free public beach access provided on Anna Maria Island would be adversely impacted if the sand were permitted to be eroded. The negative impact created is not only as to the tourism industry, but disproportionately affects those of limited income who cannot afford the cost to travel to distant recreational establishments and the expense of admission fees. Free public recreation is a public service provided by Manatee County and would be negatively impacted by the loss of public beach sand. There are over 100 separate public beach access points not counting the park system on Anna Maria alone.[3] 29

VI. **Public Safety Impacts:**

A. The DEIS does not address, with sufficient data and analysis, public safety impacts as described below. The DEIS does not contain plans to address hurricanes commonly experienced in Florida during the six month hurricane season, as well as potential hazards caused by high winds, squalls, tornadoes, extreme waves, extreme currents, tsunami, extreme heat, high humidity and lightening. To address potential 30

[3] See Attachment, Report of Coastal Planning & Engineering, Inc., Pages 26-27.

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29. Socioeconomic impacts, including environmental justice issues, are addressed in Section 4.9 of the EIS.

30. Extreme weather conditions were discussed in Phase I Risk assessment and mitigation measures would be addressed in Phase II Risk Assessment. Operations manual, which would be developed and approved by the USCG if a license is issued, specifies the limiting wave, wind and current conditions under which the operation would take place. There will be continuous weather monitoring. In case of hurricanes, the operation would be stopped and the LNGC would be moved to open sea.

significant public safety impact, the DEIS should be revised to evaluate a potential impact associated with all credible events. The DEIS should identify all feasible mitigation measures. This analysis should include the potential for island flooding and impact upon hurricane emergency evacuation routes due to eroded beaches on the island communities within Anna Maria. 30

B. Any additional expenses that Manatee County could be anticipated to incur in the future regarding additional security necessary for the Port Dolphin Pipeline or LNG vessels serving in the Deep Water Port entering the vicinity of Manatee County should be detailed in the DEIS in light of recent Federal proposed legislation and Congressional reports.[4] It should be expressly stated in the DEIS that any unfunded mandate by Federal or State governments to provide security for the liquefied natural gas facilities shall be the sole financial responsibility of Port Dolphin. 31

VII. On-Shore Pipeline Route:

A. Environmental Impacts: Seagrass mitigation areas impacted must be delineated on an appropriate map and mitigation of any impacts detailed in the mitigation plan. 32

1. Detailed plans need to be submitted to Manatee County regarding the safety aspects and logistics of running the on-shore pipeline route under the existing FP&L tank farm. 33

2. A detailed analysis of the impact of locating the proposed pipeline route in close proximity to the northern terminus of Bean Point, on Anna Maria Island, 34

[4] H.R.2830, Section 721 through Section 723 regarding State and local law enforcement augmentation of Coast Guard resources with respect to security zones in United States ports for proposed waterside liquefied natural gas facilities. Also see Congressional Research Report entitled CRS Report for Congress Liquefied Natural Gas (LNG) Infrastructure Security: Issues for Congress, updated March 25, 2008 prepared by the Congressional Research Service and filed in these proceedings by Representative Kathy Castor.

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31. If a License is issued by the Maritime Administration, the USCG would require development and approval of an Operations Manual that would include security provisions (facility security plan). The plan would be coordinated with Federal, state and local officials responsible for enforcement or response.

32. Impacts to seagrass are discussed in Section 4.2 of the EIS.

33. As described in the application, the pipeline will not run under the FP&L tank farm. It will run along the edge of the property that contains the tank farm.

34. Impacts to navigation and bird nesting due to construction activities are discussed in Sections 4.10 and 4.2 respectively.

needs to be detailed including impacts on navigation and bird nesting during construction of the pipeline. 34

B. Transportation Impacts within Manatee County:

1. There are potential impacts to roads which have future widening plans both within Port Manatee and outside the boundaries of Port Manatee within Manatee County. Specifically, the future widening of Buckeye Road to a four-lane configuration as a collector road is contained in the Manatee County Comprehensive Plan (see attached Attachment D). As a County road along which the proposed on-shore pipeline route runs, Buckeye Road is planned to be widened under the Manatee County Comprehensive Plan and such widening would be hampered if the on-shore pipeline route proposed by Port Dolphin would need to be relocated at the time of road widening. Within the boundaries of Port Manatee immediately south of South Dock Street, there are potential road improvement plans regarding a new southern road running south of South Dock Street which may be impacted by the location of the proposed pipeline route of Port Dolphin. Details and plans need to be submitted to Manatee County outlining how the new road and the pipeline route can coexist. The legal status of whether South Dock Street is a public or private road is questionable at this time. Port Dolphin should describe how they intend to acquire the right to use South Dock Street. 35

C. Local permits required such as an administrative permit, site plan, right-of-way use permit from FDOT (Florida Department of Transportation) and right-of-way use permit from Manatee County for County roads need to be listed as required permits. Any approvals required from the CSX Railroad to locate the pipeline within their right-of-way need to be detailed as required permits. The above list is not meant to be exhaustive of all local permits required but is illustrative of the omission of any local 36

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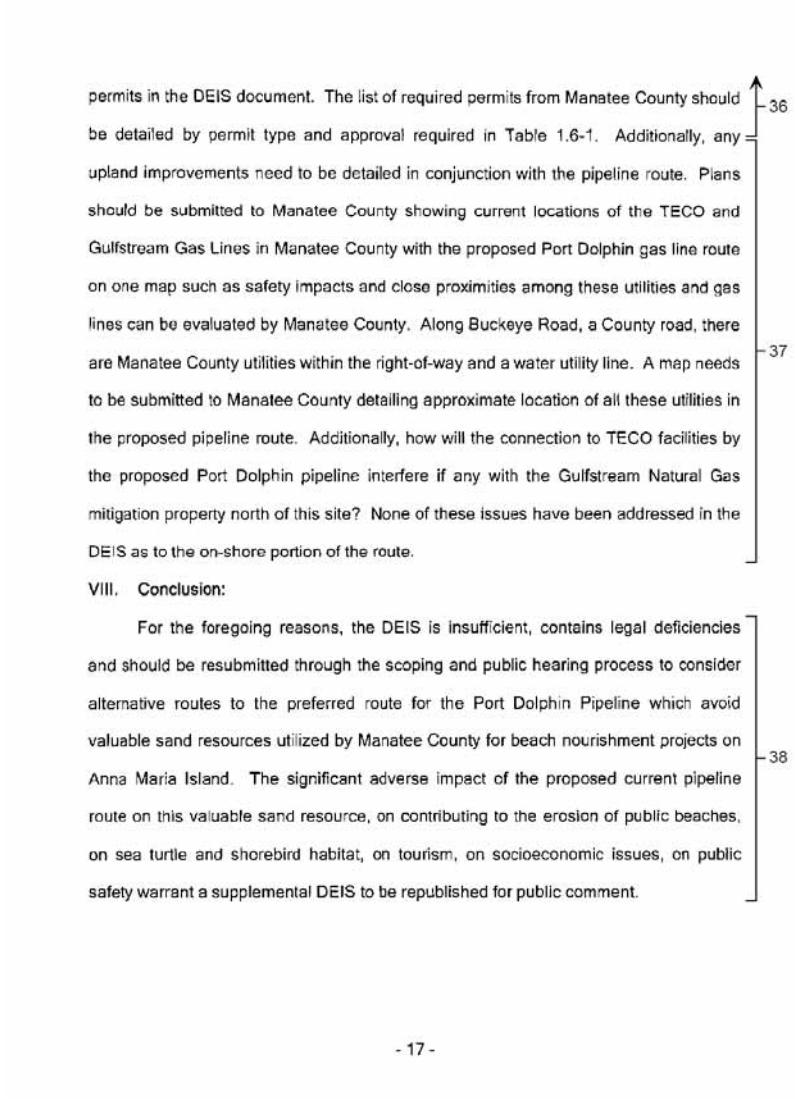
35. If a license is issued, the applicant will ensure all local ordinances would be complied with.

36. Section 1.6 of the EIS states, "It is the Applicant's responsibility to provide the permitting agency with the information necessary to determine the applicable requirements, in a timely manner." The EIS provides a representative sampling of the significant permits required for the project.



permits in the DEIS document. The list of required permits from Manatee County should be detailed by permit type and approval required in Table 1.6-1. Additionally, any upland improvements need to be detailed in conjunction with the pipeline route. Plans should be submitted to Manatee County showing current locations of the TECO and Gulfstream Gas Lines in Manatee County with the proposed Port Dolphin gas line route on one map such as safety impacts and close proximities among these utilities and gas lines can be evaluated by Manatee County. Along Buckeye Road, a County road, there are Manatee County utilities within the right-of-way and a water utility line. A map needs to be submitted to Manatee County detailing approximate location of all these utilities in the proposed pipeline route. Additionally, how will the connection to TECO facilities by the proposed Port Dolphin pipeline interfere if any with the Gulfstream Natural Gas mitigation property north of this site? None of these issues have been addressed in the DEIS as to the on-shore portion of the route.

VIII. Conclusion:

For the foregoing reasons, the DEIS is insufficient, contains legal deficiencies and should be resubmitted through the scoping and public hearing process to consider alternative routes to the preferred route for the Port Dolphin Pipeline which avoid valuable sand resources utilized by Manatee County for beach nourishment projects on Anna Maria Island. The significant adverse impact of the proposed current pipeline route on this valuable sand resource, on contributing to the erosion of public beaches, on sea turtle and shorebird habitat, on tourism, on socioeconomic issues, on public safety warrant a supplemental DEIS to be republished for public comment.

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37. Section 1.6 of the EIS states, "It is the Applicant's responsibility to provide the permitting agency with the information necessary to determine the applicable requirements, in a timely manner." The EIS provides a representative sampling of the significant permits required for the project.

38. Alternatives that avoid/reduce impacts on sand resources are discussed in Sections 2.1.4.5 and 2.1.4.6 of the EIS. Impacts from these alternatives are discussed in Sections 4.2.1.6.1, 4.4.1, 4.4.2, 4.5.1, 4.5.2, and 4.9.1.

Respectfully submitted,

MANATEE COUNTY, FLORIDA

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June 2, 2008

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in these proceedings.

Dated at Bradenton, Florida this 2nd day of June, 2008.

Sarah A. Schenk, Esq.

The following attachment is a duplicate of the letter received from The Honorable Hal Lenobel (Mayor, Town of Longboat Key). For responses to these comments please refer to page B-122.

DOT Docket No. USCG-2007-28532
ATTN: Ray Martin (CG-5225)
United States Coast Guard
2100 Second Street, S.W.
Washington, DC 20583-0001

-and-

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

In the Matter of:	§	Docket Nos. CP07-191-000
	§	CP07-191-001
Port Dolphin Energy LLC	§	

ATTACHMENT A

COASTAL PLANNING & ENGINEERING, INC.
BOCA RATON • WILMINGTON • TAMPA BAY

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May 29, 2008

Sarah Schenk
Assistant County Attorney
Office of the Manatee County Attorney
1112 Manatee Avenue West, Suite 969
Bradenton, Florida 34206

Dear Sarah,

The following document represents the technical comments prepared by Coastal Planning & Engineering (CPE) on behalf of Manatee County for the Port Dolphin Draft Environmental Impact Statement (DEIS) issued on April 18, 2008. This DEIS was prepared for, and submitted as part of the Department of Transportation docket number USCG-2007-28532 and the Federal Energy Regulatory Commission document numbers CP07-191 and CP07-192. These dockets represent the Federal review process for the Deepwater Port Application submitted by Port Dolphin LLC on March 29, 2007.

The following comments were prepared by CPE at the request of Manatee County. CPE has been the consulting Coastal Engineering firm for Manatee County for the last 20 years, and as such, has assisted the County in the design, administration, and implementation of their shore-protection program. These comments detail direct and cumulative impacts of the proposed Port Dolphin offshore pipeline to nearshore beach-compatible sand resources that Manatee County relies on for ongoing beach-nourishment projects on Anna Maria Island.

These comments were prepared under close coordination with Manatee County, and are submitted to you for inclusion in Manatee County's official June 2nd public comment submittal to the above mentioned Federal dockets. Please feel free to contact me with any questions or comments.

Sincerely,

COASTAL PLANNING & ENGINEERING, INC.,

Richard H. Spadoni
Senior Vice President

POTENTIAL IMPACTS OF THE PORT DOLPHIN PIPELINE ON THE MANATEE COUNTY SHORE-PROTECTION PROGRAM: COUNTY COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STAEMENT ON THE PORT DOLPHIN LLC DEEPWATER PORT LICENSE APPLICATION

EXECUTIVE SUMMARY

On March 29, 2007, Port Dolphin LLC submitted to the United States Coast Guard and the Maritime Administration an application for a Deepwater Port License. The proposed port would be a liquid natural gas re-gasification and offloading facility located approximately 28 miles offshore Anna Maria Island/Manatee County. As proposed, this facility would then be connected to Port Manatee via a subsea pipeline. On April 18, 2008 the United States Coast Guard and the Maritime Administration issued a Draft Environmental Impact Statement on the proposed Port Dolphin Project. The document is currently available for public comment, with comments due by June 2, 2008. The following information presented by Manatee County summarizes both the Manatee County Shore Protection Program and the potential impacts the proposed Port Dolphin Project would have on the viability of those program.

Manatee County manages an active shore-protection program for the entire coast of Anna Maria Island. This program is funded through the Tourist Development Council "Bed Tax" which is supported by the extensive tourism industry of Manatee County. The tourism industry, in turn, is highly dependent on the beaches within Manatee County, including those of Anna Maria Island. However, the beaches of Anna Maria Island are eroding and require maintenance through implementation of a comprehensive beach nourishment program. The shore-protection program relies on a proven, existing, native, white, beach-compatible Gulf of Mexico sand resource located off the northwestern tip of Anna Maria Island as the ideal sand source for beach nourishment. The high similarity of this sand source with the native beach, coupled with its proximity to the project area, makes it an invaluable resource ideally suited for the geologic, biologic, and recreational needs of Anna Maria Island's white sandy beaches. In addition, it is these white sandy beaches that support the tourism driven economy of Anna Maria Island, Manatee County, and the State of Florida.

The Manatee County shore-protection program, and ultimately the beaches of Anna Maria Island, is in jeopardy due to the proposed location of Port Dolphin LLC's preferred and southern alternative routes for the Port Dolphin natural gas pipeline. This pipeline is proposed to be built directly through the ideal sand source that supports the current and future beach nourishment projects of Anna Maria Island. The pipeline, as well as a large buffer zone which must be established along either side of the pipeline route, greatly impact sand available for the Anna Maria Island Shore Protection Program. Extraction of sand by dredging would be prohibited in the buffer zone effectively eliminating the sand for future beach nourishment use. Direct impacts to this sand resource revolve around the fact that a significant volume of these beach-compatible sands will become permanently unavailable for future beach nourishment projects depending on the extent of the required buffer zone which is provided to protect the gas pipeline. This direct impact, while extreme by itself, would lead to significant cumulative impacts to the economy, public safety and the environment of Manatee County and Anna Maria Island.

If the beach-compatible sand source is impacted by the construction of the pipeline and an associated safety buffer of up to 1,000 meters, significant programmatic issues would arise. Specifically, if the nearby beach-compatible sand resource is impacted by removing up to 8,500,000 cy of ideal, beach-compatible material, the County may be forced to explore other as yet unknown sand resources. Assuming such high quality resources can be found, these resources will assuredly occur further away from the project area, causing the County to abandon its current, efficient cutterhead dredge construction model for the less efficient and more costly hopper dredge construction model. If this was to occur, the costs of future beach nourishment projects would increase substantially, up to a potential increase of $53,200,000 over forty years, depending on the final safety buffer imposed around the pipeline. A cost increase of this magnitude will likely not be sustained by the Bed Tax alone, meaning that Manatee County will need an alternative funding source, a very difficult proposition.

A reduced or eliminated shore-protection program would result in the erosion of Anna Maria Island's white sandy beaches. If this were allowed to happen, significant cumulative impacts to biological, recreational, and socioeconomic resources would occur, as well as the introduction of sensitive public safety issues, including:

1. A reduced or eliminated shore protection program could result in the erosion of Anna Maria Island's beaches resulting in the loss of the public beaches (a major public recreation resource) of Anna Maria Island;
2. A reduced or eliminated shore protection program could result in the erosion of Anna Maria Islands beaches resulting in the loss of tourists, affecting the local socioeconomic structure through a reduction in employment and tax revenues;
3. A reduced or eliminated shore protection program could result in the erosion of Anna Maria Island's beaches resulting in the loss of protection the beaches afford the island, resulting in the potential for increased flooding and undermining of vital hurricane and emergency evacuation routes for both Anna Maria Island and Longboat Key.
4. A reduced or eliminated shore protection program could result in the erosion of Anna Maria Island's beaches resulting in the loss of the beach as habitat, and loss of critical habitat needed for threatened and endangered sea turtle nesting;

These issues are vital to the continued well being of Manatee County, yet none of these concerns are addressed in the DEIS issued by the United States Coast Guard and the Maritime Administration or the Deepwater Port License Application issued by Port Dolphin LLC. Manatee County believes that all of these issues need to be included and comprehensively addressed within the Draft Environmental Impact Statement so that the United States Coast Guard and the Maritime Administration, and the Governor of Florida (as a Governor of an adjacent coastal state) can make a fully informed decision on the Application for a Deepwater Port License submitted by Port Dolphin LLC.

The County also feels that it important to state unequivocally that the Port Dolphin LLC Deepwater Port and associated pipeline and the Manatee County shore-protection program are

not mutually exclusive projects. In fact, several seemingly viable pipeline route alternatives exist that can allow the Port Dolphin project to be constructed without affecting the vital and highly limited sand resources required by Manatee County for its shore-protection program.

These alternatives include:

1. Constructing the Port Dolphin pipeline from the deepwater port to an existing y-valve in the Gulfstream natural gas pipeline, where the Port Dolphin facility could then tie-into the existing pipeline. This option also eliminates many of the environmental impacts associated with the preferred route;
2. Follow the preferred pipeline route as it is proposed, from the deepwater port toward Southwest Passage, where the pipeline would then deviate to the proposed northern alternative route as it enters Tampa Bay through Southwest Passage. Once inside of Tampa Bay, the pipeline could then deviate back to the preferred route. The vast majority of the preferred pipeline route could be retained with this minor adjustment.
3. A new alternative that would construct the pipeline route from the proposed deepwater port site straight to a spot approximately 2,000 feet south of where the existing Gulfstream pipeline crosses the Federal/State Boundary, approximately nine miles west of Egmont Key. At this point, the new pipeline could be collocated, or constructed parallel to, the existing Gulfstream pipeline all the way into Port Manatee.
4. A new alternative that would construct the pipeline straight from the offshore deepwater port site, directly to Southwest Passage (not Passage Key Inlet), crossing the Gulfstream Pipeline, and then continuing straight to its planned location in West-Central Lower Tampa Bay (all in one straight line).

Each of these alternatives results in no impacts (direct or cumulative) to the beach-compatible mineral resources off Anna Maria Island that are vital to Manatee County's shore-protection program. With this in mind, the County strongly believes that a more detailed alternatives analysis needs to be presented in the Draft Environmental Impact Statement. This analysis needs to build on the previously described alternatives, while adding the new alternatives

suggested by the County. Each alternative needs to be critically evaluated in terms of direct and cumulative environmental resource impacts, with the greatest weight given to the alternative(s) that have the least impacts to these environmental resources. In addition, the direct and cumulative impacts raised by the County in these detailed comments need to be included and critically evaluated in the Draft Environmental Impact Statement.

In its current form, the County finds the Draft Environmental Impact Statement to be lacking a significant amount of information regarding alternatives and true resource impacts, and as such the County feels another Draft Environmental Impact Statement needs to be issued that addresses these significant issues prior to going to the Final Environmental Impact Statement stage.

While Manatee County has strong objections to the way the project is currently proposed, the County feels that there a seemingly minor changes that can be made by Port Dolphin LLC to the preferred pipeline route that would result in no impacts to vital beach-compatible mineral resources. With this in mind, the County is willing to work directly with Port Dolphin LLC and/or the United States Coast Guard and the Maritime Administration to explore these alternatives in order to design a route that is mutually beneficial to both Manatee County and Port Dolphin LLC.

ACRONYMS AND ABBREVIATIONS

BBCS	FDEP Bureau of Beaches and Coastal Systems
cy	Cubic Yards
DEIS	Draft Environmental Impact Statement
ECL	Erosion Control Line
FDEP	Florida Department of Environmental Protection
FERC	Federal Energy Regulatory Commission
JCP	Joint Coastal Permit
LNG	Liquid Natural Gas
MARAD	United States Department of Transportation, Maritime Administration
MMS	United States Minerals Management Service
NEPA	National Environmental Policy Act
ROSS	FDEP Reconnaissance Offshore Sand search
"the County"	Manatee County, Florida
"the Town"	Town of Longboat Key, Florida
USCG	United States Coast Guard
WRDA	Water Resources Development Act

INTRODUCTION

Manatee County manages the Anna Maria Island Shore Protection Project, consisting of two separate beach nourishment project areas which include more than six miles of the coastline. The goal of these projects is to provide protection for all of Anna Maria Island's approximately seven miles of coastline. The entire length of Anna Maria Island is considered to be "Critically Eroded" by the Florida Department of Environmental Protection (FDEP), and prior to implementation of the program, was eroded substantially, adversely effecting private and public upland properties.

Anna Maria Island's economy is based on tourism. The single feature that draws thousands of tourists to Anna Maria Island is its beautiful white sand beaches. Numerous hotels, motels, rental homes, restaurants, stores and other related businesses depend on the beaches of the Island to survive. However, Anna Maria Island has a serious beach erosion problem that is only addressed through a comprehensive program of periodic beach nourishment. In order to successfully maintain and preserve the beaches of Anna Maria Island, offshore high quality sediment which matches the sediment on the beaches is required as the material to replace beach sand lost to erosion.

The sediment source off of the north end of Anna Maria Island meets a series of stringent requirements which allow its use as beach nourishment material for Anna Maria Island. This sediment source is the only available economical sediment deposit with similar sediment characteristics to that of the Anna Maria Island beach available to Manatee County. It is a source which meets the rigorous requirements of the State of Florida concerning "beach-compatible" sediment. This sediment source also meets a series of environmental constraints for a beach nourishment project. The sediment source is located a sufficient distance from reefs (hard bottom resources) to avoid potential reef impacts from sedimentation during the dredge excavation process. The sediment source meets the state requirement to have 5% or less of the silt and clay sediment component. Silt and clay is of concern because it is the sediment

component which can cause water quality problems. The sediment matches the existing beach sediment very closely, which is an indication that sea turtle nesting will not be effected by sediment quality. The sediment source is clean of debris and is very low in rock content. Sediment deposits considered for beach nourishment use must be free of potential cultural resources. Studies conducted of the sediment deposit off the north end of Anna Maria Island indicate that cultural resources will not prohibit the use of the material for beach nourishment. The sediment source is free of other man made features, such as fiber optic cables or pipelines. The sediment is located in near vicinity to the beaches of Anna Maria Island. This allows for faster, more efficient construction of beach nourishment projects on Anna Maria Island verses distant sediment sources, assuming sediment sources of similar quality and characteristics are available to Manatee County for use on Anna Maria Island. Even the depth of the high quality material is such that it promotes efficient excavation, which in turn translates into lower construction costs for beach nourishment. The quality of the material, the geophysical characteristics of the sediment deposit and proximity of this sediment source allows for much lower cost to Manatee County, the State of Florida and the Federal government to construct the beach nourishment projects on Anna Maria Island.

The sediment source off the north end of Anna Maria Island is a limited resource. Most of the sediment in near vicinity to Anna Maria Island is of marginal quality, or will not meet State requirements. There is one other source of high quality white colored sand within reasonable distance of Anna Maria Island located within Longboat Pass, but this source is limited in volume, and is not eligible for permits from the FDEP BBCS. Sand resources off the west coast of Florida for beach nourishment are a dwindling resource. As the availability of beach-compatible sands becomes less and less, the regional needs of Manatee County and its neighbors, specifically the Town of Longboat Key and Pinellas County, begin to overlap, causing an increase in competition for the dwindling sand resources. As the sands become more sporadic and competition grows, regional sand management issues become more important. The existing sand resources, therefore, must be available if the beaches south of Tampa Bay are to be

maintained. The large sediment deposit off the north end of Anna Maria Island is a major deposit and is vital to Anna Maria Island.

HISTORY

The USACE initially recommended nourishment of the beaches of Anna Maria Island in a General Design Memorandum which was published in 1978. Anna Maria Island was first nourished in 1992/93 as the initial "Central Island" shore protection project. The first Central Island beach nourishment project was constructed ten years later in 2002 and a minor hurricane damage repair fill project was conducted in 2005/06. An initial nourishment project of about one mile in length is planned for construction at the southern end of Anna Maria Island fronting the Coquina Beach Park area. The sediment source will be the beach-compatible sand source off the north end of Anna Maria Island. The County is planning its second Central Island beach nourishment project for 2011-2012, and also intends to use the beach-compatible sand source off the north end of Anna Maria Island to accomplish the nourishment effort.

The 1992/93 Central Island shore protection project consisted of the placement of approximately 2.32 million cubic yards of sand along a 4.6 mile project area between FDEP monuments R-12 and R-36. The project was constructed from December 1992 to February 1993. The design berm width was 75 feet on average with an advanced fill of 85 feet. The 1992 beach nourishment project was constructed under the direct supervision of the USACE.

The 2002 Central Island beach nourishment project was constructed between March and May under the management and supervision of Manatee County. Approximately 1.9 million cubic yards of sand were placed along 5.2 miles of the Anna Maria Island shoreline. Manatee County assumed control of the project under the provisions of the 1992 Water Resources Development Act (WRDA) which provided for local government project control and Federal cost-sharing on a reimbursable basis. As the non-federal sponsor, Manatee County proceeded under the authority of Section 206 of the Water Resources Development Act of 1992, Public Law 102-580,

with the first periodic beach nourishment project. Section 206 allows a local sponsor, Manatee County in this case, to engineer and construct the beach nourishment project and then receive reimbursement for the Federal share of the project costs. For the 2002 project, USACE reviewed the County's engineering products, issued a permit for the project and participated in project cost-sharing.

The 2002 Central Island project limits included the original 4.6 mile federally authorized and federally funded project area located between FDEP monuments R-12 and R-36. The County also nourished an additional 3,000 foot (previously unnourished) of beach within the City of Anna Maria between FDEP monuments R-7 and R-10. The project limits for the newly defined City of Anna Maria segment (R-7 to R-10) had no Federal involvement other than acquisition of the USACE permit for project construction. The nourishment of the City of Anna Maria segment was entirely funded by the State and local governments.

The County defined beach-compatible sand borrow area utilized for the 2002 project was located approximately 2,000 feet offshore of the north end of Anna Maria Island and seaward of FDEP monuments R-7 through R-10, located south of Passage Key Inlet. The same borrow area was utilized for the 2005 Anna Maria Island storm damage repair project. The mean grain size of the borrow area was 0.24 mm (2.07 phi) with a silt content of 2.72%. The 2006 pre-construction survey of the borrow area indicated an available volume of 970,000 cubic yards of material. The contractor dredged approximately 200,000 cubic yards of sand from the borrow area during the 2005 project, leaving approximately 650,000 to 700,000 cubic yards of beach-compatible material within the borrow area.

The County is presently in the permitting process to restore the beach at the southern end of Anna Maria Island, referred to as the Coquina Beach Nourishment Project. The proposed project length is about 0.9 miles, and the proposed volume will be approximately 300,000 cubic yards. The project is slated for construction in late 2008 or early 2009. With the addition of this project area, the total length of Anna Maria Island which will be protected through beach

nourishment will be over six miles. The sand source for maintaining Anna Maria Island's beaches will be the native sediment deposit located west of the north end of Anna Maria Island, which will include the 2002 borrow area.

The County is planning the construction of the second periodic maintenance nourishment project for the Central Island area in late 2011 or early 2012. Again, the beach-compatible sediment source for the project is planned to be the sediment deposit off the north end of Anna Maria Island. A minimum volume of 1.5 million cubic yards of sediment is anticipated for use.

This mineral resource has proven to be an ideal beach-compatible sand source for these projects. As the periodic nourishment of Anna Maria Island beaches continues into the future, Manatee County will rely on this shoal for the optimal beach-compatible sand needed to maintain the beaches of Anna Maria Island..

COUNTY COMMENTS ON THE PORT DOLPHIN DRAFT ENVIRONMENTAL IMPACT STATEMENT

The County has reviewed the DEIS on the Port Dolphin LLC Deepwater Port License Application in order to determine what potential impacts the preferred alternatives may have on Manatee County's Shore-protection program. Potential impacts (both major and minor), as well as areas where information identifying the potential impacts is missing and/or deficient, are outlined below, referenced to the specific DEIS sections.

Section 2: Detailed Description of Project and Alternatives

The County reviewed Section 2 in order to understand how preferred alternative pipeline route was selected. After a detailed review of the Alternatives Analysis, the County found several areas where information was either contradictory to other public comments, lacking information, or missing altogether.

2.1. Alternatives Considered

2.1.1 Alternatives for Analysis

2.1.1.3 Port and Pipeline Location Alternatives

This section lists several criteria for identifying and evaluating the alternative pipeline corridor locations. Of particular interest to the County is Criterion 3. This criterion states that "siting a project in an identified sand resource would be difficult, and likely would not be approved by the Minerals Management Service" (USCG and MARAD, 2008). With this statement, there is a strong acknowledgement that sand resources in Federal waters would be protected for such uses as beach nourishment. However, this statement and alternatives analysis, while true, does not fully describe the situation regarding mapped sand resources, specifically those within State of Florida jurisdictional waters. The MMS does have authority over identifying and permitting sand resources in Federal waters, but the proposed pipeline route also impacts offshore sovereign submerged lands of the State of Florida. The MMS has no jurisdiction or authority for these lands. In regards to State of Florida sand and mineral resources, the FDEP BBCS has full authority for permitting the use of these sands as identified resources for shore protection projects through Florida Administrative Code 62B-41. In the case of this alternatives analysis, it does not appear that the USCG and MARAD, or Port Dolphin LLC in the Application (Port Dolphin, 2007a), coordinated with the FDEP BBCS in order to determine if the proposed alternatives impacted any sand resources.

There is reference to one report in which "Sand Resources" were identified. These resources are mapped on the Figure 2.1-10 (and many other figures) of the DEIS (USCG and MARAD, 2008). Upon further review of this referenced report, the "Sand Resources" as mapped within the DEIS are areas were the potential for sand resources may exist and not actual, beach-compatible mapped resources at all. The reliance of Port Dolphin LLC on this one source of mineral

resource information resulted in the misinterpretation of true sand resources and the resulting location of the proposed pipeline route, which directly impacts a regionally limited, beach-compatible sand resource (Figures 1 and 2).

The exploration, identification, permitting, and use of sand resources are highly regulated actions by the State of Florida. As such, a great detail of time, money, and effort are expended to complete the regulatory process to the satisfaction of FDEP BBCS and the State of Florida. Applicants typically conduct both geophysical and geotechnical studies to identify appropriate, beach-compatible, site-specific sediment sources for beach nourishment use. Geophysical surveys are conducted after extensive research into existing and historical geological data to identify areas of potential beach-compatible sediments, such as the mineral resource off the northern end of Anna Maria Island. These geophysical surveys include seismic sub-bottom investigations of the sub-surface sediment strata, sidescan sonar to map surficial ocean bottom features, bathymetric data to develop overlying water depths, magnetometer surveys to identify any potential cultural resources and/or hazards to borrow area development, and if necessary, diver surveys of the proposed borrow areas. After a borrow area is identified, a more detailed (30 meter spacing) seismic sub-bottom, sidescan sonar, and magnetometer survey is conducted under the supervision of a Marine Archaeologist to map all magnetic and geophysical anomalies for further study into cultural resource significance. Vibracores (sediment cores) are obtained, and the sediment layers within the vibracores are analyzed to determine sediment characteristics and compatibility with the recipient beach sediments. The vibracore and sediment data is then extrapolated to the seismic sub-bottom data in order to verify the geophysical survey data. If all of the surveys, studies, and analysis provide supportive results, a specific borrow area is identified and approved by the FDEP for use in the beach nourishment process. The sediments contained in the larger geologic feature in which the borrow area is located also

may contain beach-compatible sediment resources that are suitable for future use in beach nourishment projects. This is true for the sediment deposit located off the north end of Anna Maria Island.

As part of the process to identify sediments which meet the stringent criteria for beach nourishment, easements and State of Florida "consent to use" decisions are issued for identified resources lying within State of Florida jurisdictional waters. Had Port Dolphin LLC contacted FDEP BBCS to determine if actual identified beach-compatible sand resources were going to be impacted, it would have been apparent that an existing, fully permitted existing borrow area, as well as a very-limited, highly-valuable, native, white sand mineral resource currently used for beach nourishment projects would be directly impacted by the Preferred and Southern alternative pipeline routes (direct impacts to Geologic Resources will be discussed in greater detail in the comments on section 4.4 below). The northern pipeline route, as it approaches Egmont Key and enters Tampa Bay through Southwest Passage, does not impact any identified sand resources, and as such, the northern pipeline route alternative should be considered the preferred alternative in regards to Criterion 3. The decision to route the preferred and the southern routes through Passage Key Inlet has led to the direct impact to identified sand resources, whereas the routing of the pipeline through Southwest Passage results in no impacts to identified sand resources. Therefore, a route through Southwest Passage should be thoroughly reviewed in the alternatives analysis.

In response to the selected pipeline route, the County requests a detailed analysis of the preferred pipeline route, but taking into consideration the actual identified and mapped sediment resources described above (and not the generic "potential sand resource" currently shown in the DEIS), which were not

considered in the DEIS. There appear to be a number of alternatives which require additional analysis (Figure 3).

One option the County requests is that Port Dolphin LLC analyze is the potential use of a small portion of the northern route which deviates north of the sediment resource area. In this manner, the vast majority of the preferred route could be retained for use as the pipeline route. The County believes that revision of the preferred pipeline route to incorporate that portion of the northern pipeline route that enters Tampa Bay through Southwest Passage, fully by-passing the beach-compatible sediment deposit, is a realistic alternative.

Another option is to connect into the existing Gulfstream pipeline. The Gulfstream pipeline apparently has both capacity and an offshore point of connection available to Port Dolphin, assuming a number of technical issues can be addressed. A major advantage to use of the Gulfstream line is avoidance of environmental impacts associated with the proposed Port Dolphin pipeline. Nevertheless, each alternative provides a satisfactory solution to the potential loss of sand resources which have been identified for use as the Anna Maria Island beach nourishment sediment source (addressed by the County later in these comments). This alternative will be addressed in greater detail below.

A pipeline route which continues straight from the offshore Deepwater Port site, directly to Southwest Passage, crossing the Gulfstream Pipeline, and then continuing straight to its planned location in Central Tampa Bay (all in one straight line) is also an option, although not one specifically identified in the DEIS. This route may involve more study, but is a logical stand-alone pipeline route, and may actually result in a reduction of the overall length of pipeline, while maintaining the same number (2) of planned crossings of the Gulfstream Pipeline.

There is another alternative that is not addressed in the DEIS. This alternative would have the preferred pipeline route begin at the proposed Deepwater Port site and then continue to a spot approximately 2,000 feet south of where the existing Gulfstream Pipeline crosses the Federal/State Boundary, approximately nine miles west of Egmont Key. At this point, the new pipeline should be collocated, or constructed parallel to, the existing Gulfstream pipeline. In order to prevent impacts to either pipeline, the construction should occur outside of the easement of either Pipeline, but on a parallel path from offshore to Port Manatee. It would reduce the overall environmental impacts (addressed by the County later in these comments) while maintaining access for the Port Dolphin pipeline. This route would also avoid impacts to all identified sand resources. Without an analysis of an alternative pipeline route based on collocating the Port Dolphin pipeline parallel to the existing Gulfstream pipeline in Florida State waters, the County believes that the DEIS Alternatives Analysis is not complete.

The alternative of greatest viability may be the option of Port Dolphin LLC constructing their pipeline to, and connecting with the existing offshore piggable y-type valve already available as part of Gulfstream's existing pipeline at milepost 392.6. This valve was specifically constructed for this type of situation although as reported in the DEIS, technical issues would need to be addressed. This alternative was discussed in the DEIS, however, it was not addressed in detail and may have been dismissed after Port Dolphin LLC determined to use the preferred route. The DEIS lists several pipeline engineering reasons as to why this is not a feasible alternative, however, in response to the FERC proceeding for the onshore portion of the pipeline (and submitted as public comment to the DEIS proceeding) Gulfstream states that these issues can be successfully addressed. There is a minor discrepancy between the information presented in the DEIS and the information presented by Gulfstream regarding operating

pressures of the Gulfstream pipeline and of the re-vaporized gas at the proposed terminal. However, minor revisions to the pipeline or vessel engineering systems should be considered more seriously if they result in significant reduction in impacts to environmental resources by tapping into an existing pipeline offshore, and avoid the beach-compatible sand resources required for beach nourishment projects.

A reduction in major and minor environmental impacts would be accomplished be eliminating over 20 miles of new pipeline construction. Additionally, the Gulfstream pipeline was constructed with this valve in order to provide access to additional providers (like Port Dolphin). This appears to have been required by FERC in order to be in the public interest by allowing additional providers of natural gas access to the Gulfstream pipeline. The County questions whether it is in the public interest to allow Port Dolphin to refuse this connection and to construct a new pipeline through sensitive and scarce resources that have significant environmental, economic, and public safety value to the County (see later sections for detailed discussion of the impacts).

Based on these facts and observations it is the County's opinion that the Alternatives Analysis presented in the DEIS is not complete, and that at least four potential alternatives need to be further explored, with greater importance given to the reduction in environmental impacts and avoidance of sand resources of each of these alternatives. These suggested alternatives are listed below (in no particular order):

- A more detailed discussion regarding tapping into the Gulfstream pipeline at milepost 392.6, including a detailed analysis of the engineering issues involved and a qualitative and quantitative discussion on the reduction in environmental impacts by not having to construct 20+ miles of new pipeline;

- A discussion of the potential for diverting the pipeline to follow a small portion of the northern route as it enters Tampa Bay via Southwest Passage to avoid the beach-compatible sediment resource areas, while retaining the greater majority of the preferred pipeline route.
- A discussion of a new alternative that would construct the preferred pipeline route beginning at the proposed Deepwater Port site and then continue to a spot approximately 2,000 feet south of where the existing Gulfstream Pipeline crosses the Federal/State Boundary, approximately nine miles west of Egmont Key. At this point, the new pipeline could be collocated, or constructed parallel to, the existing Gulfstream pipeline all the way into Port Manatee.
- A discussion of a new alternative of constructing the pipeline straight from the offshore Deepwater Port site, directly to Southwest Passage (not Passage Key Inlet), crossing the Gulfstream Pipeline, and then continuing straight to its planned location in West-Central Lower Tampa Bay (all in one straight line).

Section 3: Affected Environment

Upon review of Section 3, the County feels that the discussion relating to several resources was deficient in regards to issues specific to the West-Florida Coast. Additionally, information was missing in regards to the regulatory authority of State of Florida agencies on mineral resource management, which resulted in a major oversight of previously defined and active mineral resources directly in the path of the proposed pipeline route. These issues are discussed below.

3.2 Biological Resources

3.2.3 Threatened and Endangered Species

3.2.3.2 Threatened and Endangered Sea Turtles

The beaches of Anna Maria Island and the west coast of Florida provide valuable nesting habitat for sea turtles. Five sea turtle species have been known to nest

on Florida beaches, including the threatened loggerhead sea turtle (*Caretta caretta*), endangered green sea turtle (*Chelonia mydas*), endangered leatherback sea turtle (*Dermochelys coriacea*), endangered hawksbill sea turtle (*Eretmochelys imbricata*), and endangered Kemp's ridley sea turtle (*Lepidochelys kempii*). Loggerhead sea turtles are the nesters within Manatee County, accounting for an average of 136 nests annually on the beaches of Anna Maria Island between the years 2000 and 2006 (S. Fox, personal communication, 2007). Erosion of these beaches reduces available nesting habitat; however, Manatee County's periodic beach nourishment with fill material that replicates the native beach sand increases the area that may be utilized for sea turtle nesting.

Sand source compatibility is a major consideration for the nourishment of a project area (NMFS and USFWS, 1991). Following beach nourishment, the increase in success of sea turtle hatchlings on a nourished beach environment is attributable to the type of sand (fill material) used in the project. Characteristics such as color, grain size, compaction and gas balance in the nest are major determinants in the success of nesting. Beach sand characteristics strongly influence the relative suitability of sea turtle nesting success (a choice to nest or false crawl) and hatchling success (the percentage of eggs that produce hatchlings) (T. Tucker, personal communication, 2008). According to Broadwell (1991), conditions favoring hatchling production may rely heavily on pore spacing and moisture content. The sand composition, color, and grain size can affect the incubation time, sex, and hatching success of turtle hatchlings (Street *et al.*, 2005). The color of the fill material can affect the temperature of the nest; increased nest temperatures have been linked to a strongly female-biased hatchling sex ratio among loggerhead sea turtles, which has serious implications for the reproductive success of the species (Mrosovsky and Provancha, 1992).

It is important that beach fill material be compatible with sea turtle nesting and hatching requirements. Fill material should resemble native grain size distribution and sorting level, color and shape to better maintain native beach habitats. The sediment source off of the north end of Anna Maria Island meets the rigorous requirements of the State of Florida concerning "beach-compatible" sediment, and it is the only available economical sediment deposit with similar sediment characteristics to that of the Anna Maria Island beach currently available to Manatee County. The sediment very closely matches the existing beach sand, therefore utilization of this sand source for Manatee County beach nourishment projects maintains the beaches of Anna Maria Islands as suitable and valuable sea turtle nesting habitat.

While The DEIS has a relatively extensive discussion on threatened and endangered sea turtles, it fails to discuss the importance of beaches and sediment characteristics required by threatened and endangered sea turtles to nest and successfully reproduce. This is a major oversight, and the County considers the DEIS incomplete without a discussion on:

1. A description of the optimal native beach habitat required for threatened and endangered sea turtles to successfully nest and reproduce;
2. A discussion on the importance of quality beach material and access to successful sea turtle reproduction;
3. A discussion on the requirements of beach-compatible borrow sand quality and characteristics required for maintaining suitable beach habitat for threatened and endangered sea turtles to successfully nest and reproduce.

3.4 Geological Resources

3.4.2 Offshore Regional Geology (Mineral Resources)

As described in the County's comments for Section 2.1.1.3, there was limited to no discussion of State of Florida sand and mineral resources. There was only a cursory mention of sand resources within Florida State waters, and that comment was incorrect. In both the application and DEIS, there are repeated assertions that the MMS has final regulatory authority over these resources. While this is true for Federal mineral resources, it is not true for State of Florida mineral resources which extend from the mean high water line out to a distance of nine (9) miles offshore. The FDEP BBCS has full regulatory authority over the identification, permitting, and use of State of Florida sand resources for shore protection activities under Florida Administrative Code 62B-41. It is believed that Port Dolphin LLC failed to address the potential presence of beach-compatible mineral resources required for region beach nourishment projects within the planned pipeline route with the FDEP BBCS, instead relying on one report that shows a large region of potential sand resources offshore of Anna Maria Island and Longboat Key, and not actual identified and mapped beach-compatible sand resources (*i.e.* mapped mineral resources as the NEPA process requires). However, even in considering this larger area of potential sand resources referenced in the DEIS, Port Dolphin LLC ignored that information and selected a pipeline route through the potential resource area even though there were other viable pipeline routes.

As stated earlier, potential sand deposits within the area mapped as potential sand resources in the DEIS are actually undefined, and most of them do not meet the present strict "beach compatibility" standards for use as borrow material in beach nourishment projects. The exploration and identification of beach-compatible sand resources is a highly-regulated process governed by the FDEP BBCS. The goals of these strict regulations are to identify and use only the best and most appropriate sand for beach nourishment activities, primarily seeking sediment which most closely matches the native beach sediment. In order to be deemed suitable, proposed offshore sand sources are reviewed in context with the recipient beach by the FDEP BBCS. The review includes comment by outside agencies (State Fish and Wildlife, State Historic Preservation Office,

etc.) to insure that adverse environmental or cultural impacts will not occur. In addition, sediments must meet specific criteria. The performance of a beach nourishment project is related to the quality and quantity of sand used to nourish or replenish the eroding shoreline. State and federal regulatory agencies require that sand resources for nourishment be "beach-compatible" or similar to the natural sand for any given area. Various qualities like grain size, silt content, color, and mineralogical content are taken into account. The quality of material that can be placed on Florida's beaches is governed by Rule 62B-41.007(2)(j) F.A.C. which states that:

> To protect the environmental functions of Florida's beaches, only beach-compatible fill shall be placed on the beach or in any associated dune system. Beach-compatible fill is material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system. Such material shall be predominately of carbonate, quartz or similar material with a particle size distribution ranging between 0.062 mm (4.0 phi) and 4.76 mm (-2.25 phi) (classified as sand by either the Unified Soils or the Wentworth classification), shall be similar in color and grain size distribution (sand grain frequency, mean and median grain size, and sorting coefficient) to the material in the existing coastal system at the disposal site and shall not contain:
>
> 1. Greater than 5 percent, by weight, silt, clay or colloids passing the #230 sieve (4.0 phi);
> 2. Greater than 5 percent, by weight, fine gravel retained on the #4 sieve (-2.25 phi);
> 3. Coarse gravel, cobbles or material retained on the 3/4 inch sieve in a percentage or size greater than found on the native beach;
> 4. Construction debris, toxic material or other foreign matter; and
> 5. Not result in cementation of the beach.

> If rocks or other non-specified materials appear on the surface of the filled beach in excess of 50% of background in any 10,000 square foot area, then surface rock should be removed from those areas. These areas shall also be tested for subsurface rock percentage and remediated as required. If the natural beach exceeds any of the limiting parameters listed above, then the fill material shall not exceed the naturally occurring level for that parameter.

Once a borrow area is found to be compatible with the recipient beach, a detailed Quality Assurance/Quality Control (QA/QC) plan is developed (in conjunction with, and approved by the FDEP BBCS) which must be followed exactly during construction of the shore protection project. This plan specifies a range of sediment characteristics which are considered acceptable for placement. The characteristics typically include mean grain size, silt content, color and shell content. These plans are site specific and can include other parameters as well. A detailed sampling regimen is provided to determine if material placed meets the QA/QC criteria. The plan also provides guidance on mitigation in the event that material fails to meet the criteria. Mitigation often involves either removal of non-compliant material or mixing with other material in order to meet QA/QC standards.

Based on these strict standards and rules, the area mapped in Figure 2.1-10 of the DEIS (USCG and MARAD, 2008) is not an accurate representation of sand resources. It does show the area of potential resources based on available data, but unfortunately does not highlight high quality, limited beach-compatible sediment resources such as the sediment deposit off the north end of Anna Maria Island. In fact, beach-compatible sand is a severely limited resource, and as such, needs to be conserved whenever possible for future use on shore-protection programs. Nevertheless, Port Dolphin LLC still selected a preferred pipeline route through the potential sediment resources when there were viable pipeline routes that would have preserved the limited beach-compatible sediment resources for shoreline protection.

Due to what appears to be a major oversight in not thoroughly investigating potential beach nourishment sediment resources in the path of the preferred pipeline, the applicant missed the important beach-compatible beach nourishment sediment source for both Manatee County and the Town of Longboat Key. The Port Dolphin LLC may not have been familiar with the strict rules governing the identification of a beach-compatible sand resource, not aware of the various criteria that must be met to receive approval of a beach-compatible, beach nourishment sediment source. Port Dolphin LLC may have not been aware of the fact that such resources are highly limited, and greatly sought after, by communities which need the sediment to maintain their beaches. Communication with FDEP BBCS and local government agencies in charge of local shore-protection programs (Manatee County Department of Conservation Lands Management, the Town of Longboat Key, Pinellas County Department of Environmental Resource Management, etc.) would have provided the applicant with information that would have been important in developing a pipeline route to avoid the beach-compatible sand resource area. The Applicant apparently did consult with the ROSS database for potential sediments, however, the applicant did not follow up on the ROSS information to learn of the specific resources in the direct path of the preferred pipeline route. As a result, the Application and DEIS failed to identify the true beach-compatible sand resources along the preferred pipeline route. In addition to the sediment deposit as a whole, specifically, a fully permitted, active, existing borrow area for Longboat Key is directly bisected by the proposed pipeline route (see comments in section 4.4 for more impact information). This borrow area was permitted for use by the FDEP BBCS under Consolidated Joint Coastal Permit and Sovereign Submerged Lands Authorization Number 0202209-001-JC.

Due to the proposed pipeline route, a significant portion of the sediment deposit offshore the northwestern tip of Anna Maria Island will not be available for use on both Anna Maria Island and Longboat Key after construction. This sediment is the ideal sand

mineral resource for shore protection projects on Anna Maria Island and Longboat Key. The geologic character (as described above in Florida Administrative Code 62B-41.007(2)(j)) is an excellent perfect match for both Anna Maria Island and Longboat Key. In addition to being the sand source for the above mentioned Longboat Key sand source, this sediment deposit has served as a successful sand source for the last three Anna Maria Island beach nourishment projects. Manatee County considers this shoal to be the current and long-term sediment source for its shore-protection program. Impacts to this sediment source will be described in detail under comments for section 4.4 (below).

When defining a potential pipeline route, Port Dolphin LLC should conduct a title determination on the submerged lands to be included on, or near, the proposed pipeline route. It appears that this was not done, or not completed properly, for the Application or the DEIS. If it had been, the existing Longboat Key borrow area and historic Anna Maria Island borrow areas should have been mapped as identified sand resources.

In summary, the County finds this section of the DEIS severely lacking in regard to information on actual geologic mineral resources within the proposed project area. As such, the County considers the DEIS incomplete until a detailed discussion is included on:

1. The detailed and highly-regulated process by which mineral resources are identified in Florida State waters;
2. A detailed description of true identified mineral resources (including sand borrow areas permitted for use by FDEP BBCS) as opposed to a generic mention a large portion of seafloor that has limited potential for sand resources;
3. A detailed discussion on the regional needs for sand resources for shore-protection programs in the vicinity of the project area.

3.6 Recreation and Aesthetics

3.6.1 Definition of the Resource

Although Manatee County has major beach front public parks, inexplicably none of the beach front public parks were identified in the DEIS. In particular, the section titled "Recreation on Local Islands" solely focus on island parks in Hillsborough and Pinellas County, with two of the mentioned parks (Caladesi and Honeymoon Island) occurring over 35 miles from the proposed project location, while Anna Maria Island is immediately south of the preferred pipeline route.

The County believes that there was a significant oversight of the extensive Manatee County and local government park system, and of the beaches themselves, which are in direct proximity to the project area. The beach front public park system on Anna Maria Island includes Cortez Beach Park, Coquina Beach Park (with over 1,000 parking spaces and beach facilities), Manatee Beach Park (with over 400 parking spaces and beach facilities), and Bayfront Park. All of these parks provide access to the public beach, which, in and of itself, serves as a major recreational and economic resource to the local governments, Manatee County, and the Town of Longboat Key, as well as the State of Florida.

Each and every one of the public beach parks is included in the County's beach management program. Manatee County actively maintains the beaches of six of the approximate seven miles of island coastline as part of its shore-protection program. The shore-protection program is partly funded by the United States Army Corps of Engineers, the State of Florida, and Manatee County. In order to qualify for State funds for shore protection, the County and local governments have to maintain beach access and parking facilities for the general public along the entire shoreline of Anna Maria Island. As part of the certification process, the FDEP BBCS identifies all available access points and provides funding based on actual availability. In the case of Anna Maria Island, the termination of all roads near the beach is a public access point, resulting in

over 100 separate public access points (not counting the park system) on Anna Maria Island alone.

In order to qualify for State cost-sharing funds for the Anna Maria Island Shore Protection project, the County and Cities on Anna Maria Island must maintain beach access and parking facilities for the general public along portions of the shoreline of Anna Maria Island (including the parks described above). As part of the certification process, the FDEP BBCS identifies all available access points and provides funding based on actual availability. The process of determining public access and eligibility for State cost-sharing also includes the determination of an Erosion Control Line (ECL). Since the State of Florida cost-shares the construction (and related) costs of Manatee County's beach nourishment projects, the ECL was determined and platted in relation to the existing mean-high water line prior to the construction of the first beach-nourishment project. Once determined, the ECL becomes the legal boundary between upland, private property and public, State of Florida sovereign lands, meaning that anything seaward of the ECL is State of Florida public property. This rule is critical to the Florida shore protection program by ensuring that all constructed beaches that are funded (at least partly) by the State of Florida are owned by the State and considered public property for the enjoyment of the citizens of the State of Florida.

The goal of this process is to ensure, on behalf of the Governor and Board of Trustees for the Internal Improvement Trust Fund of the State of Florida, access to the general public to the sandy beaches of the State of Florida. In essence, this allows for the entire shoreline of Anna Maria Island to be accessed and enjoyed by the general public, and therefore, the entire sandy coastline of Anna Maria Island (and all other local barrier island beaches) is a major public recreation area. Due to this fact, the maintenance of these public recreational resources through shore protection activities like beach nourishment is vital to the protection and continued availability to the general public.

This is a major recreational resource enjoyed by the general public and tourists from all over the United States and abroad.

The DEIS does not identify or otherwise mention the beaches and extensive park system of Anna Maria Island, in particular the beaches in the vicinity of the proposed pipeline project, as a major recreational resource. The County considers the DEIS to be incomplete and misleading without the inclusion of a detailed discussion of the existing park system and public beach access program present on Anna Maria Island and neighboring barrier islands.

3.9 Socioeconomic Resources and Environmental Justice

3.9.1 Definition of the Resource

The DEIS states that "NEPA requires an analysis of socioeconomic issues if socioeconomic effects are interrelated with environmental effects" and continues to define the resource as "the basic attributes and resources associated with the human environment, particularly population and economic activity" (USCG and MARAD, 2008). One of the largest economic sectors of the State of Florida and Manatee County is the tourism industry. The tourism industry in Florida and Manatee County is highly dependent on the environment, in particular, to the access and health of Florida's white sandy beaches. The County was dismayed to see that the DEIS discussion of socioeconomics was limited to fisheries and fisheries management as well as basic statistics as to general onshore economic industries, population, and employment. There is only brief mention of tourism, on DEIS page 3-116, that is inadequate at best. This reference is to recreational fishing as the only tourism related industry in the region is both highly misleading and completely incorrect.

The main economic engine for Anna Maria Island is tourism, which is based on the existence of the beaches of Anna Maria Island. Rental properties, transportation, retail,

food and service industries primarily revolve around the beach–related tourism industry of Manatee County. None of these economic issues are even addressed in the DEIS.

Additionally, the tax base of Manatee County is highly dependent on Tourist Development "Bed Taxes" as well as the retail sales tax. Currently, it is the Bed Taxes that directly fund tourism development activities, including beach nourishment projects. The DEIS fails to discuss any issues related to the extensive tourism industry of Manatee County, or how these issues fund large socioeconomic programs, including environmentally based activities like beach nourishment.

Seeing that these activities are closely linked, the County believes a detailed discussion of the total tourism industry and its direct impact to tax revenues in Manatee County is required. Additionally, the link between the tourism industry, "Bed Taxes", and beach nourishment need to be addressed in the DEIS. It is important for the DEIS to accurately describe the interconnectivity of beach nourishment (including protection of available beach-compatible mineral resources) to tourism, to tax revenue, to the continued funding of the shore-protection program through beach nourishment. Without this discussion the DEIS is incomplete.

Section 4: Environmental Consequences

In Section 4, the County was able to identify a direct, major impact to a sensitive environmental resource that the County relies on for shore-protection. The impact to this geologic resource is described below, and several major cumulative impacts due to this direct environmental impact are described later in the County's comments to Section 6 of the DEIS.

Section 4.4: Geological Resources

The DEIS states that "Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to mineral resources and potential geologic hazards are considered when evaluating potential impacts of the Port Dolphin project on geological

resources. Generally, impacts on geological resources or caused by geologic hazards can be avoided or minimized through proper siting" (USCG and MARAD, 2008). Both the DEIS and the Application plainly state, in an effort to properly site the preferred pipeline route, that "the route avoids mapped mineral resources" with the DEIS stating the following...."geological resources generally would not be impacted by the project. Some localized, short-term changes in sedimentation would be expected. It is not expected that the project would cause destruction of any unique geologic feature, increase erosion potential, prevent recovery of mineral resources..." These statements are inaccurate, rendering this portion of the DEIS completely unacceptable.

As discussed earlier in the comments for Section 3.4.2, the DEIS maps a much larger area of potential sand resources instead of referencing actual permitted and identified sand resources (*i.e.* mapped mineral resources as the NEPA process requires). However, even in considering this larger area of potential sand resources referenced in the DEIS, Port Dolphin LLC ignored that information and selected a pipeline route through the potential resource area even though there were other viable pipeline routes. Yet, even with this clearly mapped on figures in the DEIS, the document still states that "It is not expected that the project would cause destruction of any unique geologic feature, increase erosion potential, prevent recovery of mineral resources..." This is clearly contradictory to figure 2.1-10 (among others) presented in the DEIS which shows the preferred pipeline route going through the northern section of the potential sand resources. Also, as discussed earlier in the County's comments on section 3.4.2, had Port Dolphin LLC considered the State of Florida's regulatory authority regarding mineral resources in State of Florida jurisdictional waters, it would have discovered the FDEP BBCS has full regulatory authority over the identification and permitting of mineral resources in Florida State jurisdictional waters. This, together with a properly performed title determination, may have led to the discovery that, as proposed, the preferred pipeline route completely bisects an existing, fully permitted borrow area used by Longboat Key, as well as bisecting a much larger beach-compatible sand resource, containing an estimated 18,245,000 cy of beach-compatible

sand resources, that is the historic and future source for beach-compatible sands for the Manatee County shore-protection program.

The Manatee County beach-compatible sand resource mentioned above is directly impacted by the proposed pipeline route, which bisects this oblong feature as the route travels from the offshore Port facility into Passage Key Inlet. This mineral resource has served as the source of beach-compatible sand for the Manatee County shore-protection program for the last three beach nourishment events. This sand source has repeatedly proven to meet the strict beach-compatibility guidelines, including optimal compatibility for nesting threatened and endangered sea turtles, as set by the FDEP BBCS (described in the County comments on Section 3.4.2 above). Due to the limited availability of similar beach-compatible sand resources, and to the fact that this resource has been used successfully on at least four occasions (three for Anna Maria Island and once for Longboat Key), this mineral resource qualifies as a unique geologic feature. Referring back to the DEIS contention that "it is not expected that the project would cause destruction of any unique geologic feature, increase erosion potential, prevent recovery of mineral resources...", the County disagrees, as the proposed pipeline route directly impacts a unique geologic feature while also preventing recovery of a substantial volume of beach-compatible mineral resources vital to the Manatee County shore-protection program.

In addition to being the ideal sand source in regards to geologic and biologic native beach compatibility, this sand source is in close proximity to the recipient beaches of Anna Maria Island. This allows Manatee County to employ a construction model that revolves around the use of a "cutterhead" dredge to excavate and place the beach-compatible sand resources. Cutterhead dredges are able to access shallower water, where they can then excavate the mineral resources directly into a pipeline system that carries the sand from the seafloor straight to the recipient beach. This technology is the most efficient technology for excavating borrow sands and transporting them to the recipient beach, resulting in significant cost and time savings to Manatee County. This is one of only two sand resources known to Manatee County that have the unique, beach specific qualities and proximity to the project area required for the

County's shore-protection program. Unfortunately the other source, the Longboat Pass ebb shoal presently does not qualify for the State of Florida permits required for excavation of those beach-compatible sands. This means that the beach-compatible sand source off the northern end of Anna Maria Island is the only sand resource that contains the only readily available ideal beach-compatible sand required by the State of Florida available to the County for its current and future beach nourishment programs. Therefore, quantifying the impact of the proposed construction of the Port Dolphin natural gas pipeline directly through this sand resource is vital to Manatee County as such an analysis will lead to the conclusion that a non-impactive pipeline route is absolutely necessary .

In order to determine the true impact that the proposed pipeline route would have on these geologic resources, the County must consider not just the actual footprint of the pipeline itself, but a "safety buffer", restricting dredging or other bottom impacts, that would be employed around the constructed pipeline in order to avoid future impacts to the natural gas pipeline. In the State of Florida, this is a common occurrence when defining boundaries for mineral resources (such as beach-compatible sand borrow areas) when they occur in proximity to cable routes, storm water, and waste water outfalls, and other buried obstructions. Unfortunately, there is no clear precedent for how wide a safety buffer around a natural gas pipeline must be in the State of Florida. Its size would be determined through the State permitting process. Nevertheless, natural gas pipelines which are located in other areas of the country require buffer zones of 300 to 600 meters (or potentially more) to either side of the pipeline. In Louisiana, these pipelines are quite distant from highly-populated areas in many cases, yet the 300 – 600 meter buffer zones are the common. The preferred Port Dolphin pipeline route, as it passes through the sediment resource of concern, is close to highly populated areas, and to areas of relatively high recreational boat traffic. Considering the proximity of the proposed pipeline to the populace, it is anticipated that the State of Florida could require at least a 300 meter buffer zone, if not more. In the case of defining and permitting a beach-compatible borrow area, the safety buffer would be negotiated during the permitting process between the beach nourishment project applicant (typically a County or municipality) and the FDEP BBCS,

the State regulatory agency in charge of permitting beach-compatible mineral resources and the related beach nourishment projects. Due to the sensitive nature of a natural gas pipeline, it is assumed that the State would err on the side of caution and design a larger "no dredge" safety buffer.

Realistic assumptions must be made to try and determine what this safety buffer will be, prior to allowing construction of any pipeline. Louisiana and Texas have extensive oil and gas infrastructure, including widespread oil and gas pipelines throughout their State and Federal submerged lands. Borrow areas have been defined in proximity to these pipelines in the past, and recently, the safety buffer proposed by the MMS (the regulatory agency in charge of Federal oil, gas, and mineral resources) was 1,000 meters to either side of the pipeline, resulting in a 2,000 meter no-dredge corridor centered on the pipeline. This is a significant buffer and probably the worst case scenario regarding a safety buffer for the Port Dolphin pipeline. In order to determine how a safety buffer may impact the mineral resources along the proposed pipeline route, the worst case scenario of 1,000 meters was considered along with a less restrictive, but still highly significant, 1,000 foot buffer (Figures 1 and 2).

When a 1,000 meter buffer is placed around the proposed pipeline route, the currently available 18,245,000 cy yards of beach-compatible sand is reduced to an estimated 9,654,800 cy, resulting in the loss of 8,590,200 cy of beach-compatible sand for future beach nourishment projects. If the buffer is reduced to the less restrictive 1,000 ft, the currently available 18,245,000 cy yards of beach-compatible sand is reduced to an estimated 16,211,200 cy, resulting in the loss of 2,033,800 cy of sand for future beach nourishment projects.

Manatee County's current sand resource needs for its shore-protection program are substantial. The Central Project area requires approximately 1,900,000 cy of beach-compatible offshore sand every ten years. The next nourishment of the Central Project is currently scheduled for sometime between 2011 and 2013. The Coquina Beach Project area requires 420,000 cy of beach-compatible offshore sand. The next nourishment of the Coquina Beach

Project is currently scheduled for early 2009. When you weigh the loss of beach-compatible sands due to the pipeline construction and associated safety buffer with the project needs, approximately four full Anna Maria Island nourishment projects alone (not counting any other regional sand needs) becomes unavailable for future beach nourishment projects when a 1,000 meter safety buffer is placed around the pipeline route. In other words, the current proposed pipeline location, together with a 1,000 meter buffer, would result in the loss of 40 years worth of highly-limited, beach-compatible sands for the Manatee County shore-protection program. If the buffer was reduced to 1,000 feet, well over the minimum volume needed for one full Anna Maria Island beach nourishment project becomes unavailable for future beach nourishment projects. These represent significant volumes of regionally-limited, beach-compatible material that would become permanently unavailable for future beach nourishment activities. Not only does this directly impact the Manatee County shore-protection program, but it impacts regional sand management, further limiting and already limited mineral resource.

If the pipeline construction occurred as currently proposed, and the volumes of sand discussed above became unavailable for future Manatee County beach nourishment projects, the County would be forced to try and locate a new source of beach-compatible sand. First, there is no guarantee that the County would be successful in locating a new beach-compatible sand source, however, if it was, it is assured that the beach-compatible sand resources would be further from the project area. This would result in Manatee County having to change from its efficient, cutterhead dredge construction model to a hopper dredge construction model. Hopper dredges operate in deeper water and instead of pumping the material directly from the mineral resource area, they dredge the material into large holds within the ship. Once the ship has filled to capacity, the ship steams to a location directly offshore the project area, hooks into a pipeline, and offloads the sand to the beach. The hopper dredge continues back and forth, between the project area and the sand source until the beach project is fully constructed. This is a much less efficient and much more costly construction method than the cutterhead model currently employed by Manatee County.

In order to quantify the loss of this unique geologic resource, the County calculated the potential economic impact of replacing the mineral resources lost due to the construction of the pipeline and its associated safety buffer. Based on accepted dredging industry costs, the County can assume an increased cost of $5 to $7 per cubic yard to explore, define, permit, and excavate and construct a more distant beach-compatible sand resource using a hopper dredge instead of a cutterhead dredge. This cost may rise as the cost of fuel continues to escalate. For the standard Anna Maria Island beach nourishment project this results in an additional cost of $9,500,000 to $13,300,000 for one 1,900,000 cy project. If Manatee County lost over four projects worth of sand (up to 8,590,200 cy of material) from the nearby beach-compatible sand resource due to a 1,000 m buffer around the pipeline, and had to switch to a new, as yet unknown beach-compatible sand source and hopper dredge technology, the County would be looking at a cumulative project cost increase as high as $38,000,000 to $53,200,000 over the next forty years. This calculation does not include changes in economic conditions such as inflation, the cost of fuel, and availability of dredging contractors for future projects. A cost increase this large could effectively paralyze Manatee County's shore protection efforts.

It is important to point out that these figures are based on an assumed 1,000 meter safety buffer (recently proposed by the MMS in Louisiana) to either side of the pipeline. It is possible that the buffer could be smaller, reducing (but not eliminating) the impact, but there is no State of Florida precedent for defining a safety buffer for dredging near a natural gas pipeline, and unfortunately, there is no way to set the buffer until a pipeline has been constructed and a mineral resource identified in proximity to the pipeline. Once that happens, it is already too late to try and minimize the impact the pipeline route would have on mineral resources.

The impacts described above are direct impacts to a unique geologic mineral resource of limited existence both locally and regionally. This type of resource is of great value not only to Manatee County, but to neighboring regional communities for their shore-protection programs, including Pinellas County, Sarasota County, and the Town of Longboat Key. By allowing the construction of the Port Dolphin pipeline in its current proposed configuration, not only would

it further limit this specific beach-compatible mineral resource, but would result in the increased completion for similar, already scarce resources for regional shore-protection programs. In addition to the direct impacts, a series of cumulative impacts would occur for the foreseeable future. These cumulative impacts, described below in the County's comments for Section 6, not only impact this geologic resource, but impact biological, recreational, and socioeconomic resources as well as create issues of public safety.

The DEIS entirely overlooks the impacts to the unique mineral resources listed above. The DEIS describes the destruction of unique geological features as a major impact, and impacts due to siting of facilities to prevent recovery of mineral resources can have varying degrees of importance. With that knowledge, the DEIS then goes on to say that "Geological resources generally would not be impacted by the project. Some localized, short-term changes in sedimentation would be expected. It is not expected that the project would cause destruction of any unique geologic feature, increase erosion potential, prevent recovery of mineral resources, increase the potential for geologic hazards (e.g., seismicity), or alter soil composition or structure." This is inaccurate and misrepresents the true impacts to geologic resources due to the construction of the pipeline (as it is currently proposed) and the implementation of a "no-dredge" safety buffer around the pipeline. Without a discussion of the issues listed in the above comments, with specific details on existing, permitted, State of Florida borrow areas and unique, regionally-limited, beach-compatible sand resources, and how the proposed pipeline route directly impacts these mineral resources, the DEIS is incomplete and insufficient, as well as misleading to the layperson.

4.11 Mitigation and Minimization Measures and Monitoring

As described above, there are major impacts to Geologic Resources due to the siting of the preferred pipeline route. This route has significant impacts on scarce beach-compatible sands, both those currently identified and permitted as existing beach-compatible sand resources and those resources identified as the sole beach-compatible source for future Anna Maria Island beach nourishment needs. As such, the County believes "avoidance" should be addressed in the

DEIS since there are no plausible options for mitigation, and minimization can be accomplished through avoiding the limited beach-compatible sediment resources. However, no discussion exists in the current DEIS to address the presence of the sediment resource off the north end of Anna Maria Island.

While no mitigation measures exist for the impacts on sand resources, there are specific minimization efforts that can be employed. These efforts are described in detail in the comments provided above for section 2.1.1.3. Impacts to Geologic Resources can be minimized, or actually completely avoided, by rerouting that portion of the pipeline route which impacts the sediment resource. Viable options exist which can achieve avoidance. For example, one potential option would be to utilize the northern pipeline route in the area of the sediment resources, retaining the majority of the preferred pipeline route. Another option would be to connect via an offshore subsea interconnection to the Gulfstream Pipeline. The subsea interconnection valve already exists. This is also an alternative deemed viable by Gulfstream. By rerouting the pipeline to connect to the Gulfstream pipeline offshore, all impacts to mineral resources will be removed. The County would have no further objection to the project (in regards to mineral resource impacts) as the one major impact that greatly affects the future of its shore-protection program will be eliminated with the rerouting of the pipeline through the northern route, or selecting the subsea interconnection of the Port Dolphin pipeline to the existing Gulfstream pipeline.

If this is not deemed possible, following an extensive alternatives analysis, then perhaps the second minimization effort involves rerouting the pipeline to be collocated with the existing Gulfstream Pipeline in Florida State waters. The existence of the Gulfstream pipeline already creates a corridor where sand resources are no longer available. As an alternative to the subsea Gulfstream connection, a parallel, collocated pipeline along the existing Gulfstream Pipeline route would reduce and/or eliminate the impacts the current proposed route has to mineral resources.

The final potential minimization measure involves rerouting the pipeline entirely. This route could take the pipeline on a direct route from the offshore deepwater port, into the central portion of Southwest Passage, and onto its planned route in West-Central Lower Tampa Bay, where it would continue along its currently proposed route to Port Manatee. Another option within this alternative could be routing the pipeline from the deepwater port to a location near the subsea interconnection valve on the Gulfstream Pipeline, at which point the route would follow the proposed northern pipeline alternative through Southwest Passage to Port Manatee.

All four of these potential minimization measures would result in the elimination of impacts to geologic resources. Avoidance is the only measure that would result in a minimization to the impacts on geologic resources the proposed pipeline route would have. As stated before, once the resources are removed as a sand source due to the construction of the proposed pipeline, there are no realistic mitigation options available. Beach-compatible sands on the west-coast of Florida are a very scarce resource. There are no mitigation measures that provide relief from the destruction of these valuable and limited resources. Without seriously addressing potential measures to completely avoid the beach-compatible sediment resource, and considering the lack of realistic mitigation available for these impacts, the County will consider the DEIS to be incomplete.

Section 6: Cumulative and Other Impacts

The major impacts to the existing Geologic Resources described in our comments for section 4.4 above would lead to a series of reasonably foreseeable cumulative impacts to other resources. These major and minor impacts, described in the sections below, are not presented in the DEIS and are vital for evaluating the overall impact the proposed project would have on environmental resources.

6.2 Past, Present, and Reasonable Foreseeable Cumulative Actions

6.2.4 Oil and Gas Leasing/Mineral Leasing

The County was able to identify major impacts to the future mineral leasing activities in Florida State waters due to the previously described direct impacts to the beach-compatible geologic resource off the northwestern tip of Anna Maria Island if the Port Dolphin natural gas pipeline were constructed along the preferred route (described under our comments for section 4.4).

The geologic resource off Anna Maria Island has been used multiple times for beach nourishment and has proven time and time again to be an optimal source of beach-compatible sand for shore-protection programs. Sands of this high-quality are difficult to find due to their limited existence on the west coast of Florida. By removing access to these mineral resources by constructing a pipeline and safety buffer directly though them, Port Dolphin LLC would be further restricting the available beach-compatible mineral resources on the west-coast of Florida. This is not in the public interest of Manatee County or Florida citizens.

Several large, local communities rely on regional beach-compatible sand resources to support their shore-protection programs. These include Pinellas County, Manatee County, Sarasota County, and the Town of Longboat Key. By eliminating access to this one large, beach-compatible mineral resource, a significant increase in competition will result for the remaining limited beach-compatible mineral resources. The impact to regional mineral resources is further described below in our comments on section 6.3.4: Cumulative Impacts to Geologic Resources.

After reviewing section 6.2.4 in the DEIS, the County was surprised to see that there was no discussion of the impacts to State or Federal mineral resources. The discussion in this section focused solely on Oil and Gas leasing. There are no active Oil and Gas leases on Florida's west coast in the vicinity of the proposed project. In fact, there is currently a Congressional moratorium on Oil and Gas exploration within the immediate project area. Alternatively, there is a very long history of, and numerous active, mineral mining

projects. All of the mineral mining projects focus on identifying and utilizing beach-compatible minerals sources for beach nourishment.

The fact that Oil and Gas issues are exclusively discussed within this section, and no discussion if offered on potential cumulative impacts to mineral resources, is a major oversight in the DEIS. The DEIS is incomplete without a discussion of the following items within section 6.2.4:

1. The extensive need for beach-compatible mineral resources for shore-protection programs along the west coast of Florida;
2. A discussion of the different regional shore-protection programs (Pinellas County, Manatee County, the Town of Longboat Kay, and Sarasota County) and the specific mineral resource/leasing activities (present and future needs) of each program;
3. A discussion of the regulatory authority of the MMS and FDEP BBCS to explore, define, and permit beach-compatible mineral resources for beach nourishment activities, including a detailed discussion on the effort required to explore and define these resources;
4. A discussion on the cumulative impacts to regional sand management issues caused by the removal of a large volume of beach-compatible mineral resources due to the construction of the proposed pipeline route and associated safety buffer.

6.3 Overview of Cumulative Impacts

6.3.2 Biological Resources (Threatened and Endangered Species)

As described in the County's comments to Section 4.4, construction of the proposed pipeline in its current configuration would result in the loss of much of an optimal, proven, state-approved beach-compatible sand resource. This resource is highly limited, and primarily found only in relative close proximity to the barrier island, in shallower waters. The loss of this sediment resource due to establishment of the Port Dolphin

pipeline will result in the County having to attempt to locate a distant, less-compatible sand source elsewhere, assuming such a source would be permittable, or result in the reduction or total elimination of the shore-protection program all together.

Threatened and endangered sea turtle species, specifically the threatened Loggerhead sea turtles, rely on the beaches of Anna Maria Island to reproduce. If the County is forced to use a less-compatible sand source (i.e. darker and coarser), there could be cumulative impacts to endangered sea turtles. The less compatible beach material could impact the ability of nesting sea turtles to successfully lay eggs on the beaches of Anna Maria Island. The increase in success of sea turtle hatchlings on a nourished beach environment is partially attributable to the type of sand fill used in the project. Characteristics such as color, grain size, compaction, and gas exchange in the nest are determinants in the success of nesting.

According to Mortimer (1990), conditions favoring hatchling production may rely heavily on moisture content. The idea that moisture content may play a role in the success of hatchlings is shown in evidence that suggests turtles may experience difficulties in constructing nests in coarse, dry sands. A positive correlation between mortality of clutches and the mean particle size of the sand has been found in studies conducted on nests of the green sea turtle. Typically, the coarser the sand is, the harder it is for the nesting female to dig the nest. The sand located in the beach-compatible sediment resource located off the north end of Anna Maria Island, where the pipeline is proposed to be constructed, has been proven to be an ideal sand source for beach nourishment in terms of turtle nesting compatibility. If this sand becomes unavailable to future beach nourishment projects, then lesser-compatible material may have to be substituted for future projects, resulting in a potential cumulative impact to endangered sea turtles by reducing the quality of beach material (by having to use coarser, darker sand from a more distant source).

If the Anna Maria Island shore-protection program is eventually reduced or eliminated due to the cumulative impacts associated with the construction of the proposed pipeline through the beach-compatible sand source, then the shoreline will continue to erode until it begins to impact upland structures and infrastructure. This erosion will result in the direct loss of critical nesting habitat for endangered and threatened sea turtles. Without periodic beach nourishment, the beaches of Anna Maria Island and Longboat Key will disappear, leaving nowhere for engendered and threatened sea turtle species to nest.

The DEIS lists biological resource impact evaluation criteria as follows:

1. Violate a legal standard for protection of a species or its critical habitat (major impact);
2. Degrade the commercial, recreational, ecological, or scientific importance of a biological resource or its critical habitat (minor to major impact depending on extent of degradation);
3. Measurably change the population size (density) or change the distribution of an important species in the region (minor to major depending on extent of change).

The cumulative impacts listed within the County's comments above have the potential to satisfy all of these criteria overtime. Without a discussion of the major cumulative impacts lesser-compatible beach sand and/or the lack of sands or funds to support a beach nourishment project on the ability of endangered and threatened sea turtles to successfully nest, the DEIS is incomplete.

6.3.4 Geological Resources

Locating the proposed pipeline in the local native, white, beach-compatible sand resource available to Anna Maria Island and Manatee County, and thereby removing it from the inventory of optimal sand resources, will increase local competition for limited

sand resources, even assuming such resources can be located at a distant location and would be available to Manatee County or the Town of Longboat Key. In addition to increased local competition, regional sand management issues would arise, as the local communities are forced to look for beach-compatible sand further away from their project areas.

In the case of West-Central Florida, the removal of the beach-compatible sediment source near Anna Maria Island from the inventory of beach-compatible sand resources will result in Manatee County and Longboat Key having to explore further north and south to look for beach-compatible sand resources, which may not even be available for a variety of reasons. This takes both entities into the local territories of Pinellas and Sarasota Counties, both of which have their own active shore-protection programs requiring large amounts of beach-compatible sand. With the removal of up to 8,500,000 cy of beach-compatible material due to the construction and safety buffer associated with the proposed pipeline, competition for regional sand resources will be greatly increased among Pinellas County, Manatee County, Sarasota County, and the Town of Longboat Key, with each government trying to locate and develop beach-compatible sand resources from an ever shrinking pool of available material.

Without a discussion of how the removal of this sand source results in a cumulative effect to geologic resources by effecting regional sand management plans and multiple shore-protection programs, the DEIS is incomplete and insufficient.

6.3.6 Recreation and Aesthetics

The discussion in this section focuses on recreational issues related almost exclusively to the marine environment, *i.e.* fishing, boating, etc. There is no mention of potential impacts to upland recreational facilities, in particular beaches. As explained in the County's comments on Section 3.6.1 of the DEIS, little to no discussion exists in the DEIS on beaches and parks immediately adjacent to the pipeline route. The beaches of Anna

Maria Island are a major recreational resource, and are not mentioned as such in the DEIS. As explained in the comments on the sections above, significant cumulative impacts may arise due to the construction of the Port Dolphin pipeline in its proposed configuration. As far as recreational resources are concerned, there is the potential of long-term, cumulative impacts on the health and accessibility of Anna Maria Island beaches (of which the entire length is considered public beach), including Cortez Beach Park, Coquina Beach Park, and Manatee Beach Park, due to the proposed pipeline route. Specifically, if major impacts to the beach-compatible sand resource are realized by the construction of the pipeline and associated safety buffer, there could be significant impacts to the funding structure and availability of beach-compatible mineral resources for the foreseeable future. If this were to happen, the viability of Manatee County's shore-protection program would be in question. The beach-compatible sediments contained in the sediment deposit off the north end of Anna Maria Island may not exist elsewhere in the needed volumes, or be permittable for use by the County. Even if a sediment deposit of similar quality were discovered, a significant increase in cost, coupled with a significant decrease in available beach-compatible materials would conspire to reduce and/or eliminate the County's ability to construct beach nourishment projects. If these projects are not constructed, then the beaches of Anna Marine Island will continue to erode, eating away at the public recreational beach along the entire coastline of Anna Maria Island. Without maintenance through beach nourishment, Anna Maria Island's public beach will eventually disappear, resulting in the loss of a major recreational resource for the general public.

The DEIS lists the following criteria for evaluating impacts to recreational resources:

1. Interference with access to coastal recreational shorelines or waterways (minor to moderate depending on extent of alteration);
2. Loss or displacement of an important recreational resource, such as impairment of recreational fishing activities and other water-dependent uses (minor to major depending on extent of alteration);

3. Degradation of recreational value (moderate);
4. Alter or impair a viewshed, scenic quality, or aesthetic value not consistent with applicable laws or regulations (minor to major depending on extent of alteration).

The construction of the Port Dolphin pipeline though existing beach-compatible sand resources, as currently proposed, could foreseeably result in cumulative adverse impacts to the Anna Maria Island shoreline as a recreational resource. These impacts, as described above, would satisfy all four of the decision criteria for evaluating impacts listed in the DEIS. Without a discussion of the cumulative impacts caused by the construction of the pipeline within beach-compatible mineral resources, and how these impacts relate to the decision criteria listed in the DEIS, the DEIS is incomplete.

6.3.9 Socioeconomics and Environmental Justice

Section 6.3.9 not only neglects to discuss potential major cumulative socioeconomic impacts, but misleads the reader by indicating that the impacts are mostly positive, with only some minor and isolated negative impacts. There is absolutely no discussion as to how cumulative impacts to the funding structure of Manatee County's shore-protection program, the potential degradation of future beach-nourishment projects, the potential implications to the tax structure, and potential long-term impacts to the tourism industry are related to the cumulative effects of construction of the pipeline (as it is currently proposed) directly though a beach-compatible, nearby, sand resource.

As described in the County's comments on Section 3.9.1 above, a significant portion of the economy and tax base for Manatee County revolves around the extensive tourism industry. This industry relies on healthy and accessible beaches as the main recreational draw for the tourism industry, and for the public in general (as described in the County's comments on Section 3.6.1). The cumulative socioeconomic impact as a result of the

direct geologic impacts to the beach-compatible sand resource offshore Anna Maria is not addressed in the DEIS.

This is a significant oversight, in that the direct impact to the geologic resource as described in the County's comments on section 4.4 above has a dramatic impact to the cost of maintaining, or the future viability of, Manatee County's shore-protection program via beach nourishment projects. The direct and cumulative impacts to geologic beach-compatible sand resources (described in our comments on Section 4.4) due to the construction of the pipeline as currently proposed would result in an economic impact to Manatee County's shore-protection projects in the amount of $38,000,000 to $53,200,000 over the next 40 years (at today's financial rates). This significant cost increase to the Manatee County shore-protection program is not sustainable.

The funding for the Manatee County shore-protection program is generated through the Tourist Development Council's "Bed Tax", which is generated from the large tourism industry within Manatee County. The current bed tax provides enough funding to maintain the Manatee County shore-protection program at its current funding level, allowing for the continued support of beach nourishment programs for Anna Maria Island. The bed tax is currently able to barely keep up with the cost of construction using the current, nearby sand source/cutterhead dredge model employed by Manatee County. If the County loses access to the nearby sand resource historically used for beach nourishment, resulting in the $38,000,000 to $53,200,000 impact of exploring, defining, permitting, and excavating an as yet unknown distant sand source, and constructing future projects using a hopper dredge, the current bed tax funding structure will not be able to cover the cost increase.

This leaves the County with two alternatives, both of which are not realistic. The first alternative is that the County explores alternate funding sources. At an increase of $38,000,000 to $53,200,000, the only alternate funding source is through the County's

ad valorem property tax. This is not a realistic alternative in that the ad valorem property taxes of Manatee County are already stretched beyond capacity, and cannot sustain an increase as large as the one caused by the loss of the current and future beach-compatible sand source due to the construction of the Port Dolphin pipeline as it is currently proposed.

In addition, the County is operating under increased restrictions as to how property taxes can be raised and spent in a direct reaction to the public view that property taxes are too high and cause excessive hardship to property owners. With these new rules, and the already burdensome level of property taxes, the County will be left to decide on two options regarding property tax funding for the increase in the cost of the shore-protection program due to cumulative impacts from the construction of the pipeline in its currently proposed location. First, the County must decide if the burden of property taxes needs to be increased to cover the added cost of beach nourishment construction due to the pipeline impacts. The second option is for the County to cut funding for other existing County programs in order to fund the increase in cost due to the pipeline impacts. Based on the current restrictions the County has regarding funding of existing projects, together with the State of Florida mandate to reduce property tax burdens on property owners, the County believes these two specific options, or any other option, requiring additional funding for the shore-protection program from ad valorem property taxes is not realistic and cannot be implemented. Either one of these ad valorem property tax options would produce significant socioeconomic impacts to the general public of Manatee County, by either increasing their already burdensome property taxes, or by reducing or eliminating other County programs that benefit and support the general public of Manatee County.

This leaves only one other option. Since the bed tax cannot keep up with the cost increases due to the pipeline impacts described above, and the ad valorem tax cannot be realistically implemented without increasing the burden to tax payers or at the

expense of existing County programs, the only option left is to greatly reduce or completely abandon the shore-protection program for Manatee County. In addition to the obvious public safety issues this option would create (see County comments for Section 6.3.11 below), significant cumulative socioeconomic impacts will occur. Specifically, by not maintaining the beaches, the shoreline will continue to erode over time. As described above in our comments on sections 3.6.1. and 3.9.1, the beaches of Anna Maria Island serve as the main draw to tourist from around the United State and the world, as well as being the main recreational resource for the general public. As this resource erodes away, the tourism industry would begin to decline, effecting employment, tax revenue, and the tourism industry in general. Overtime, the beaches would be gone, and with them, the tourism industry that Manatee County and Anna Maria rely on as a major economic engine. The cumulative socioeconomic impacts of this happening are significant, yet not even mentioned in the DEIS.

One of the evaluation criteria listed for determining potential impacts on socioeconomic resources states that "substantial change to the local or regional economy, population, housing, infrastructure (schools, police, and fire services), social conditions, or employment" would be considered a major impact. As described in the County's comments on this section, the potential cumulative impacts to tourism and the tax system of Manatee County as a result of the pipeline construction, as it is currently proposed, would satisfy this evaluation criterion as a major impact. The DEIS must include a detailed discussion of the potential socioeconomic impacts due to the cost increases associated with the removal of the beach-compatible sands offshore of Anna Maria Island from the inventory of available beach-compatible sands for future beach nourishment projects. Without this discussion, the DIES is incomplete and insufficient. The following specific items should be addressed in the DIES in terms of cumulative socioeconomic impacts:

1. The impacts to the socioeconomics of Manatee County if ad valorem property taxes will be required to cover the cost increases in future beach nourishment construction projects due to the removal of the beach-compatible sands in question, and exploration for, and use of, an as yet unknown more distant sand resource due to the construction of the Port Dolphin pipeline as currently proposed. This discussion should include both the option of increasing future ad valorem taxes to cover the cost increase and the option of not increasing taxes, but cutting funding for existing programs in order to fund future beach nourishment projects.
2. The impacts to the socioeconomics of Manatee County if the shore-protection program needs to be reduced and/or abandoned due to cost increases in future beach nourishment construction projects due to the removal of the beach-compatible sands in question, and exploration for, and use of, an as yet unknown more distant sand resource due to the construction of the Port Dolphin pipeline as currently proposed. This discussion should include a detailed analysis of the impacts this would have on the Tourism Industry, employment, and tax system (including the bed tax).

6.3.11 Public Safety

As described in the comments for Section 4.4, 6.3.2, 6.3.4, and 6.3.9, the direct and cumulative impacts on the proposed pipeline route on geologic resources available for beach nourishment could cause irreparable harm to the Manatee County shore-protection program. These impacts would stress the current tax-based funding structure for the program while significantly limiting the available mineral resources required to construct future beach nourishment projects. The cumulative effect of these impacts can lead to the foreseeable reduction or elimination of the shore-protection program in the near future. Without periodic beach nourishment, Anna Maria Island will continue to erode. As the erosion continues, the shoreline will retreat and begin to threaten upland structures and infrastructure, potentially including portions of the major hurricane evacuation route for Anna Maria Island, Gulf Drive. Public and private facilities will face destruction due to the forces of the retreating shoreline.

As a result of the unchecked erosion, Gulf Drive, which serves as the hurricane and emergency evacuation route, could become compromised in the event of a major storm. Of even greater concern is the fact that Anna Maria Island has many sections which are low in elevation. These areas are subject to flooding in the event of a major storm. Studies indicate that some of the population is likely to wait until the storm is fairly close before deciding to evacuate the island. For the general public living on and visiting the barrier islands of Manatee and Sarasota Counties, there are only two evacuation routes, with both of them running parallel to the beach along Longboat Key and Anna Maria Island. The northern Longboat Key evacuation route crosses over Longboat Pass and runs along Coquina Beach on Anna Maria Island. This evacuation route is relatively close to the shoreline (less than 250 feet in some places), and without maintenance of the shoreline though beach nourishment, can quickly become undermined, resulting in the stranding of a significant number of residents and visitors on Longboat Key and Southern Anna Maria Island. One area is of particular concern. Cortez beach includes three long groin structures which were constructed in an attempt to maintain the beach in an area where Gulf Drive is particularly vulnerable to storm damage. This area is also within the limits of a beach nourishment project. There are also areas within the central part of Anna Maria Island that have experienced water overwash in storm events. The water has been pushed over Gulf Drive and the entire barrier island, eventually draining back into the bay on the back side of the island. Without a beach, this phenomenon may increase, especially in a major storm event. The public on the northern end of Anna Maria Island must also rely on a beach-parallel evacuation route that runs south to one of two bridges connecting Anna Maria Island to the mainland.

Without the shore protection benefits provided by periodic beach nourishment with available, nearby, beach-compatible sand resources, the existing hurricane and evacuation routes for both Anna Maria Island and Longboat Key face the very real

possibility of being flooded or undermined due to a reduced or eliminated shore-protection program. This results in a major cumulative impact to Public Safety due to the construction of the proposed pipeline in its current configuration. Without a discussion of the cumulative impact to Public Safety described above, the DEIS is incomplete.

In light of the information above, the County feels that Table 6.3-1 of the DEIS (presented on pages 6-9 to 6-11) needs some major revisions. This table lists the different resources, past actions, background activities, the proposed action and alternatives, known future actions, and cumulative impacts. The past actions, known future actions, and cumulative impacts columns all need to be revised to include the shore-protection activities described above and the cumulative impacts to these resources (specifically the geologic, biologic, recreational, and socioeconomic resources) describes in the County comments for section 6.3. Without a detailed discussion of these major cumulative impacts and how they affect these resources, the DEIS is incomplete and inaccurate.

6.4 Unavoidable Impacts

6.4.4 Geological Resources

The DEIS describes unavoidable impacts as "those impacts that would result from the Proposed Action or any alternatives that cannot be mitigated." The complete DEIS entry for section 6.4.4 identifies "Unavoidable disturbance of surficial sediment or soils would occur during installation of the proposed Port and pipeline" (USCG and MARAD, 2008) as the only unavoidable geologic resource impact due to the proposed project or any presented alternatives. This statement is only true for one alternative proposed in the DEIS. The DEIS alternative of tapping into the Gulfstream subsea interconnection would result in only minor additional impacts to the surficial sediments and soils along the route of the proposed pipeline from the deepwater port to the interconnection site.

As proposed, the DEIS preferred pipeline route and associated buffer zone will cause direct and irreparable harm to the availability of already limited, beach-compatible mineral resources available for beach nourishment programs such as the County's shore-protection program. These impacts cannot be mitigated or avoided once the pipeline has been constructed through the beach-compatible sediment resource off the north end of Anna Maria Island.

In order to assess "unavoidable impacts" the DEIS must comprehensively consider the impact to sediment resources for beach nourishment, and seriously address the County's proposed alternatives (utilizing a portion of the northern route, rerouting the State portion of the pipeline to be collocated alongside the Gulfstream pipeline, or to reroute the entire pipeline to go straight through the Southwest Passage, possibly along the northern route alternative as it enters Tampa Bay). Without a more detailed discussion of all three alternatives proposed by the County in the comments for section 2.1.1.3, the County feels that section 6.4.4 needs to reflect that fact that, under the preferred alternative, unavoidable and unacceptable impacts will occur to geologic resources needed to support the shore-protection program of Manatee County. These impacts will be major and could result in the expected reduction or elimination of the shore-protection program, leading to a series of cumulative impacts to geologic, biologic, and socioeconomic resources as well as public safety issues.

SUMMARY

Manatee County manages an active shore-protection program for the entire coast of Anna Maria Island. This program is funded through the Tourist Development Council "Bed Tax" which is supported by the extensive tourism industry of Manatee County. The tourism industry, in turn, is highly dependent on the beaches within Manatee County, including those of Anna Maria Island. However, the beaches of Anna Maria Island are eroding and require maintenance through implementation of a comprehensive beach nourishment program. The shore-

protection program relies on a proven, existing, native, white, beach-compatible Gulf of Mexico sand resource located off the northwestern tip of Anna Maria Island as the ideal sand source for beach nourishment. The high similarity of this sand source with the native beach, coupled with its proximity to the project area, make it an invaluable resource ideally suited for the geologic, biologic, and recreational needs of Anna Maria Island's white sandy beaches. In addition, it is these white sandy beaches that support the tourism driven economy of Anna Maria Island, Manatee County, and the State of Florida.

The Manatee County shore-protection program, and ultimately the beaches of Anna Maria Island, is in jeopardy due to the proposed location of Port Dolphin LLC's preferred and southern alternative routes for the Port Dolphin natural gas pipeline. This pipeline is proposed to be built directly through the ideal sand source that supports the current and future beach nourishment projects of Anna Maria Island. The pipeline, as well as a large buffer zone which must be established along either side of the pipeline route, greatly impact sand available for the Anna Maria Island Shore Protection Program (Figures 1 and 2). Extraction of sand by dredging would be prohibited in the buffer zone effectively eliminating the sand for future beach nourishment use. Direct impacts to this sand resource revolve around the fact that a significant volume of these beach-compatible sands will become permanently unavailable for future beach nourishment projects depending on the extent of the required buffer zone which is provided to protect the gas pipeline. This direct impact, while extreme by itself, would lead to significant cumulative impacts to the economy, public safety and the environment of Manatee County and Anna Maria Island.

If the beach-compatible sand source is impacted by the construction of the pipeline and an associated safety buffer of up to 1,000 meters, significant programmatic issues would arise. Specifically, if the nearby beach-compatible sand resource is impacted by removing up to 8,500,000 cy of ideal, beach-compatible material, the County may be forced to explore other as yet unknown sand resources. Assuming such high quality resources can be found, these resources will assuredly occur further away from the project area, causing the County to

abandon its current, efficient cutterhead dredge construction model for the less efficient and more costly hopper dredge construction model. If this was to occur, the costs of future beach nourishment projects would increase substantially, up to a potential increase of $53,200,000 over forty years, depending on the final safety buffer imposed around the pipeline. A cost increase of this magnitude will likely not be sustained by the Bed Tax alone, meaning that Manatee County will need an alternative funding source, a very difficult proposition.

A reduced or eliminated shore-protection program would result in the erosion of Anna Maria Island's white sandy beaches. If this were allowed to happen, significant cumulative impacts to biological, recreational, and socioeconomic resources would occur, as well as the introduction of sensitive public safety issues, including:

1. A reduced or eliminated shore protection program could result in the erosion of Anna Maria Island's beaches resulting in the loss of the public beaches (a major public recreation resource) of Anna Maria Island;
2. A reduced or eliminated shore protection program could result in the erosion of Anna Maria Islands beaches resulting in the loss of tourists, effecting the local socioeconomic structure through a reduction in employment and tax revenues;
3. A reduced or eliminated shore protection program could result in the erosion of Anna Maria Island's beaches resulting in the loss of protection the beaches afford the island, resulting in the potential for increased flooding and undermining of vital hurricane and emergency evacuation routes for both Anna Maria Island and Longboat Key.
4. A reduced or eliminated shore protection program could result in the erosion of Anna Maria Island's beaches resulting in the loss of the beach as habitat, and loss of critical habitat needed for threatened sea turtle nesting;

These issues are vital to the continued well being of Manatee County, yet none of these concerns are addressed in the DEIS issued by the USCG and MARAD or the Deepwater Port License Application issued by Port Dolphin LLC. Manatee County believes that all of these issues need to be included and comprehensively addressed within the DEIS so that the USCG and

MARAD, and the Governor of Florida (as a Governor of an adjacent coastal state) can make a fully informed decision on the Application for a Deepwater Port License submitted by Port Dolphin LLC.

The County also feels that it important to state unequivocally that the Port Dolphin LLC Deepwater Port and associated pipeline and the Manatee County shore-protection program are not mutually exclusive projects. In fact, several seemingly viable pipeline route alternatives exist that can allow the Port Dolphin project to be constructed without affecting the vital and highly limited sand resources required by Manatee County for its shore-protection program (Figure 3).

These alternatives include:

- Constructing the Port Dolphin pipeline from the deepwater port to an existing y-valve in the Gulfstream natural gas pipeline, where the Port Dolphin facility could then tie-into the existing pipeline. This option also eliminates many of the environmental impacts associated with the preferred route;
- Follow the preferred pipeline route as it is proposed, from the deepwater port toward Southwest Passage, where the pipeline would then deviate to the proposed northern alternative route as it enters Tampa Bay through Southwest Passage. Once inside of Tampa Bay, the pipeline could then deviate back to the preferred route. The vast majority of the preferred pipeline route could be retained with this minor adjustment.
- A new alternative that would construct the pipeline route from the proposed deepwater port site straight to a spot approximately 2,000 feet south of where the existing Gulfstream pipeline crosses the Federal/State Boundary, approximately nine miles west of Egmont Key. At this point, the new pipeline could be collocated, or constructed parallel to, the existing Gulfstream pipeline all the way into Port Manatee.
- A new alternative that would construct the pipeline straight from the offshore deepwater port site, directly to Southwest Passage (not Passage Key Inlet), crossing the

Gulfstream Pipeline, and then continuing straight to its planned location in West-Central Lower Tampa Bay (all in one straight line).

Each of these alternatives results in no impacts (direct or cumulative) to the beach-compatible mineral resources off Anna Maria Island that are vital to Manatee County's shore-protection program. With this in mind, the County strongly believes that a more detailed alternatives analysis needs to be presented in the DEIS. This analysis needs to build on the previously described alternatives, while adding the new alternatives suggested by the County. Each alternative needs to be critically evaluated in terms of direct and cumulative environmental resource impacts, with the greatest weight given to the alternative(s) that have the least impacts to these environmental resources. In addition, the direct and cumulative impacts raised by the County in these detailed comments need to be included and critically evaluated in the DEIS.

In its current form, the DEIS lacks a significant amount of essential information regarding alternatives and true resource impacts, and a revised DEIS needs to be issued that addresses these significant issues prior to going to the Final EIS stage.

While Manatee County has strong objections to the way the project is currently proposed, the County feels that there a seemingly minor changes that can be made by Port Dolphin LLC to the preferred pipeline route that would result in no impacts to vital beach-compatible mineral resources. With this in mind, the County is willing to work directly with Port Dolphin LLC and/or the USCG and MARAD to explore these alternatives in order to design a route that is mutually beneficial to both Manatee County and Port Dolphin LLC.

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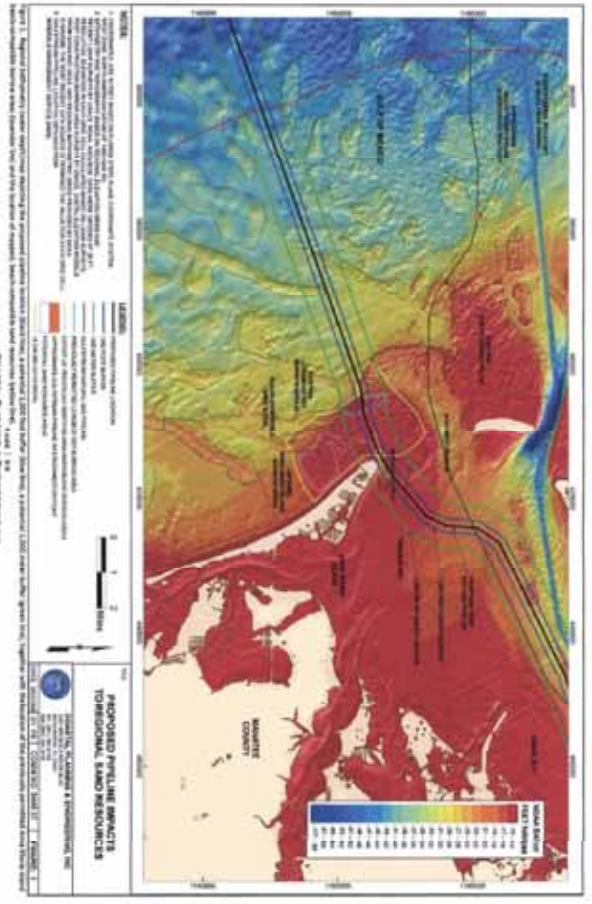

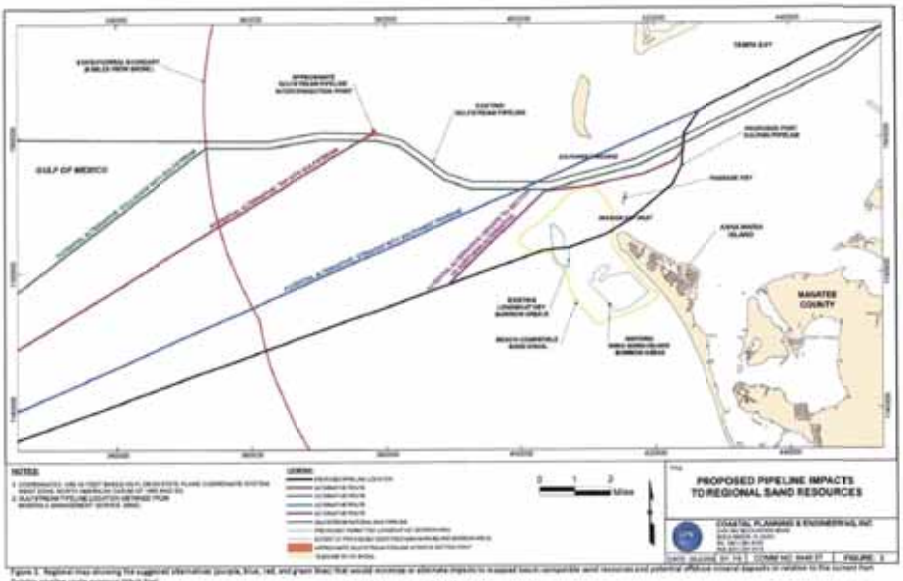
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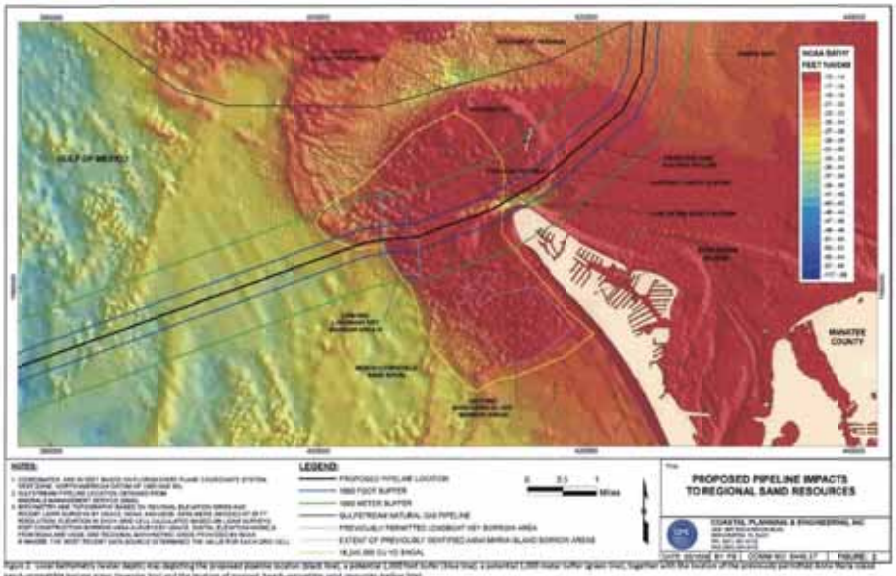
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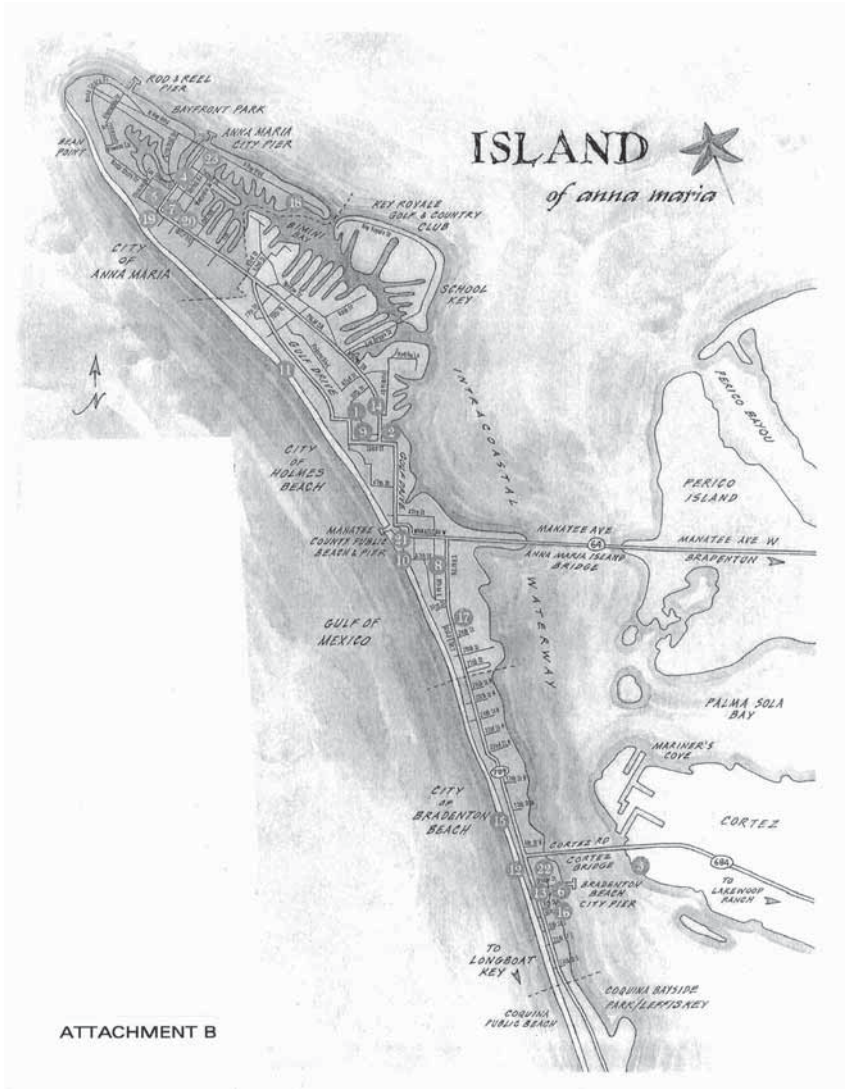

ATTACHMENT B

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Researchers to develop ocean sanctuary 'noise budget' to evaluate potential impact on marine mammals

3-D blueprint could serve as national and international model

Like sentinels at their posts, an array of buoys equipped with underwater microphones and other sensors will be on duty in the Stellwagen Bank National Marine Sanctuary off the coast of Massachusetts for the next 30 months, recording sounds from whales, fish, ships and other sources around the clock. NOAA marine mammal scientists will analyze the biological sounds to help develop a global monitoring network for ocean noise, an important step in effectively managing marine sanctuary resources and protecting endangered species like the North Atlantic right whale.

"The ocean is a noisy place," said Sofie Van Parijs, marine mammal acoustician at NOAA's Northeast Fisheries Science Center (NEFSC) and a project scientist. "It's full of natural sounds and those from human activities, and there is substantial evidence that the level of man-made noise is rising. Marine mammals and many fishes are highly dependent on sound for communication, navigation, foraging and predator avoidance. We need to understand how these animals, especially endangered and protected species, are impacted by sounds from many sources to be able to better manage and protect these living resources."

An ocean-observing system consisting of ten autonomous recording units will be deployed for periods of three months, each in different parts of the Sanctuary at different times of the year, to monitor low frequency sounds. The passive-acoustic buoys, moored to the ocean floor and fully submerged, continually record ocean sounds around the clock before they pop to the surface on command so the data can be retrieved and batteries refreshed.

The three-year project began in late December with funding from the National Oceanographic Partnership Program and a team of scientists and engineers from NOAA Fisheries, NOAA Sanctuaries, the Bioacoustic Research Program at Cornell University and Marine Acoustics, Inc. Van Parijs and NEFSC colleague Denise Risch, also a marine mammal bioacoustician, will analyze the biological sounds collected during the study, while Sanctuary scientists Leila Hatch, Michael Thompson and Dave Wiley will focus on the anthropogenic or human-produced sounds. Project leader Chris Clark of Cornell University and colleagues provide scientific guidance, hardware and software, and are working with Bill Ellison of Marine Acoustics, Inc. on modeling ocean noise propagation within the sanctuary.

The Gerry E. Studds Stellwagen Bank National Marine Sanctuary is an urban marine sanctuary located in close proximity to Boston and a densely populated coastal zone. The area has commercial fishing fleets, heavy vessel traffic, is frequented by marine mammals like endangered Northern right whales, and forms a critical feeding ground for endangered fin and humpback whales. It is also home to acoustically-sensitive marine animals like commercially important haddock and other fishes, sharks and sea turtles.

Van Parijs says the Sanctuary is a perfect place to build a case study that can provide a benchmark to scientifically evaluate the impacts and interactions between various human-produced sounds and acoustically-sensitive marine animals.

ATTACHMENT C

The abundance of endangered whales and human activities in the Sanctuary will help the team address many of the recommendations made by the National Research Council's

committee on the potential impacts of ambient noise in the ocean on marine mammals. The committee has cited the importance of sound in the lives of marine mammals, the potential for harm from excessive noise, and the lack of scientific data as to the amounts of noise introduced into the oceans by human activities and its potential impact on marine mammals.

"We need to ground-truth current sampling and analysis techniques and identify gaps that must be addressed prior to implementing a large-scale domestic or international monitoring program," Van Parijs said. "The products of this project will be a suite of tools designed to be transferable for use in other ecological regions or sanctuaries along with an extensive database of sounds. This project is a first step toward a much larger goal of establishing a global passive acoustic monitoring network to measure ambient noise levels in a variety of locations."

The first set of project buoys deployed in December were recently recovered from the northeast corner of the Sanctuary and were redeployed March 7 in the southwest corner, where endangered Northern right whales are congregating. The area is a primary nursing and feeding ground for the whales in the spring.

Ten similar buoys were used successfully in the Sanctuary in 2006 during a one-year pilot project in preparation for this study. This is the first project to record all types of sounds over a long time period in a relatively large area in an effort to characterize the marine acoustic environment and the health of an urbanized, highly productive ecosystem. One potential use of the information: scientists could track whale migration patterns and ship movements to help prevent collisions, a leading cause of whale mortality.

"Our goals are to map the low-frequency noise budget throughout the Sanctuary, identify and quantify the contributing sources of sounds, and determine whether or not these noises have the potential to impact endangered marine mammals and fishes," said David Wiley, the Sanctuary's research coordinator. "The results from this project will have local, national and international implications."

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TABLE 5-1 (PA-07-04)
MANATEE COUNTY PEAK HOUR LEVEL OF SERVICE STANDARDS
RIGHT-OF-WAY NEEDS / TWENTY YEAR ROADWAY REQUIREMENTS
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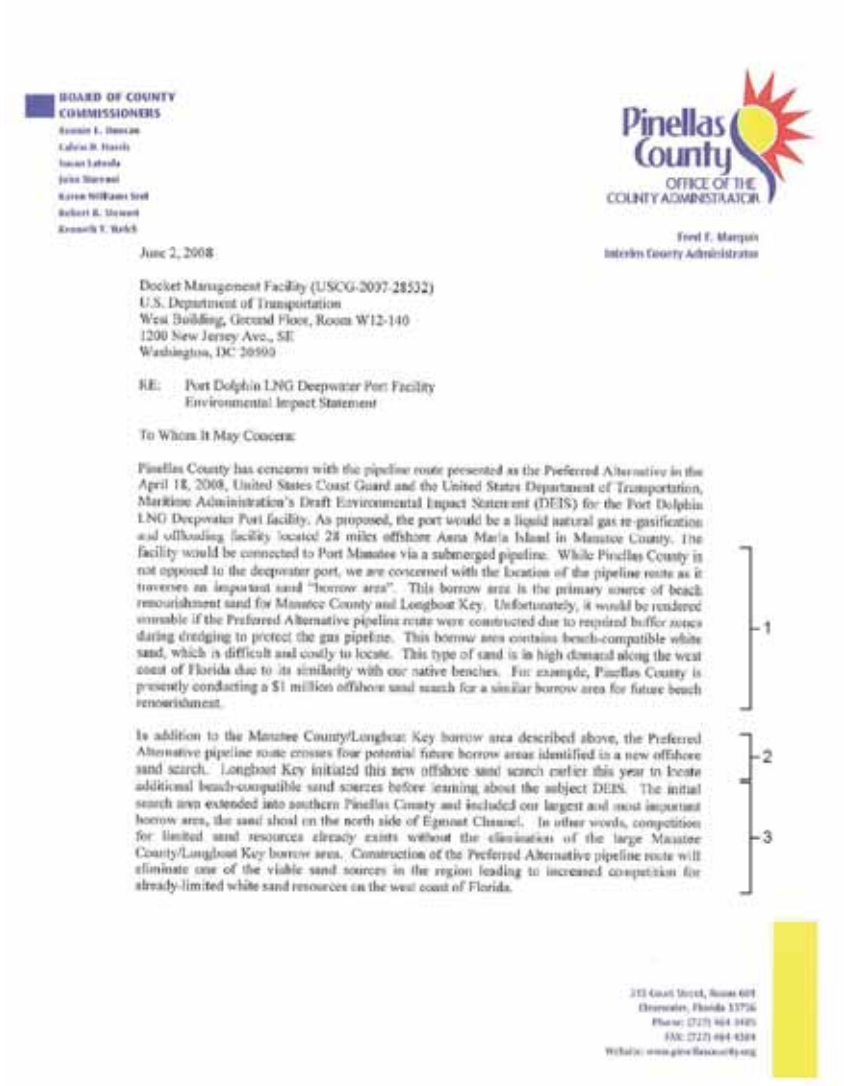
Facility Adopted 9/25/07 Effective 11/29/07	Limits	Jur	Current Year Std	Five Year Std	Twenty Year Std	Twenty Year Functional Classification	Twenty Year # of Lanes	Twenty Year ROW Needs (width in feet)
	Whitfield – 53rd Ave E/SR 70	MC	E	E	D	Arterial	2	120
	53rd Ave E/SR 70 – US 41	MC	F	D	D	Arterial	4	120
	US 41 – 9th St W	MC	D	D	D	Arterial	4	120
AA Road	Spencer Parrish Rod – Buckeye Rd	MC	N/A	N/A	D	Collector	2	84
BB Road	North Rye Rd – DD Road	MC	N/A	N/A	D	Collector	4	120
CC Road	18th St E – DD Road	MC	N/A	N/A	D	Collector	4	120
DD Road	CR 675 – SR 62	MC	N/A	N/A	D	Collector	2	84
EE Road	Carter Rd – Sawgrass Rd	MC	N/A	N/A	D	Collector	2	84
Bayshore Gardens Pkwy	34th St W – US 41	MC	D	N/A	D	Collector	2	84
				D	D	Arterial	4	120
Bayshore Rd	US 41 S – US 41 N (Palmetto)	MC	D	D	D	Collector	2	84
Betts Road	Sarasota County Line – SR 70	MC	C	C	C	Collector	2	100
Braden River Road	SR 70 – Linger Lodge Road	MC	D	D	D	Collector	2	84
Broadway (Buckeye Rd)	Alabama St - Tuttle Ave	MC	N/A	N/A	D	Collector	2	84
	US 41 – Bud Rhoden Rd	MC	D	D	D	Collector	4	150
	Bud Rhoden Rd - I-75	MC	D	D	D	Collector	4	150
	I-75 – US 301 (Parrish)	MC	C	C	C	Collector	4	120
Bud Rhoden Rd	Buckeye Rd – Moccasin Wallow Rd	MC	D	D	D	Collector	4	120
Buffalo Rd	69th St E – Moccasin Wallow Rd	MC	D	D	D	Collector	4	120
Bunker Hill Rd	SR 62 W – SR 62 E	MC	C	C	C	Collector	2	100
Business US 41	Cortez Rd – 26th Ave W City Limits (Bradenton)	ST	D	D	D	Arterial	4	120
	17th St E/Memphis Rd (Palmetto City Limits) – US 41	ST	D	D	D	Arterial	4	120
Canal Rd	US 301 – Memphis Rd/17th St E	MC	D	D	D	Collector	4	120

o an additional 24' of right-of-way shall be required at the intersection of two or more thoroughfare roadways when turn lanes are necessary. Said right-of-way shall run for a depth/distance al to the potential commercial node depth (600'/1000' depending on the future land use category). Additional rights of way shall be required when intersection realignments are essary for public safety such as removing offsets, correcting misalignments or mitigating unsafe sight conditions or upon finding the additional right of way is needed for ther public purpose.

Attached Addendum for thoroughfares that shall not have an entitlement for commercial node designation.

ATTACHMENT D



BOARD OF COUNTY COMMISSIONERS

Pinellas County
OFFICE OF THE COUNTY ADMINISTRATOR

June 2, 2008

Docket Management Facility (USCG-2007-28532)
U.S. Department of Transportation
West Building, Ground Floor, Room W12-140
1200 New Jersey Ave., SE
Washington, DC 20590

RE: Port Dolphin LNG Deepwater Port Facility
Environmental Impact Statement

To Whom It May Concern:

Pinellas County has concerns with the pipeline route presented as the Preferred Alternative in the April 18, 2008, United States Coast Guard and the United States Department of Transportation, Maritime Administration's Draft Environmental Impact Statement (DEIS) for the Port Dolphin LNG Deepwater Port facility. As proposed, the port would be a liquid natural gas re-gasification and offloading facility located 28 miles offshore Anna Maria Island in Manatee County. The facility would be connected to Port Manatee via a submerged pipeline. While Pinellas County is not opposed to the deepwater port, we are concerned with the location of the pipeline route as it traverses an important sand "borrow area". This borrow area is the primary source of beach renourishment sand for Manatee County and Longboat Key. Unfortunately, it would be rendered unusable if the Preferred Alternative pipeline route were constructed due to required buffer zones during dredging to protect the gas pipeline. This borrow area contains beach-compatible white sand, which is difficult and costly to locate. This type of sand is in high demand along the west coast of Florida due to its similarity with our native beaches. For example, Pinellas County is presently conducting a $1 million offshore sand search for a similar borrow area for future beach renourishment.

1

In addition to the Manatee County/Longboat Key borrow area described above, the Preferred Alternative pipeline route crosses four potential future borrow areas identified in a new offshore sand search. Longboat Key initiated this new offshore sand search earlier this year to locate additional beach-compatible sand sources before learning about the subject DEIS. The initial search area extended into southern Pinellas County and included our largest and most important borrow area, the sand shoal on the north side of Egmont Channel. In other words, competition for limited sand resources already exists without the elimination of the large Manatee County/Longboat Key borrow area. Construction of the Preferred Alternative pipeline route will eliminate one of the viable sand sources in the region leading to increased competition for already-limited white sand resources on the west coast of Florida.

2

3

1. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. Alternatives that avoid/reduce impacts on sand resources are discussed in Sections 2.1.4.5 and 2.1.4.6 of the Final EIS. Impacts from these alternatives are discussed in Sections 4.2.1.6.1, 4.4.1, 4.4.2, 4.5.1, 4.5.2, and 4.9.1.

2. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. Alternatives that avoid/reduce impacts on sand resources are discussed in Sections 2.1.4.5 and 2.1.4.6 of the Final EIS. Impacts from these alternatives are discussed in Sections 4.2.1.6.1, 4.4.1, 4.4.2, 4.5.1, 4.5.2, and 4.9.1.

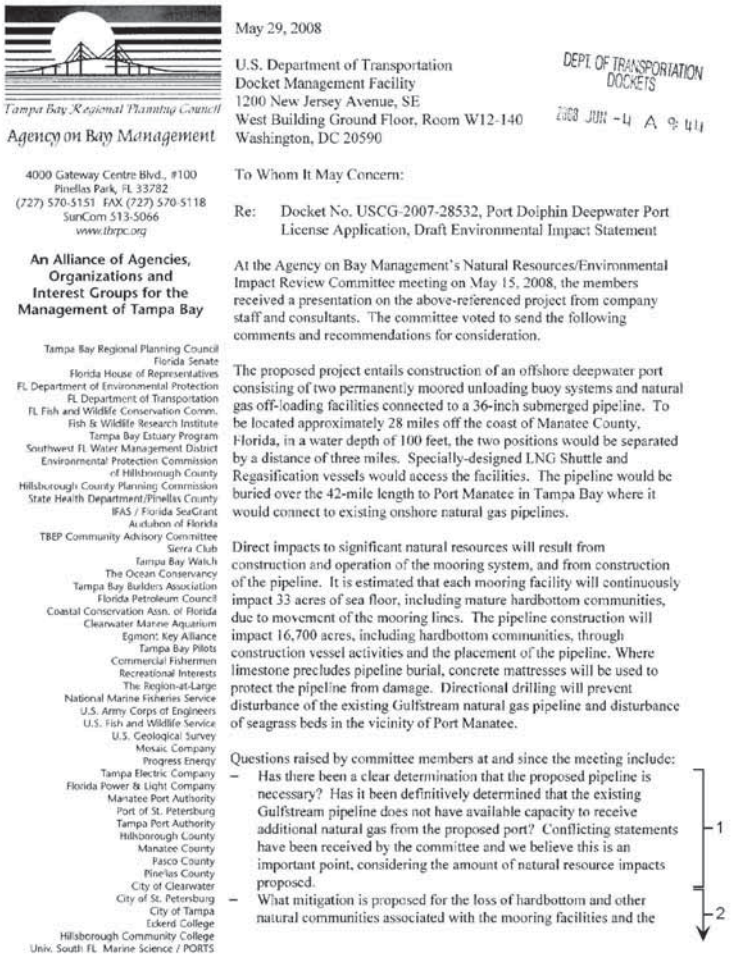
3. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. Alternatives that avoid/reduce impacts on sand resources are discussed in Sections 2.1.4.5 and 2.1.4.6 of the Final EIS. Impacts from these alternatives are discussed in Sections 4.2.1.6.1, 4.4.1, 4.4.2, 4.5.1, 4.5.2, and 4.9.1.

Four potential pipeline route alternatives were proposed for the Port Dolphin project that would not impact the limited sand resources on the west coast of Florida. These alternatives were presented in a report compiled for the Town of Longboat Key by their consultant, Coastal Planning and Engineering, Inc. We strongly urge you to give higher priority to these other proposed routes. -4

Sincerely,

Fred E. Marquis
Interim County Administrator
ewJ

4. The alternatives proposed by CPE, Inc. have been considered in preparation of the Final EIS.



Tampa Bay Regional Planning Council

Agency on Bay Management

4000 Gateway Centre Blvd., #100
Pinellas Park, FL 33782
(727) 570-5151 FAX (727) 570-5118
SunCom 513-5066
www.tbrpc.org

An Alliance of Agencies, Organizations and Interest Groups for the Management of Tampa Bay

Tampa Bay Regional Planning Council
Florida Senate
Florida House of Representatives
FL Department of Environmental Protection
FL Department of Transportation
FL Fish and Wildlife Conservation Comm.
Fish & Wildlife Research Institute
Tampa Bay Estuary Program
Southwest FL Water Management District
Environmental Protection Commission of Hillsborough County
Hillsborough County Planning Commission
State Health Department/Pinellas County
IFAS / Florida SeaGrant
Audubon of Florida
TBEP Community Advisory Committee
Sierra Club
Tampa Bay Watch
The Ocean Conservancy
Tampa Bay Builders Association
Florida Petroleum Council
Coastal Conservation Assn. of Florida
Clearwater Marine Aquarium
Egmont Key Alliance
Tampa Bay Pilots
Commercial Fishermen
Recreational Interests
The Region-at-Large
National Marine Fisheries Service
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
U.S. Geological Survey
Mosaic Company
Progress Energy
Tampa Electric Company
Florida Power & Light Company
Manatee Port Authority
Port of St. Petersburg
Tampa Port Authority
Hillsborough County
Manatee County
Pasco County
Pinellas County
City of Clearwater
City of St. Petersburg
City of Tampa
Eckerd College
Hillsborough Community College
Univ. South FL Marine Science / PORTS

May 29, 2008

U.S. Department of Transportation
Docket Management Facility
1200 New Jersey Avenue, SE
West Building Ground Floor, Room W12-140
Washington, DC 20590

DEPT. OF TRANSPORTATION DOCKETS
2008 JUN -4 A 9:44

To Whom It May Concern:

Re: Docket No. USCG-2007-28532, Port Dolphin Deepwater Port License Application, Draft Environmental Impact Statement

At the Agency on Bay Management's Natural Resources/Environmental Impact Review Committee meeting on May 15, 2008, the members received a presentation on the above-referenced project from company staff and consultants. The committee voted to send the following comments and recommendations for consideration.

The proposed project entails construction of an offshore deepwater port consisting of two permanently moored unloading buoy systems and natural gas off-loading facilities connected to a 36-inch submerged pipeline. To be located approximately 28 miles off the coast of Manatee County, Florida, in a water depth of 100 feet, the two positions would be separated by a distance of three miles. Specially-designed LNG Shuttle and Regasification vessels would access the facilities. The pipeline would be buried over the 42-mile length to Port Manatee in Tampa Bay where it would connect to existing onshore natural gas pipelines.

Direct impacts to significant natural resources will result from construction and operation of the mooring system, and from construction of the pipeline. It is estimated that each mooring facility will continuously impact 33 acres of sea floor, including mature hardbottom communities, due to movement of the mooring lines. The pipeline construction will impact 16,700 acres, including hardbottom communities, through construction vessel activities and the placement of the pipeline. Where limestone precludes pipeline burial, concrete mattresses will be used to protect the pipeline from damage. Directional drilling will prevent disturbance of the existing Gulfstream natural gas pipeline and disturbance of seagrass beds in the vicinity of Port Manatee.

Questions raised by committee members at and since the meeting include:

- Has there been a clear determination that the proposed pipeline is necessary? Has it been definitively determined that the existing Gulfstream pipeline does not have available capacity to receive additional natural gas from the proposed port? Conflicting statements have been received by the committee and we believe this is an important point, considering the amount of natural resource impacts proposed. — 1
- What mitigation is proposed for the loss of hardbottom and other natural communities associated with the mooring facilities and the — 2

1. The purpose and need are discussed in Section 1.2 of the EIS. Section 2.1.4 discusses an alternative to connect to the Gulfstream pipeline offshore.

2. The Maritime Administration and USCG would require the Applicant to mitigate impacts to hardbottom communities. The Applicant has proposed to bury the pipeline with concrete mattresses over hardbottom areas resulting in a net increase of hard bottom area. Section 4 discussions include potential construction, operation, and decommissioning impacts by resource area. Section 4.11.1 (subsection Benthic Habitat Impact Mitigation), discusses the mitigation measures for hard-bottom communities. Section 6 relates project impacts to other past and known future actions in the area.

pipeline? Have the secondary impacts of construction and operation been taken into account in the assessment of impact and mitigation? 2

- Concerns have been raised by the Florida Fish and Wildlife Conservation Commission and the National Oceanic and Atmospheric Administration over the database used to model fisheries impacts from the regasification operation. How will the analysis of impacts be modified to address these concerns? 3

The Agency on Bay Management wishes to review the Final Environ-mental Impact Statement and any permit applications associated with this project, including the port, offshore pipeline, onshore pipeline, and facility operation. Please provide all material to Ms. Suzanne Cooper, ABM staff, via "ftp" access or e-mail to *suzanne@tbrpc.org* or U.S. Postal Service to the address on the letterhead. She will distribute it to the Agency members.

We deeply appreciate the opportunity to provide comments on this project, and look forward to reviewing the additional information outlined above.

And please do not hesitate to call on us, at 727-570-5151 x 32, if we can assist in any other way.

Sincerely,

Suzanne J. Cooper for

Robert Kersteen
ABM Chair

cc: M.A. Prescott
Mr. Ray Martin
H. Keith Lesnick
Mr. German Castro

2

3. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements not listed in Section 4.11 would be developed after a license is issued

U.S. Coast Guard and the Maritime Administration
Port Dolphin LLC (USCG-2007-28532)
PUBLIC MEETING COMMENTS

Palmetto, FL

Comments can be: (1) left at the sign-in table or (2) mailed to the address below.

Please send one copy referenced to Docket No. (USCG-2007-28532) to the address below.
Docket Management Facility
U. S. Department of Transportation
West Building, Ground Floor, Room W12-140
1200 New Jersey Avenue, SE
Washington, DC 20590
The Facility's telephone is 202-366-9329.

COMMENTS: (*Please print; use and attach an additional sheet if necessary*)

THE LONGBOAT KEY TOWN COMMISSION WISHES TO EXPRESS THEIR CONCERN WITH THE PROPOSED PREFERRED NEARSHORE PIPELINE ROUTE. IF APPROVED AND CONSTRUCTED THIS PIPELINE WILL CROSS OVER A SAND SOURCE USED BY THE TOWN IN THE PAST FOR BEACH RESTORATION PROJECTS. THE TOWN CONTEMPLATES USING THIS AREA FOR FUTURE PROJECTS AS WELL. I HAVE ATTACHED SUPPORTING DOCUMENTATION OF THE TOWN'S CONCERNS

1

Commentor's Name and Mailing Address (***Please Print***)
JUAN FLORENSA
PUBLIC WORKS DIRECTOR, TOWN OF LONGBOAT KEY
600 GENERAL HARRIS ST.
LONGBOAT KEY, FL. 34228
Date: MAY 01, 2008

1. In response to comments the Applicant revised the proposed pipeline route to avoid permitted sand resources. See Section 2.1.4 of the Final EIS for a description of the alternatives. Sand resources are described in Section 3.4 and impacts from these alternatives are discussed in Sections 4.2.1.6.1, 4.4.1, 4.4.2, 4.5.1, 4.5.2, and 4.9.1.

COASTAL PLANNING & ENGINEERING, INC.

BOCA RATON • WILMINGTON • TAMPA BAY

2481 NW BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
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Potential Impacts of the Port Dolphin Pipeline on Beach Nourishment Sand Resources on Florida's West Coast

INTRODUCTION

Both Manatee County and the Town of Longboat Key (together with other Florida west coast communities) have active shore protection programs requiring large amounts of beach compatible offshore sand resources for beach nourishment activities. Sand resources undergo extensive and costly mapping and analysis in order to define and permit the most suitable sand for these projects. Unfortunately, these sand resources are limited and will eventually be depleted. Loss of beach compatible sand due to the impact of the proposed Port Dolphin pipeline route through beach quality sand resources will irreparably harm beach preservation and maintenance efforts in Manatee and Sarasota counties, as well as other neighboring communities. Alternatives exist that can minimize impacts to these communities. 1

MANATEE COUNTY SHORE PROTECTION PROGRAM

Manatee County manages the Anna Maria Island Shore Protection Project, consisting of two separate beach nourishment project areas. The goal of these projects is to provide protection for all of Anna Maria Island's approximately seven miles of coastline. The entire length of Anna Maria Island is considered to be "Critically Eroded" by the Florida Department of Environmental Protection (FDEP), and prior to implementation of the program, was eroded substantially, adversely effecting private and public upland properties (Figure 1).

Anna Maria Island's economy is based on tourism. The single feature that draws thousands of tourists to Anna Maria 2

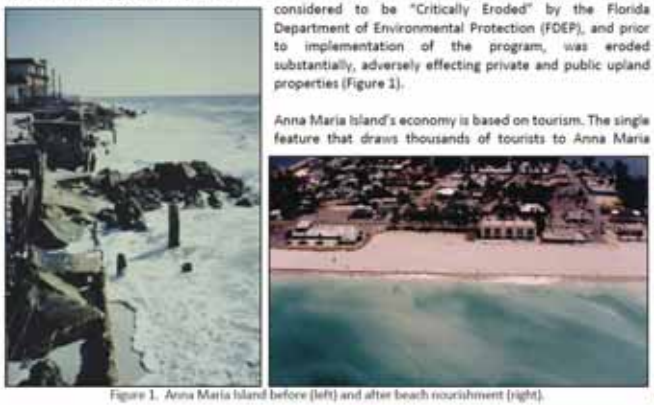

Figure 1. Anna Maria Island before (left) and after beach nourishment (right).

1. In response to comments the Applicant revised the proposed pipeline route to avoid permitted sand resources. See Section 2.1.4 of the Final EIS for a description of the alternatives. Sand resources are described in Section 3.4 and impacts from these alternatives are discussed in Sections 4.2.1.6.1, 4.4.1, 4.4.2, 4.5.1, 4.5.2, and 4.9.1.

2. A pipeline route paralleling Gulfstream would involve impacts to other benthic resources and raise objections from Gulfstream similar to objections already raised in filings on the FERC docket.

Island is its beautiful white sand beaches. Numerous hotels, motels, rental homes, restaurants, stores and other related businesses depend on the beaches of the Island to survive. However, Anna Maria Island has a serious beach erosion problem that is only addressed through a comprehensive program of periodic beach renourishment. In order to successfully maintain and preserve the beaches of Anna Maria Island, offshore high quality sediment is needed as the material to replace beach sand lost to erosion.

The sediment source off of the north end of Anna Maria Island is the only available economical sediment deposit with similar sediment characteristics to that of the Anna Maria Island beach available to Manatee County. It is a source which meets the rigorous requirements of the State of Florida concerning "beach compatible" sediment. Most of the sediment in near vicinity to Anna Maria Island is of marginal quality, or will not meet State requirements. There is one other source of high quality white colored sand located within Longboat Pass, but this source is limited in volume, and is not eligible for permits from the FDEP. Sand resources off the west coast of Florida for beach nourishment are a dwindling resource. As the availability of beach-compatible sands becomes less and less, the regional needs of Manatee County and its neighbors, specifically the Town of Longboat Key and Pinellas County, begin to overlap, causing an increase in competition for the dwindling sand resources. As the sands become more sporadic and competition grows, regional sand management issues become more important. The existing sand resources, therefore, must be available if the beaches south of Tampa Bay are to be maintained. The ebb tidal shoal complex off the north end of Anna Maria Island is a major deposit and is vital to Anna Maria Island.



Figure 2. Anna Maria Island Shore Protection Project limits.

Manatee County's current sand resource needs for these projects are substantial. The Central Project area requires 1,900,000 cubic yards (cy) of beach compatible offshore sand every ten years (Figure 2). The next nourishment of the Central Project is currently scheduled for sometime between 2011 and 2013. The Coquina Beach Project area requires 420,000 cy of beach compatible offshore sand. The next nourishment of the Coquina Beach Project is currently scheduled for early 2009.

Identification of sand resources for both of these projects is currently underway and is focusing on the ebb tidal shoal complex off the north end of Anna Maria Island (described above), which was utilized for the last two beach nourishment events (Figure 6). This historic Anna Maria Island borrow areas lie immediately south of the proposed pipeline route, within a large shoal offshore the northern tip of Anna

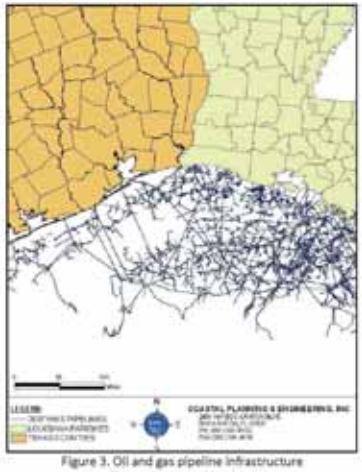

Figure 3. Oil and gas pipeline infrastructure offshore Texas and Louisiana

Maria Island. The sand quality of this shoal has repeatedly proven to be optimal for the beach nourishment needs of Manatee County and is considered to be the long term source of beach nourishment sands for the County. An estimated 18,245,000 cy of beach-compatible material is located within this shoal (Figure 7). The pipeline route is currently proposed to bisect this shoal.

If the pipeline follows the proposed route, any future dredging activities will have to be buffered to prevent impacts to the pipeline. These buffers (as yet undefined by the FDEP) can be quite large. The closest example of oil and gas pipelines impacting proposed sediment resource areas occurs offshore Texas and Louisiana, where substantial (and historically uncoordinated) pipeline construction present extreme difficulties to sediment resource delineation (Figure 3). Recently, the United States Minerals Management Service (MMS) was requesting buffers as large as 1,000 meters (m) around pipeline routes. Therefore, any buffer will greatly impact the volume of available material from this shoal for future use in beach nourishment projects. 2

As an example, we have calculated an estimate of the impact the proposed pipeline route, in the form of both a 1,000 m and 1,000 foot (ft) buffer, would have on the existing beach-compatible sands available in the shoal offshore the northern tip of Anna Maria Island (Figure 7). When a 1,000 m buffer is placed around the proposed pipeline route, the currently available 18,245,000 cy yards of beach compatible sand is reduced to an estimated 9,654,800 cy, resulting in the loss of 8,590,200 cy of sand for future beach nourishment projects. This figure is the equivalent of approximately four full Anna Maria Island renourishment projects alone (not counting any other regional sand needs). In other words, the current proposed pipeline location, together with a 1,000 m buffer, would result in the loss of 40 years worth of project-compatible sands for the Anna Maria Island Shoreline Protection Project.

If this buffer was reduced to 1,000 ft (a potentially optimistic buffer), the currently available 18,245,000 cy yards of beach compatible sand is reduced to an estimated 16,211,200 cy, resulting in the loss of 2,033,800 cy of sand for future beach nourishment projects, well over the minimum needed for one full Anna Maria Island beach nourishment project. These represent significant volumes of beach compatible material that would become permanently unavailable for future beach nourishment activities. Not only does this impact regional sand management, but it will cause irreparable harm for Manatee County's Shore Protection Program.

The sediment within this area can be excavated by a hydraulic cutterhead dredge because the distance from the sediment deposit to the beach is relatively short. This area has previously been used on two occasions to restore the beaches of Anna Maria Island. In each case, a cutterhead dredge was used to excavate the sediment and pump it to the beach. The use of a cutterhead type dredge resulted in a substantial reduction in construction cost verses the use of other types of dredging technology because cutterhead technology is more efficient. The unit cost to place the sand on the beach is estimated to be half of the cost compared to the use of other types of dredging technology, such as hopper dredges. Cost savings are estimated to be $5 to $7 per cubic yard of placed beach sediment using a cutterhead dredge from the existing sand source verses a hopper dredge mining a slightly more distant sand source. For the Anna Maria Island Beach Renourishment Project, this results in a cost savings of $9,500,000 to $13,300,000 for one 1,900,000 cy project. If Manatee County lost four projects worth of sand from the nearby sand resource (due to a 1,000 m buffer around the pipeline), and had to switch to a different sand source and dredge technology, the County would be looking at a cumulative project cost increase in the neighborhood of $38,000,000 to $53,200,000. This calculation does not include changes in economic conditions such as inflation, the cost of fuel, and availability of dredging contractors for future projects. A cost increase this large could effectively paralyze Manatee County's shore protection efforts.

LONGBOAT KEY SHORE PROTECTION PROGRAM

The Town of Longboat Key administers an extensive shore protection program that actively manages the entire twelve-mile coastline of the Town (Figure 5). This program revolves around an eight year cycle of



Figure 4. Longboat Key Reach 2 before (top left) and after (bottom left) 2005/2006 beach nourishment; and Reach 4 before (top right) and after (bottom right) 2005/2006 beach nourishment.

2

renourishment for the entire coastline of Longboat Key, all of which is designated "Critically Eroded" by the Florida Department of Environmental Protection (Figure 4).

During the most recent nourishment in 2005/2006, 1,789,332 cy of beach-compatible sand was pumped along 52,000 ft of Longboat Key shoreline. Approximately 1,000,000 cy of this material was dredged from a permitted borrow area within the beach-compatible shoal described above. This borrow area was not fully depleted, and currently has approximately 1,500,000 cy of beach-compatible material available for future beach nourishment events. Unfortunately, as currently proposed, the Port Dolphin pipeline bisects this borrow area (Figure 6). Once buffered, the pipeline will likely prevent use of the remaining sands of the active borrow area in the future. Considerable expense has already been spent to locate, design, and permit this borrow area, and the loss of this borrow area would represent a significant financial, timing, and resource loss to the Longboat Key Comprehensive Beach Management Plan.



Figure 5. Longboat Key Shore Protection Project Limits.

If the Town of Longboat Key loses access to the borrow area, it will be required to search for an alternate sand source. Considering the potential loss of a large portion of the nearshore shoal off Anna Maria Island due to the pipeline construction, the likelihood of locating a similar quality borrow area at the same distance or closer to the project area is low. The location of a borrow area further away will result in a substantial increase in cost to the Town in order to construct the next beach nourishment. -2

For purposes of discussion, the economic impact to the Town can be summarized as follows:

1. Loss of investment of previous sand investigations and analyses for current borrow area ($500,000).
2. Investment cost to locate a new sand resource of similar quality ($500,000).
3. Incremental increase in cost (estimated at $2.00/cy) of transporting sand the additional distance ($3,000,000).
4. Total economic impact to the Town of Longboat Key is $4,000,000.

In addition to bisecting an existing Longboat Key borrow area, the proposed pipeline route impacts several offshore sand hills that are currently being investigated as potential future Longboat Key sand sources. These hills occur along the proposed pipeline route from three to ten nautical miles (nm) offshore of Anna Maria Island (Figure 8). In April, 2008, the Town of Longboat Key initiated a



reconnaissance-level geophysical and geotechnical investigation of those potential resources. The proposed pipeline route, if constructed, would impact large portions of these potential sediment resources, and together with the impact to the nearshore shoal off the northern tip of Anna Maria Island, would constitute a substantial economic impact to all future Longboat Key beach nourishment events.

POTENTIAL ALTERNATIVES

Both Manatee County and the Town of Longboat Key desire to work with Port Dolphin LLC in order to define an alternate pipeline route that satisfies the goals of all interested parties. We feel that there are multiple options that revolve around the existing Gulfstream pipeline that could both preserve a pipeline route for Port Dolphin LLC while avoiding beach-compatible sand resources. The fact that the Gulfstream pipeline has already been constructed automatically creates a pipeline corridor that local communities must avoid while developing and dredging regional sand source areas. It would seem logical to build within this corridor to reduce impacts to sand resources while preserving a pipeline route from the proposed deep-water port facility to Port Manatee. A second alternative would consist of tapping into the Gulfstream pipeline well offshore, thus eliminating the need to traverse potential State of Florida sand resources with a new pipeline.

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SUMMARY

Both Manatee County and Longboat Key have major concerns with the proposed Port Dolphin pipeline route. The route, as currently designed, will have major economic and performance impacts on the existing shore protection programs of both communities, resulting in increased project costs (greater than $50,000,000 in direct impacts), most of which is funded by tax-payer dollars. These cost increases may inevitably result in a decrease in project scope, which ultimately decreases shore protection to private and public infrastructure and public safety within these communities. In addition, Pinellas County has expressed concern over the pipeline route and its impact on regional sand management. While the current proposed route does not have direct impacts on Pinellas County, a reduction of regional sand resources can have a potential long-term impact on all regional Shore Protection Programs by creating increased competition for already limited regional sand resources.

4

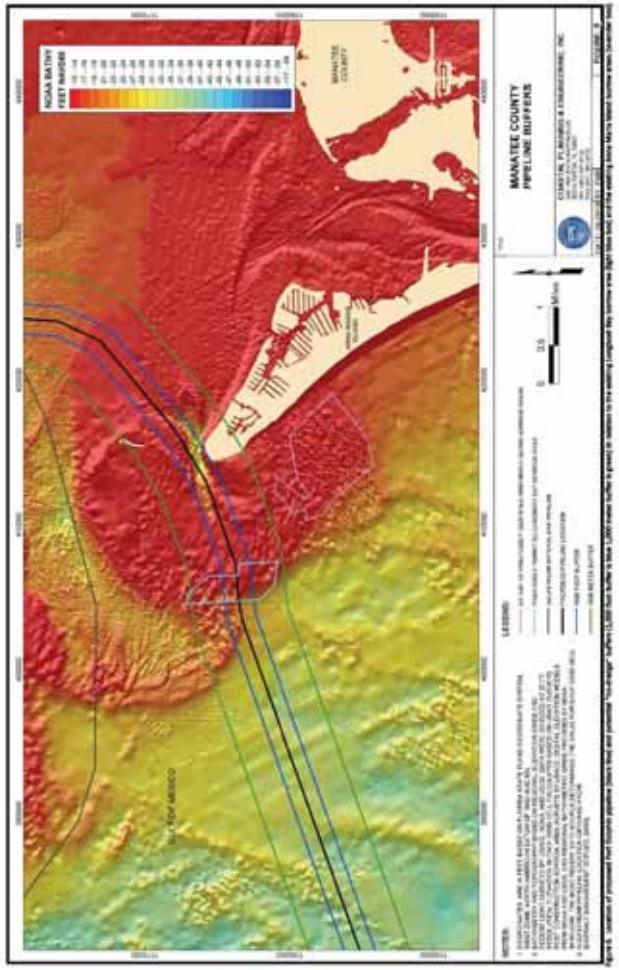
For more information, please contact:

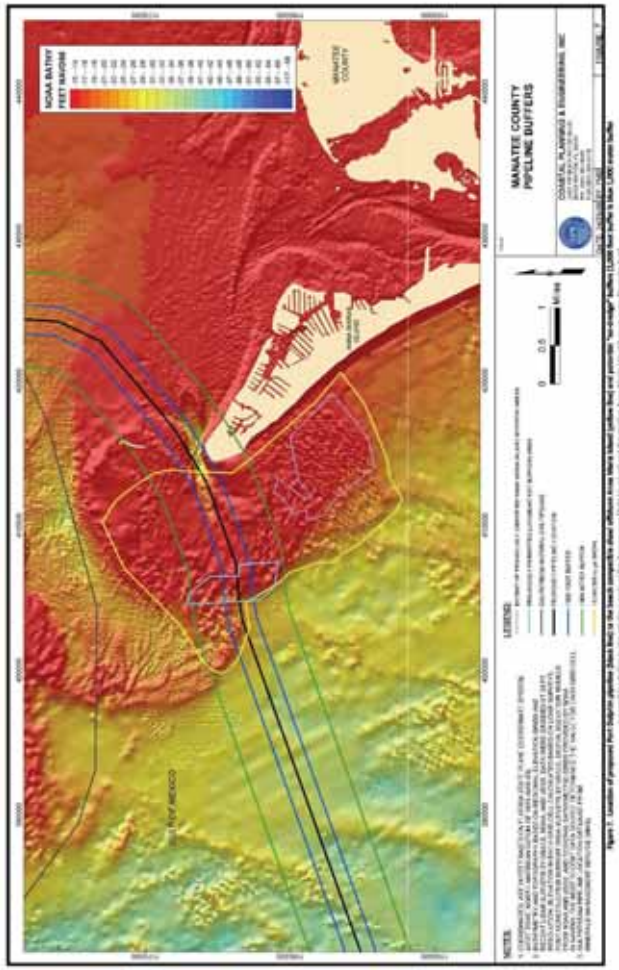
Rick Spadoni
Senior Vice President
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Boulevard
Boca Raton, FL 33431
(561) 391-8102
rspadoni@coastalplanning.net

Beau Suthard
Marine Geologist
Coastal Planning & Engineering, Inc.
101 16th Avenue South, Suite 4
St. Petersburg, Florida 33701
(727) 565-4660
bsuthard@coastalplanning.net

3. An offshore interconnection with the Gulfstream Pipeline has been added in Sections 2.1.4.6 and 2.3 and ~~its~~ impacts evaluated are in Section 4.

4. In response to comments the Applicant revised the proposed pipeline route to avoid permitted sand resources. See Section 2.1.4 of the Final EIS for a description of the alternatives. Sand resources are described in Section 3.4 and impacts from these alternatives are discussed in Sections 4.2.1.6.1, 4.4.1, 4.4.2, 4.5.1, 4.5.2, and 4.9.1.


MANATEE COUNTY
PIPELINE BUFFERS
LEGEND
NOTES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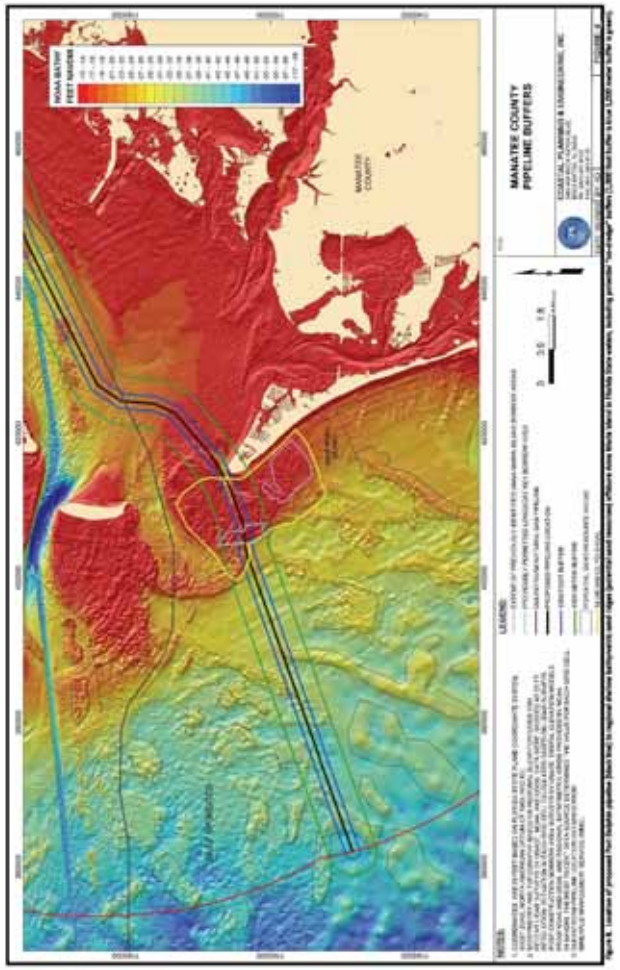
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SARASOTA COUNTY
"Dedicated to Quality Service"

BOARD OF COUNTY COMMISSIONERS
1660 Ringling Boulevard
Sarasota, Florida 34236
Telephone 941-861-5344
Fax 941-861-5987

February 13, 2009

Raymond M. Martin Deepwater Ports Project Officer
Deepwater Ports Standards Division (CG-3PSO-5)
U.S. Coast Guard Headquarters
Room 1508 2100 Second Street, S.W.
Washington, D.C. 20593-0001

RE: Port Dolphin LLC Liquefied Natural Gas Deepwater Port License Application, Public Docket USCG-2007-28532.

Dear Mr. Martin:

My name is Jon Thaxton and I am the Chair of the Sarasota Board of County Commissioners. I am writing on behalf of the Board to express our support of the Town of Longboat Key's efforts to have the Port Dolphin LNG pipeline route changed to eliminate or minimize impacts to critical current and future beach compatible sand resources. 1

While Sarasota County supports construction of the Port Dolphin project, Sarasota County does not concur in the proposed near-shore modified pipeline route because the pipeline still will intercept sand deposits farther offshore that may contain extremely valuable beach-quality sand. It would be hard to overstate the importance of the area's beaches to Sarasota County, its neighboring jurisdictions, and the millions of people who live in the immediate area. Replenishing the area's beaches is necessary to prevent erosion and flooding, protect the public safety, sustain the region's economy, preserve the habitat of threatened and endangered sea turtles and provide for the well being of residents and visitors alike. The sand resources nearest shore will eventually be depleted, requiring Sarasota County and its neighboring jurisdictions to use the other resources off shore of Tampa Bay, major portions of which the Port Dolphin pipeline would put off limits to us. 2 3

Local jurisdictions, including Sarasota County, have invested millions of dollars in recent years to develop information about known and potential sand sources that could support our absolutely essential beach nourishment and habitat protection programs. As shown by these studies, and as confirmed by the extensive data that we understand Port Dolphin has developed, the proposed pipeline will pass through at least four areas that contain beach-quality sand. Sarasota County, and its neighbors, will need this sand within a few years. 4

Addendum II does propose a slightly revised route that avoids most of the closest near-shore known beach-compatible sand deposits. However, Addendum II does not consider the alternative route that the Town of Longboat Key proposed that would co-locate the pipeline with the Gulfstream Pipeline, or the possibility of other alternative routes that could be 5

Carolyn J. Mason, District 1 • Joseph A. Barbetta, District 2 • Shannon Staub, District 3 • Nora Patterson, District 4 • Jon Thaxton, District 5
cmason@scgov.net jbarbetta@scgov.net sstaub@scgov.net npatters@scgov.net jthaxton@scgov.net

1. Comment noted.

2. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.

3. Section 2.1 addresses several possible alternatives for the project including three pipeline alternatives, an offshore interconnection to the Gulfstream Interstate Pipeline, and the route proposed by Longboat Key during the public comment period. Furthermore, the Applicant revised the proposed pipeline route to avoid sand resource areas. See the revised pipeline description in Section 2.1.4 of the Final EIS. Sand resources are discussed in Sections 3.4 and 4.4.

4. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.

5. Section 2.1 addresses several possible alternatives for the project including three pipeline alternatives, an offshore interconnection to the Gulfstream Interstate Pipeline, and the route proposed by Longboat Key during the public comment period. Furthermore, the Applicant revised the proposed pipeline route to avoid sand resource areas. See the revised pipeline description in Section 2.1.4 of the Final EIS. Sand resources are discussed in Sections 3.4 and 4.4.



Raymond M. Martin
February 13, 2009
Page two

located in large offshore areas that appear to have little or no sand resources. We do not understand how the Coast Guard or the Maritime Administration could prepare an adequate Environmental Impact Statement or ultimately issue a license for the project without thorough study of these fundamentally different routes, and not just the minor adjustments Port Dolphin has proposed. 5

Sarasota County understands that Port Dolphin has extensive geophysical and geotechnical data from which Port Dolphin could readily construct a complete scientific picture of where beach-quality sand exists in most if not all of the off-shore area west of Tampa Bay along any of the pipeline routes that have been discussed. This kind of study by Port Dolphin would supplement the information that Sarasota County and the other shoreline jurisdictions have developed and are developing through ongoing studies. We urge the Coast Guard and the Maritime Administration to require Port Dolphin to conduct such an analysis before any evaluation of the environmental impacts of any of the alternatives occurs. 6

Beach-quality sand resources in the offshore area, whether in state or close-in federal waters, are essential to Sarasota County's and other beachfront jurisdictions' beach restoration and protection programs. Yet the impact of the pipeline on this essential resource received only superficial attention in the draft EIS. Accordingly, we respectfully request that the Coast Guard and MARAD issue a revised or supplemental draft EIS that fully addresses the sand issue and circulate that draft for public comment before preparing a final EIS. 7

Sincerely,

JON THAXTON
Chair

6. The Applicant revised the proposed pipeline route to avoid sand resource areas. See the revised pipeline description in Section 2.1.4 of the Final EIS. Sand resources are discussed in Sections 3.4 and 4.4.

7. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.

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June 2, 2008

VIA ELECTRONIC SUBMISSION

U.S. Department of Transportation
Docket Management Facility
1200 New Jersey Avenue, S.E.
West Building, Ground Floor, Room W12-140
Washington, DC 20590-00001

c/o Mr. Raymond W. Martin
Deepwater Ports Standards Division (CG-3PSO-5)
U.S. Coast Guard Headquarters

c/o Mr. Chris Hanan
Transportation Industry Analyst
Maritime Administration

Re: *Port Dolphin Energy LLC, Liquefied Natural Gas Deepwater Port License Application,* Public Docket USCG-2007-28532, 72 Fed. Reg. 34,741 (June 25, 2007)

Dear Messrs. Martin and Hanan:

Transmitted herewith are the Comments of Gulfstream Natural Gas System, L.L.C. on the Draft Environmental Impact Statement issued by the United States Coast Guard and the Maritime Administration on April 18, 2008 in DOT Docket No. USCG-2007-28532.

Please contact me with any questions regarding this filing.

Respectfully submitted,

/s/ Brian D. O'Neill

Brian D. O'Neill
Counsel to Gulfstream Natural Gas System, LLC

Enclosure

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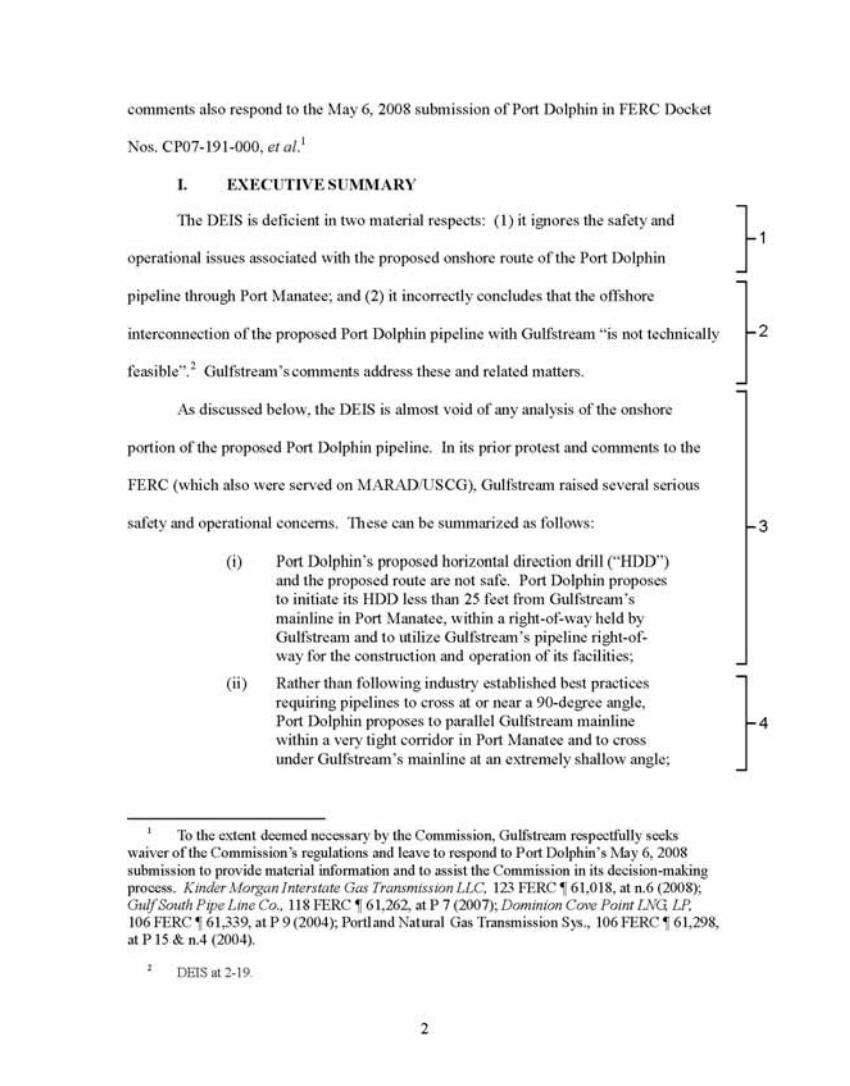
UNITED STATES OF AMERICA
BEFORE THE
UNITED STATES COAST GUARD/MARITIME ADMINISTRATION
AND
FEDERAL ENERGY REGULATORY COMMISSION

Port Dolphin Energy LLC Liquefied Natural Gas Deepwater Port License Application	)))	**DOT Docket No. USCG-2007-28532**
Port Dolphin Energy LLC	))	**FERC Docket Nos. CP07-191-001 CP07-192-000**

COMMENTS OF GULFSTREAM NATURAL GAS S YSTEM, L.L.C. ON PORT DOLPHIN SUBMISSI ON AND DRAFT ENVIRONMENTAL IMPACT STATEMENT

Gulfstream Natural Gas System, L.L.C. ("Gulfstream") submits these comments on the April 2008 Draft Environmental Impact Statement ("DEIS") issued by the United States Coast Guard ("USCG") and the Maritime Administration ("MARAD") in response to Port Dolphin LLC's ("Port Dolphin") March 2007 deepwater port application, as amended in December 2007, and its January 2008 amended application under Section 7(c) of the Natural Gas Act ("NGA"), 15 U.S.C. § 717f(c), and Part 157 of the Federal Energy Regulatory Commission's ("Commission") regulations, 18 C.F.R. Part 157, for a certificate of public convenience and necessity to construct, install, own, operate, and maintain a new non-open access natural gas pipeline and related facilities to transport Port Dolphin's regasified LNG from the proposed Port Dolphin Project, a deepwater port offshore of Tampa Bay, Florida, from the shoreline to proposed interconnections with Gulfstream and Peoples Gas System/TECO Energy, Inc. ("Peoples/TECO"). Because of its relationship with and reference to the DEIS, these



comments also respond to the May 6, 2008 submission of Port Dolphin in FERC Docket Nos. CP07-191-000, *et al.*[1]

I. EXECUTIVE SUMMARY

The DEIS is deficient in two material respects: (1) it ignores the safety and operational issues associated with the proposed onshore route of the Port Dolphin pipeline through Port Manatee; and (2) it incorrectly concludes that the offshore interconnection of the proposed Port Dolphin pipeline with Gulfstream "is not technically feasible".[2] Gulfstream's comments address these and related matters.

As discussed below, the DEIS is almost void of any analysis of the onshore portion of the proposed Port Dolphin pipeline. In its prior protest and comments to the FERC (which also were served on MARAD/USCG), Gulfstream raised several serious safety and operational concerns. These can be summarized as follows:

(i) Port Dolphin's proposed horizontal direction drill ("HDD") and the proposed route are not safe. Port Dolphin proposes to initiate its HDD less than 25 feet from Gulfstream's mainline in Port Manatee, within a right-of-way held by Gulfstream and to utilize Gulfstream's pipeline right-of-way for the construction and operation of its facilities;

(ii) Rather than following industry established best practices requiring pipelines to cross at or near a 90-degree angle, Port Dolphin proposes to parallel Gulfstream mainline within a very tight corridor in Port Manatee and to cross under Gulfstream's mainline at an extremely shallow angle;

[1] To the extent deemed necessary by the Commission, Gulfstream respectfully seeks waiver of the Commission's regulations and leave to respond to Port Dolphin's May 6, 2008 submission to provide material information and to assist the Commission in its decision-making process. *Kinder Morgan Interstate Gas Transmission LLC*, 123 FERC ¶ 61,018, at n.6 (2008); *Gulf South Pipe Line Co.*, 118 FERC ¶ 61,262, at P 7 (2007); *Dominion Cove Point LNG, LP*, 106 FERC ¶ 61,339, at P 9 (2004); Portland Natural Gas Transmission Sys., 106 FERC ¶ 61,298, at P 15 & n.4 (2004).

[2] DEIS at 2-19.

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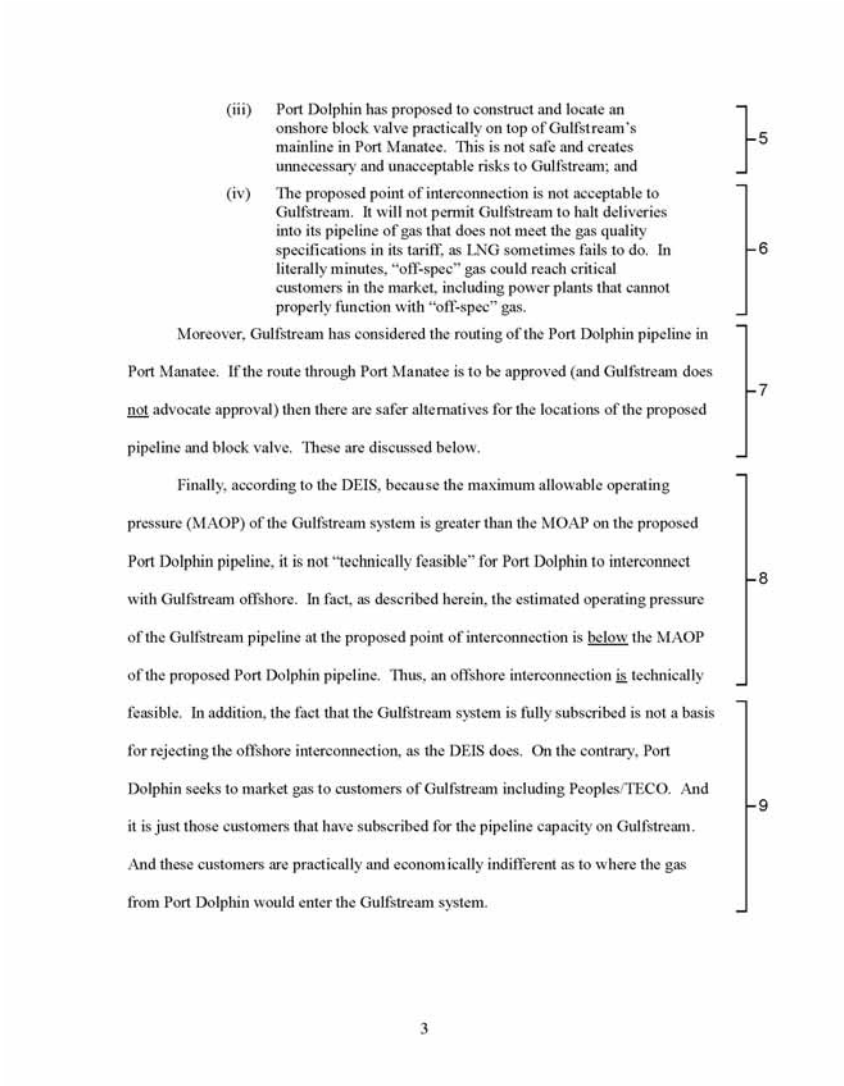
1. Proposed engineering plans for the project submitted to the Maritime Administration and USCG are not meant to serve as the final designs for the project. Final designs are forth coming and will depend in part on the environmental constraints provided by the Final EIS and ROD. In addition to the USCG, the Federal agencies (i.e., FERC and PHSMA) that review the construction and operational safety of the project will review the project plans submitted on the Federal Docket as part of their review of final construction plans. The Applicant would be required to build the project in a way that upholds industry safety standards.

2. Due to public comments on the Draft EIS, the Final EIS discusses an offshore interconnection with the existing Gulfstream pipeline. The description is discussed in Section 2.1.4 and impacts are discussed in Section 4.

3. Proposed engineering plans for the project submitted to the Maritime Administration and USCG are not meant to serve as the final designs for the project. Final designs are forth coming and will depend in part on the environmental constraints provided by the Final EIS and ROD. In addition to the USCG, the Federal agencies (i.e., FERC and PHSMA) that review the construction and operational safety of the project will review the project plans submitted on the Federal Docket as part of their review of final construction plans. The Applicant would be required to build the project in a way that upholds industry safety standards.

4. Proposed engineering plans for the project submitted to the Maritime Administration and USCG are not meant to serve as the final designs for the project. Final designs are forth coming and will depend in part on the environmental constraints provided by the Final EIS and ROD. In addition to the USCG, the Federal agencies (i.e., FERC and PHSMA) that review the construction and operational safety of the project will review the project plans submitted on the Federal Docket as part of their review of final construction plans. The Applicant would be required to build the project in a way that upholds industry safety standards.



(iii) Port Dolphin has proposed to construct and locate an onshore block valve practically on top of Gulfstream's mainline in Port Manatee. This is not safe and creates unnecessary and unacceptable risks to Gulfstream; and

(iv) The proposed point of interconnection is not acceptable to Gulfstream. It will not permit Gulfstream to halt deliveries into its pipeline of gas that does not meet the gas quality specifications in its tariff, as LNG sometimes fails to do. In literally minutes, "off-spec" gas could reach critical customers in the market, including power plants that cannot properly function with "off-spec" gas.

Moreover, Gulfstream has considered the routing of the Port Dolphin pipeline in Port Manatee. If the route through Port Manatee is to be approved (and Gulfstream does not advocate approval) then there are safer alternatives for the locations of the proposed pipeline and block valve. These are discussed below.

Finally, according to the DEIS, because the maximum allowable operating pressure (MAOP) of the Gulfstream system is greater than the MOAP on the proposed Port Dolphin pipeline, it is not "technically feasible" for Port Dolphin to interconnect with Gulfstream offshore. In fact, as described herein, the estimated operating pressure of the Gulfstream pipeline at the proposed point of interconnection is below the MAOP of the proposed Port Dolphin pipeline. Thus, an offshore interconnection is technically feasible. In addition, the fact that the Gulfstream system is fully subscribed is not a basis for rejecting the offshore interconnection, as the DEIS does. On the contrary, Port Dolphin seeks to market gas to customers of Gulfstream including Peoples/TECO. And it is just those customers that have subscribed for the pipeline capacity on Gulfstream. And these customers are practically and economically indifferent as to where the gas from Port Dolphin would enter the Gulfstream system.

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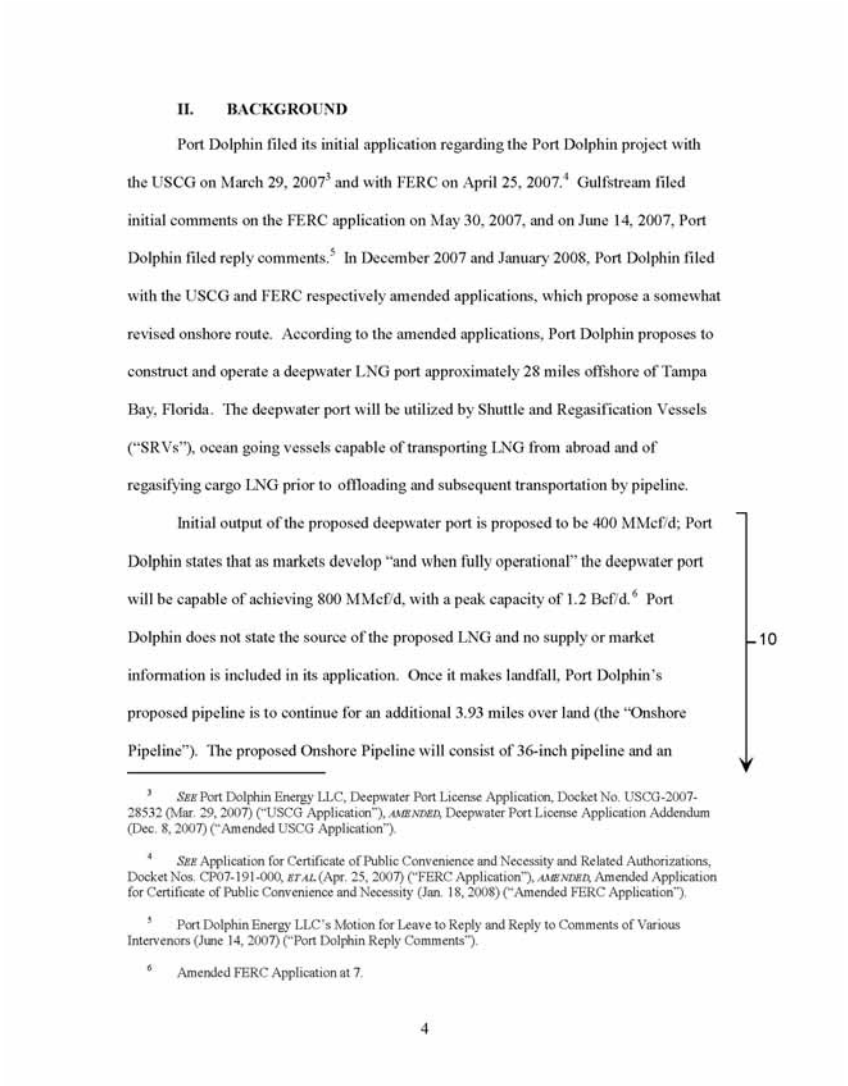
5. Comment noted. Proposed engineering plans for the project submitted to the Maritime Administration and USCG are not meant to serve as the final designs for the project. Final designs are forth coming and will depend in part on the environmental constraints provided by the Final EIS and ROD. In addition to the USCG, the Federal agencies (i.e., FERC and PHSMA) that review the construction and operational safety of the project will review the project plans submitted on the Federal Docket as part of their review of final construction plans. The Applicant would be required to build the project in a way that upholds industry safety standards.

6. Comment noted. FERC will consider this and make recommendations in their certificate.

7. Comment noted.

8. Comment noted. FERC will consider this and make recommendations in their certificate.

9. The offshore interconnection with Gulfstream is analyzed in the EIS, Section 2.1.4.6.



II. BACKGROUND

Port Dolphin filed its initial application regarding the Port Dolphin project with the USCG on March 29, 2007[3] and with FERC on April 25, 2007.[4] Gulfstream filed initial comments on the FERC application on May 30, 2007, and on June 14, 2007, Port Dolphin filed reply comments.[5] In December 2007 and January 2008, Port Dolphin filed with the USCG and FERC respectively amended applications, which propose a somewhat revised onshore route. According to the amended applications, Port Dolphin proposes to construct and operate a deepwater LNG port approximately 28 miles offshore of Tampa Bay, Florida. The deepwater port will be utilized by Shuttle and Regasification Vessels ("SRVs"), ocean going vessels capable of transporting LNG from abroad and of regasifying cargo LNG prior to offloading and subsequent transportation by pipeline.

Initial output of the proposed deepwater port is proposed to be 400 MMcf/d; Port Dolphin states that as markets develop "and when fully operational" the deepwater port will be capable of achieving 800 MMcf/d, with a peak capacity of 1.2 Bcf/d.[6] Port Dolphin does not state the source of the proposed LNG and no supply or market information is included in its application. Once it makes landfall, Port Dolphin's proposed pipeline is to continue for an additional 3.93 miles over land (the "Onshore Pipeline"). The proposed Onshore Pipeline will consist of 36-inch pipeline and an

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[3] *See* Port Dolphin Energy LLC, Deepwater Port License Application, Docket No. USCG-2007-28532 (Mar. 29, 2007) ("USCG Application"), *amended*, Deepwater Port License Application Addendum (Dec. 8, 2007) ("Amended USCG Application").

[4] *See* Application for Certificate of Public Convenience and Necessity and Related Authorizations, Docket Nos. CP07-191-000, *et al.* (Apr. 25, 2007) ("FERC Application"), *amended*, Amended Application for Certificate of Public Convenience and Necessity (Jan. 18, 2008) ("Amended FERC Application").

[5] Port Dolphin Energy LLC's Motion for Leave to Reply and Reply to Comments of Various Intervenors (June 14, 2007) ("Port Dolphin Reply Comments").

[6] Amended FERC Application at 7.

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10. Section 1.2 describes the need for the project and Section 1.3 describes the intended market for LNG distribution.

interconnection station connecting Port Dolphin's facilities to Gulfstream and Peoples/TECO just downstream of Gulfstream's Station 420.

Gulfstream filed an initial protest to the amended FERC application on February 19, 2008, to which Port Dolphin filed a response on March 5, 2008. At the request of Gulfstream, representatives of Port Dolphin met with representatives of Gulfstream to discuss various concerns that Gulfstream has with safety, construction, and other matters associated with the Port Dolphin proposal. The meeting occurred in Tampa, Florida on April 1, 2008. At the outset, Port Dolphin declared that it would not discuss or provide any information to Gulfstream that was non-public. It continues to be the case that Port Dolphin will not release any non-public information to Gulfstream without Gulfstream signing a confidentiality agreement that would prevent Gulfstream from using such information in these proceedings.

The USCG and MARAD issued its DEIS on Friday, April 18, 2008. On Monday, April 21, 2008, Gulfstream filed additional comments on the Port Dolphin Project with both USCG/MARAD and FERC.[7] Those additional comments should be considered along with this submission in preparation of the final environmental impact statement ("FEIS"). Port Dolphin filed a reply with the Commission on May 6, 2008.[8]

As noted in previous comments, Gulfstream is not opposed to an interconnection with Port Dolphin. However, the interconnection point that Port Dolphin proposes is problematic for myriad reasons. FERC policy requires Gulfstream to permit an

[7] Supplement to Protest and Additional Comments of Gulfstream Natural Gas System, L.L.C. (Apr. 21, 2008) ("Gulfstream Additional Comments").

[8] Port Dolphin Energy LLC's Motion for Leave to Reply and Reply to Gulfstream's April 21, 2008 Supplemental Protest (May 6, 2008) ("Port Dolphin Reply").

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11. Comment noted.

interconnection upon request so long as it creates no operational or safety problems.[9] The proposed interconnection appears to raise significant safety concerns. These must be considered not only by the FERC as part of its responsibilities under the NGA, but also by USCG/MARAD in fulfilling the obligations under the National Environmental Policy Act.

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III. COMMENTS ON PORT DOLPHIN'S MAY 6, 2008 SUBMISSION

A. NOTHING IN THE DEIS OR PORT DOLPHIN'S MAY 6, 2008 ANSWER ADDRESSES GULFSTREAM'S SAFETY CONCERNS.

Nothing in the DEIS or Port Dolphin's Reply addresses Gulfstream's safety concerns. As explained previously, to make landfall, Port Dolphin proposes a horizontal direction drill ("HDD") that would begin at FM 1327.18 as shown on Drawing No. 26017-D-2022[10] and travel west (seaward) for 4,900 feet, coming up in the waters close to the Terra Ceia Aquatic Preserve.[11] The available space at Port Manatee that Port Dolphin seeks to utilize presents significant construction and safety concerns that are not acceptable to Gulfstream and have not been satisfactorily addressed by Port Dolphin. The proposed route for the Onshore Pipeline lies within a narrow corridor running

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[9] *See Panhandle E. Pipe Line Co.*, 91 FERC ¶ 61,037, at 61,141 (2000) ("The policy announced here enables a party desiring access to a pipeline to obtain an interconnection if it satisfies five conditions. First, the party seeking the interconnection must be willing to bear the costs of the construction if the pipeline performs that task. In the alternative, the party seeking the interconnection could construct the facilities itself in compliance with the pipeline's technical requirements. Second, the proposed interconnection must not adversely affect the pipeline's operations. Third, the proposed interconnection and any resulting transportation must not diminish service to the pipeline's existing customers. Fourth, the proposed interconnection must not cause the pipeline to be in violation of any applicable environmental or safety laws or regulations with respect to the facilities required to establish an interconnection with the pipeline's existing facilities. Finally, the proposed interconnection must not cause the pipeline to be in violation of its right-of-way agreements or any other contractual obligations with respect to the interconnection facilities.").

[10] Amended Resource Report No. 1, Drawing No. 26017-D-2022.

[11] *See id.*; Amended Resource Report No. 1, Drawing No. 26017-D-2306 (Horizontal Directional Drill (HDD), Port Manatee Shore Approach).

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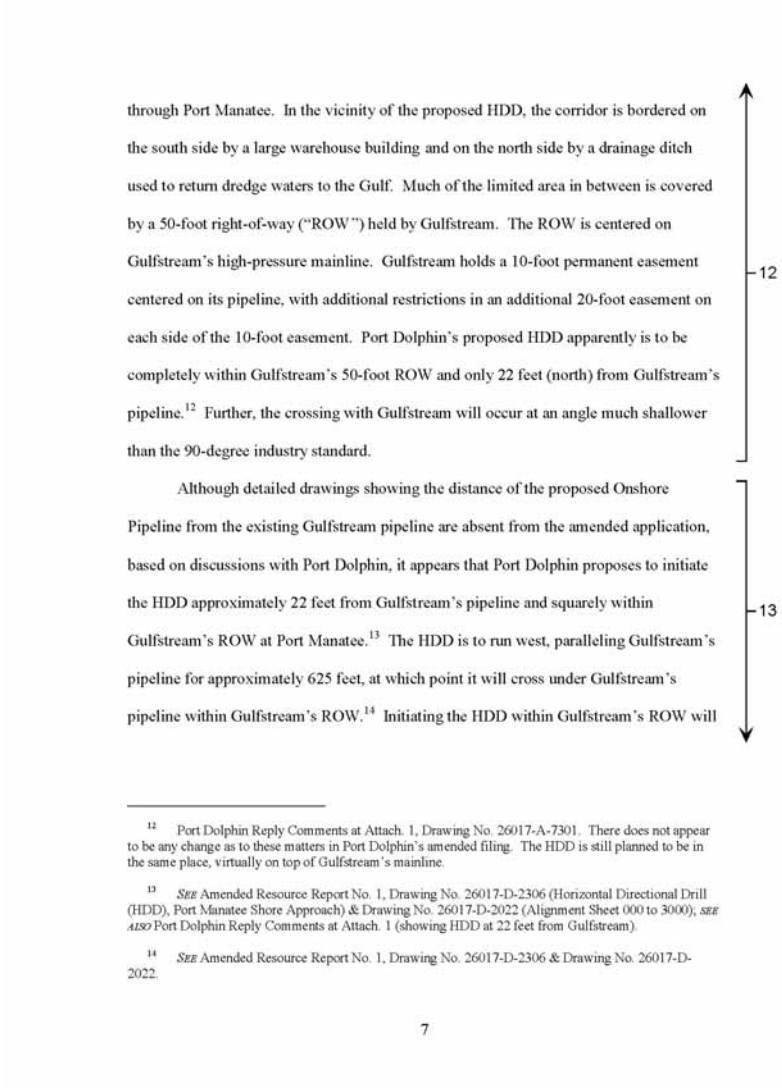
12. Proposed engineering plans for the project submitted to the Maritime Administration and USCG are not meant to serve as the final designs for the project. Final designs are forth coming and will depend in part on the environmental constraints provided by the Final EIS and ROD. In addition to the USCG, the Federal agencies (i.e., FERC and PHSMA) that review the construction and operational safety of the project will review the project plans submitted on the Federal Docket as part of their review of final construction plans. The Applicant would be required to build the project in a way that upholds industry safety standards..



through Port Manatee. In the vicinity of the proposed HDD, the corridor is bordered on the south side by a large warehouse building and on the north side by a drainage ditch used to return dredge waters to the Gulf. Much of the limited area in between is covered by a 50-foot right-of-way ("ROW") held by Gulfstream. The ROW is centered on Gulfstream's high-pressure mainline. Gulfstream holds a 10-foot permanent easement centered on its pipeline, with additional restrictions in an additional 20-foot easement on each side of the 10-foot easement. Port Dolphin's proposed HDD apparently is to be completely within Gulfstream's 50-foot ROW and only 22 feet (north) from Gulfstream's pipeline.[12] Further, the crossing with Gulfstream will occur at an angle much shallower than the 90-degree industry standard.

Although detailed drawings showing the distance of the proposed Onshore Pipeline from the existing Gulfstream pipeline are absent from the amended application, based on discussions with Port Dolphin, it appears that Port Dolphin proposes to initiate the HDD approximately 22 feet from Gulfstream's pipeline and squarely within Gulfstream's ROW at Port Manatee.[13] The HDD is to run west, paralleling Gulfstream's pipeline for approximately 625 feet, at which point it will cross under Gulfstream's pipeline within Gulfstream's ROW.[14] Initiating the HDD within Gulfstream's ROW will

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[12] Port Dolphin Reply Comments at Attach. 1, Drawing No. 26017-A-7301. There does not appear to be any change as to these matters in Port Dolphin's amended filing. The HDD is still planned to be in the same place, virtually on top of Gulfstream's mainline.

[13] *See* Amended Resource Report No. 1, Drawing No. 26017-D-2306 (Horizontal Directional Drill (HDD), Port Manatee Shore Approach) & Drawing No. 26017-D-2022 (Alignment Sheet 000 to 3000); *see also* Port Dolphin Reply Comments at Attach. 1 (showing HDD at 22 feet from Gulfstream).

[14] *See* Amended Resource Report No. 1, Drawing No. 26017-D-2306 & Drawing No. 26017-D-2022.

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13. Proposed engineering plans for the project submitted to the Maritime Administration and USCG are not meant to serve as the final designs for the project. Final designs are forth coming and will depend in part on the environmental constraints provided by the Final EIS and ROD. In addition to the USCG, the Federal agencies (i.e., FERC and PHSMA) that review the construction and operational safety of the project will review the project plans submitted on the Federal Docket as part of their review of final construction plans. The Applicant would be required to build the project in a way that upholds industry safety standards..

require Port Dolphin to excavate a sump pit,[15] again within 25 feet of Gulfstream's pipeline. This exposes Gulfstream to unacceptable risks of potential damage to the Gulfstream mainline.

Despite Gulfstream's repeated efforts to have Port Dolphin explain how it will safely perform an HDD so close to Gulfstream's pipe, Port Dolphin continues to ignore this concern. Even in its May 6, 2008 filing, Port Dolphin does not meaningfully address Gulfstream's safety concerns. Gulfstream has responsibilities under its FERC certificate authority to assure the safe and reliable operation of its own jurisdictional pipeline system, a system that provides 35% of the natural gas pipeline capacity into Florida. The potential disruption of service of this magnitude and the resulting hardships it would cause just cannot be taken lightly, particularly in this situation where Port Dolphin is attempting to squeeze its proposed pipeline into Gulfstream's narrow right-of-way. 13

As an initial matter, the Department of Transportation's regulations at 49 C.F.R. Part 192 do not address the methods and safety precautions for horizontal directional drills. Therefore, Port Dolphin's stated intent to comply with such regulations does nothing to address Gulfstream's concerns. Gulfstream attached to its Additional Comments published industry best practices and demonstrated that such best practices would be ignored by Port Dolphin under the current proposal. Port Dolphin does not address this evidence or Gulfstream's concerns.

Port Dolphin also argues that the Commission has in the past recommended co-location in rights-of-way.[16] While this may be true in the abstract, general policies

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[15] *See* Amended Resource Report No. 1 at Fig. 1-11.

[16] Port Dolphin Reply at 8-10.

regarding co-location also do not address Gulfstream's concerns with an HDD entry within 22 feet of it pipeline. Further, the cases cited by Port Dolphin are not on point.

In *Freeport-McMoRan ENergy LLC*, 115 FERC ¶ 61,201 (2006), although the proposed pipeline's right-of-way was *ADJACENT* to Gulfstream's and Transco's existing easement, *ID.* at P 5, it was not within those easements, and the Commission did not discuss how close the HDD exit point was to Gulfstream's pipeline. In fact, that HDD exit point was 75 feet from Gulfstream. In that instance, based on all of the factors involved, Gulfstream and Freeport-McMoRan were able to reach agreement on a safe construction plan in proximity to Gulfstream's pipe.

Equitrans, L.P., 117 FERC ¶ 61,184 (2006), and *Transwestern Pipeline Co.*, 121 FERC ¶ 61,175 (2007), also cited by Port Dolphin, also are not on point. In *Equitrans*, the Commission held that a pipeline application will not be denied simply because the proposed pipeline will cross an existing pipeline. *Equitrans* at P 32. Gulfstream does not argue that Port Dolphin should not be permitted to cross Gulfstream's pipeline. Rather, Gulfstream objects to the risk involved with initiating an HDD almost on top of Gulfstream's existing pipeline. In *TRANSWESTERN*, the Commission held that the proposed pipeline could parallel an existing pipeline at a distance of 35 feet, not the 22.5 feet that Port Dolphin claims. *Id.* at P 136. In any event, Gulfstream does not object to co-location, but rather to an HDD being staged less than 25 feet from its pipe.

In response, Port Dolphin continues to do nothing more than make conclusory statements regarding the safety of the proposed HDD. For example, Port Dolphin blandly states that it "has consulted with several of the most experienced and industry

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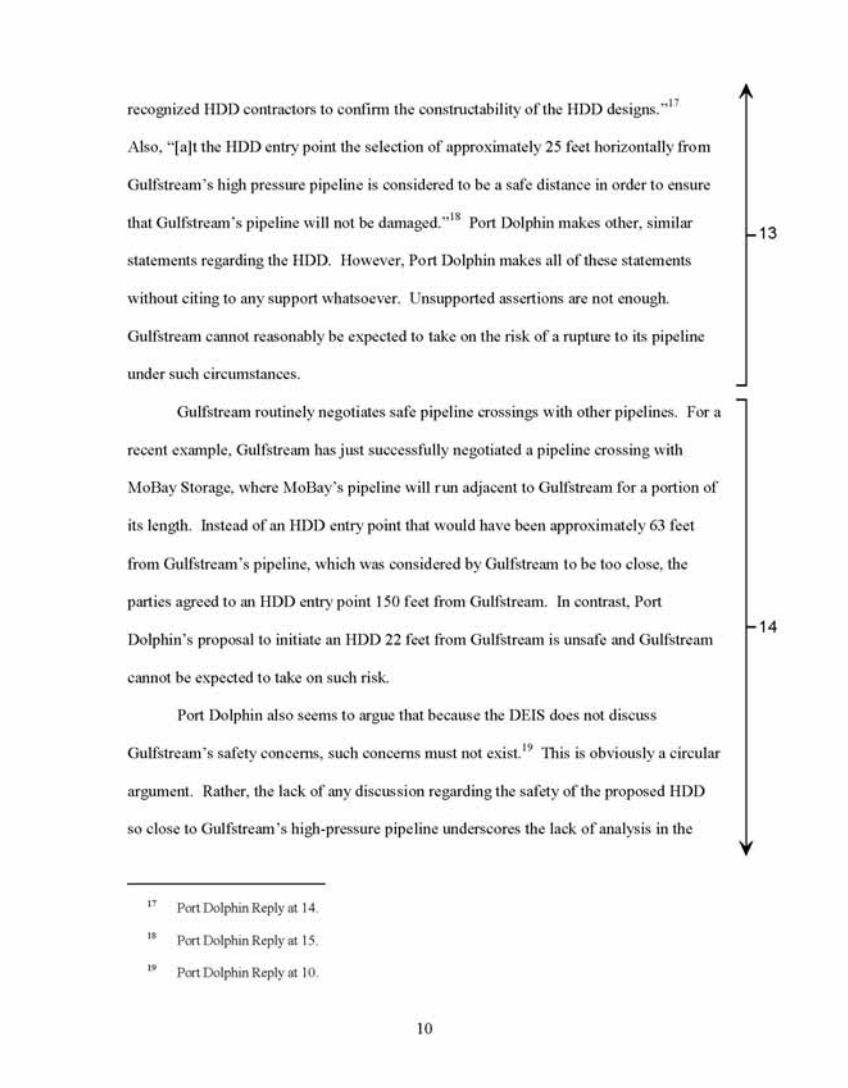

recognized HDD contractors to confirm the constructability of the HDD designs."[17] Also, "[a]t the HDD entry point the selection of approximately 25 feet horizontally from Gulfstream's high pressure pipeline is considered to be a safe distance in order to ensure that Gulfstream's pipeline will not be damaged."[18] Port Dolphin makes other, similar statements regarding the HDD. However, Port Dolphin makes all of these statements without citing to any support whatsoever. Unsupported assertions are not enough. Gulfstream cannot reasonably be expected to take on the risk of a rupture to its pipeline under such circumstances.

Gulfstream routinely negotiates safe pipeline crossings with other pipelines. For a recent example, Gulfstream has just successfully negotiated a pipeline crossing with MoBay Storage, where MoBay's pipeline will run adjacent to Gulfstream for a portion of its length. Instead of an HDD entry point that would have been approximately 63 feet from Gulfstream's pipeline, which was considered by Gulfstream to be too close, the parties agreed to an HDD entry point 150 feet from Gulfstream. In contrast, Port Dolphin's proposal to initiate an HDD 22 feet from Gulfstream is unsafe and Gulfstream cannot be expected to take on such risk.

Port Dolphin also seems to argue that because the DEIS does not discuss Gulfstream's safety concerns, such concerns must not exist.[19] This is obviously a circular argument. Rather, the lack of any discussion regarding the safety of the proposed HDD so close to Gulfstream's high-pressure pipeline underscores the lack of analysis in the

[17] Port Dolphin Reply at 14.

[18] Port Dolphin Reply at 15.

[19] Port Dolphin Reply at 10.

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14. Proposed engineering plans for the project submitted to the Maritime Administration and USCG are not meant to serve as the final designs for the project. Final designs are forth coming and will depend in part on the environmental constraints provided by the Final EIS and ROD. In addition to the USCG, the Federal agencies (i.e., FERC and PHSMA) that review the construction and operational safety of the project will review the project plans submitted on the Federal Docket as part of their review of final construction plans. The Applicant would be required to build the project in a way that upholds industry safety standards.

DEIS. This critical safety issue cannot be ignored, and a NEPA analysis that does not do so will not withstand judicial review. 14

B. Gulfstream offers the following alternatives regarding the placement of Port Dolphin's Facilities.

Gulfstream has legitimate concerns about the close proximity of the proposed Port Dolphin pipeline to Gulfstream's existing pipeline in the narrow corridor selected by Port Dolphin in Port Manatee. The pictures in Attachment 1 (Drawing No. 69-14-37/42405 and inset pictures) demonstrate how tight the space is in this corridor of Port Manatee and highlight the safety concerns. Gulfstream believes that the proposed pipeline route should not be approved. However, if the route through Port Manatee is to be approved, there are alternative points of entry for the HDD and valve sites that should be considered. These alternative sites at least reduce the safety concerns. Gulfstream believes that Port Dolphin's valve could be located at several locations at or downstream of FM 6600, as shown at Attachment 2 (Drawing No. 69-14-37/42405). The current valve site overlaps Gulfstream's pipeline centerline and right of way. The alternate sites are not as close to Gulfstream's pipe and still allow very good emergency access by Port Dolphin. In particular, Proposed Valve Site 1 has good access from South Dock Street. 15, 16

Port Dolphin also could relocate the HDD entry point 93 feet to the north to the center of the drainage ditch in which its pipeline will run.[20] *See* Attachment 1. This would locate the HDD entry point approximately 115 feet from Gulfstream's pipeline, which is clearly much safer than Port Dolphin's proposal. In fact, the entirety of Port Dolphin's pipeline could be moved from Gulfstream's ROW to the drainage ditch as 17

[20] As proposed, the Port Dolphin pipeline is 51' 2" from the edge of the drainage ditch, and the distance from the edge to the center of the drainage ditch is 41' 7". *See* Drawing No. 26017-D-4106.

11

15. Comment noted.

16. Comment noted.

17. Comment noted.

shown in Attachment 1. In its May 6, 2008 filing, Port Dolphin indicated that it will "take appropriate action to reshape the drainage ditch cross-section for properly handling future runoff and discharge, and eliminate any future need for additional excavation work."[21] If this is true, there appears to no longer be any reason for Port Dolphin to intrude on Gulfstream's ROW. It can simply move its pipeline 93 feet to the north of the proposed route in Port Manatee. 17

IV. COMMENTS ON DEIS

On Gulfstream's existing offshore system at Gulfstream's MP 392.6, approximately 26 miles off of the Florida shoreline, there is a valve site, which includes a piggable Y-type configuration that Gulfstream refers to as the East Subsea Tie-In. This existing tie-in location was designed for just the type of interconnection needed by Port Dolphin. Gulfstream believes that Port Dolphin readily can interconnect with Gulfstream at that point. 18

The DEIS dismisses out-of-hand the alternative of an off-shore interconnection with Gulfstream.[22] It does so the on grounds that an off-shore interconnection with Gulfstream does not appear to be technically feasible and because Gulfstream is currently operating at capacity. Neither of these reasons is persuasive, and the USCG must thoroughly address an off-shore interconnection alternative, and the environmental consequences that would be avoided thereby, in the FEIS. 19

[21] Port Dolphin Answer at 16.

[22] DEIS at 2-17–2-29.

12

18. Due to public comments on the Draft EIS, the Final EIS discusses an offshore interconnection with the existing Gulfstream pipeline. The description is discussed in Section 2.1.4 and impacts are discussed in Section 4.

19. Due to public comments on the Draft EIS, the Final EIS discusses an offshore interconnection with the existing Gulfstream pipeline. The description is discussed in Section 2.1.4 and impacts are discussed in Section 4.

A. The DEIS is incorrect when it concludes that Port Dolphin cannot interconnect because of pressure differentials.

The DEIS states that the operating pressure of the Gulfstream pipeline is 2,180 psig, that the maximum operating pressure for the vaporization and send out systems proposed by Port Dolphin is 1,643 psig, and that its Station 420 Gulfstream regulates its pressure down to 1,470 psig. From these assertions, the DEIS concludes that "[o]nly on shore, after this pressure drop, would it be possible for Port Dolphin to interconnect with Gulfstream."[23] 20

The facts as set forth in the DEIS are not wholly accurate. It is correct that the natural gas on Gulfstream's pipeline can be compressed at Station 410, which is located onshore near Coden, Alabama, up to Gulfstream's MAOP of 2,180 psig. However, as explained in Gulfstream's Additional Comments,[24] the pressure on the Gulfstream pipeline decreases as the gas travels from Station 410 in Alabama to Station 420 in Florida, a distance of 428 miles across the Gulf of Mexico. 21

Under typical operating conditions based on Gulfstream's existing design, the pressure at the proposed offshore interconnection point at the East Subsea Tie-In is estimated by Gulfstream to be 1,595 psig, which is below the maximum operating pressure of the proposed Port Dolphin pipeline. Gulfstream believes this will accommodate receipts from Port Dolphin without the need for additional compression. 22

Also, the DEIS states that "the maximum allowable operating pressure for the vaporization and send-out systems proposed by the Applicant is 11,328 kiloPascal (kPa) 23

[23] DEIS at 2-18.

[24] Gulfstream Additional Comments at 21.

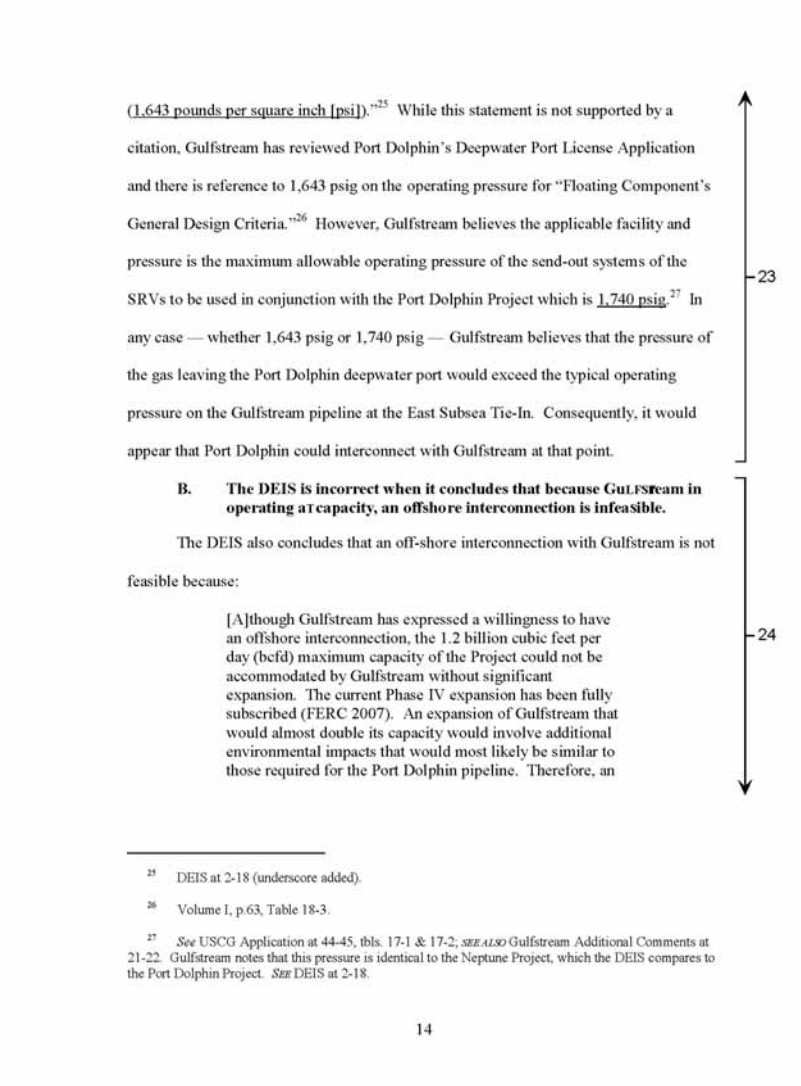
13

20. Comment noted. Due to public comments on the Draft EIS, the Final EIS discusses an offshore interconnection with the existing Gulfstream pipeline. The description is discussed in Section 2.1.4 and impacts are discussed in Section 4.

21. Comment noted.

22. Comment noted.

23. Comment noted.



(1,643 pounds per square inch [psi]).[25] While this statement is not supported by a citation, Gulfstream has reviewed Port Dolphin's Deepwater Port License Application and there is reference to 1,643 psig on the operating pressure for "Floating Component's General Design Criteria."[26] However, Gulfstream believes the applicable facility and pressure is the maximum allowable operating pressure of the send-out systems of the SRVs to be used in conjunction with the Port Dolphin Project which is 1,740 psig.[27] In any case — whether 1,643 psig or 1,740 psig — Gulfstream believes that the pressure of the gas leaving the Port Dolphin deepwater port would exceed the typical operating pressure on the Gulfstream pipeline at the East Subsea Tie-In. Consequently, it would appear that Port Dolphin could interconnect with Gulfstream at that point.

B. The DEIS is incorrect when it concludes that because GULFSTREAM in operating AT capacity, an offshore interconnection is infeasible.

The DEIS also concludes that an off-shore interconnection with Gulfstream is not feasible because:

> [A]though Gulfstream has expressed a willingness to have an offshore interconnection, the 1.2 billion cubic feet per day (bcfd) maximum capacity of the Project could not be accommodated by Gulfstream without significant expansion. The current Phase IV expansion has been fully subscribed (FERC 2007). An expansion of Gulfstream that would almost double its capacity would involve additional environmental impacts that would most likely be similar to those required for the Port Dolphin pipeline. Therefore, an

[25] DEIS at 2-18 (underscore added).

[26] Volume I, p.63, Table 18-3.

[27] *See* USCG Application at 44-45, tbls. 17-1 & 17-2; *SEE ALSO* Gulfstream Additional Comments at 21-22. Gulfstream notes that this pressure is identical to the Neptune Project, which the DEIS compares to the Port Dolphin Project. *SEE* DEIS at 2-18.

14

24. Comment noted. Proposed engineering plans for the project submitted to the Maritime Administration and USCG are not meant to serve as the final designs for the project. Final designs are forth coming and will depend in part on the environmental constraints provided by the Final EIS and ROD. In addition to the USCG, the Federal agencies (i.e., FERC and PHSMA) that review the construction and operational safety of the project will review the project plans submitted on the Federal Docket as part of their review of final construction plans. The Applicant would be required to build the project in a way that upholds industry safety standards.

alternative that interconnects offshore is not technically feasible and will not be evaluated in detail.[28]

There are several assumptions in this statement that need to be addressed. First, based on the project description as set forth in Port Dolphin's application, at least 70% of the gas deliveries by Port Dolphin are to go into Gulfstream's pipeline and therefore serve Gulfstream's customers. Consequently, Port Dolphin must have taken into account the need for those shippers to have transportation capacity on Gulfstream. 24

Second, each of those shippers already holds a certain amount of capacity on the entire Gulfstream system. That also will not change or increase as a result of an interconnection with Port Dolphin onshore. So it should not matter if the new receipt point is onshore or offshore. To the extent a shipper decides to purchase its gas from Port Dolphin, as opposed to some other seller at or upstream of Station 410, the gas that Port Dolphin sells to such a shipper will simply displace gas coming from Alabama. New interconnections among pipelines are routine, and such interconnections are not thwarted because a connecting pipeline is operating at capacity. The new supply source simply increases the availability and diversity of gas supplies that markets like Florida desire. 25

C. The FEIS must thoroughly review an offshore interconnection with Gulfstream as the environmentally superior alternative to Port Dolphin's proposed interconnection.

As demonstrated above, an offshore interconnection with Gulfstream is feasible. The negative environmental effects that would be avoided with an offshore interconnection are very likely significant. For example, under this alternative proposal, the amount of new subsea pipeline would be significantly reduced. Under the current proposal, Port Dolphin will require approximately 50 miles of subsea pipeline to reach 26

[28] DEIS at 2-19.

15

25. Comment noted.

26. Due to public comments on the Draft EIS, the Final EIS discusses an offshore interconnection with the existing Gulfstream pipeline. The description is discussed in Section 2.1.4 and impacts are discussed in Section 4.

the Florida shoreline. In addition, Port Dolphin will require approximately 3.93 miles of pipe landward of the mean high water mark and a regulator or regulators to regulate Port Dolphin's gas pressure down to 1480 psig for an interconnection with Gulfstream and 1250 psig for Peoples/TECO.[29] Under Gulfstream's alternative, and based on a description of the proposed deepwater port as being 28 miles offshore of Tampa Bay, Florida, Gulfstream roughly estimates that Port Dolphin would need only approximately 15 miles of subsea pipeline and no onshore pipeline and regulators. Therefore, under the requirements of the National Environmental Policy Act, an offshore interconnection with Gulfstream must be thoroughly reviewed as an alternative in the FEIS. *See, e.g.*, *City and State of N.Y. v. DOT*, 715 F.2d 732, 740-43 (2d Cir. 1983), *cert. denied*, 465 U.S. 1055 (1984). Gulfstream stands ready to assist the USCG and MARAD in this regard. 26

V. CONCLUSION

Regardless of the technical ability of Port Dolphin to interconnect with Gulfstream at the East Subsea Tie-In, the safety concerns raised by Gulfstream are of paramount importance. Gulfstream is an existing, operating natural gas pipeline system, while Port Dolphin is a greenfield project. Therefore, it is appropriate to require Port Dolphin to substantively address and meet Gulfstream's safety concerns. Port Dolphin can do this by changing the design of the vessels associated with the project to connect at the East Subsea Tie-In or by connecting to Gulfstream at a point resulting in the least amount of risk to Gulfstream's system.

As stated by Gulfstream before, the fact that the offshore portion of the overall Port Dolphin project is not subject to the Commission's NGA jurisdiction does not mean,

[29] Amended Resource Report 1 at 1-16.

16

and should not be interpreted to mean, that the Commission's analysis of Port Dolphin's onshore pipeline facilities may not consider the alternative of the East Subsea Tie-In as described above. On the contrary, the Commission's responsibilities under the National Environmental Policy Act (NEPA) require that it consider all reasonable alternatives that would mitigate (in this case eliminate) adverse environmental and safety issues.[30] Similarly, MARAD/USCG also must consider the East Subsea Tie-In as part of its own analysis of the Port Dolphin project flowing from the Deepwater Port Act jurisdiction and the similar NEPA demands on MARAD/USCG.

[30] *See, e.g., Florida Gas Transmission Co.*, 100 FERC ¶ 61,282, at P 20 (recognizing that NEPA requires the FERC "to analyze the environmental consequences of alternatives that are feasible, practical, and effective." (*CITING ALL INDIAN PUEBLO COUNCIL V. UNITED STATES*, 975 F.2d 1437, 1444 (10th Cir. 1992)).

17

For the foregoing reasons, and the reasons set forth in Gulfstream's previous comments, the Commission should deny Port Dolphin's request for certificate authorization. If the Commission approves Port Dolphin's application, the Commission should require Port Dolphin to interconnect with Gulfstream offshore, or, in the alternative, at the alternate onshore locations described herein.

Respectfully submitted,

/s/ Brian D. O'Neill

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Tampa, FL 33607
(813) 282-6605

Counsel to Gulfstream Natural Gas System, L.L.C.

Dated: June 2, 2008

18

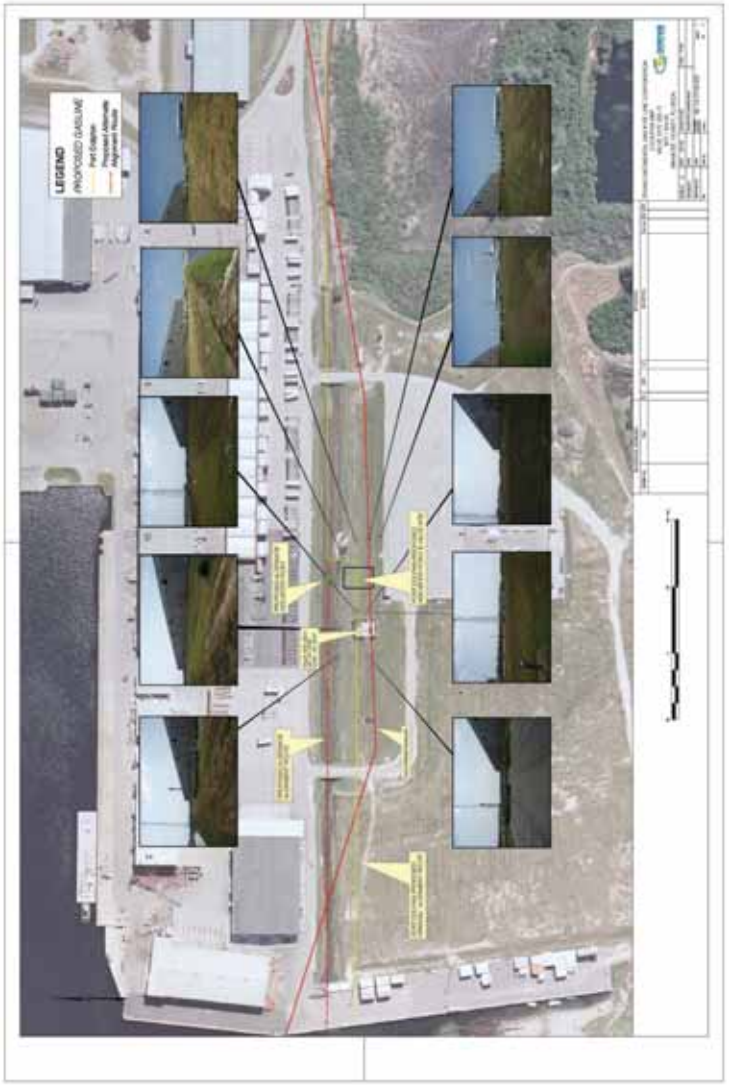
CERTIFICATE OF SERVICE

I hereby certify that, I have this day caus ed to be served by First Class Mail or electronic mail the foregoing documents upon the parties to the official service list compiled by the Secretary for this proceeding.

Dated at Washington, DC this 2nd day of June 2008.

Claire M. Brennan
Claire M. Brennan
Paralegal Manager
Dewey & LeBoeuf LLP
1101 New York Avenue, N.W., Suite 1100
Washington, D.C. 20005
202-986-8000

Attachment 1















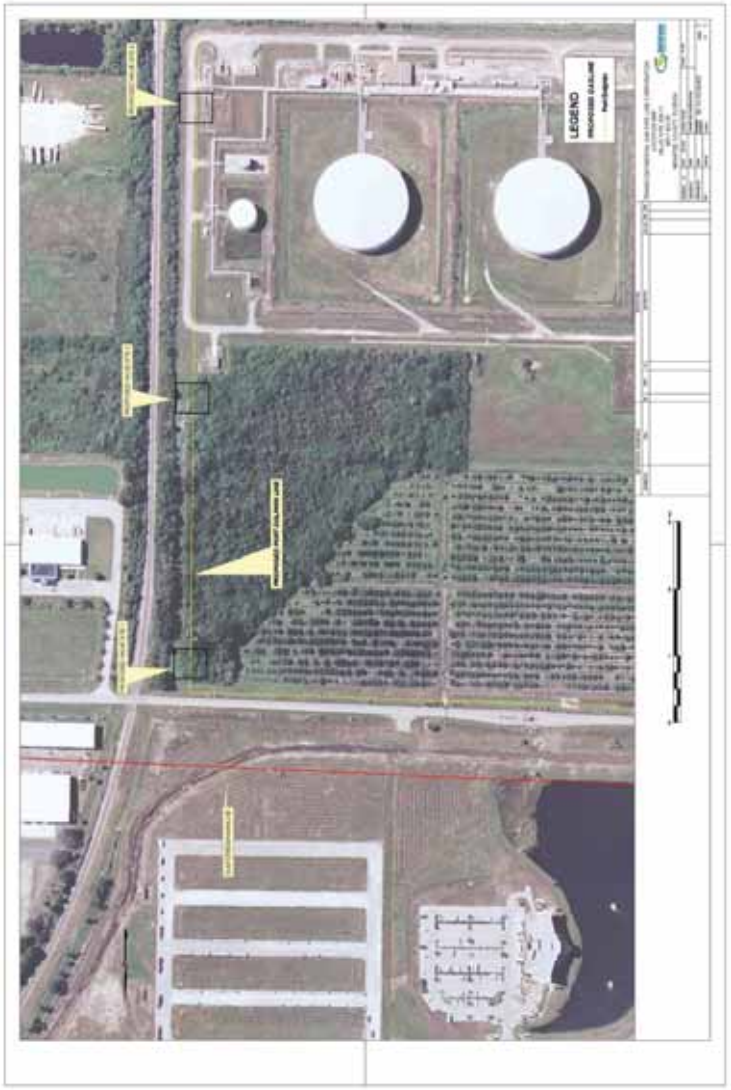


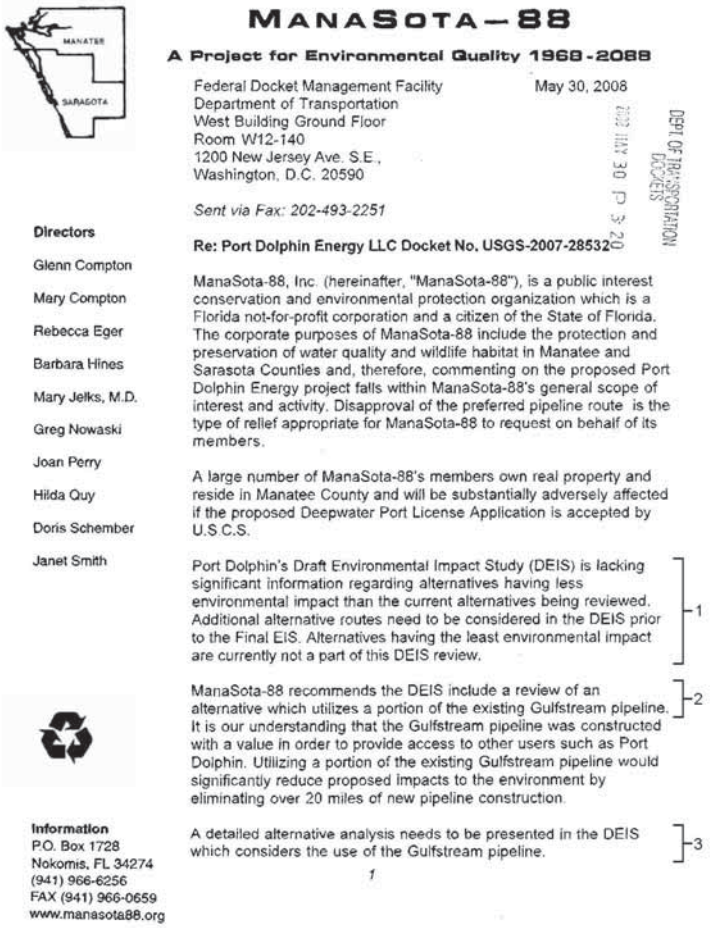






Attachment 2





MANASOTA–88

A Project for Environmental Quality 1968-2088

Federal Docket Management Facility
Department of Transportation
West Building Ground Floor
Room W12-140
1200 New Jersey Ave. S.E.,
Washington, D.C. 20590

May 30, 2008

2008 MAY 30 P 3:20
DEPT OF TRANSPORTATION DOCKETS

Sent via Fax: 202-493-2251

Re: Port Dolphin Energy LLC Docket No. USGS-2007-28532

ManaSota-88, Inc. (hereinafter, "ManaSota-88"), is a public interest conservation and environmental protection organization which is a Florida not-for-profit corporation and a citizen of the State of Florida. The corporate purposes of ManaSota-88 include the protection and preservation of water quality and wildlife habitat in Manatee and Sarasota Counties and, therefore, commenting on the proposed Port Dolphin Energy project falls within ManaSota-88's general scope of interest and activity. Disapproval of the preferred pipeline route is the type of relief appropriate for ManaSota-88 to request on behalf of its members.

A large number of ManaSota-88's members own real property and reside in Manatee County and will be substantially adversely affected if the proposed Deepwater Port License Application is accepted by U.S.C.S.

Port Dolphin's Draft Environmental Impact Study (DEIS) is lacking significant information regarding alternatives having less environmental impact than the current alternatives being reviewed. Additional alternative routes need to be considered in the DEIS prior to the Final EIS. Alternatives having the least environmental impact are currently not a part of this DEIS review. -1

ManaSota-88 recommends the DEIS include a review of an alternative which utilizes a portion of the existing Gulfstream pipeline. It is our understanding that the Gulfstream pipeline was constructed with a value in order to provide access to other users such as Port Dolphin. Utilizing a portion of the existing Gulfstream pipeline would significantly reduce proposed impacts to the environment by eliminating over 20 miles of new pipeline construction. -2

A detailed alternative analysis needs to be presented in the DEIS which considers the use of the Gulfstream pipeline. -3

1

Directors
Glenn Compton
Mary Compton
Rebecca Eger
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Mary Jelks, M.D.
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1. The EIS has been expanded to discuss three Port site alternatives and three pipeline route alternatives. Alternatives were also considered for regasification technology and propulsion types. See Section 2.1 for discussions.

2. This alternative is included in the Final EIS. Please refer to Section 2.1.4.

3. This alternative is included in the Final EIS. Please refer to Section 2.1.4.

As proposed, the preferred route will likely reduce or eliminate shore-protection programs, this could result in an increase in the erosion of Anna Maria Island's coast. The entire length of Anna Maria Island is considered to be "Critically Eroded" by the Florida Department of Environmental Protection (FDEP). 4

Increased beach erosion will result in an increased risk from significant storm events and an increase in coastal flooding. Hurricane and emergency evacuation routes for both Anna Maria Island and Longboat Key will be affected by increased erosion of the coastline. 5

The loss of the beach habitat will result in loss of critical habitat needed for sea turtle nesting. Five sea turtle species have been known to nest on Florida beaches, including the threatened loggerhead sea turtle (Caretta caretta), endangered green sea turtle (Chelonia mydas), endangered leatherback sea turtle (Dermochelys coriacea), endangered hawksbill sea turtle (Eretmochelys imbricata), and endangered Kemp's ridley sea turtle (Lepidochelys kempii). 6

Unless additional alternatives are considered, ManaSota-88 recommends a "No Build Alternative" for Port Dolphin's proposed pipeline.

Additional comments on the DEIS will be made at a future date.

Sincerely,



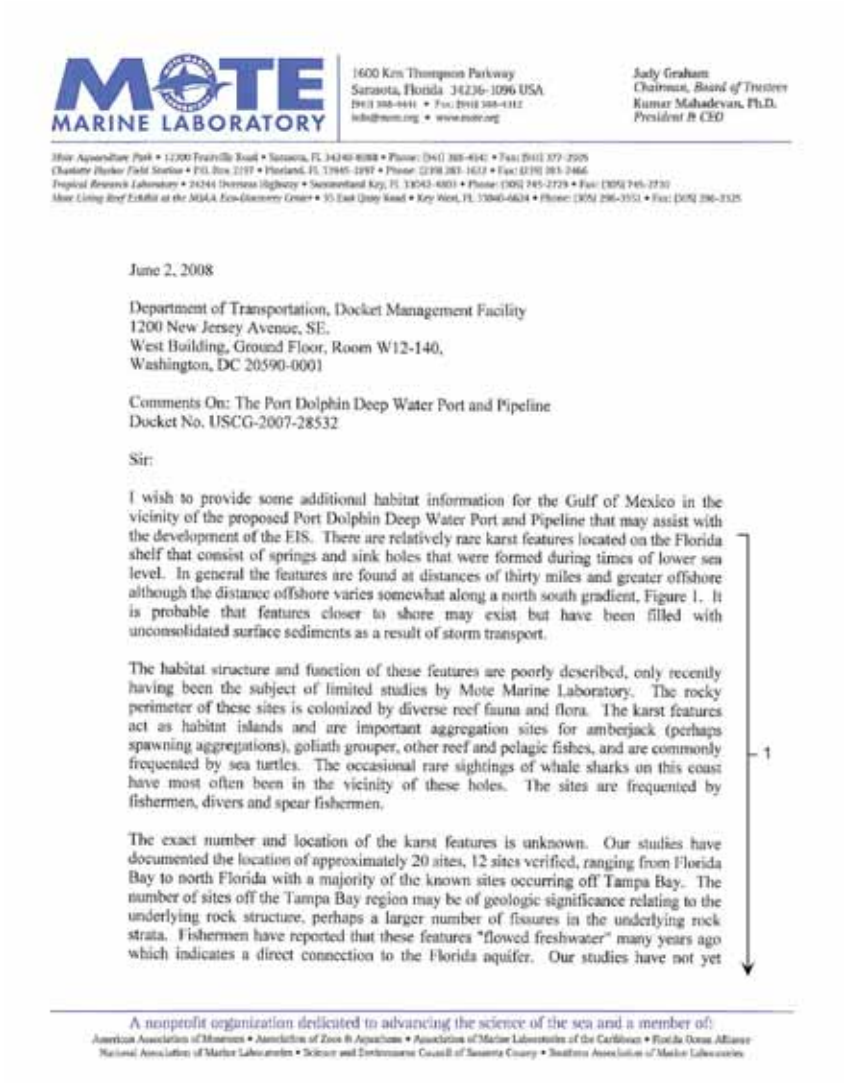
Chairman, ManaSota-88

2

4. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.

5. The Proposed Action is not anticipated to cause erosion of the coastline, or increase the risk of natural disasters.

6. Please see Section 4.2.1.3 of the Final EIS for potential impacts to sea turtles.



MOTE MARINE LABORATORY

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Mote Living Reef Exhibit at the NOAA Eco-Discovery Center • 35 East Quay Road • Key West, FL 33040-6624 • Phone: (305) 296-3551 • Fax: (305) 296-3325

June 2, 2008

Department of Transportation, Docket Management Facility
1200 New Jersey Avenue, SE.
West Building, Ground Floor, Room W12-140,
Washington, DC 20590-0001

Comments On: The Port Dolphin Deep Water Port and Pipeline
Docket No. USCG-2007-28532

Sir:

I wish to provide some additional habitat information for the Gulf of Mexico in the vicinity of the proposed Port Dolphin Deep Water Port and Pipeline that may assist with the development of the EIS. There are relatively rare karst features located on the Florida shelf that consist of springs and sink holes that were formed during times of lower sea level. In general the features are found at distances of thirty miles and greater offshore although the distance offshore varies somewhat along a north south gradient, Figure 1. It is probable that features closer to shore may exist but have been filled with unconsolidated surface sediments as a result of storm transport.

The habitat structure and function of these features are poorly described, only recently having been the subject of limited studies by Mote Marine Laboratory. The rocky perimeter of these sites is colonized by diverse reef fauna and flora. The karst features act as habitat islands and are important aggregation sites for amberjack (perhaps spawning aggregations), goliath grouper, other reef and pelagic fishes, and are commonly frequented by sea turtles. The occasional rare sightings of whale sharks on this coast have most often been in the vicinity of these holes. The sites are frequented by fishermen, divers and spear fishermen. 1

The exact number and location of the karst features is unknown. Our studies have documented the location of approximately 20 sites, 12 sites verified, ranging from Florida Bay to north Florida with a majority of the known sites occurring off Tampa Bay. The number of sites off the Tampa Bay region may be of geologic significance relating to the underlying rock structure, perhaps a larger number of fissures in the underlying rock strata. Fishermen have reported that these features "flowed freshwater" many years ago which indicates a direct connection to the Florida aquifer. Our studies have not yet

1. A discussion of karst features is discussed in Section 3.4 and 4.4.

verified definitive freshwater flows. However, we have documented that a number of the sites exhibit tidal pumping of water in and out of the hole, which verifies water flow into and out of the underlying rock strata. A site off the mouth of Tampa Bay contains a verified saltwater spring.

These features are also of significant archaeological interest. Former sea level stands left these areas exposed 8,000 - 12,000 years before present, representing the period of colonization of the Florida peninsula by man. Human skeletons and artifacts have been recovered from two sink hole archaeological sites in Sarasota County that have been dated to 10,000 YBP. Sources of freshwater were important aggregation sites for humans and the offshore sites may contain similar human artifacts from that time period. 1

The primary proposed offshore terminal site lies closest to several of the known karst features, approximately 8 miles from the AJ hole and MD, Figure 2. While this is not particularly close it should be noted that based on the distribution of known features, all three sites lie within a zone that could possibly have unreported or unknown underlying karst features. The proposed south alternative lies approximately 11 miles from the closest known karst feature and the north alternative is 13 miles from the closest known karst feature. Most of these features have a relatively small surface expression, less than 70 ft in diameter, although they open into much larger caverns or caves. Because of this the features can be difficult to locate by coarse bottom surveys which may simply show a fish aggregation. I would suggest that each of the proposed sites be examined with high resolution side scan sonar coupled with sub-bottom profiling and diver verification of suspect depressions or areas of fish aggregations. 2

I hope this information is useful. If you need additional information I can be reached at the above listed address and phone numbers.

Sincerely,

James K. Culter
Senior Scientist
Benthic Ecology Program

2. Comment noted. Site specific hazard surveys would be conducted prior to construction.

3.

Figure 1. Location of karst features on the Florida continental shelf.

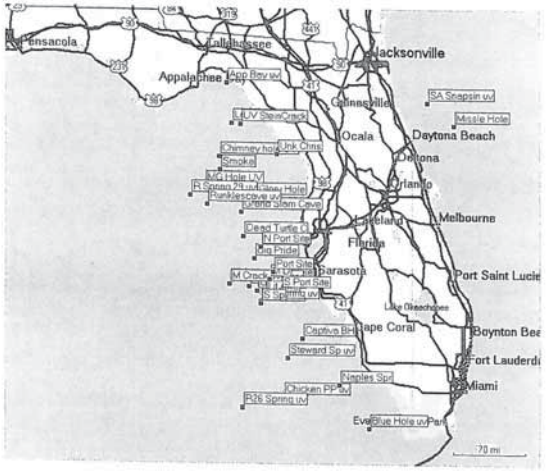
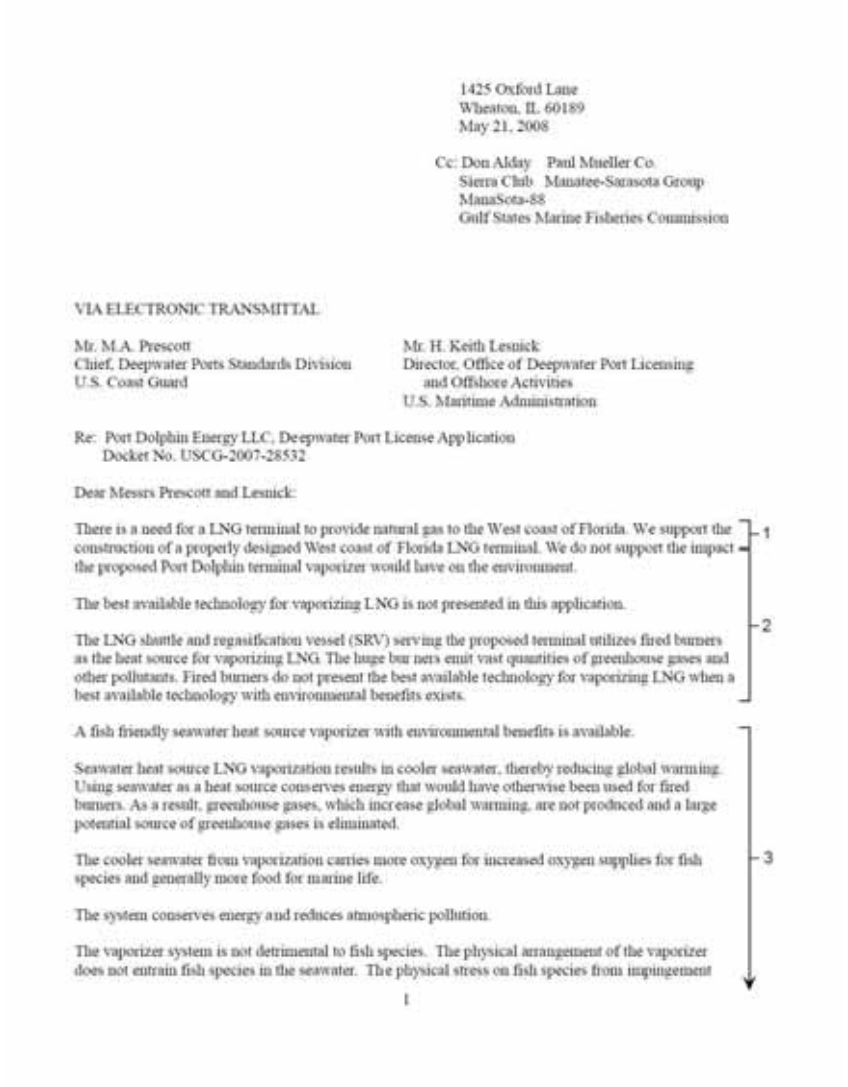


Figure 2. Location of karst features in the region of the proposed LNG terminal. Proposed port locations labeled, Port Site, N Port site, S Port Site.





1425 Oxford Lane
Wheaton, IL 60189
May 21, 2008

Cc: Don Alday Paul Mueller Co.
Sierra Club Manatee-Sarasota Group
ManaSota-88
Gulf States Marine Fisheries Commission

VIA ELECTRONIC TRANSMITTAL

Mr. M.A. Prescott
Chief, Deepwater Ports Standards Division
U.S. Coast Guard

Mr. H. Keith Lesnick
Director, Office of Deepwater Port Licensing
and Offshore Activities
U.S. Maritime Administration

Re: Port Dolphin Energy LLC, Deepwater Port License Application
Docket No. USCG-2007-28532

Dear Messrs Prescott and Lesnick:

There is a need for a LNG terminal to provide natural gas to the West coast of Florida. We support the construction of a properly designed West coast of Florida LNG terminal. We do not support the impact the proposed Port Dolphin terminal vaporizer would have on the environment. 1

The best available technology for vaporizing LNG is not presented in this application.

The LNG shuttle and regasification vessel (SRV) serving the proposed terminal utilizes fired burners as the heat source for vaporizing LNG. The huge burners emit vast quantities of greenhouse gases and other pollutants. Fired burners do not present the best available technology for vaporizing LNG when a best available technology with environmental benefits exists. 2

A fish friendly seawater heat source vaporizer with environmental benefits is available.

Seawater heat source LNG vaporization results in cooler seawater, thereby reducing global warming. Using seawater as a heat source conserves energy that would have otherwise been used for fired burners. As a result, greenhouse gases, which increase global warming, are not produced and a large potential source of greenhouse gases is eliminated.

The cooler seawater from vaporization carries more oxygen for increased oxygen supplies for fish species and generally more food for marine life. 3

The system conserves energy and reduces atmospheric pollution.

The vaporizer system is not detrimental to fish species. The physical arrangement of the vaporizer does not entrain fish species in the seawater. The physical stress on fish species from impingement

1

1. Comment noted.

2. Based on information provided by the commenter and on publicly available documents describing the system, it was determined that there has been no commercial application or demonstration project for the technology. Since the heat exchanger proposed must be exposed to ocean currents, it would not appear to be feasible for a shipboard system for inclusion in the shuttle and regassification vessel design proposed for the project. Therefore, the proposed alternative was not included in the evaluation.

3. The system proposed by Wheaton Process Systems is discussed in in Section 2.1.7.

and impact is in effect absent with the fish friendly vaporizer. The thermal effect on fish species is essentially nonexistent. The system is designed to eliminate toxic chemical use. Fish species have no chemical stress.

The fish friendly seawater heat source vaporizer technology is the most environmentally responsive LNG vaporizer presently available. We would be pleased to provide information on this new fish friendly and environmentally beneficial vaporizer. 3

Best regards,

Gerald Engdahl

Gerald Engdahl
Wheaton Process Systems
gerrywps@att.net

2

DEPT. OF TRANSPORTATION
DOCKETS

2008 JUN -2 A 9:00

COMMENTS CONCERNING THE DRAFT ENVIRONMENTAL IMPACT STATEMENT ON THE PORT DOLPHIN LLC DEEPWATER PORT LICENSE APPLICATION Dated April 2008

by
Steve LeGore, Ph.D.
A Resident of Anna Maria Island, Florida
President of
LeGore Environmental Associates, Inc.
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slegore@mindspring.com

Submitted to:
Federal Docket Management Facility
Department of Transportation
West Building Ground Floor
Room W12-140
1200 New Jersey Avenue, S.E.
Washington, DC 20590

Reference:
Docket Number: USCG-2007-28532

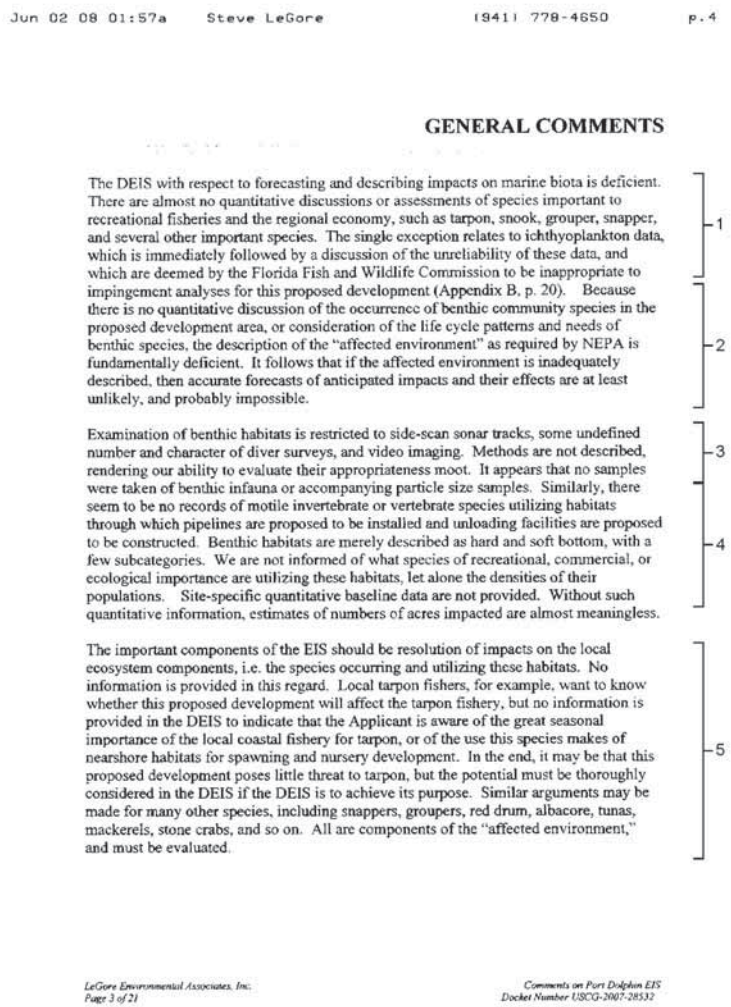
Submitted by Fax to
(202) 493-2251
on
June 1, 2007

INTRODUCTION

The comments expressed here reflect the views of a single, but informed resident of Anna Maria Island, Florida. Dr. LeGore is a consulting marine scientist with >30 years extensive project experience, much of it related both to EIS development and EIS review. His professional credentials are provided as the final component of this submission.

Dr. LeGore regrets that due to project travel he was unaware of this DEIS until May 27, 2008, and was unable to obtain a copy until the evening of May 28. This review is therefore hurried due to the comment deadline of June 2, and would have benefited significantly from an extension of the comment and review period.

It is also important to note that the function of an EIS is not to value impacts, but to describe them in sufficient detail that socio-economic judgments may be made by resource managers, the interested public, and the elected representatives of regional stakeholders. The authors of an EIS are not called upon to render judgments of impacts as "minor" or "insignificant." Anticipated impacts must be clearly described and quantified to enable stakeholder judgment of whether impacts are minor or important, insignificant or significant. Local values apply to such judgments, and they must not be usurped by inappropriate representations in an EIS.



Jun 02 08 01:57a Steve LeGore (941) 778-4650 p.4

GENERAL COMMENTS

The DEIS with respect to forecasting and describing impacts on marine biota is deficient. There are almost no quantitative discussions or assessments of species important to recreational fisheries and the regional economy, such as tarpon, snook, grouper, snapper, and several other important species. The single exception relates to ichthyoplankton data, which is immediately followed by a discussion of the unreliability of these data, and which are deemed by the Florida Fish and Wildlife Commission to be inappropriate to impingement analyses for this proposed development (Appendix B, p. 20). Because there is no quantitative discussion of the occurrence of benthic community species in the proposed development area, or consideration of the life cycle patterns and needs of benthic species, the description of the "affected environment" as required by NEPA is fundamentally deficient. It follows that if the affected environment is inadequately described, then accurate forecasts of anticipated impacts and their effects are at least unlikely, and probably impossible. 1 2

Examination of benthic habitats is restricted to side-scan sonar tracks, some undefined number and character of diver surveys, and video imaging. Methods are not described, rendering our ability to evaluate their appropriateness moot. It appears that no samples were taken of benthic infauna or accompanying particle size samples. Similarly, there seem to be no records of motile invertebrate or vertebrate species utilizing habitats through which pipelines are proposed to be installed and unloading facilities are proposed to be constructed. Benthic habitats are merely described as hard and soft bottom, with a few subcategories. We are not informed of what species of recreational, commercial, or ecological importance are utilizing these habitats, let alone the densities of their populations. Site-specific quantitative baseline data are not provided. Without such quantitative information, estimates of numbers of acres impacted are almost meaningless. 3 4

The important components of the EIS should be resolution of impacts on the local ecosystem components, i.e. the species occurring and utilizing these habitats. No information is provided in this regard. Local tarpon fishers, for example, want to know whether this proposed development will affect the tarpon fishery, but no information is provided in the DEIS to indicate that the Applicant is aware of the great seasonal importance of the local coastal fishery for tarpon, or of the use this species makes of nearshore habitats for spawning and nursery development. In the end, it may be that this proposed development poses little threat to tarpon, but the potential must be thoroughly considered in the DEIS if the DEIS is to achieve its purpose. Similar arguments may be made for many other species, including snappers, groupers, red drum, albacore, tunas, mackerels, stone crabs, and so on. All are components of the "affected environment," and must be evaluated. 5

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1. Comment noted. Detailed benthic surveys were conducted as part of the Deepwater Port Application. These studies were incorporated into the Draft EIS analysis in appropriate detail for a Draft EIS. Additional studies have been conducted and additional detail has been added to the Final EIS, as appropriate. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements would be developed after a license is issued. All available data would be used to specify mitigation type, extent, duration, and schedule.

2. Comment noted. Detailed benthic surveys were conducted as part of the Deepwater Port Application. These studies were incorporated into the Draft EIS analysis in appropriate detail for a Draft EIS. Additional studies have been conducted and additional detail has been added to the Final EIS, as appropriate. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements would be developed after a license is issued. All available data would be used to specify mitigation type, extent, duration, and schedule.

3. Comment noted. Detailed benthic surveys were conducted as part of the Deepwater Port Application. These studies were incorporated into the Draft EIS analysis in appropriate detail for a Draft EIS. Additional studies have been conducted and additional detail has been added to the Final EIS, as appropriate. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements would be developed after a license is issued. All available data would be used to specify mitigation type, extent, duration, and schedule.

4. This discussion has been expanded. Please see Section 3.2.8 of the EIS.

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SPECIFIC COMMENTS

Executive Summary

Page ES-7, lines 6-7: "Minor to moderate short-term adverse impacts and minor long-term adverse impacts on biological resources could occur as a result of the Project."

(a) Change "could occur" to "will occur." (b) The terms "minor" and "moderate" are subject to debate as quantitative data are not made available to scale these impacts. 6

Page ES-7, line 17: "Minor to moderate . . . impacts . . ."

Same comment as above 7

Page ES-7, line 17: ". . . impacts on benthic communities . . ."

Impacts on benthic communities are left unclear by this document, because no quantitative baseline survey was conducted to estimate populations of benthic community components. It is therefore not possible to scale the extent of impacts or their secondary effects on species living in or dependent upon the benthic community. 8

Page ES-7, lines 20-22: "The area off Tampa Bay is highly dynamic with constantly shifting sediments. Benthic communities would be expected to recover quickly by recolonization from surrounding communities of similar organisms."

No citations are provided to support these contentions. In cases of lost hard bottom habitat, it is not at all clear that recovery would occur quickly, or that all species would quickly recover in soft sedimentary habitats. 9

Page ES-7, lines 36-44: ". . . two additional species were identified for analysis . . . gag grouper . . . [and] sheepshead . . . It is assumed that impacts on other species in the Project area would be similar to impacts on these representative species."

Unfortunately, these analyses extended only to the ichthyoplanktonic life stages of these species, and not to other stages involving use of nursery and benthic habitat. 10

5. Commercial and recreational fishing are described in Section 3.9 and 4.9.

6. Comment noted.

7. Comment noted.

8. Comment noted. Detailed benthic surveys were conducted as part of the Deepwater Port Application. These studies were incorporated into the Draft EIS analysis in appropriate detail for a Draft EIS. Additional studies have been conducted and additional detail has been added to the Final EIS, as appropriate. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements would be developed after a license is issued. All available data would be used to specify mitigation type, extent, duration, and schedule.

9. Text in the Final EIS has been revised to add quantitative measurements when information is available. Otherwise, a qualitative assessment has been given. The Applicant is in consultation with USCG and the Maritime Administration to develop appropriate mitigation plans. Additionally, video mapping results from the Gulfstream Pipeline Project EIS (2001) are being compiled to augment the predicted benthic impacts, as appropriate. All available data will be used to specify mitigation type, extent, duration and schedule.

10. Comment noted.

Chapter 2: Detailed Description of the Project and Alternatives

Page 2-15, lines 4-5: "[A good development program] avoids dredging in areas where sediments contain high levels of heavy metals, biocides, oil, or other pollutants or hazardous materials . . ."

Were any samples collected in the proposed development areas to verify absence of such materials? 11

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*Page 2-17, lines 9-10: "**Criterion 3, Avoidance of Mapped Sand Resources**. Siting a project in an identified sand resource would be difficult, and likely would not be approved by Minerals Management Service."*

See comments from Longboat Key, Manatee County, and others concerning sand resources through which the pipeline is proposed to be placed. 12

Pages 2-23 to 2-25, Discussion on Vaporization Alternatives.

This discussion is somewhat difficult to follow and would benefit greatly by the addition of schematic representations of the several alternatives, as well as of the alternative actually proposed by the Applicant. 13

Page 2-25, lines 28-30: "The proposed design provides for a through slot intake of 0.25 inches with a velocity of less than the USEPA-recommended velocity of 0.15 meters per second (m/s) . . . It provides for exclusion of most juvenile fish."

Please provide the citation to these USEPA recommendations. 14

Page 2-26, lines 18-19: "Plowing involves laying the pipeline on the bottom and then dragging a plow along the sea bottom using the pipeline to guide the plow."

Does plowing as proposed by the Applicant involve the use of anchors? If so, what kind, how large, how many, and how often will they be deployed to the bottom. How large and how deep will the resulting holes be, and what will be the resulting impacts? 15

Page 2-39, line 39: ". . . the maximum flow rate of 1,520 m^3 per hour (6,692 gallons per minute . . ."

For reference, this = 112 gallons per second 16

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11. Available data and samples collected by the Applicant are described in Section 4.1 of the EIS.

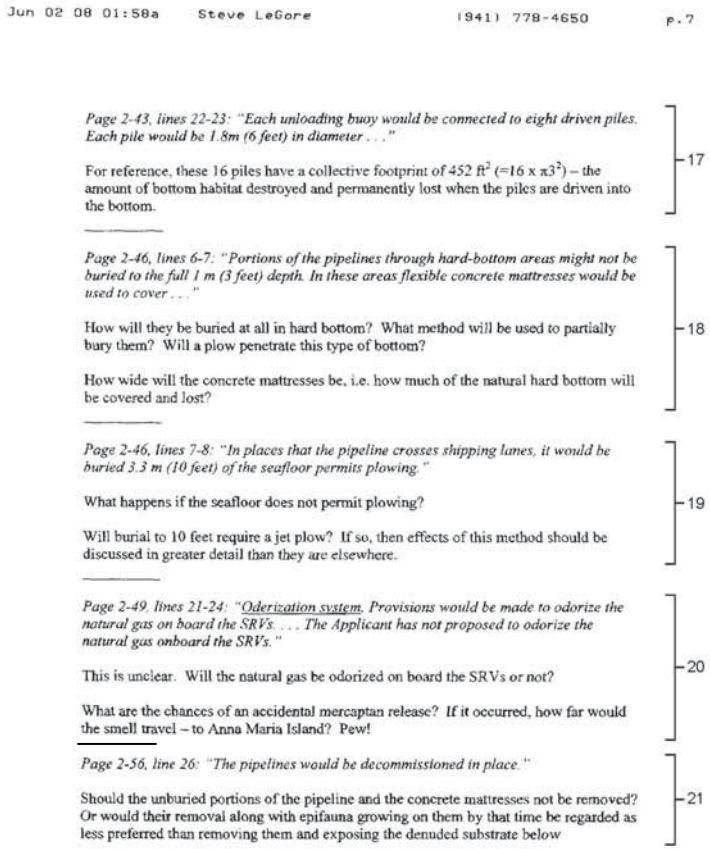
12. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.

13. Schematic representations have been added.

14. Citation added.

15. An anchoring plan has been submitted by the Applicant and impacts from those activities on benthic habitats are discussed in Section 4.2.1.6.

16. Comment noted.



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Page 2-43, lines 22-23: "Each unloading buoy would be connected to eight driven piles. Each pile would be 1.8m (6 feet) in diameter . . ."

For reference, these 16 piles have a collective footprint of 452 ft^2 ($\approx 16 \times \pi 3^2$) – the amount of bottom habitat destroyed and permanently lost when the piles are driven into the bottom. 17

Page 2-46, lines 6-7: "Portions of the pipelines through hard-bottom areas might not be buried to the full 1 m (3 feet) depth. In these areas flexible concrete mattresses would be used to cover . . ."

How will they be buried at all in hard bottom? What method will be used to partially bury them? Will a plow penetrate this type of bottom?

How wide will the concrete mattresses be, i.e. how much of the natural hard bottom will be covered and lost? 18

Page 2-46, lines 7-8: "In places that the pipeline crosses shipping lanes, it would be buried 3.3 m (10 feet) of the seafloor permits plowing."

What happens if the seafloor does not permit plowing?

Will burial to 10 feet require a jet plow? If so, then effects of this method should be discussed in greater detail than they are elsewhere. 19

Page 2-49, lines 21-24: "Oderization system. Provisions would be made to odorize the natural gas on board the SRVs. . . . The Applicant has not proposed to odorize the natural gas onboard the SRVs."

This is unclear. Will the natural gas be odorized on board the SRVs or not?

What are the chances of an accidental mercaptan release? If it occurred, how far would the smell travel – to Anna Maria Island? Pew! 20

Page 2-56, line 26: "The pipelines would be decommissioned in place."

Should the unburied portions of the pipeline and the concrete mattresses not be removed? Or would their removal along with epifauna growing on them by that time be regarded as less preferred than removing them and exposing the denuded substrate below 21

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17. Comment noted.

18. In some areas along the pipeline route, there is a sandy cover over shallow hardbottom areas. Therefore part of the pipeline may be buried in that shallow sandy cover. Mattresses would cover the rest of the pipeline over the hard bottom areas (see Sections 2.3.8 4.2.1.3.1, 4.2.1.5, 4.2.1.6, 4.4, and 4.5).

19. Shipping lanes are continually dredged to stay deep enough for the large vessels so plowing in this area is not expected to be cause a major impact. The bounding case of impacts is discussed in the EIS, and other impacts would be expected to be lower in magnitude (see Sections 2.1.10 and 2.3.8).

20. As proposed by the Applicant, natural gas will not be odorized on board the SRVs.

21. Text has been added to clarify that decommissioning would be governed by the the appropriate Federal agencies' requirements at the time and the Operator would be required to submit a decommissioning plan to the Secretary for approval. The general decommissioning process is outlined in 2.3.12 of the EIS.

Chapter 3: Affected Environment

Page 3-6, lines 22-23: "No turbidity or TSS data specific to the Gulf portion of the Project Site are available."

Why not? Did the Applicant not collect any data? — 22

Page 3-6, lines 27-29: "Sediments within both the continental shelf and Tampa Bay portions of the project area consist of a mixture of quartz sands eroded from older deposits and biogenic carbonates. The mean grain size of the sediment ranges from 0.18 to 0.5 mm, and is classified as fine- to medium-grained sand."

What is the source of these statements? The ASA citation provided is a modeling study. How much of the primary data, if any were collected to verify literature-based data?

Did the Applicant collect any sediment samples for particle size analysis to correlate with benthic habitat discussions? This reviewer was unable to find any. — 23

Page 3-26, lines 35-36; "Benthic habitats are characterized by physical and structural features, such as topography, substrate type, sediment grain size, and water depth, and by . . .

How many grain-size distribution samples were collected? Where were they collected and how were they analyzed. This reviewer was unable to find such data in the DEIS. — 24

Page 3-27, lines 8-9 ff: "The Inner and Middle Shelf Live Bottom Assemblage II consists of algae, sea squirts, bryozoans, hard corals, small sea fans, hydrozoans and several sponges."

Note that this assemblage description includes only sessile organisms, which are appropriately used to characterize this kind of live bottom. However, as noted on the previous page (3-26, lines 34-35) benthic *communities* consist of both substrate (habitat) and organisms that occupy that substrate. The named sessile organisms in effect define the substrate of this assemblage. Unfortunately, this description does not include mention of any motile species (fish, invertebrates) or benthic infauna (animals living in the sediment) living in or using this hard bottom assemblage. Thus, this is not a description of a benthic *community* despite inferences to the contrary throughout this DEIS. This reviewer was unable to find any information in this document providing quantitative estimates of benthic infauna populations or motile species associated with these assemblages. This is a basis for difficulty in scaling environmental impacts of this proposed development. — 25

22. Turbidity data is now available and is included in Section 3.1.3.4 of the Final EIS.

23. References have been added to the discussion.

24. Geophysical and geotechnical surveys have been conducted by the Applicant. The reports from these surveys are available electronically via the Federal Docket Management System (*www.regulations.gov*), Docket No. USCG-2007-28532.. The surveys have not been included in already lengthy EIS due to size.

25. Comment noted.

Page 3-27, lines 16-17: "Rocky bottom is colonized by sponges, soft corals, true corals, and anemones. These provide commercially important fish and shellfish habitat."

True, but which fish and shellfish species utilize these habitats in the proposed project area? How many (density) occur in the affected environment, and where are they? Without these data, how is it possible to anticipate environmental impacts of the project? 26

Such generalities occur throughout this chapter, but quantitative data are not provided. It appears that the Applicant conducted no benthos baseline survey beyond the side-scan sonar, diver and photographic surveys that seem to have been conducted more for construction and design purposes than for analysis of benthic communities.

Page 3-27, lines 22-34: Paragraph discussing hard-bottom habitats in Tampa Bay. 27

This is all very general information, and its relevance to the proposed project is unclear.

Page 3-27, lines 37-38: "Five species of seagrass are common to the GOM."

This is merely another example of a generality without project-site specificity. GOM = the entire Gulf of Mexico. The statement above is fair enough if it serves as an introduction to site-specific information, but this appears to not be the case. 28

Page 3-28, lines 1-11: "The Applicant performed a benthic survey . . . Side-scan sonar, photodocumentation (video and still photographic data), and diver surveys were used to identify marine benthic communities within the Project Area. Surveyed habitats were classified into six different habitat types, presented in Table 3.2-3."

Descriptions of specific survey methods would enable appreciation of their applicability, benefits, and limitations.

It seems to this reviewer that the habitat types identified were more relevant to construction planning than benthic community characterization. They included Type A – with relief of ≥0.25 m, Type B - with relief < 0.25 m, Type C – Breakwater Spoil Area or Habitat of Special Concern, Type D – Sand near hard bottom or sandy veneer over hard substrate, Soft Substrate/Sand, and Seagrass. 29

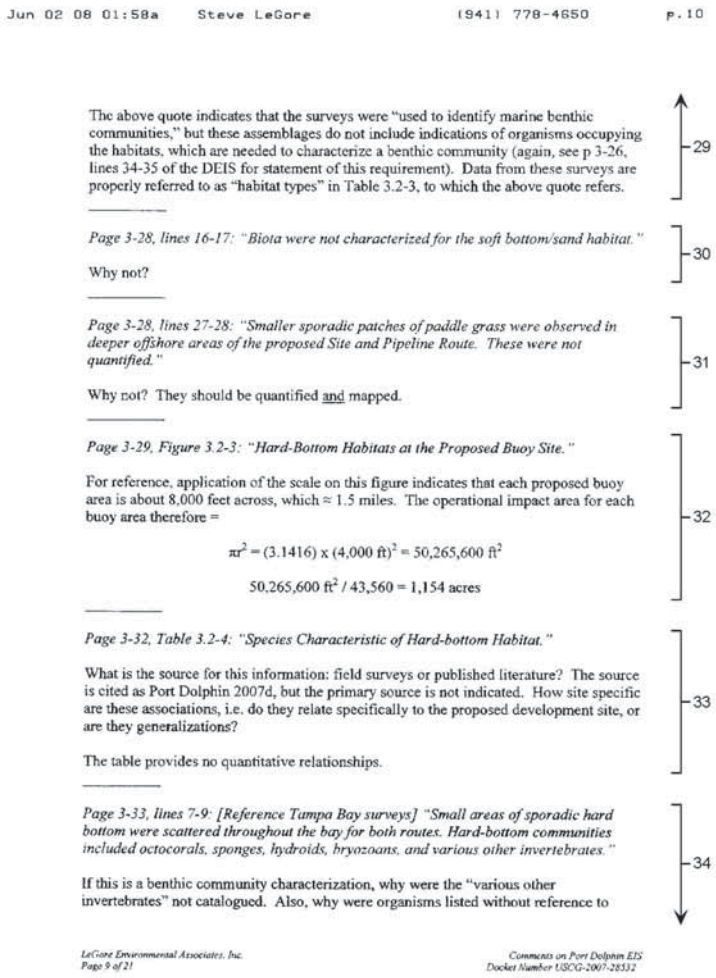
No mention is made in the DEIS of sampling infauna, of samples for establishing grain size distributions, or of characterizing fish and macroinvertebrate assemblages utilizing these habitats. Even qualitative species relationships are left uncharacterized. Quantitative data are absent, rendering scaled environmental impact assessments impossible.

26. Comment noted. Detailed benthic surveys were conducted as part of the Deepwater Port Application. See Section 4.2.1.6 for benthic resources analysis.

27. Comment noted.

28. Seagrass studies have been completed since the development of the Draft EIS and have been quantified in the Final EIS.

29. Comment noted. Detailed benthic surveys were conducted as part of the Deepwater Port Application. See Section 4.2.1.6 for benthic resources analysis.



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The above quote indicates that the surveys were "used to identify marine benthic communities," but these assemblages do not include indications of organisms occupying the habitats, which are needed to characterize a benthic community (again, see p 3-26, lines 34-35 of the DEIS for statement of this requirement). Data from these surveys are properly referred to as "habitat types" in Table 3.2-3, to which the above quote refers. 29

Page 3-28, lines 16-17: "Biota were not characterized for the soft bottom/sand habitat." 30

Why not?

Page 3-28, lines 27-28: "Smaller sporadic patches of paddle grass were observed in deeper offshore areas of the proposed Site and Pipeline Route. These were not quantified." 31

Why not? They should be quantified and mapped.

Page 3-29, Figure 3.2-3: "Hard-Bottom Habitats at the Proposed Buoy Site." 32

For reference, application of the scale on this figure indicates that each proposed buoy area is about 8,000 feet across, which ≈ 1.5 miles. The operational impact area for each buoy area therefore =

$$\pi r^2 = (3.1416) \times (4{,}000 \text{ ft})^2 = 50{,}265{,}600 \text{ ft}^2$$

$$50{,}265{,}600 \text{ ft}^2 / 43{,}560 = 1{,}154 \text{ acres}$$

Page 3-32, Table 3.2-4: "Species Characteristic of Hard-bottom Habitat." 33

What is the source for this information: field surveys or published literature? The source is cited as Port Dolphin 2007d, but the primary source is not indicated. How site specific are these associations, i.e. do they relate specifically to the proposed development site, or are they generalizations?

The table provides no quantitative relationships.

Page 3-33, lines 7-9: [Reference Tampa Bay surveys] "Small areas of sporadic hard bottom were scattered throughout the bay for both routes. Hard-bottom communities included octocorals, sponges, hydroids, bryozoans, and various other invertebrates." 34

If this is a benthic community characterization, why were the "various other invertebrates" not catalogued. Also, why were organisms listed without reference to

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30. Soft-bottom species were not quantified because survey protocols from both MMS and FDEP required that quantitative photos only be taken of live-bottom areas, not soft bottom. Many of the organisms observed in the soft-bottom areas are motile species that move along the seafloor (see Section 3.2.5).

31. Seagrass studies have been completed since the development of the Draft EIS and have been quantified in the Final EIS.

32. Comment noted.

33. The data are site-specific. The wrong source is cited and has been corrected. The citation should be: *Port Dolphin Energy LLC (Port Dolphin). 2007. Port Dolphin Energy LLC Deepwater Port License Application. Volume II, Appendix E, Field Survey Report, Survey of Marine Benthic Habitats within the Port Dolphin Deepwater Port and Pipeline Corridor, Offshore, and within Tampa Bay. Port Dolphin Project, Tampa Bay, FL. Prepared by CSA International, Inc. January 2007.* The citation has been changed in several places.

useful identifying taxa? These questions reinforce the impression that the benthic surveys were conducted more for construction planning reasons than for environmental impact assessment purposes. 34

Page 3-33, lines 9-10: "Fields of one species of tunicate was observed in Tampa Bay, but not offshore. It is not known whether this species is native or nonnative."

The designation of native vs. non-native is fairly important as baseline information for an EIS, particularly if the Applicant wishes to protect himself against future accusations of importing or enabling establishment of exotic species. 35

Page 3-49, line 33 ff: "Fish and Fisheries Resources" Section, extending to page 3-50, line 31.

The DEIS attempts to characterize fishery resources of the project area by citing literature describing generalized fishery assemblages. This is useful for basic understanding and introduction, but it does not provide the quantitative data one generally expects in an EIS. This discussion is far too general to provide a basis for estimating or characterizing impacts of the proposed project. For example is a km^2 of a particular hard-bottom type is destroyed by the project, there is no quantitative basis for relating that loss to an effect on any fishery resource. If the DEIS provided some measure of fish density in various habitat types, then a relationship would be readily computed. It appears, however, that no quantitative surveys of fishery or benthic communities were made in support of this DEIS. 36

Page 3-91, Table 3.6-2: "Annual Landing Statistics for . . . Counties, Florida in 2006."

Does this table assert that only 1,690 Finfish Trips were made in Manatee County for all of 2006? This seems like a very low number considering the popularity of recreational fin fishing in the area. What is the source of these data? 37

Page 3-123, Table 3.9-13: "Income and Poverty, 1999."

In first column, change Per Capital Income to read: Per Capita Income. 38

Chapter 4: Environmental Consequences

Page 4-4, lines 30-31: "These actions are expected to result in increases in turbidity from sediment disturbance during placement of the anchors and laying of equipment on the seafloor." 39

34. Comment noted. This has been further analyzed in Section 3.2.5 of the Final EIS.

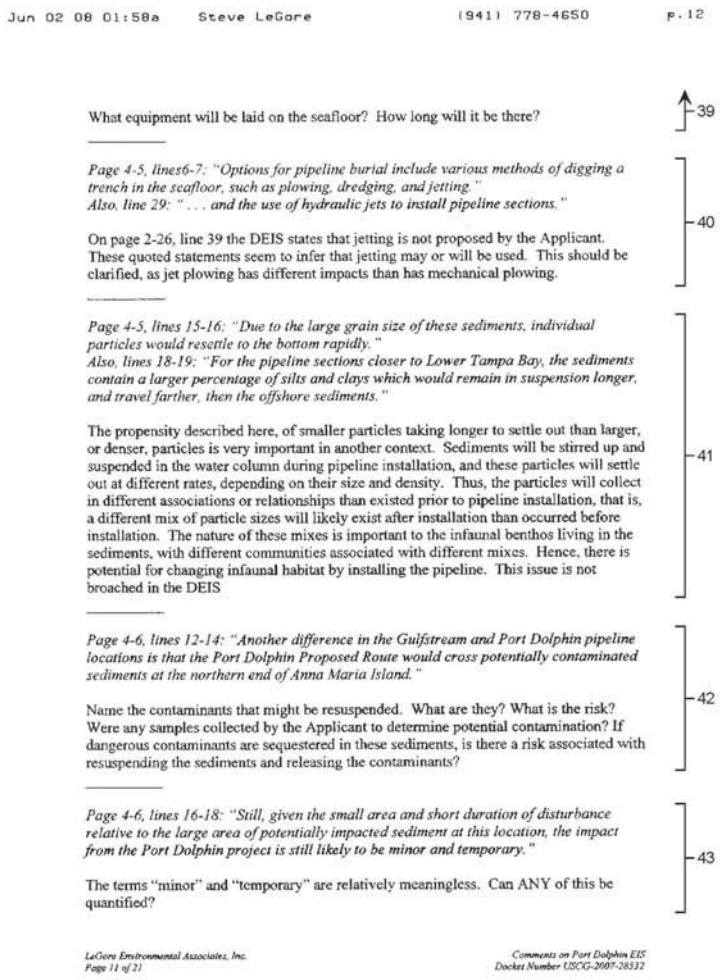
35. Comment noted. Quantitative data is included where available.

36. Table sources were added for Tables 3.6-1 and 3.6-2.

37. Text changed to reflect comment.

38. This information is provided in the first three sentences of the paragraph.

39. Text revised per comment.



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What equipment will be laid on the seafloor? How long will it be there? 39

Page 4-5, lines6-7: "Options for pipeline burial include various methods of digging a trench in the seafloor, such as plowing, dredging, and jetting."
Also, line 29: ". . . and the use of hydraulic jets to install pipeline sections."

On page 2-26, line 39 the DEIS states that jetting is not proposed by the Applicant. These quoted statements seem to infer that jetting may or will be used. This should be clarified, as jet plowing has different impacts than has mechanical plowing. 40

Page 4-5, lines 15-16: "Due to the large grain size of these sediments, individual particles would resettle to the bottom rapidly."
Also, lines 18-19: "For the pipeline sections closer to Lower Tampa Bay, the sediments contain a larger percentage of silts and clays which would remain in suspension longer, and travel farther, then the offshore sediments."

The propensity described here, of smaller particles taking longer to settle out than larger, or denser, particles is very important in another context. Sediments will be stirred up and suspended in the water column during pipeline installation, and these particles will settle out at different rates, depending on their size and density. Thus, the particles will collect in different associations or relationships than existed prior to pipeline installation, that is, a different mix of particle sizes will likely exist after installation than occurred before installation. The nature of these mixes is important to the infaunal benthos living in the sediments, with different communities associated with different mixes. Hence, there is potential for changing infaunal habitat by installing the pipeline. This issue is not broached in the DEIS 41

Page 4-6, lines 12-14: "Another difference in the Gulfstream and Port Dolphin pipeline locations is that the Port Dolphin Proposed Route would cross potentially contaminated sediments at the northern end of Anna Maria Island."

Name the contaminants that might be resuspended. What are they? What is the risk? Were any samples collected by the Applicant to determine potential contamination? If dangerous contaminants are sequestered in these sediments, is there a risk associated with resuspending the sediments and releasing the contaminants? 42

Page 4-6, lines 16-18: "Still, given the small area and short duration of disturbance relative to the large area of potentially impacted sediment at this location, the impact from the Port Dolphin project is still likely to be minor and temporary."

The terms "minor" and "temporary" are relatively meaningless. Can ANY of this be quantified? 43

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40. This issue has been further analyzed in Section 4.1.1 of the Final EIS.

41. After reviewing revised data, the original map was incorrect and there are no "hot spots" near Anna Maria Island. Text revised clarify.

42. After reviewing revised data, the original map was incorrect, and there are no "hot spots" near Anna Maria Island. Text revised to clarify.

43. Impacts of chain sweep on biota have been updated and are addressed in Section 4.2 and are accounted in Table 4.1-2.

Page 4-10, lines 40-44: "While the SRVs are moored at the Port, raising and lowering of the buoy and weathervaning of the SRVs would cause dragging of the mooring chains and risers on the seafloor. This would result in localized and temporary disturbances to the sediment, potentially causing short-term sediment resuspension and increases in turbidity near the bottom of the water column. These disturbances would occur periodically during the entire duration of the project (25 years)."

More significantly, the mooring chains are very heavy, and dragging them across the sediment will surely kill and benthic flora and fauna present. Since this will occur repeatedly over the duration of the project, this area will presumably be taken out of production for 25 years. As per comments above concerning page 3-29, this seems to mean that two times 1,154 acres, or 2,308 acres, will be effectively denuded for 25 years. 44

Page 4-13, lines 16-18: "Approximately 8,787 acres of soft-bottom and hard-bottom benthic habitat would be impacted from pipeline installation, buoy anchor installation, and anchoring impacts of construction vessels along the construction pathway."

The term "impacted" should be clarified. Does it here mean "destroyed?"

What effects will this habitat destruction have on animals that live in and utilize this habitat? What species use it, e.g. for protective habitat or for food? What impacts will this have on the populations of these habitat users? How much actual biomass is lost by destroying, even temporarily, these habitats? Answers to these questions require some measure of quantitative information, which does not appear to be provided by this DEIS. 45

Page 4-14, Table 4.2-1, 2nd row, Pipeline installation – plowing, total of 176.1 acres.

Referring to the comment above for page 4-5, lines 15-16, this entry means that 176.1 acres will potentially be filled with redistributed sediments particle sizes, i.e. altered habitat. Neither this potential nor its implications are mentioned by the DEIS. 46

Page 4-14, Table 4.2-1, 4th row, Concrete mattresses along pipeline route – 16.32 acres of soft bottom . . .

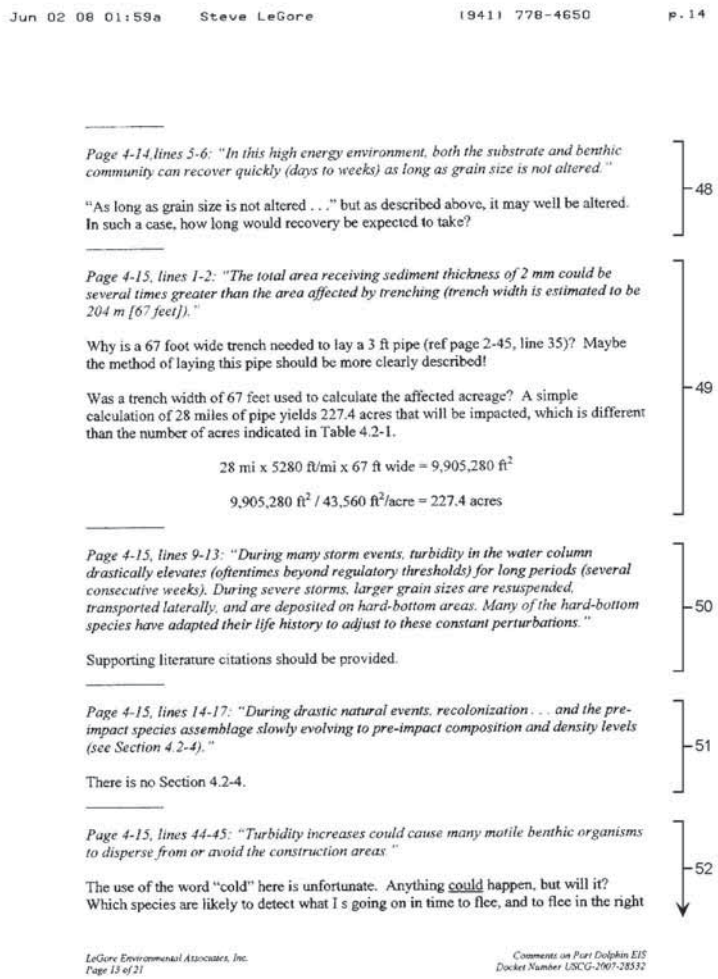
Why are concrete mattresses being applied to so much soft bottom? The previous description indicated that these mattresses will only be used when hard bottom prevents burial of the pipeline to 3 feet.

Also, is mooring line chain drag, as discussed above re: page 4-10, lines 40-44, included in this table? IF Anchor sweep (STL buoy) is the same thing, then our estimates of acreage affected differ greatly. Can this be clarified? 47

44. The amount of hard bottom habitat that will be impacted is quantified as discussed in Section 4.2.1.3.1 and Table 4.2-13.

45. The impact of resettled sediments is addressed in Section 4.1 (water quality), and impacts on habitat are discussed Section 4.2.

46. Mattresses will be applied in areas where the pipeline cannot be buried with three feet of cover. There are areas along the pipeline that have some sand cover over hard bottom areas, but are not deep enough to completely cover the pipeline to the depth required. Anchor sweep is quantified in Table 4.2-1.



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Page 4-14,lines 5-6: "In this high energy environment, both the substrate and benthic community can recover quickly (days to weeks) as long as grain size is not altered."

"As long as grain size is not altered . . ." but as described above, it may well be altered. In such a case, how long would recovery be expected to take? 48

Page 4-15, lines 1-2: "The total area receiving sediment thickness of 2 mm could be several times greater than the area affected by trenching (trench width is estimated to be 204 m [67 feet])."

Why is a 67 foot wide trench needed to lay a 3 ft pipe (ref page 2-45, line 35)? Maybe the method of laying this pipe should be more clearly described!

Was a trench width of 67 feet used to calculate the affected acreage? A simple calculation of 28 miles of pipe yields 227.4 acres that will be impacted, which is different than the number of acres indicated in Table 4.2-1. 49

$$28 \text{ mi} \times 5280 \text{ ft/mi} \times 67 \text{ ft wide} = 9{,}905{,}280 \text{ ft}^2$$

$$9{,}905{,}280 \text{ ft}^2 / 43{,}560 \text{ ft}^2/\text{acre} = 227.4 \text{ acres}$$

Page 4-15, lines 9-13: "During many storm events, turbidity in the water column drastically elevates (oftentimes beyond regulatory thresholds) for long periods (several consecutive weeks). During severe storms, larger grain sizes are resuspended, transported laterally, and are deposited on hard-bottom areas. Many of the hard-bottom species have adapted their life history to adjust to these constant perturbations."

Supporting literature citations should be provided. 50

Page 4-15, lines 14-17: "During drastic natural events, recolonization . . . and the pre-impact species assemblage slowly evolving to pre-impact composition and density levels (see Section 4.2-4)."

There is no Section 4.2-4. 51

Page 4-15, lines 44-45: "Turbidity increases could cause many motile benthic organisms to disperse from or avoid the construction areas."

The use of the word "cold" here is unfortunate. Anything could happen, but will it? Which species are likely to detect what I s going on in time to flee, and to flee in the right 52

LeGore Environmental Associates, Inc.
Page 13 of 21

Comments on Port Dolphin EIS
Docket Number USCG-2007-28532

47. Information has been added to the EIS regarding recovery.

48. Construction methods are described in Section 2.1.1.9, and shown in Figures 2.2-8 and 2.2-9.

49. Citations added per comment.

50. Section reference deleted.

51. Additional detail provided in Sections 4.2.1.7 and 4.2.1.13.

direction? Which species are not? To a small crab or sea cucumber, the plow will certainly seem very big and fast moving. The contention that motile benthic organisms will be able to detect and avoid harm should be seriously substantiated. 52

Page 4-18, lines 6-7: "The mid-line buoy would be a single buoy and line used to suspend the anchor line to prevent it from dragging and scouring the seafloor."

Will there be NO dragging when the anchors are retrieved as the vessel moves forward? The forward anchors would seem to be controllable by the buoys, but retrieving the trailing anchors ad the vessel moves forward, is probably likely to drag and scour the seafloor to some extent. Is the Applicant willing to guarantee that all scour from this cause will be prevented? 53

Page 4-18, lines 8-10: "Anchor lines on the derrick/lay barge would be set and raised once during the installation of each loading buoy, but they would be set and raised repeatedly during pipeline installation."

How many anchor placements will there be per mile of pipeline installation – and in total? How big are these anchors, and what kind of anchors are they? How large and deep a hole will they leave behind in the sediments, and what impact will these holes have, e.g. on commercial fishing operations such as trawling? How much benthic biomass of what species will be destroyed with each anchor placement? 54

Page 4-18, Line 10: "Other construction vessels could also employ anchors and anchor lines."

Which ones? How many? What will be the impacts from thee anchors? 55

Page 4-18, line 33: ". . . and beneficial impacts . . ."

Please itemize and clearly identify the beneficial impacts of project operations. 56

Page 4-18, lines 35-38: "The placement of buoy system parts and concrete mattresses along the pipeline route, as well as anchor sweep would result in 16.32 acres of long-term disturbance on soft-bottom habitat and 19.42 acres of long-term disturbance on hard-bottom habitat. An additional 18.98 acres of soft substrate/sand habitat would be disturbed due to anchor sweep."

The term "disturbed" should be more clearly defined here. Does this mean "destroyed?" 57

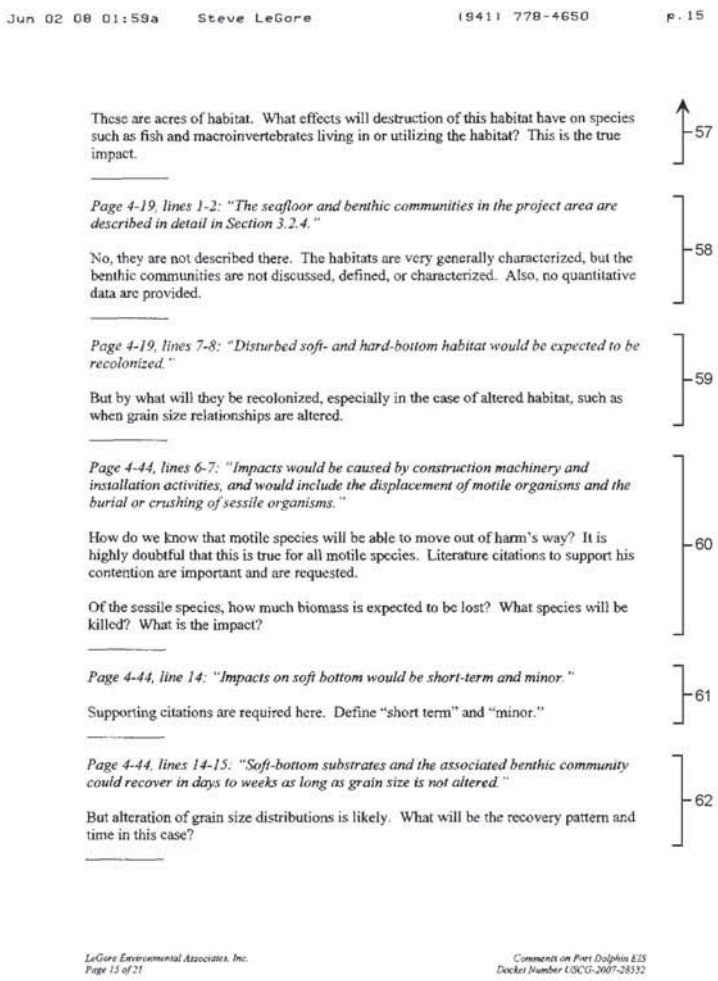
52. If a License is issued by the Maritime Administration, the license would include a condition that would require a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements would be developed after a license is issued.

53. Total anchor line impacts are estimated in Table 4.2-1.

54. Information on construction and operation vessels is included in Section 4.10 and impacts have been estimated in Table 4.2-1.

55. Text revised to clarify.

56. Text revised to clarify.



Jun 02 08 01:59a Steve LeGore (941) 778-4650 p.15

These are acres of habitat. What effects will destruction of this habitat have on species such as fish and macroinvertebrates living in or utilizing the habitat? This is the true impact. 57

Page 4-19, lines 1-2: "The seafloor and benthic communities in the project area are described in detail in Section 3.2.4."

No, they are not described there. The habitats are very generally characterized, but the benthic communities are not discussed, defined, or characterized. Also, no quantitative data are provided. 58

Page 4-19, lines 7-8: "Disturbed soft- and hard-bottom habitat would be expected to be recolonized."

But by what will they be recolonized, especially in the case of altered habitat, such as when grain size relationships are altered. 59

Page 4-44, lines 6-7: "Impacts would be caused by construction machinery and installation activities, and would include the displacement of motile organisms and the burial or crushing of sessile organisms."

How do we know that motile species will be able to move out of harm's way? It is highly doubtful that this is true for all motile species. Literature citations to support his contention are important and are requested.

Of the sessile species, how much biomass is expected to be lost? What species will be killed? What is the impact? 60

Page 4-44, line 14: "Impacts on soft bottom would be short-term and minor."

Supporting citations are required here. Define "short term" and "minor." 61

Page 4-44, lines 14-15: "Soft-bottom substrates and the associated benthic community could recover in days to weeks as long as grain size is not altered."

But alteration of grain size distributions is likely. What will be the recovery pattern and time in this case? 62

LeGore Environmental Associates, Inc.
Page 15 of 21

Comments on Port Dolphin EIS
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57. Comment noted. Description and analysis incorporate a level of detail that is appropriate for an EIS. The amount of hard bottom habitat that will be impacted is quantified. From an ecosystem perspective, this is enough detail to determine the nature, context, and intensity of the impact.

58. Additional detail provided in Section 4.2.1.7.

59. This issue has been further analyzed in Sectuib 4.2.1.6.1 of the Final EIS.

60. Nature and intensity of the impact is supported by the remainder of the paragraph. The paragraph is cited appropriately.

61. Text revised to reflect comment.

62. Text revised to clarify.

Page 4-44, lines 16-18: "Impacts such as pile driving into hard bottom or the laying of pipelines and concrete mattresses on limestone outcroppings and other hard-bottom relief features would be permanent."

How much of what species will be lost? To what effect? 63

Page 4-44,line 18: "The substrates that replace the limestone outcropping would be recolonized."

By what? 64

Page 4-44, lines 18-19: "If soft substrates replace hard bottom the new habitat would be replaced with opportunistic organisms."

Which are what species? Also, these recruits would not "replace" the habitat. Rather, they would colonize and inhabit the habitat. 65

Page 4-44, lines 22-24: ". . . the structural component of the habitat would be reduced because the biota such as corals, sponges, and algae provide structure for juvenile and adult fish and shellfish species in this low relief habitat . . ."

What species of fish and shellfish utilize this habitat and in what numbers or densities? What is the impact on these species? Can these impacts be quantified? 66

Page 4-44, lines 26-28: "In the offshore areas, patches of paddlegrass would be affected by trenching of the pipeline. These impacts could be long-term as patches are completely disturbed or uprooted, or permanent if bathymetry is changed."

What species utilizing paddlegrass habitat would be affected by these changes? In what numbers? These areas were not quantified or mapped, so analysis of these impacts will probably be difficult, but they should be done. 67

Page 4-44, lines 31-37: "Seafloor disturbance could also occur as a result . . .possible mortality to these species as well."

This paragraph is very general. Can specifics be provided? This IS an EIS. What are the expected impacts? 68

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63. Text revised to clarify.

64. Text revised to clarify.

65. Text revised to clarify.

66. Text revised to clarify.

67. Specific impacts have been included in the Final EIS.

68. This issue has been further analyzed in the Final EIS.

Page 4-44, lines 38-39: "Effects of burial are dependent on sediment type, depth of sediment, and the size and behavior of infaunal or epifaunal organisms (including the species' ability to burrow and species' mobility) . . ."

Because no infaunal baseline survey was conducted, we do not know what species occur in the project area, hence we do not know which will survive and which will not. 69

Page 4-44, line 44 ff: "In areas where burrowing species compose the benthic community, it is possible that the fauna would burrow up through a 10-cm (3.9-inch) thick layer of material, which is well within the burrowing depth of most benthic organisms."

How can this be stated if we do not even know what infaunal species inhabit the area? Indeed, what is the point of the statement if we do not know the species involved?

This discussion is not relevant to the species likely to be buried 3-10 feet deep in the 67 ft-wide pipeline trenches. Few species can burrow out of a layer that thick. 70

Page 4-45, lines 35-37: "Predicting recovery times of benthic communities following disturbance is complex and depends on (1) the timing, severity, and frequency of the impact; (2) the complexity of the habitat and the organisms that are being disturbed; and (3) the energy of the environment . . ."

It also requires knowledge of what is living in these communities, which we do not have because no baseline surveys were conducted.

As it stands, this paragraph predicts nothing other than that the recovery times are complex and unknown. 71

Page 4-46, lines 1-2: "While recolonization usually begins soon after dredging ends, the process may range in duration from a few months for shallow dredging to years or decades . . ."

Can citations be provided? 72

Page 4-46, lines 4-5: "Unlike typical dredging sites, the trench itself would be only a few m wide."

According to page 4-5, line 2, the trench will be 20.4 m wide – hardly a "few." 73

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69. This issue has been further analyzed in the Final EIS.

70. This issue has been further analyzed in the Final EIS.

71. Citation added to reflect comment.

72. Comment noted. This issue has been further analyzed in the Final EIS.

73. Please see Section 4.2.1.7, page 4-46, lines 7-8.

Page 4-46, lines 8-9: "Epifaunal species associated with hard bottom would be buried and infaunal species would recruit the soft bottom habitat."

With what impact to species utilizing the respective habitats? 74

Page 4-46, line 40: "The extent of hard/live bottom exposed to turbidity from plowing/jetting can be roughly estimated. . ."

Is it really the same for mechanical plowing and jet plowing? Doubtful, I think. 75

Page 4-47, line 14: "long-term . . . beneficial impacts . . ."

These beneficial impacts should be enumerated. 76

Page 4-47, lines 22-23: ". . . a shift in associated benthic assemblages could occur."

"Could" or "would?" The EIS should amplify its expectations, not catalogue possibilities. 77

Page 4-47, lines 27-32: "Additional long-term disturbance . . . would be caused by the sweeping and scouring of benthic substrate by anchor chains/cables. In soft-bottom areas . . . anchor rise/sweep could cut through the top few inches of the sediment layer, adversely impacting fauna such as tube-dwelling polychaetes, anemones, and other large infauna. In hard-bottom areas . . . anchors/risers would scrape the surface of limestone outcropping, impacting various epifaunal species."

"Adversely impacting" seems like a serious understatement for a massive chain plowing three inches deep through the soft sediment. More likely, this sweep will denude the affected area of virtually all life for the life of the project. 78

Page 4-47, lines 37-38: "The importance of this habitat to commercial and recreational fish and shellfish species is presented in Section 3.2.9."

No, it is not. Section 3.2.9 is titled "Terrestrial Resources." 79

Page 4-47,lines 38-40: "A characterization of the commercial and recreational fish and shellfish species, and commercial and recreational fisheries in the area is presented in Section 3.2.8."

Characterizations are not presented quantitatively, so degrees of impact remain unclear. 80

74. This issue has been further analyzed in the Final EIS.

75. Comment noted.

76. Comment noted.

77. Comment noted.

78. Correct section callout is 3.2.8. Text revised to clarify.

79. Comment noted.

80. Benthic communities are evaluated in 4.2.1.1 of the EIS.

Page 4-58, line 23: "The need for quantitative assessment off impacts on Ichthyoplankton was recognized . . .

Why was it recognized for Ichthyoplankton, but not for benthic community evaluation? 81

Page 4-64, lines3-5: "These impacts would include the displacement of demersal fish . . . and the displacement crushing of benthic shellfish such as shrimp, stone crabs, and spiny lobsters."

The meaning of "displacement crushing" is unclear. Also, quantitative impacts are not provided. 82

Page 4-64, lines11-13: "The redeposition of sediment would cause additional short-term minor direct adverse impacts on benthic fish and shellfish . . . through burial. The effects of burial of benthic invertebrates depends on the species mobility and burrowing ability"

Yes, it would. Can the species present be enumerated and predictions made concerning their ability to burrow through covering sediments? As it stands, the DEIS provides no estimates of impacts, but only lists of what could happen. This is not helpful to resource managers who must decide the fate of this proposed project. 83

Also, the individuals buried in the actual trenches to 3-10 ft depths would be lost.

Page 4-64, lines 17-18: "As stated above, these species [shrimp, spiny lobster, stone crabs] are expected to avoid the installation construction/installation [sic.] area due to the noise."

Literature citations supporting this contention would be appreciated. 84

Page 4-68, lines 21-23: "The crushing of benthic epifauna such as bryozoans, sponges, and corals in hard/live bottom habitat would result in long-term, minor adverse impacts on EFH for juvenile and adult fish and shellfish that utilize these benthic invertebrates as structure."

For EIS purposes, we should be told what fish and shellfish species are being discussed. Once again, we ask that the EIS be more specific and quantitative to enable evaluation of impacts and decision-making. 85

81. Text changed to clarify comment.

82. Comment noted.

83. Citation added.

84. This issue has been further analyzed in the Final EIS.

85. This issue has been further analyzed in the Final EIS.

Page 4-139, line 15-17 ref mitigation: "Geohazards and benthic video survey that were conducted during the summer and fall of 2006 provided a fine-scale delineation of seafloor structure, substrate, and habitat within the proposed Port Dolphin project area."

However, no information on benthic infauna or other species utilizing these habitats was provided. 86

Page 4-139, line 23 ref mitigation: "Identify avoidance zones of critical habitat for placement of installation barge anchors."

The value of this contribution is difficult to judge, however, because impacts of these anchors is not described in the DEIS. 87

Page 4-139, lines 24-25 ref mitigation: "Midline buoys would be utilized to the extent practicable on anchor chains to reduce the amount of anchor chain sweep."

This says to "reduce" effects of sweep. On page 4-18, line 7, the document uses the word "prevent." These statements should be rendered consistent. 88

Page 4-139, lines 28-29 ref mitigation: "During detailed design, an anchoring plan would be developed that would provide procedures for anchor deployment to minimize impacts on hard/live bottom habitat."

Why wait, Can this not be committed to in the EIS? 89

Page 4-139, lines 30-31 ref mitigation: "A Mitigation Plan to compensate for unavoidable impacts on hard bottom would be developed during the permitting process."

The Mitigation Plan would seem to be related to net project impacts, and should perhaps appear in the EIS rather than waiting to develop some undescribed plan at some undetermined time in the future. 90

Appendix F:

Page 1-1, final two lines on the page: "However, based on the proposed monitoring and mitigation plan, no long-term effects on [fishery] stock size are expected.

This statement must be substantiated, and its basis clearly and thoroughly described. 91

86. An anchor placement plan has been developed to avoid critical habitat to the extent applicable. The Applicant has developed a mitigation plan for unavoidable impacts to hard bottom that will be finalized by USCG and the Maritime Administration and appropriate resource agencies if a license is issued.

87. Text changed to reflect comment.

88. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements not listed in Section 4.11 would be developed after a license is issued.

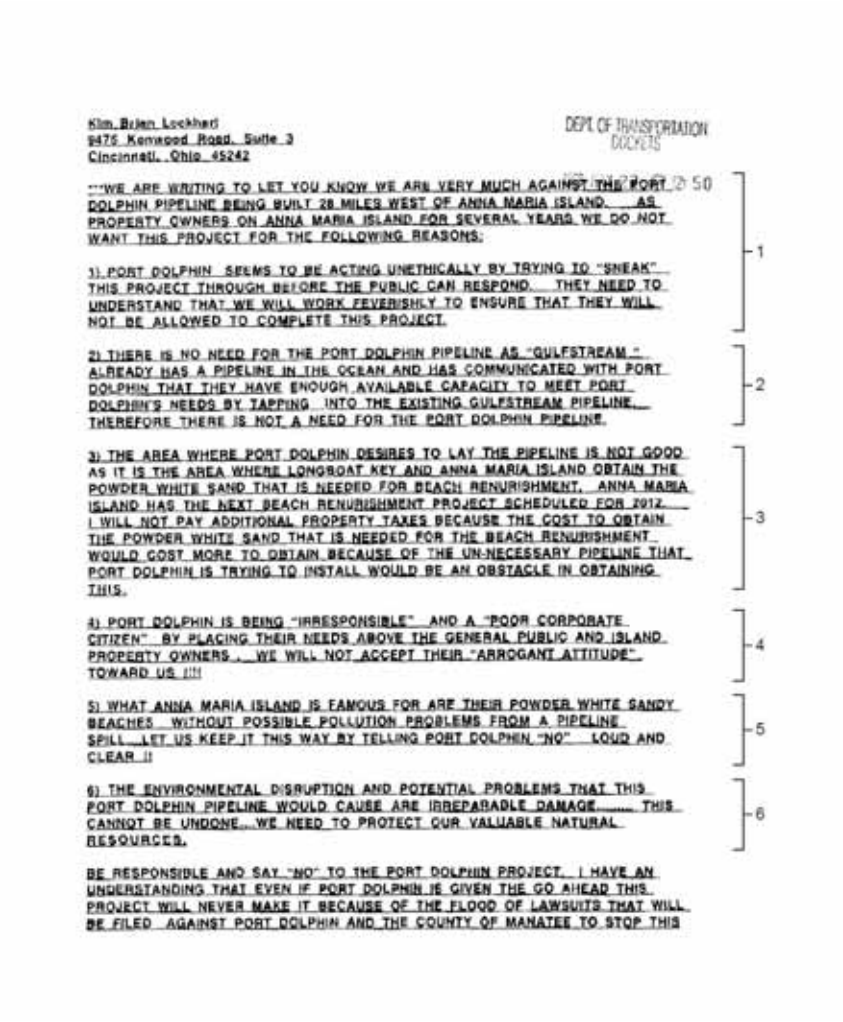
89. If a License is issued by the Maritime Administration, the license would include a condition that would require development of a Monitoring and Mitigation Plan with input from applicable Federal and state resource agencies. Specific monitoring requirements not listed in Section 4.11 would be developed after a license is issued.

90. Comment noted.

REVIEWER CREDENTIALS

Dr. Steve LeGore earned his M.S. and Ph.D. Degrees from the University of Washington's College of Fisheries. He has more than 30 years of project experience relating to environmental impact assessment. Dr. LeGore has successfully completed projects throughout the United States and in more than 30 other nations; his project sponsors have included The World Bank, USAID, The UN's International Maritime Organization, several foreign governments and multinational companies. He has worked on offshore issues for several petroleum companies and he served for 5 years on the API's Fate & Effects of Oil Spills Committee. Dr. LeGore is in his 7th year of service as the Executive Director of the Association of Marine Laboratories of the Caribbean, and he serves on the Board of the International Society for Environmental Bioindicators. Additional details may be found on Dr. LeGore's Website:

http://www.developmentex.com/member/steve_legore



Kim Brien Lockhart
9475 Kenwood Road, Suite 3
Cincinnati, Ohio 45242

DEPT OF TRANSPORTATION
DOCKETS

"WE ARE WRITING TO LET YOU KNOW WE ARE VERY MUCH AGAINST THE PORT DOLPHIN PIPELINE BEING BUILT 28 MILES WEST OF ANNA MARIA ISLAND. AS PROPERTY OWNERS ON ANNA MARIA ISLAND FOR SEVERAL YEARS WE DO NOT WANT THIS PROJECT FOR THE FOLLOWING REASONS:

1) PORT DOLPHIN SEEMS TO BE ACTING UNETHICALLY BY TRYING TO "SNEAK" THIS PROJECT THROUGH BEFORE THE PUBLIC CAN RESPOND. THEY NEED TO UNDERSTAND THAT WE WILL WORK FEVERISHLY TO ENSURE THAT THEY WILL NOT BE ALLOWED TO COMPLETE THIS PROJECT. 1

2) THERE IS NO NEED FOR THE PORT DOLPHIN PIPELINE AS "GULFSTREAM" ALREADY HAS A PIPELINE IN THE OCEAN AND HAS COMMUNICATED WITH PORT DOLPHIN THAT THEY HAVE ENOUGH AVAILABLE CAPACITY TO MEET PORT DOLPHIN'S NEEDS BY TAPPING INTO THE EXISTING GULFSTREAM PIPELINE. THEREFORE THERE IS NOT A NEED FOR THE PORT DOLPHIN PIPELINE. 2

3) THE AREA WHERE PORT DOLPHIN DESIRES TO LAY THE PIPELINE IS NOT GOOD AS IT IS THE AREA WHERE LONGBOAT KEY AND ANNA MARIA ISLAND OBTAIN THE POWDER WHITE SAND THAT IS NEEDED FOR BEACH RENURISHMENT. ANNA MARIA ISLAND HAS THE NEXT BEACH RENURISHMENT PROJECT SCHEDULED FOR 2012. I WILL NOT PAY ADDITIONAL PROPERTY TAXES BECAUSE THE COST TO OBTAIN THE POWDER WHITE SAND THAT IS NEEDED FOR THE BEACH RENURISHMENT WOULD COST MORE TO OBTAIN BECAUSE OF THE UN-NECESSARY PIPELINE THAT PORT DOLPHIN IS TRYING TO INSTALL WOULD BE AN OBSTACLE IN OBTAINING THIS. 3

4) PORT DOLPHIN IS BEING "IRRESPONSIBLE" AND A "POOR CORPORATE CITIZEN" BY PLACING THEIR NEEDS ABOVE THE GENERAL PUBLIC AND ISLAND PROPERTY OWNERS. WE WILL NOT ACCEPT THEIR "ARROGANT ATTITUDE" TOWARD US !!!! 4

5) WHAT ANNA MARIA ISLAND IS FAMOUS FOR ARE THEIR POWDER WHITE SANDY BEACHES WITHOUT POSSIBLE POLLUTION PROBLEMS FROM A PIPELINE SPILL. LET US KEEP IT THIS WAY BY TELLING PORT DOLPHIN "NO" LOUD AND CLEAR !! 5

6) THE ENVIRONMENTAL DISRUPTION AND POTENTIAL PROBLEMS THAT THIS PORT DOLPHIN PIPELINE WOULD CAUSE ARE IRREPARABLE DAMAGE..... THIS CANNOT BE UNDONE... WE NEED TO PROTECT OUR VALUABLE NATURAL RESOURCES. 6

BE RESPONSIBLE AND SAY "NO" TO THE PORT DOLPHIN PROJECT. I HAVE AN UNDERSTANDING THAT EVEN IF PORT DOLPHIN IS GIVEN THE GO AHEAD THIS PROJECT WILL NEVER MAKE IT BECAUSE OF THE FLOOD OF LAWSUITS THAT WILL BE FILED AGAINST PORT DOLPHIN AND THE COUNTY OF MANATEE TO STOP THIS

1. Thank you for your comment.

2. The need for the project is discussed in Sections 1.2 and 1.3 of the EIS. An offshore interconnection with the Gulfstream Pipeline has been added as an alternative in Section 2.1.4 and its impacts discussed in Section 4.

3. Due to public comments on the sand resources, Port Dolphin has moved their preferred route to avoid mapped sand resources currently used by Longboat Key and Anna Maria Island. The pipeline route is discussed in Section 2.1.4. Sand resources are discussed in Sections 3.4 and 4.4.

4. Thank you for your comment.

5. Thank you for your comment.

6. For Environmental Consequences see Section 4 of the Final EIS.



Public Submission: USCG-2007-28532-0109

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Docket: USCG-2007-28532
Docket Title: Port Dolphin Energy LLC, Port Dolphin Energy Liquefied Natural Gas Deepwater Port License Application
Docket Type: Nonrulemaking
Document: USCG-2007-28532-0003
Document Title: U.S. DOT/MARAD - Notice of Application
Public Submission: USCG-2007-28532-0109
Public Submission Title: Angela Lucido

General Comment

Comment: I'm devastated at the thought/idea of placing yet another pipeline in the gulf of Florida.

I also share the concerns of the Coast Guard re: all the hazards/ (spills/ explosions/fire/gas release at processing equipment/severe weather/ just to name a few !)

I'm strongly concerned of the death caused to the gulf waters/ including all the wild life/sea life/that would eventually result in the death of the gulf waters/ turning the current pristine color of waters/ into dark/murky HORROR! I find it so hard to fathom that we'd allow this kind of natural occurring events to take place since the inevitable is obvious. Just look at other ocean/sea waters where pipelines have now been in exisistance. I know we are stewards of this land/ocean/air....could we please NOT do this to the last pristine beaches left on the gulf of Florida

1

2

1. As discussed in the *Maritime, Safety, and Related Matters* (Section 2.3.10), shipboard systems such as the metering system and cargo system, would help identify risk and potential issues that may result in spills, such as fire and gas release before such events occur. The Coast Guard would also approve the Operations Manual to ensure that the Applicant only operates in weather conditions that are safe for unloading and processing the liquefied natural gas. Since the terminal would be located 28 miles offshore, if there were a spill/fire, the thermal impact radius would not reach the shore to risk human life.

   As discussed in Section 4, natural gas in its liquid or gaseous form does not mix with seawater. Therefore, impacts to aquatic systems from an LNG spill would not be significant.

2. Comment noted.

05/30/2008 FRI 14:16 FAX 001/001

FEDERAL DOCKET MANAGEMENT FACILITY

DOCKET # USCG-2007-28532

MONICA NEWCOMER
PO BOX 1357
239 LAKEVIEW
ANNA MARIA FL 34216

2008 MAY 30 P 2:28
DEPT OF TRANSPORTATION
DOCKETS

I OPPOSE THE
PIPELINE PROJECT]-1

1. Comment noted.

05/30/2008 FRI 14:22 FAX 001/001

FEDERAL DOCKET MANAGEMENT FACILITY
DOCKET # USCG-2007-28532

Douglas Newcomer
P.O. Box 1357
239 LAKEVIEW
ANNA MARIA FL

2008 MAY 30 P 2:47
DEPT OF TRANSPORTATION
DOCKETS

I OPPOSE THE
PIPELINE
PROJECT

-1

1. Comment noted.

05/30/2008 FRI 18:00 FAX 001/001

DEPT. OF TRANSPORTATION DOCKETS

I am against the Port Dolphin natural gas project which will impact our environment, imperil Florida sea life, and also impact our beach renourishment programs. 1

In Manatee County there are less than five residential communities that utilize natural gas. Additionally, Manatee County proudly bears its name because we have numerous manatees here which are already fairly heavily impacted by the boats upon the water. 2 3

This area relies for a substantial part of its income upon tourist and eco-tourist visitors. We have all varieties of sea turtles nesting in the areas that would be impacted by this project. 4 5

Many articles have been written about concerns for this project and it is generally believed by long term residents in our island and adjacent mainland communities that this would not be a beneficial project for this area. 6

Mary Sutton Mary Sutton
415 Eagles Nest Lane
Sarasota, FL 34243

Docket # USCG-2007-28532

202-493-2251

1. Comment noted.

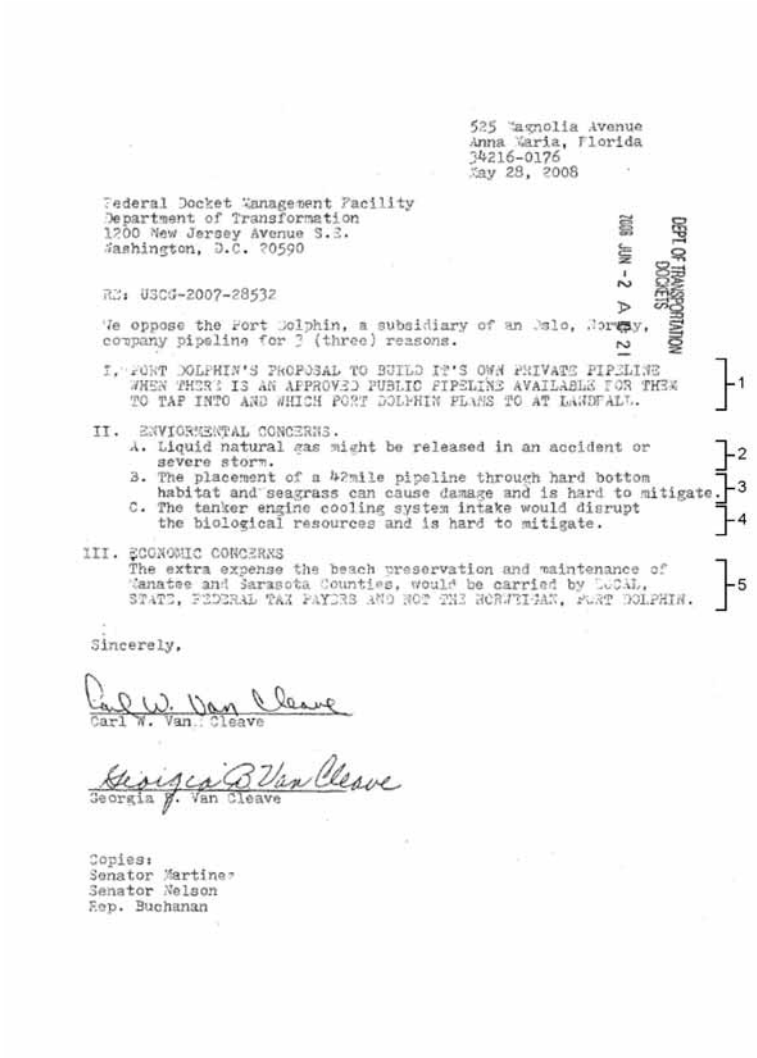
2. The Florida natural gas market and anticipated demand increases are described in Section 1.3 of the EIS.

3. A complete discussion regarding the potential impacts to manatee and the proposed mitigation to manatee are discussed in Sections 4.2.1.2 and 4.11. Based on proposed mitigations, and Best Management Plans, vessel traffic associated with the Proposed Action is not likely to adversely affect marine mammals.

4. Comment noted. Socioeconomics are discussed in Sections 3.9 and 4.9.

5. A complete discussion regarding the potential impacts on sea turtles and proposed mitigation to sea turtles is discussed in Section 4.2.1.3 and Section 4.11. Impacts are expected to be minor and short-term in duration during the construction of the Project.

6. Comment noted.



525 Magnolia Avenue
Anna Maria, Florida
34216-0176
May 28, 2008

Federal Docket Management Facility
Department of Transformation
1200 New Jersey Avenue S.E.
Washington, D.C. 20590

2008 JUN -2 A 9:21
DEPT OF TRANSPORTATION
DOCKETS

RE: USCG-2007-28532

We oppose the Port Dolphin, a subsidiary of an Italo, Norway, company pipeline for 3 (three) reasons.

I. PORT DOLPHIN'S PROPOSAL TO BUILD IT'S OWN PRIVATE PIPELINE WHEN THERE IS AN APPROVED PUBLIC PIPELINE AVAILABLE FOR THEM TO TAP INTO AND WHICH PORT DOLPHIN PLANS TO AT LANDFALL. 1

II. ENVIORMENTAL CONCERNS.
A. Liquid natural gas might be released in an accident or severe storm. 2
B. The placement of a 42mile pipeline through hard bottom habitat and seagrass can cause damage and is hard to mitigate. 3
C. The tanker engine cooling system intake would disrupt the biological resources and is hard to mitigate. 4

III. ECONOMIC CONCERNS
The extra expense the beach preservation and maintenance of Manatee and Sarasota Counties, would be carried by LOCAL, STATE, FEDERAL TAX PAYERS AND NOT THE NORWEGIAN, PORT DOLPHIN. 5

Sincerely,

Carl W. Van Cleave
Carl W. Van Cleave

Georgia B Van Cleave
Georgia B. Van Cleave

Copies:
Senator Martinez
Senator Nelson
Rep. Buchanan

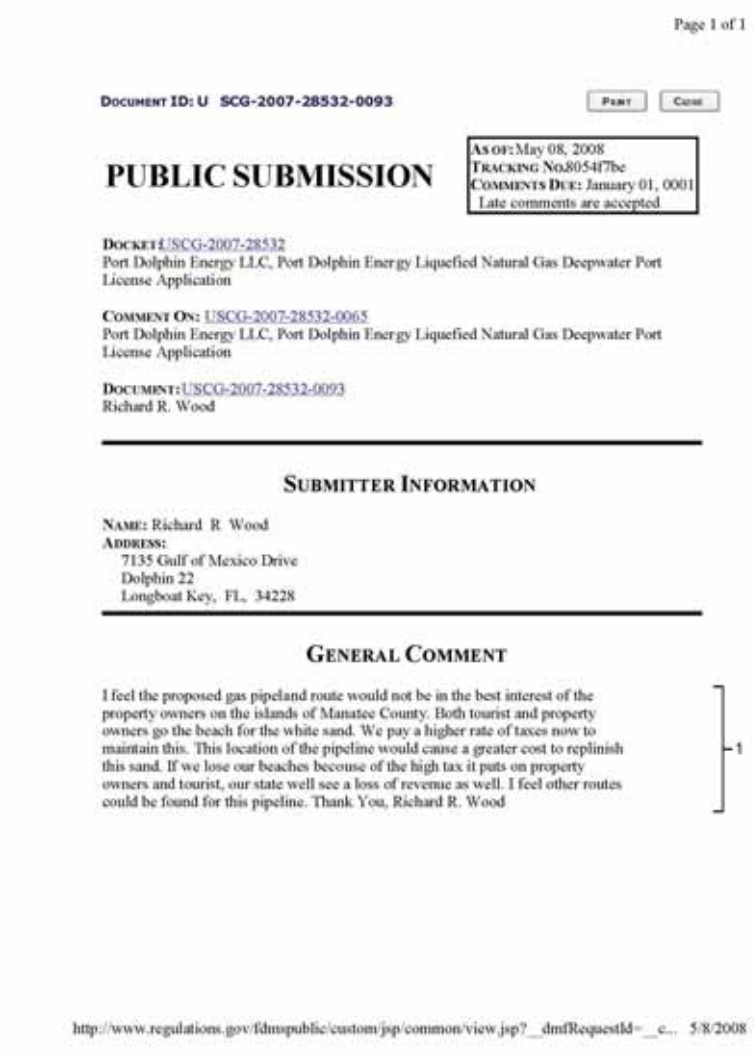
1. The potential for offshore interconnection with the Gulfstream Pipeline is discussed in Section 2.1.4 of the EIS. An offshore interconnection to the Gulfstream Pipeline has been added as an alternative and its impacts are discussed in Section 4.

2. The Coast Guard would require the Applicant to develop an approved operating plan for the Port to ensure that it is not operated in severe weather that may cause an accident or spill. Furthermore, Section 2.3.10 *Maritime, Safety, and Related Matters* outlines specific onboard control and safety systems such as a pipeline metering system, and a cargo system to ensure monitoring of all operations.

3. Comment noted. Impacts to biological resources such as hard bottom areas and sea grass are discussed in Section 4.2 of the EIS. Mitigation for those impacts is discussed in Section 4.11.

4. Impacts to fish and fisheries from the engine cooling system are discussed in Section 4.2.1.14 of the EIS. Conservative estimates suggest that no more than 0.05 percent of the average Florida landings would be lost during an entire year.

5. In response to comments on the Draft EIS, the Applicant has revised the pipeline route to minimize impacts on sand resource areas. The pipeline route is described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.



Page 1 of 1

DOCUMENT ID: U SCG-2007-28532-0093 PRINT CLOSE

PUBLIC SUBMISSION

AS OF: May 08, 2008
TRACKING NO.8054f7be
COMMENTS DUE: January 01, 0001
Late comments are accepted

DOCKET: USCG-2007-28532
Port Dolphin Energy LLC, Port Dolphin Energy Liquefied Natural Gas Deepwater Port License Application

COMMENT ON: USCG-2007-28532-0065
Port Dolphin Energy LLC, Port Dolphin Energy Liquefied Natural Gas Deepwater Port License Application

DOCUMENT: USCG-2007-28532-0093
Richard R. Wood

SUBMITTER INFORMATION

NAME: Richard R Wood
ADDRESS:
7135 Gulf of Mexico Drive
Dolphin 22
Longboat Key, FL, 34228

GENERAL COMMENT

I feel the proposed gas pipeland route would not be in the best interest of the property owners on the islands of Manatee County. Both tourist and property owners go the beach for the white sand. We pay a higher rate of taxes now to maintain this. This location of the pipeline would cause a greater cost to replinish this sand. If we lose our beaches becouse of the high tax it puts on property owners and tourist, our state well see a loss of revenue as well. I feel other routes could be found for this pipeline. Thank You, Richard R. Wood

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http://www.regulations.gov/fdmspublic/custom/jsp/common/view.jsp?__dmfRequestId=__e... 5/8/2008

1. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.

D. Canniff
327 Tarpon St.
POB 1472
Anna Maria, FL 34216

DEPT. OF TRANSPORTATION
DOCKETS
2008 JUN -5 A 9:52

May 27, 2008

RE: USCG-2007-28532 -- PROPOSED DOLPHIN PROJECT

I oppose this project for most of the reasons put forth by other individuals and organizations and especially because

* it seems that running a pipe line through the channel subject to the most forceful tidal currents (that occur at the tip of the island) is asking for trouble from the most severe stress on the pipe itself. -1

* the exploitation of public space for private profit with the major risk for damage and disaster accruing to the public -- and especially when there is already a means of transporting the material available (but, of course, the profit would not be as great to the company). -2

1. Pipeline safety is discussed in Section 5 of the EIS. Any pipeline constructed and operated in the US would be constructed to withstand normal tidal currents.

2. Comment noted.

PORT DOLPHIN LNG DEEPWATER PORT

PUBLIC MEETING TO RECEIVE COMMENTS ON THE DRAFT EIS

DATE TAKEN: Tuesday, May 6, 2008

TIME: 4:30 p.m.

PLACE: Manatee Convention Center
One Haben Boulevard
Palmetto, Florida

PRESENT:

DON BECKHAM - Engineering-Environmental Management
RAY MARTIN - U.S. Coast Guard
CHRIS HANAN - Maritime Administration
DAVE SWEARINGEN - Federal Energy Regulatory Commission
MARK SRAMEK - National Geographic Atmospheric Administration
GARY LARSEN - Moderator

Proceedings Reported by:

Patricia A. Pilarski, CSR
Executive Reporting Service
Bank of America Tower, Suite 400
One Progress Plaza, 200 Central Avenue

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I N D E X

PUBLIC SPEAKERS:
Beau Suthard
Juan Florensa
Charlie Hunsicker
Suzanne Cooper
Glenn Compton
Ted Bisterfeld
Jim Locascio
Mark Peterson

Written comments received by Beau Suthard and Juan Florensa and attached

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* * *

MR. MARTIN: Good afternoon. Welcome, Ladies and Gentlemen. My name is Ray Martin of the Deepwater Port Standards Division of the Coast Guard Headquarters. Also, here are Mr. Chris Hanan of the Maritime Administration, Dave Swearingen of the Federal Energy Regulatory Commission, and Mark Sramek of the National Geographic Atmospheric Administration and Don Beckham of Engineering Environmental Management, or E²M.

In a few minutes they will provide a short overview of their responsibilities regarding the Port Dolphin deepwater port license application. But first I would like to give a brief background of the process.

In November of 2002 Coast Guard -- Congress passed the Maritime Transportation Security Act, which amended the Deepwater Port Act by including the importation of natural gas. Prior to that, it only included oil.

Since the passage of the Act, the Coast Guard and the Maritime Administration have received 16 applications for natural gas deepwater ports. One of those applications was submitted on March 29,

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2007, by Port Dolphin Energy, LLC. They proposed to own, construct and operate a natural gas deepwater port located, approximately, 28 miles off the western coast of Florida. This project is referred to as Port Dolphin.

Since the project is closest to Florida it has been identified as an adjacent coastal state. This gives the governor specific authority in the approval process under the Deepwater Port Act. The governor of an adjacent coastal state may approve, disapprove or notify Maritime of inconsistencies with state programs relating to environmental protection, land and water use, and coastal zone management for which Maritime condition the license to make consistent.

To issue a deepwater port license, there are a number of elements that must be considered by the Maritime Administration. Chris Hanan will describe those in a minute.

With that as some background, I would now like to provide a brief overview of the Coast Guard's responsibility regarding the license application process. The Coast Guard and the Maritime Administration work together in processing deepwater port license applications. Although, the

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administrator of the Maritime Administration will ultimately decide whether to approve, disapprove or approve with conditions a license for the proposed deepwater port. The Coast Guard is the lead federal agency for developing the environmental impact statement as one important input for that decision.

In fulfilling this role the Coast Guard must seek input from the public as well as from other state and federal agencies.

The Coast Guard is also responsible for the evaluation of the proposed deepwater port engineering design standards; the development of operations, water waste management, Maritime safety and security requirements and risk management; environmental protection and monitoring requirements; and compliance with various domestic and international laws for LNG carriers that might call on the Port Dolphin deepwater port.

Should the application be approved the Coast Guard will also coordinate with other agencies in overlapping areas or responsibility of design and operational conditions to be included in the record of decision and license and in developing post licensing requirements.

I want to make it clear that the Coast Guard

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is neither a proponent nor an opponent for any deepwater port project. I also want to emphasize that only after the environmental review process have been completed can there be any activity on the proposed project.

As required by the Deepwater Port Act, the environmental analysis, in this case the environmental impact statement or EIS must be prepared in accordance with the National Environmental Policy Act or NEPA.

On April 17, 2008, we published a draft EIS. The intent of this public meeting is to receive your comments on the draft EIS or DEIS. In addition, written comments on the DEIS can be submitted until June 2, 2008, to the docket management facility. Instructions for filing written comments are available at the registration table.

The DEIS describes the nature and extent of the environmental impacts of the proposed action, which is the construction and operation of Port Dolphin deepwater port and associated pipelines. The DEIS includes, among other topics, the purpose and need for the proposed action, a description of the alternatives, a description of the affected environment, and an evaluation of impacts and

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cumulative impacts on the natural and human environment by the proposed action and alternatives.

Comments received on the DEIS will become public record and will be considered in preparation of the final EIS. Following publication of the final EIS there will be another comment period and public hearing on the EIS and overall application.

Don Beckham of E²M will explain more on this in a few minutes.

At this time I would like to introduce Chris Hanan of the Maritime Administration who will describe the responsibilities of his agency.

MR. HANAN: Good afternoon. As Ray said, my name is Chris Hanan, and I am a member of the Maritime Administration of deepwater port management team, together with the U.S. Coast Guard.

The secretary of transportation has charged the Maritime Administration with processing all deepwater port applications for the Federal Government. In addition, the secretary has placed the responsibility for issuing or denying a deepwater port license with the Maritime Administration. The environmental impact statement is a major and important step in the deepwater port application process.

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Early on in this process a public meeting was held here in Palmetto, where you and other individuals expressed concerns and provided areas of interests to be addressed in the environmental impact statement. The staff at E²M, along with many other staff members from various other government agencies, worked hard to produce this comprehensive document that specifically addressed your concerns.

I want to thank everyone who helped put this draft document together. However, we have more work to do. We have returned here today to see how we can make the environmental impact statement better. Your comments will help us do just that and will be greatly appreciated.

The next step in the EIS process requires us to take your comments made here today and those written, which we will accept until June 2, 2008, and try and make an improved and more comprehensive environmental document.

After the final environmental document is completed and published the Maritime Administration and the U.S. Coast Guard will host the third and final public hearing later this year.

At that time we will accept comments from all concerned parties for up to 45 days after the final

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public hearing. After the comment period the Maritime Administration will make a decision within 45 days of the close of comments. The decision will be either: approve the application and issue a license, approve the application and issue a license subject to conditions, or disapprove the application.

The agency's decision to approve or disapprove the application will be reflected in the record of decision document issued by the Maritime Administrator. Issuance of the official license will follow should the application be accepted.

Any stated terms and/or conditions for the license will be reflected in the record of decision as well as in the official license document.

We emphasize these license requirements are stringent and completely enforceable. If a licensee violates the conditions of its license the Maritime Administration will suspend the license and/or operation of the facility until the conditions are sufficiently met.

Finally, we can assure you that the environmental review will have a substantial bearing on the final licensing decision. We appreciate your interest and encourage you to express your views and

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concerns to help shape an adequate environmental document for the Port Dolphin Energy, LLC deepwater port project.

Now I will turn this over to Dave Swearingen and he can elaborate on his roles.

MR. SWEARINGEN: Thank you, Chris.

Good evening. My name is Dave Swearingen and I am an environmental project manager of the Federal Energy Regulatory Commission.

As Ray mentioned earlier, the FERC is a cooperating agency for the production of the EIS because of the onshore pipeline, which is under FERC jurisdiction. NEPA requires that the FERC Commission take into consideration environmental impacts associated with new natural gas facilities under its jurisdiction. So the FERC will use this cooperation process to fulfill its NEPA obligations.

The FERC Commission is responsible for making a determination on whether to issue a certificate of public convenience and necessity to Port Dolphin. The EIS prepared by the various agencies does not make that decision for the FERC.

The purpose of the EIS will be used to advise the FERC Commission and to disclose to the public the environmental impact of constructing and

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operating the proposed project. The commission will consider the environmental information in the EIS, public comments, as well as a host of nonenvironmental issues, such as engineering, markets, rates, finances, tariffs and design and costs in making an informed decision on whether or not to approve the part of the project under FERC jurisdiction, that is the onshore pipeline.

Only after taking the environmental and nonenvironmental factors into consideration will the commission make its final decision on whether or not to approve Port Dolphin's proposed onshore pipeline.

As Ray mentioned, we are in the comment period phase of the environmental analysis. The FERC invites you to submit either oral or written comments on the draft EIS this evening or either by mailing them in or using the FERC Web site to submit them electronically. Only comments directly related to environmental impacts on the onshore pipeline should be submitted directly to the FERC. All others should be submitted via the Coast Guard process.

Okay. With that, I will turn things over to Mark Sramek with NOAA, National Marine Fisheries Service.

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MR. SRAMEK: Thank you, Dave.

Good evening. My name is Mark Sramek. I work with the National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Habitat Conservation Division. I work in St. Petersburg, Florida.

My principal role on the project is the environmental role -- excuse me -- environmental review and assessment of potential impacts on living and the marine resources, particularly essential fish habitat, icthyoplankton and hard bottom habitats in the project area.

My area of responsibility stands from Dixie County near the Suwannee River, south down to Naples, Florida, Ten Thousand Islands estuary.

Next I would like to turn this over to Mr. Beckham with the E²M. Thank you.

MR. BECKHAM: Thank you, Mark.

Good afternoon. I am Don Beckham. I am the project manager for this -- development of this EIS for engineering and environmental management, or E²M as Ray mentioned.

E²M is an environmental contractor that help the Coast Guard and Maritime Administration to prepare the draft of the environmental impact

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statement.

I want to provide an overview of the public participation process that is involved in preparing the EIS.

E2M is a science-based environmental consulting firm experienced in preparing EISs and related studies. The EIS is being conducted in accordance with the National Environmental Policy Act or NEPA. We conducted an independent evaluation of the anticipated environmental impacts of the proposed project.

Public involvement is a fundamental aspect of NEPA and of the Coast Guard and Maritime Administration's NEPA policies.

The public involvement process started several months ago when the Coast Guard and Maritime Administration published a notice of intent to prepare the EIS in the federal register on July 12th of 2007. The notice was also published in the Tampa Tribune and the Bradenton Herald.

The notice -- we also mailed a notice to about 190 state and federal agencies, individuals and groups that might have some interest in the project.

During the 30-day public comment period in July and August an open house and public meeting was

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held here at the Manatee County Convention Center. Information was provided on how to submit written comments. A number of comments were received and these were taken into account in the preparation of the draft EIS.

Since that time the draft EIS has been published. A notice of availability of the DEIS was published in the federal register on April 17th and that notice announced this public meeting that the DEIS was available and how you could get copies of it.

The notice was also published in the Tampa Tribune and the Bradenton Herald and included information about how to make comments on the federal government's electronic docket system.

We also mailed, approximately, 200 copies of the draft EIS to people or agencies that had requested a copy or that we knew were interested in the project. We also have copies here tonight. You saw them on the table in the other room and we'll make those available at the registration table if you would like to take a copy with you. We have both paper copies and CDs of the draft EIS.

The comment period for the draft EIS is 45 days, starting on April 17th and closing on June

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2nd. At the close of the comment period the Coast Guard Maritime Administration will start work on the final EIS. A notice of availability of the final EIS is expected somewhere in mid-July. A notice will also be published and distributed when the final EIS is available and there will also be a 30-day public comment period specifically on the FEIS.

On a similar track, but not directly connected to the NEPA process, the Coast Guard and Maritime Administration will hold a formal hearing on the deepwater port license application following the distribution of the FEIS. At that meeting the public will be given additional opportunity to provide comments on all aspects of the proposed project.

We would like to thank you for taking your time to come out tonight and provide your comments on the draft EIS. Thanks very much.

MR. MARTIN: Thanks, Don.

Now I would like to introduce Mr. Gary Larsen who will explain how the remainder of this meeting will go.

MR. LARSEN: Thank you.

Good afternoon, everyone. My name is Gary

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Larsen. I am a local mediator. I have been asked to do one thing, and that is to help moderate and facilitate these public comments. I am sure you have all heard by now that we are here to talk about and receive the public comments for the draft EIS, a similar format to what we use at the initial public scope meeting.

We have a wonderful court reporter here, who I assure you will take down everything that you say, and accurately as well.

And what I am going to do is, I have got a sheet of people that signed up. I will go down that sheet. I will ask you to come up. And initially your comments should be three minutes. That is to make sure that everyone gets to speak. I assure you if you don't have a chance to complete what you want to say in that three minutes, when we are done with everyone who signed up and they've had their opportunity, I will look back to this audience and anyone who has got something more to say is certainly free to do it.

I would clarify that the purpose of this is not a question-and-answer session, but rather to receive the public comments as you have heard for consideration by the various agencies and what they

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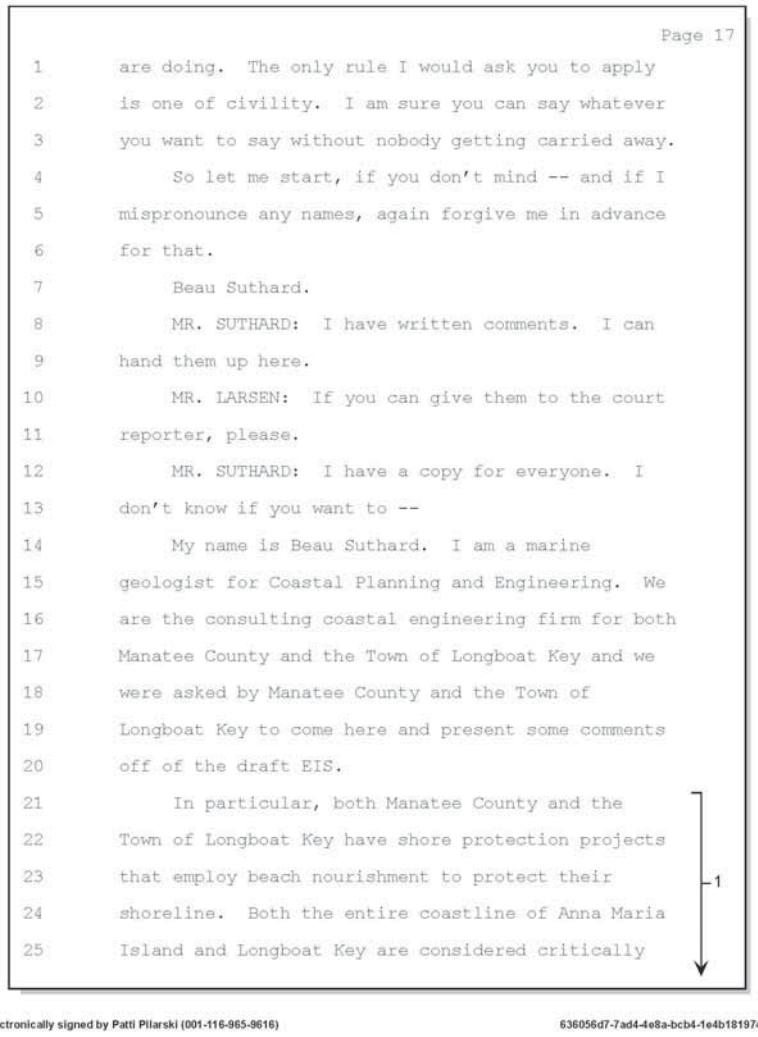

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are doing. The only rule I would ask you to apply is one of civility. I am sure you can say whatever you want to say without nobody getting carried away.

So let me start, if you don't mind -- and if I mispronounce any names, again forgive me in advance for that.

Beau Suthard.

MR. SUTHARD: I have written comments. I can hand them up here.

MR. LARSEN: If you can give them to the court reporter, please.

MR. SUTHARD: I have a copy for everyone. I don't know if you want to --

My name is Beau Suthard. I am a marine geologist for Coastal Planning and Engineering. We are the consulting coastal engineering firm for both Manatee County and the Town of Longboat Key and we were asked by Manatee County and the Town of Longboat Key to come here and present some comments off of the draft EIS.

In particular, both Manatee County and the Town of Longboat Key have shore protection projects that employ beach nourishment to protect their shoreline. Both the entire coastline of Anna Maria Island and Longboat Key are considered critically

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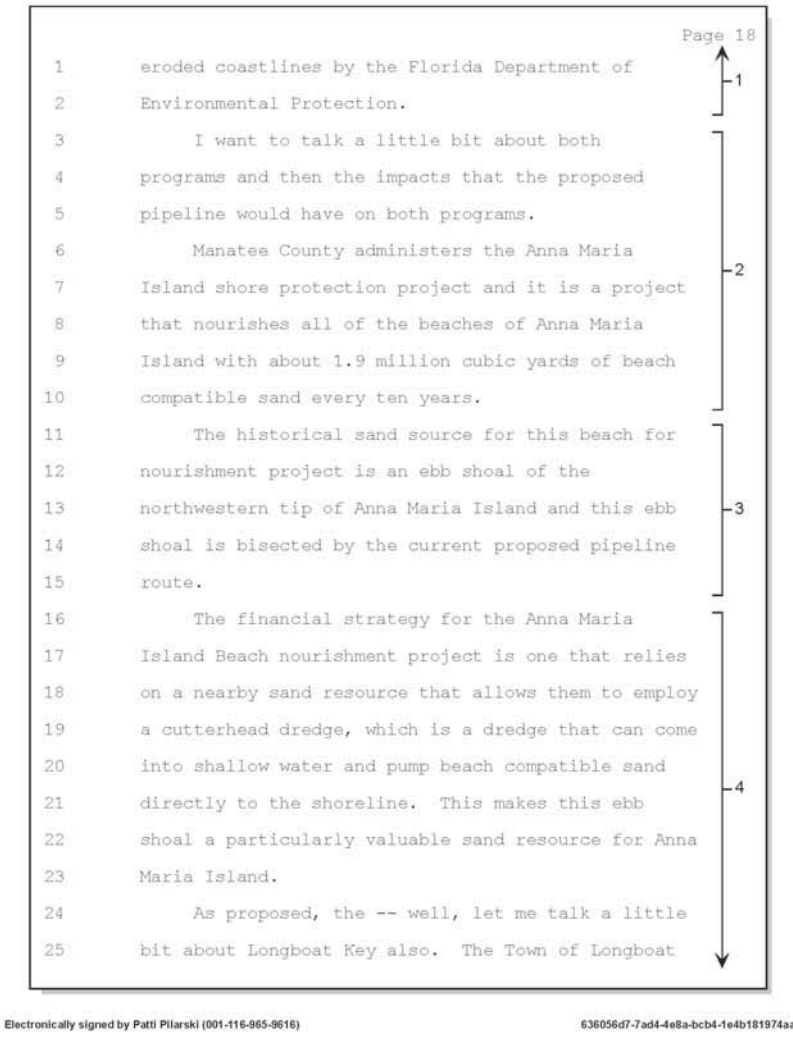
1. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.



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eroded coastlines by the Florida Department of Environmental Protection.

I want to talk a little bit about both programs and then the impacts that the proposed pipeline would have on both programs.

Manatee County administers the Anna Maria Island shore protection project and it is a project that nourishes all of the beaches of Anna Maria Island with about 1.9 million cubic yards of beach compatible sand every ten years.

The historical sand source for this beach for nourishment project is an ebb shoal of the northwestern tip of Anna Maria Island and this ebb shoal is bisected by the current proposed pipeline route.

The financial strategy for the Anna Maria Island Beach nourishment project is one that relies on a nearby sand resource that allows them to employ a cutterhead dredge, which is a dredge that can come into shallow water and pump beach compatible sand directly to the shoreline. This makes this ebb shoal a particularly valuable sand resource for Anna Maria Island.

As proposed, the -- well, let me talk a little bit about Longboat Key also. The Town of Longboat

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2. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.

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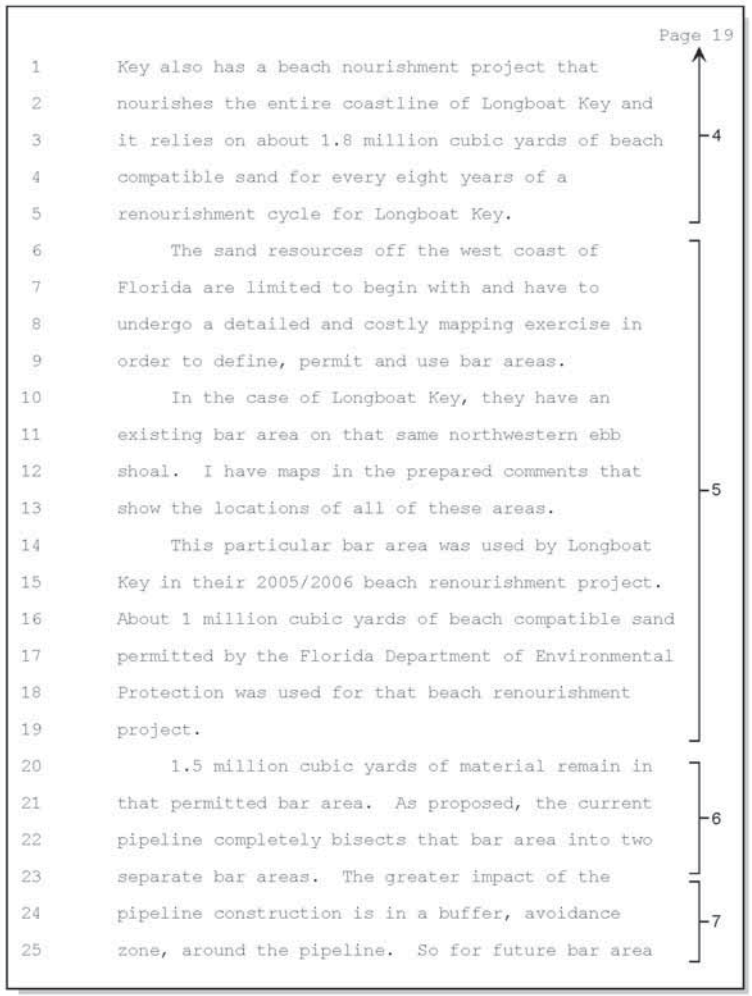

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Key also has a beach nourishment project that nourishes the entire coastline of Longboat Key and it relies on about 1.8 million cubic yards of beach compatible sand for every eight years of a renourishment cycle for Longboat Key. 4

The sand resources off the west coast of Florida are limited to begin with and have to undergo a detailed and costly mapping exercise in order to define, permit and use bar areas.

In the case of Longboat Key, they have an existing bar area on that same northwestern ebb shoal. I have maps in the prepared comments that show the locations of all of these areas. 5

This particular bar area was used by Longboat Key in their 2005/2006 beach renourishment project. About 1 million cubic yards of beach compatible sand permitted by the Florida Department of Environmental Protection was used for that beach renourishment project.

1.5 million cubic yards of material remain in that permitted bar area. As proposed, the current pipeline completely bisects that bar area into two separate bar areas. 6 The greater impact of the pipeline construction is in a buffer, avoidance zone, around the pipeline. 7 So for future bar area

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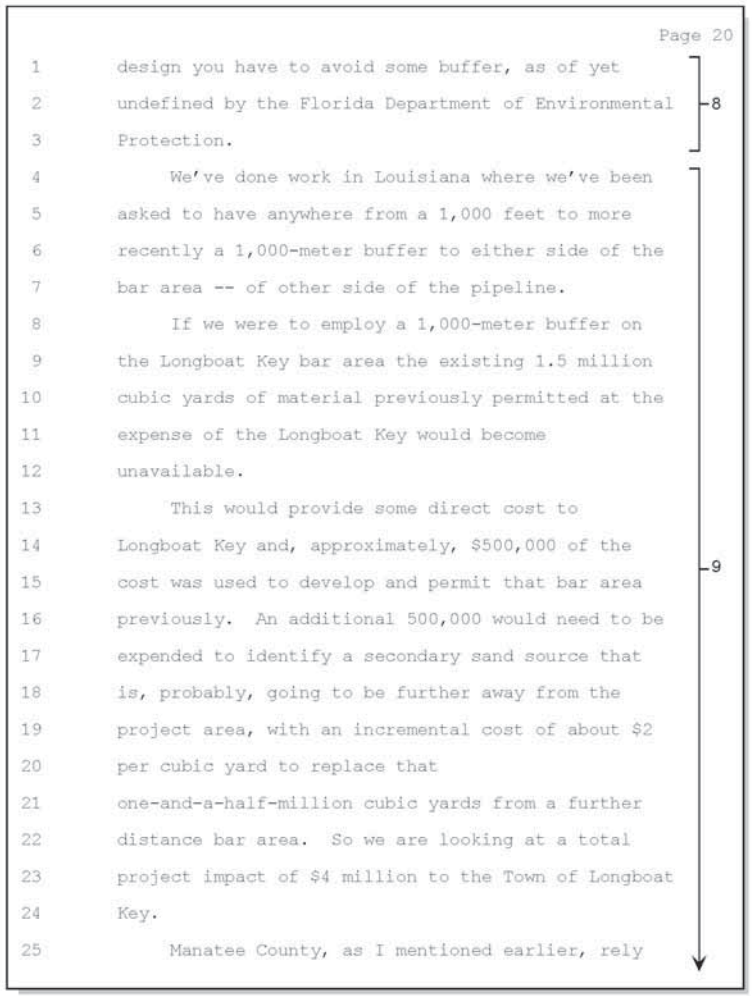
5. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.

6. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.

7. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4. Also, the Applicant has proposed a 400 foot buffer through potential sand resource areas based on the best available information from discussions from the state.



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design you have to avoid some buffer, as of yet undefined by the Florida Department of Environmental Protection. 8

We've done work in Louisiana where we've been asked to have anywhere from a 1,000 feet to more recently a 1,000-meter buffer to either side of the bar area -- of other side of the pipeline.

If we were to employ a 1,000-meter buffer on the Longboat Key bar area the existing 1.5 million cubic yards of material previously permitted at the expense of the Longboat Key would become unavailable.

This would provide some direct cost to Longboat Key and, approximately, $500,000 of the cost was used to develop and permit that bar area previously. An additional 500,000 would need to be expended to identify a secondary sand source that is, probably, going to be further away from the project area, with an incremental cost of about $2 per cubic yard to replace that one-and-a-half-million cubic yards from a further distance bar area. So we are looking at a total project impact of $4 million to the Town of Longboat Key. 9

Manatee County, as I mentioned earlier, rely

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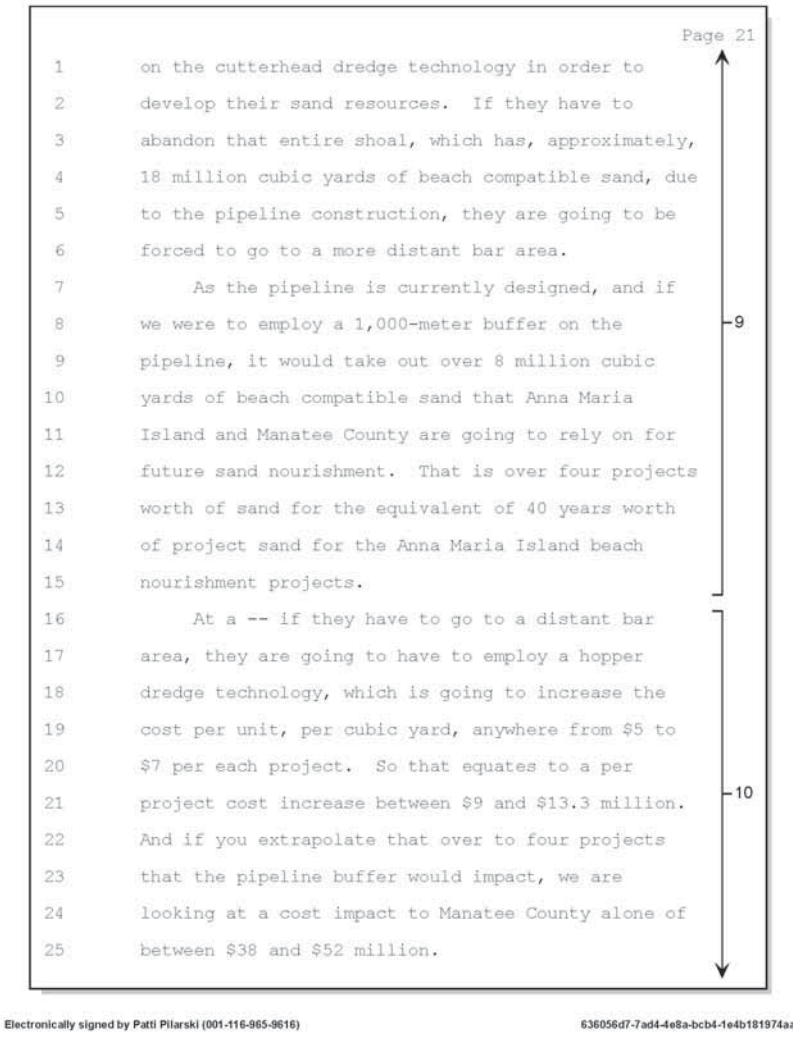
8. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4. Also, the Applicant has proposed a 400 foot buffer through potential sand resource areas based on the best available information from discussions from the state.

9. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4. Also, the Applicant has proposed a 400 foot buffer through potential sand resource areas based on the best available information from discussions from the state.



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on the cutterhead dredge technology in order to develop their sand resources. If they have to abandon that entire shoal, which has, approximately, 18 million cubic yards of beach compatible sand, due to the pipeline construction, they are going to be forced to go to a more distant bar area.

As the pipeline is currently designed, and if we were to employ a 1,000-meter buffer on the pipeline, it would take out over 8 million cubic yards of beach compatible sand that Anna Maria Island and Manatee County are going to rely on for future sand nourishment. That is over four projects worth of sand for the equivalent of 40 years worth of project sand for the Anna Maria Island beach nourishment projects. 9

At a -- if they have to go to a distant bar area, they are going to have to employ a hopper dredge technology, which is going to increase the cost per unit, per cubic yard, anywhere from $5 to $7 per each project. So that equates to a per project cost increase between $9 and $13.3 million. And if you extrapolate that over to four projects that the pipeline buffer would impact, we are looking at a cost impact to Manatee County alone of between $38 and $52 million. 10

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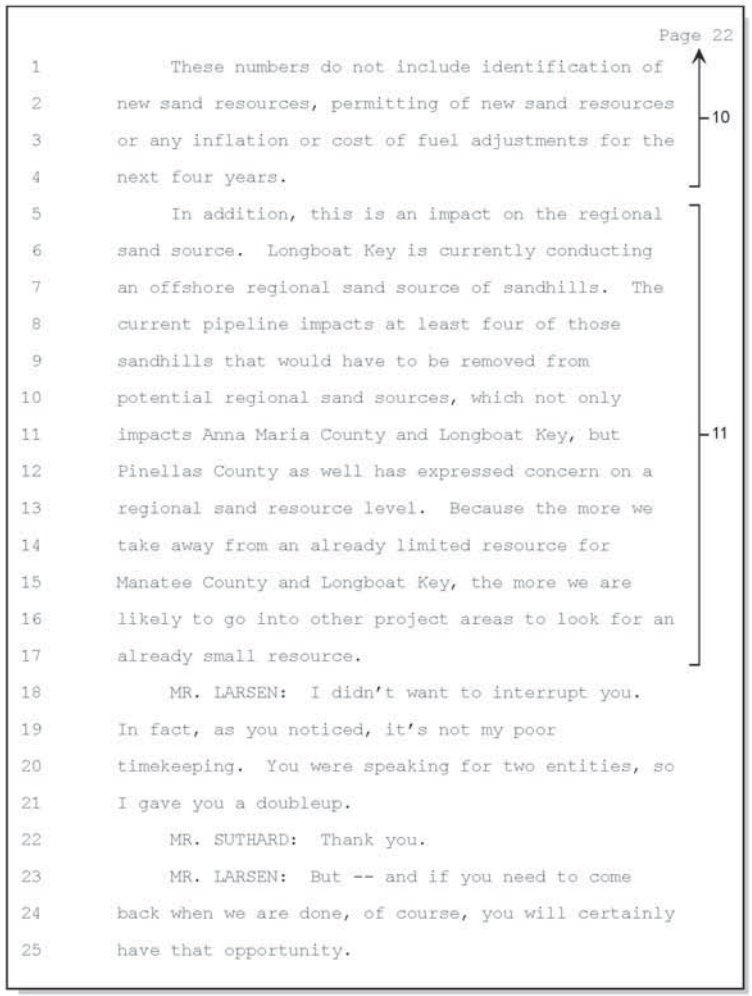
10. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4. Also, the Applicant has proposed a 400 foot buffer through potential sand resource areas based on the best available information from discussions from the state. Furthermore, sand resource estimates have been calculated and are discussed in Section 4.4.



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These numbers do not include identification of new sand resources, permitting of new sand resources or any inflation or cost of fuel adjustments for the next four years.

In addition, this is an impact on the regional sand source. Longboat Key is currently conducting an offshore regional sand source of sandhills. The current pipeline impacts at least four of those sandhills that would have to be removed from potential regional sand sources, which not only impacts Anna Maria County and Longboat Key, but Pinellas County as well has expressed concern on a regional sand resource level. Because the more we take away from an already limited resource for Manatee County and Longboat Key, the more we are likely to go into other project areas to look for an already small resource.

MR. LARSEN: I didn't want to interrupt you. In fact, as you noticed, it's not my poor timekeeping. You were speaking for two entities, so I gave you a doubleup.

MR. SUTHARD: Thank you.

MR. LARSEN: But -- and if you need to come back when we are done, of course, you will certainly have that opportunity.

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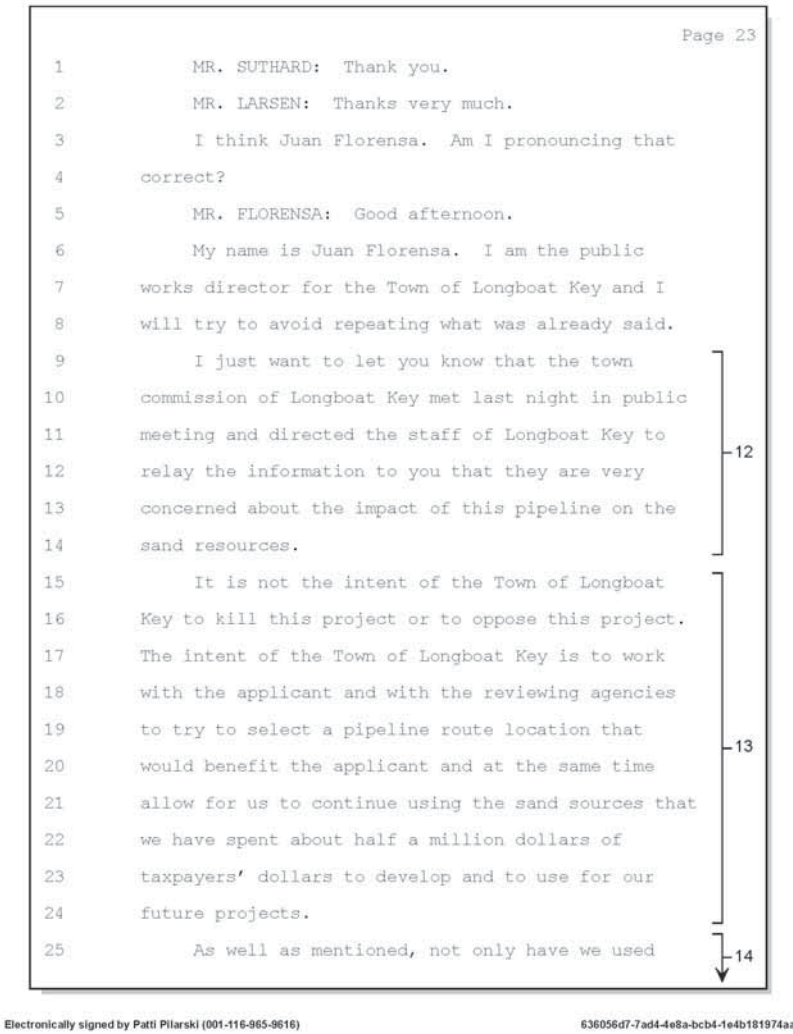
11. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.



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MR. SUTHARD: Thank you.

MR. LARSEN: Thanks very much.

I think Juan Florensa. Am I pronouncing that correct?

MR. FLORENSA: Good afternoon.

My name is Juan Florensa. I am the public works director for the Town of Longboat Key and I will try to avoid repeating what was already said.

I just want to let you know that the town commission of Longboat Key met last night in public meeting and directed the staff of Longboat Key to relay the information to you that they are very concerned about the impact of this pipeline on the sand resources. 12

It is not the intent of the Town of Longboat Key to kill this project or to oppose this project. The intent of the Town of Longboat Key is to work with the applicant and with the reviewing agencies to try to select a pipeline route location that would benefit the applicant and at the same time allow for us to continue using the sand sources that we have spent about half a million dollars of taxpayers' dollars to develop and to use for our future projects. 13

As well as mentioned, not only have we used 14

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12. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.

13. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.

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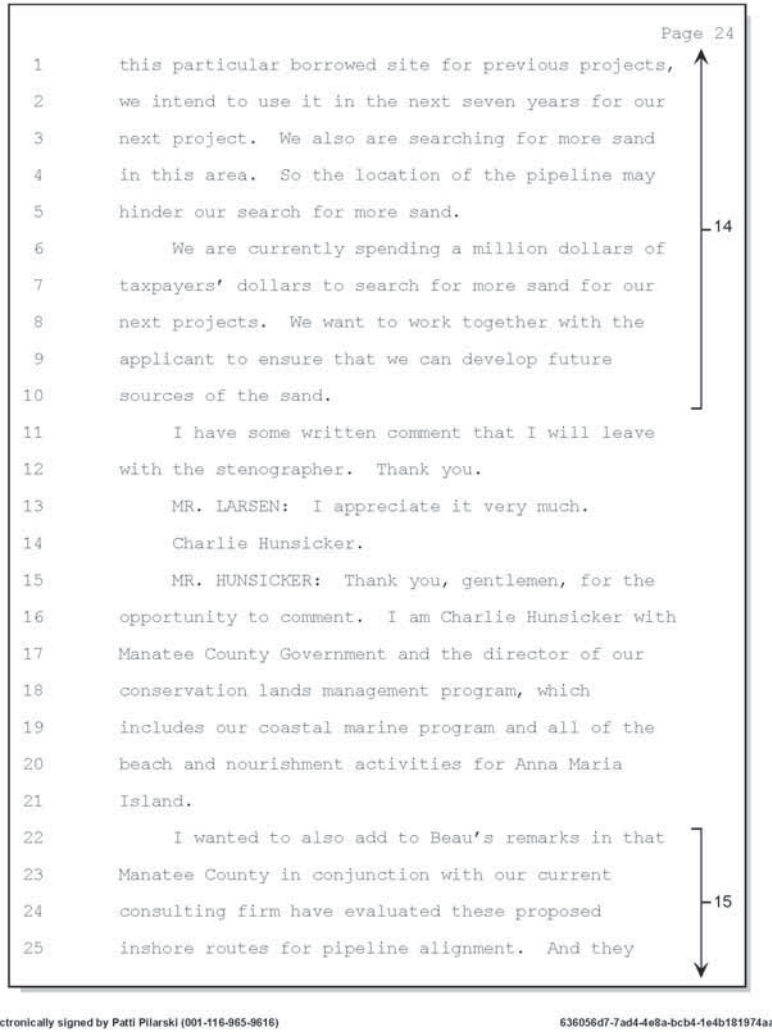

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this particular borrowed site for previous projects, we intend to use it in the next seven years for our next project. We also are searching for more sand in this area. So the location of the pipeline may hinder our search for more sand.

We are currently spending a million dollars of taxpayers' dollars to search for more sand for our next projects. We want to work together with the applicant to ensure that we can develop future sources of the sand. 14

I have some written comment that I will leave with the stenographer. Thank you.

MR. LARSEN: I appreciate it very much.

Charlie Hunsicker.

MR. HUNSICKER: Thank you, gentlemen, for the opportunity to comment. I am Charlie Hunsicker with Manatee County Government and the director of our conservation lands management program, which includes our coastal marine program and all of the beach and nourishment activities for Anna Maria Island.

I wanted to also add to Beau's remarks in that Manatee County in conjunction with our current consulting firm have evaluated these proposed inshore routes for pipeline alignment. And they 15

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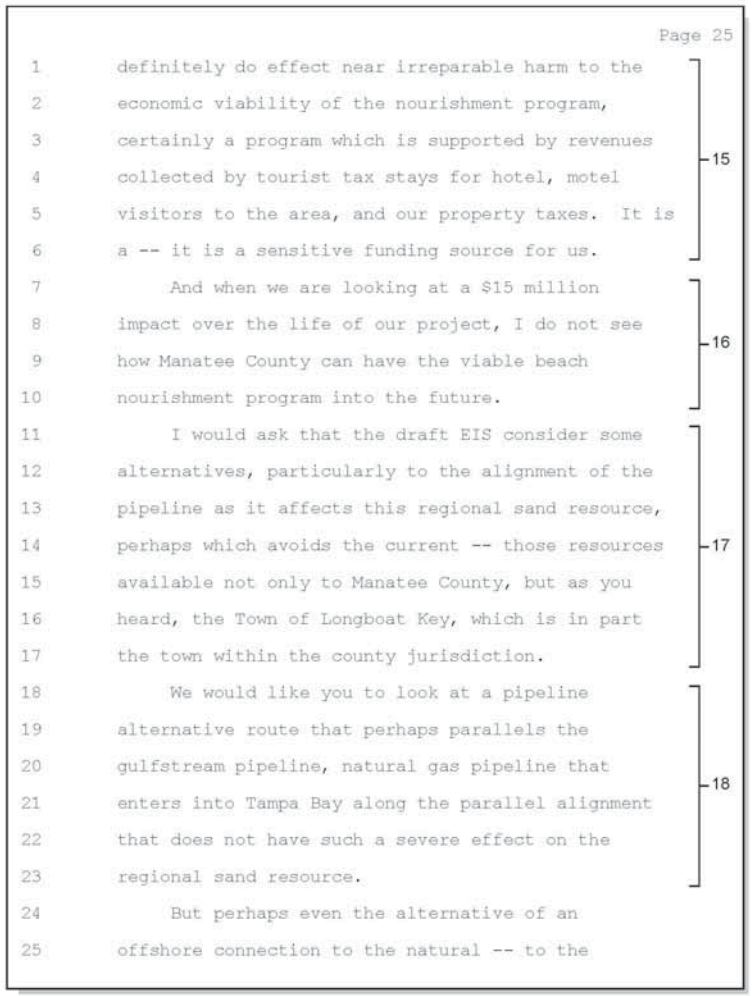
15. Comment noted.



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definitely do effect near irreparable harm to the economic viability of the nourishment program, certainly a program which is supported by revenues collected by tourist tax stays for hotel, motel visitors to the area, and our property taxes. It is a -- it is a sensitive funding source for us. 15

And when we are looking at a $15 million impact over the life of our project, I do not see how Manatee County can have the viable beach nourishment program into the future. 16

I would ask that the draft EIS consider some alternatives, particularly to the alignment of the pipeline as it affects this regional sand resource, perhaps which avoids the current -- those resources available not only to Manatee County, but as you heard, the Town of Longboat Key, which is in part the town within the county jurisdiction. 17

We would like you to look at a pipeline alternative route that perhaps parallels the gulfstream pipeline, natural gas pipeline that enters into Tampa Bay along the parallel alignment that does not have such a severe effect on the regional sand resource. 18

But perhaps even the alternative of an offshore connection to the natural -- to the

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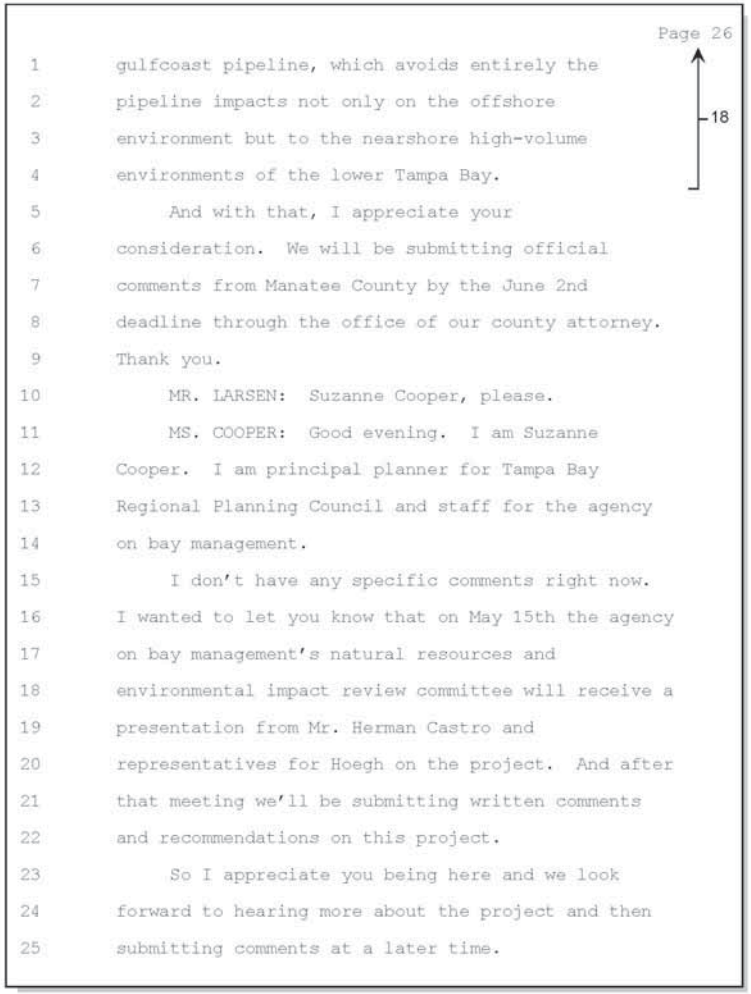
16. Comment noted.

17. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.

18. Three pipeline alternatives are outlined in Section 2.1.4 and impacts of each are discussed in Section 4.



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gulfcoast pipeline, which avoids entirely the pipeline impacts not only on the offshore environment but to the nearshore high-volume environments of the lower Tampa Bay.

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And with that, I appreciate your consideration. We will be submitting official comments from Manatee County by the June 2nd deadline through the office of our county attorney. Thank you.

MR. LARSEN: Suzanne Cooper, please.

MS. COOPER: Good evening. I am Suzanne Cooper. I am principal planner for Tampa Bay Regional Planning Council and staff for the agency on bay management.

I don't have any specific comments right now. I wanted to let you know that on May 15th the agency on bay management's natural resources and environmental impact review committee will receive a presentation from Mr. Herman Castro and representatives for Hoegh on the project. And after that meeting we'll be submitting written comments and recommendations on this project.

So I appreciate you being here and we look forward to hearing more about the project and then submitting comments at a later time.

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MR. LARSEN: Mr. Bisterfeld.

MR. BISTERFELD: Thank you, Mr. Martin and gentlemen. Good afternoon.

I am Ted Bisterfeld. I am a biologist on the staff of the NEPA program office, U.S. Environmental Protection Agency Region IV in Atlanta. Here with me tonight is Kelly Fortan representing our air programs branch.

I don't have a prepared statement but I would just like to run over a few -- make a few brief remarks about EPA's role in the review of this project.

First of all, it's important to realize that EPA places a high priority in the review of all national -- nationally significant energy projects, including the Port Dolphin LNG import project.

Specifically, EPA has mete the requirements that we must fulfill. One of them is that we have a statutory obligation to review all environmental impact statements, to comment on them and make our comments known to the public. EPA is now reviewing the draft EIS along with the other agencies.

I would also like to mention that EPA has its regulatory actions for Port Dolphin. First of all, the port would be in federal waters, and as such,

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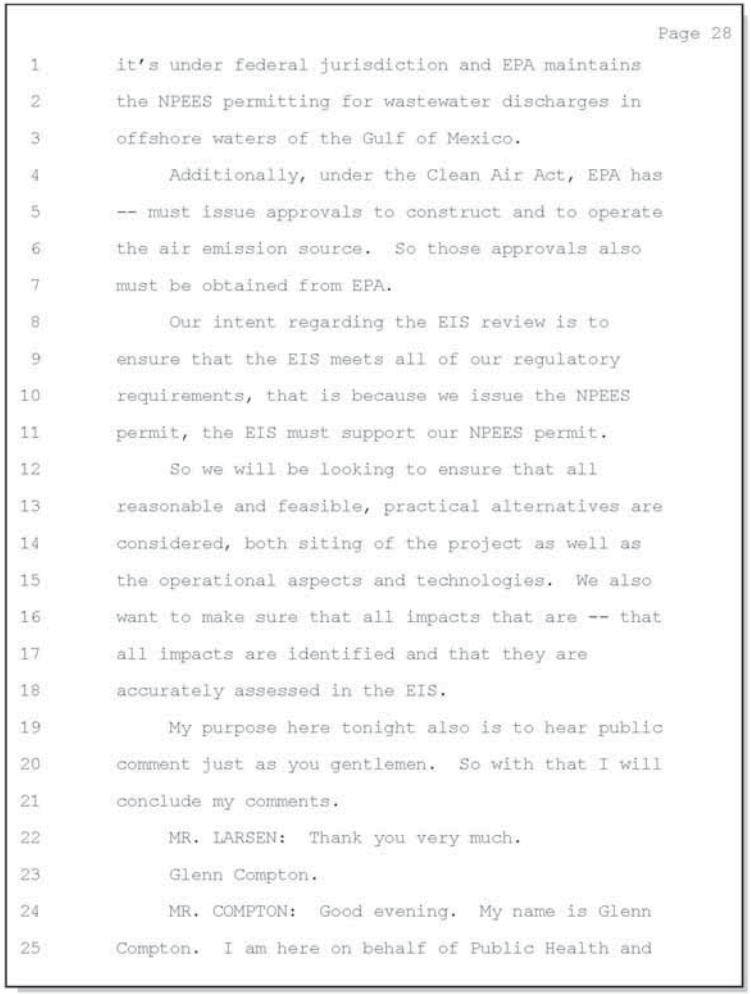

it's under federal jurisdiction and EPA maintains the NPEES permitting for wastewater discharges in offshore waters of the Gulf of Mexico.

Additionally, under the Clean Air Act, EPA has -- must issue approvals to construct and to operate the air emission source. So those approvals also must be obtained from EPA.

Our intent regarding the EIS review is to ensure that the EIS meets all of our regulatory requirements, that is because we issue the NPEES permit, the EIS must support our NPEES permit.

So we will be looking to ensure that all reasonable and feasible, practical alternatives are considered, both siting of the project as well as the operational aspects and technologies. We also want to make sure that all impacts that are -- that all impacts are identified and that they are accurately assessed in the EIS.

My purpose here tonight also is to hear public comment just as you gentlemen. So with that I will conclude my comments.

MR. LARSEN: Thank you very much.

Glenn Compton.

MR. COMPTON: Good evening. My name is Glenn Compton. I am here on behalf of Public Health and

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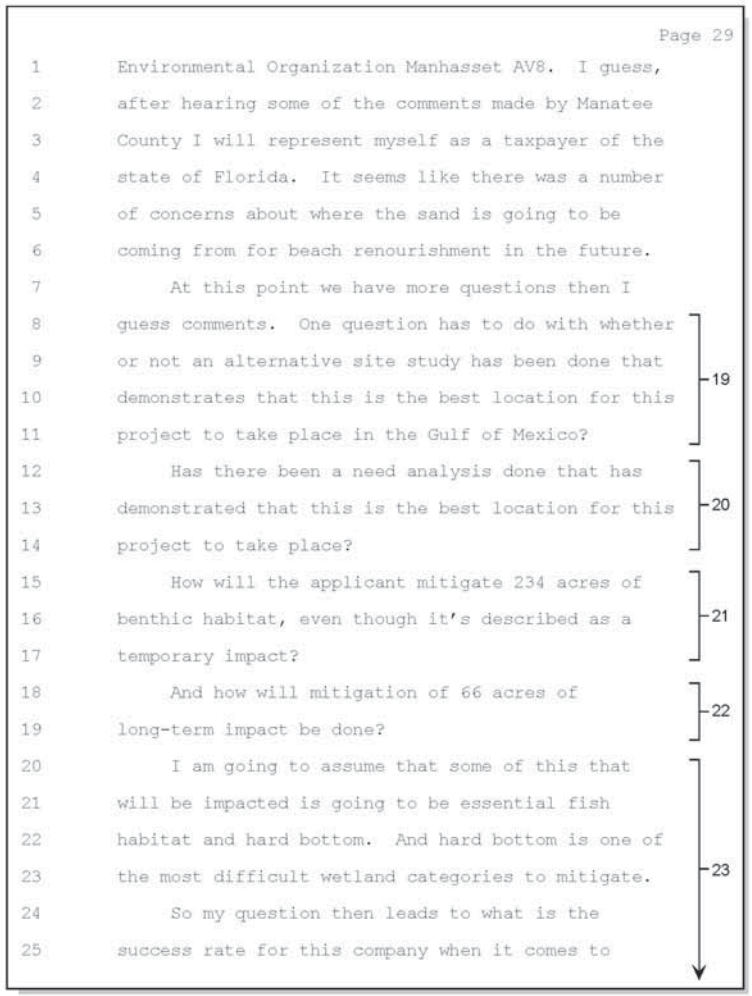

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Environmental Organization Manhasset AV8. I guess, after hearing some of the comments made by Manatee County I will represent myself as a taxpayer of the state of Florida. It seems like there was a number of concerns about where the sand is going to be coming from for beach renourishment in the future.

At this point we have more questions then I guess comments. One question has to do with whether or not an alternative site study has been done that demonstrates that this is the best location for this project to take place in the Gulf of Mexico? 19

Has there been a need analysis done that has demonstrated that this is the best location for this project to take place? 20

How will the applicant mitigate 234 acres of benthic habitat, even though it's described as a temporary impact? 21

And how will mitigation of 66 acres of long-term impact be done? 22

I am going to assume that some of this that will be impacted is going to be essential fish habitat and hard bottom. And hard bottom is one of the most difficult wetland categories to mitigate. 23

So my question then leads to what is the success rate for this company when it comes to

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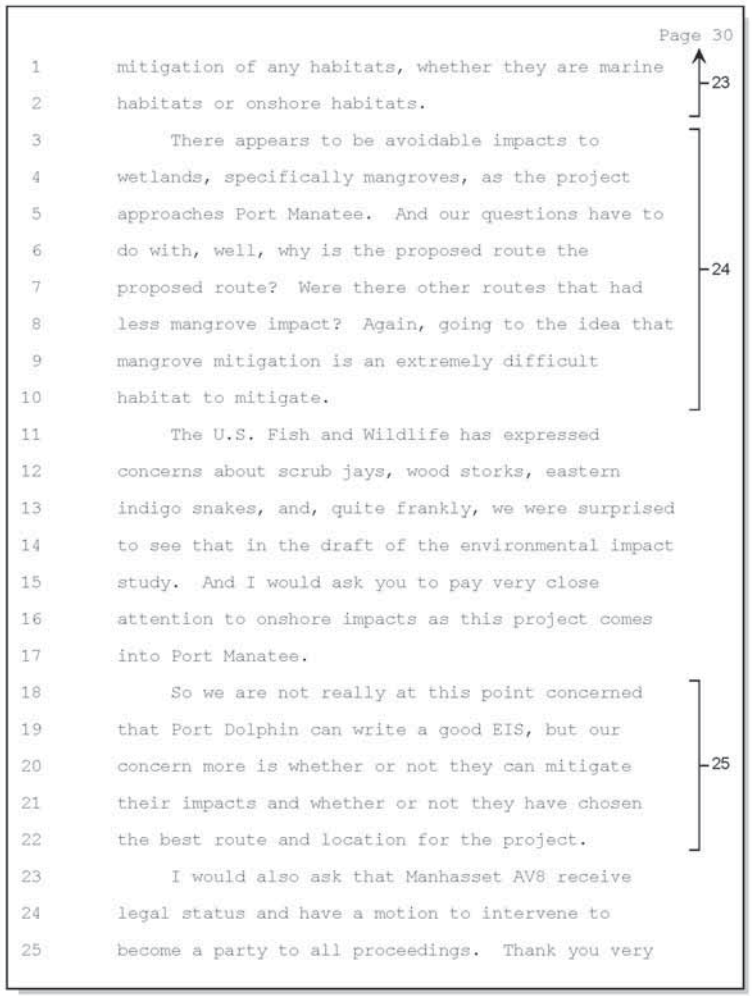
19. Section 2.1.4 of the EIS discusses the phases and criteria for choosing the port location.

20. The purpose and need for the project are discussed in detail in Section 1.2 of the EIS.

21. Impacts to benthic habitat are quantified and discussed in Section 4.2.1.6. Information has been revised to include geotechnical data provided by the applicant since the Draft EIS was published.

22. Impacts to benthic habitat are quantified and discussed in Section 4.2.1.6. Information has been revised to include geotechnical data provided by the applicant since the Draft EIS was published. Section 4.11 provides information on mitigation, including compensatory, that are recommended regarding impacts to benthic habitat.

23. If granted a license, the Maritime Administration and USCG would require a mitigation and monitoring plan to ensure success.



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mitigation of any habitats, whether they are marine habitats or onshore habitats. 23

There appears to be avoidable impacts to wetlands, specifically mangroves, as the project approaches Port Manatee. And our questions have to do with, well, why is the proposed route the proposed route? Were there other routes that had less mangrove impact? Again, going to the idea that mangrove mitigation is an extremely difficult habitat to mitigate. 24

The U.S. Fish and Wildlife has expressed concerns about scrub jays, wood storks, eastern indigo snakes, and, quite frankly, we were surprised to see that in the draft of the environmental impact study. And I would ask you to pay very close attention to onshore impacts as this project comes into Port Manatee.

So we are not really at this point concerned that Port Dolphin can write a good EIS, but our concern more is whether or not they can mitigate their impacts and whether or not they have chosen the best route and location for the project. 25

I would also ask that Manhasset AV8 receive legal status and have a motion to intervene to become a party to all proceedings. Thank you very

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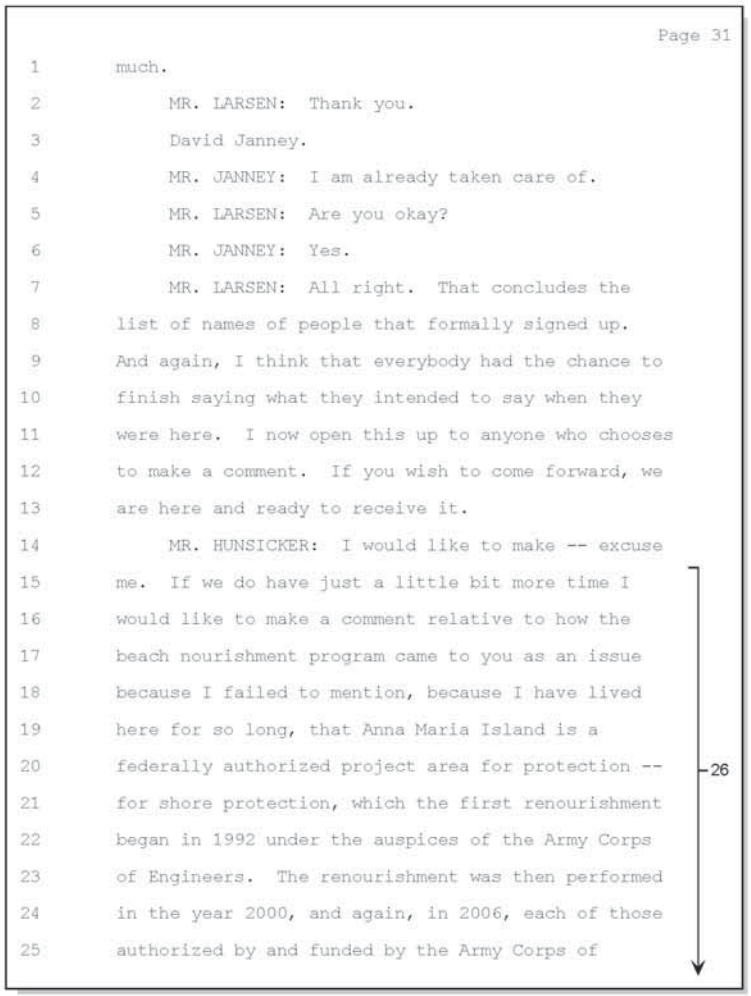
24. Impacts to wetlands and mitigation are discussed in Section 4.2 and 4.11. The Applicant would be required to follow FERC Procedures for wetland crossings, and mitigate any wetland loss with in-kind wetlands from an established wetland bank in Florida as approved by FERC.

25. Comment noted.



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much.

MR. LARSEN: Thank you.

David Janney.

MR. JANNEY: I am already taken care of.

MR. LARSEN: Are you okay?

MR. JANNEY: Yes.

MR. LARSEN: All right. That concludes the list of names of people that formally signed up. And again, I think that everybody had the chance to finish saying what they intended to say when they were here. I now open this up to anyone who chooses to make a comment. If you wish to come forward, we are here and ready to receive it.

MR. HUNSICKER: I would like to make -- excuse me. If we do have just a little bit more time I would like to make a comment relative to how the beach nourishment program came to you as an issue because I failed to mention, because I have lived here for so long, that Anna Maria Island is a federally authorized project area for protection -- for shore protection, which the first renourishment began in 1992 under the auspices of the Army Corps of Engineers. The renourishment was then performed in the year 2000, and again, in 2006, each of those authorized by and funded by the Army Corps of

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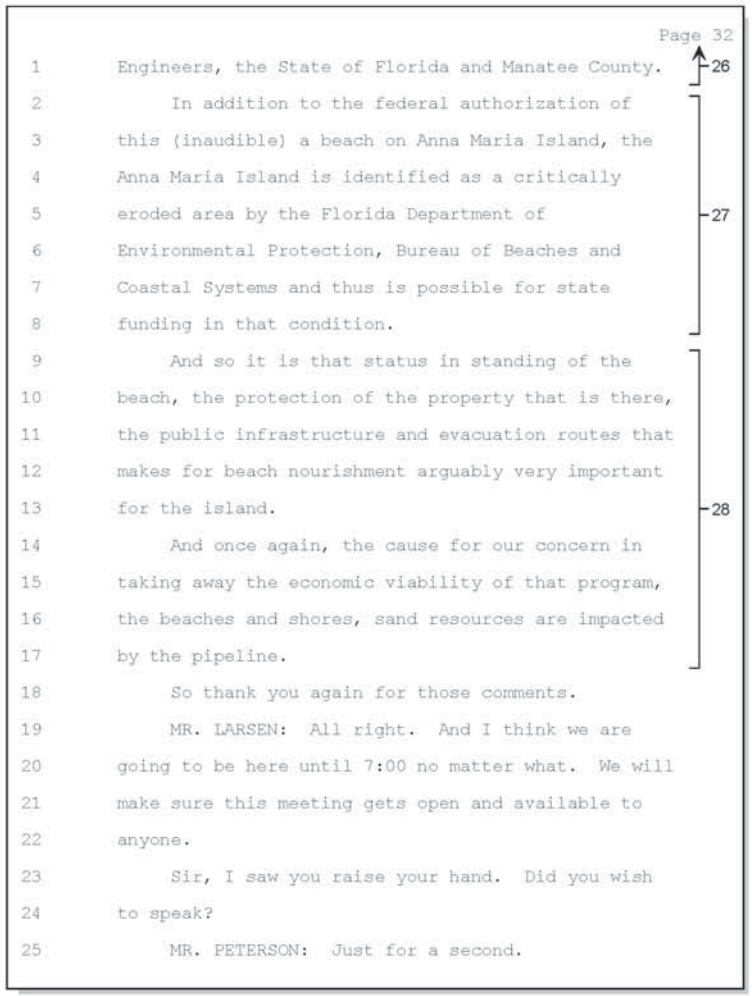
26. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.



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Engineers, the State of Florida and Manatee County. 26

In addition to the federal authorization of this (inaudible) a beach on Anna Maria Island, the Anna Maria Island is identified as a critically eroded area by the Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems and thus is possible for state funding in that condition. 27

And so it is that status in standing of the beach, the protection of the property that is there, the public infrastructure and evacuation routes that makes for beach nourishment arguably very important for the island. 28

And once again, the cause for our concern in taking away the economic viability of that program, the beaches and shores, sand resources are impacted by the pipeline.

So thank you again for those comments.

MR. LARSEN: All right. And I think we are going to be here until 7:00 no matter what. We will make sure this meeting gets open and available to anyone.

Sir, I saw you raise your hand. Did you wish to speak?

MR. PETERSON: Just for a second.

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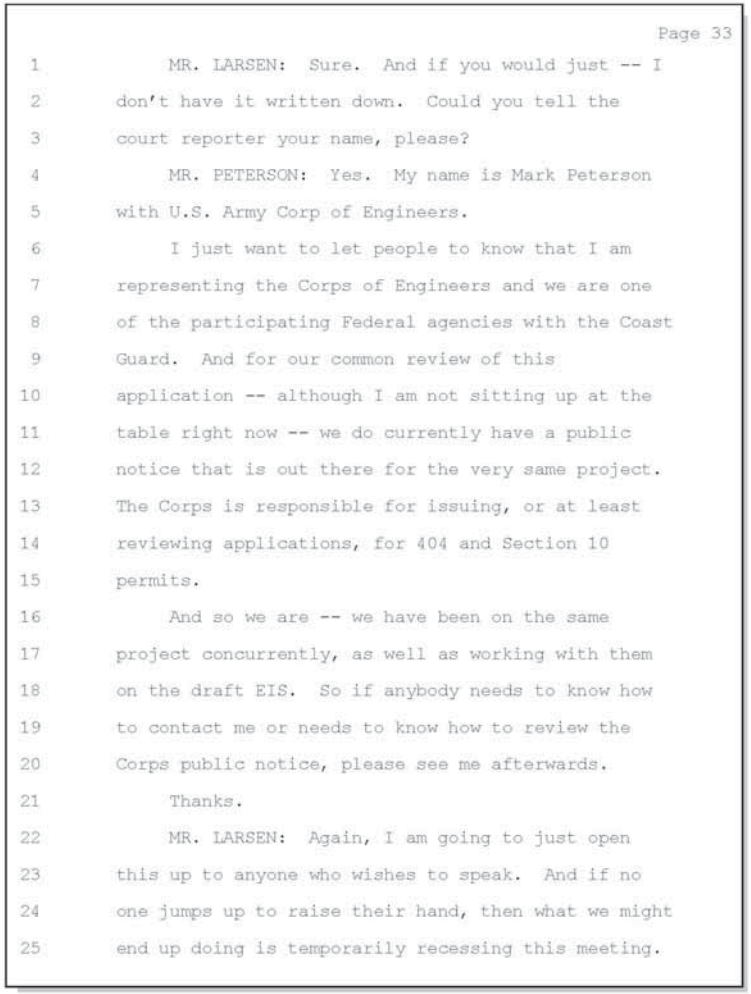
27. In response to comments the Applicant has revised the pipeline route to minimize impacts on permitted sand resource areas. The pipeline route alternatives are described in Section 2.1.4 and sand resources are discussed in Sections 3.4 and 4.4.

28. Comment noted.



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MR. LARSEN: Sure. And if you would just -- I don't have it written down. Could you tell the court reporter your name, please?

MR. PETERSON: Yes. My name is Mark Peterson with U.S. Army Corp of Engineers.

I just want to let people to know that I am representing the Corps of Engineers and we are one of the participating Federal agencies with the Coast Guard. And for our common review of this application -- although I am not sitting up at the table right now -- we do currently have a public notice that is out there for the very same project. The Corps is responsible for issuing, or at least reviewing applications, for 404 and Section 10 permits.

And so we are -- we have been on the same project concurrently, as well as working with them on the draft EIS. So if anybody needs to know how to contact me or needs to know how to review the Corps public notice, please see me afterwards.

Thanks.

MR. LARSEN: Again, I am going to just open this up to anyone who wishes to speak. And if no one jumps up to raise their hand, then what we might end up doing is temporarily recessing this meeting.

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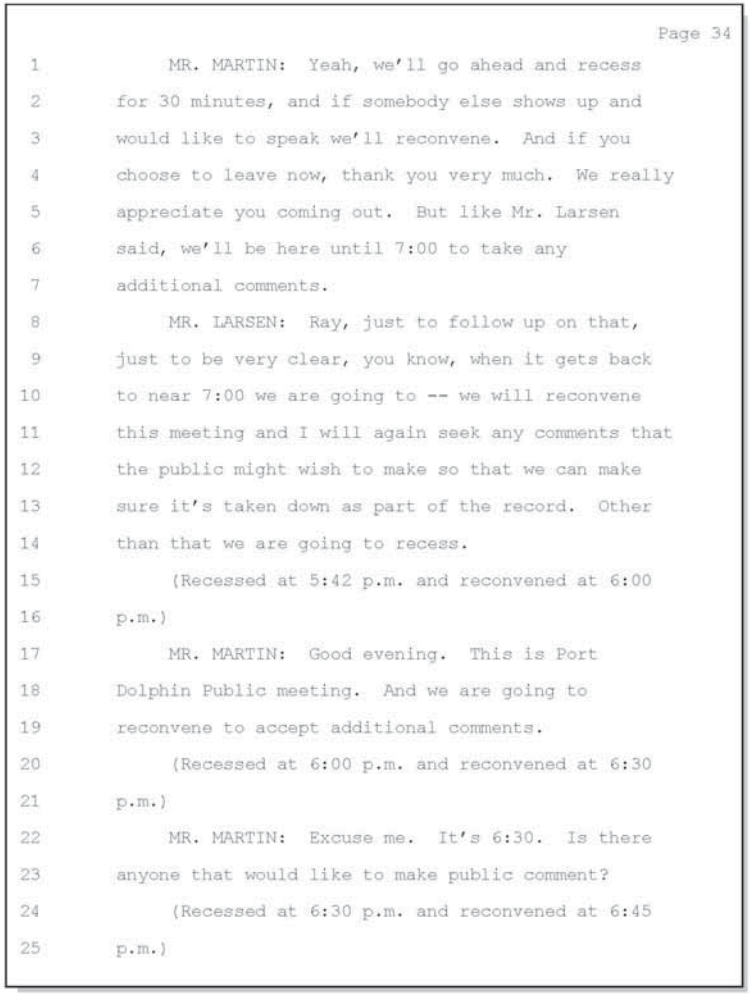

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MR. MARTIN: Yeah, we'll go ahead and recess for 30 minutes, and if somebody else shows up and would like to speak we'll reconvene. And if you choose to leave now, thank you very much. We really appreciate you coming out. But like Mr. Larsen said, we'll be here until 7:00 to take any additional comments.

MR. LARSEN: Ray, just to follow up on that, just to be very clear, you know, when it gets back to near 7:00 we are going to -- we will reconvene this meeting and I will again seek any comments that the public might wish to make so that we can make sure it's taken down as part of the record. Other than that we are going to recess.

(Recessed at 5:42 p.m. and reconvened at 6:00 p.m.)

MR. MARTIN: Good evening. This is Port Dolphin Public meeting. And we are going to reconvene to accept additional comments.

(Recessed at 6:00 p.m. and reconvened at 6:30 p.m.)

MR. MARTIN: Excuse me. It's 6:30. Is there anyone that would like to make public comment?

(Recessed at 6:30 p.m. and reconvened at 6:45 p.m.)

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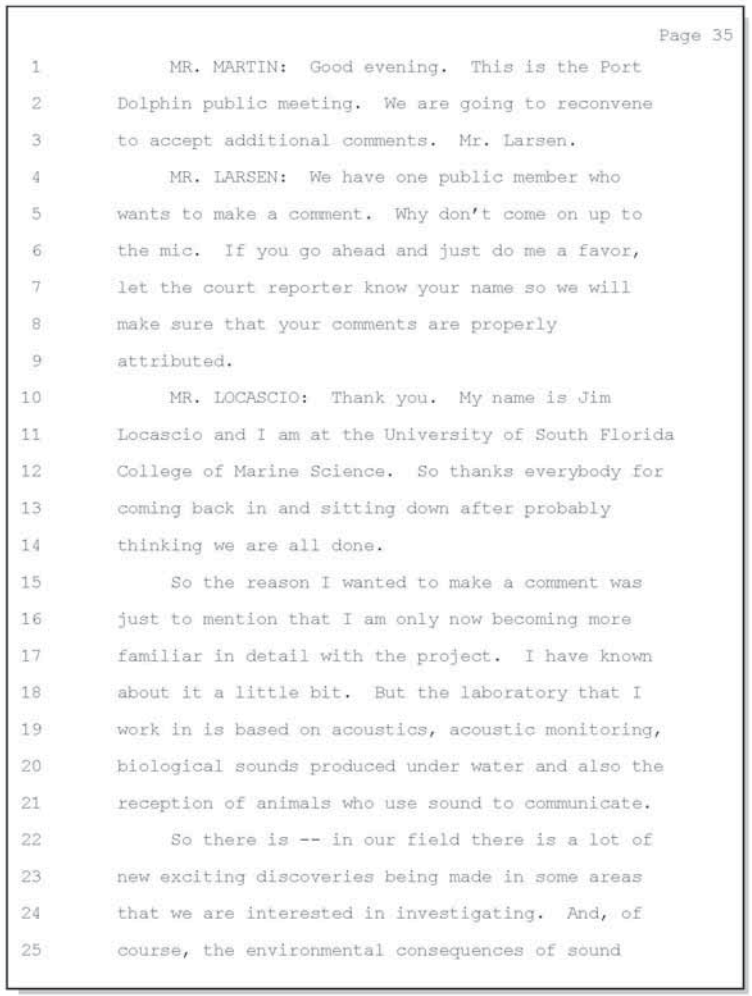

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MR. MARTIN: Good evening. This is the Port Dolphin public meeting. We are going to reconvene to accept additional comments. Mr. Larsen.

MR. LARSEN: We have one public member who wants to make a comment. Why don't come on up to the mic. If you go ahead and just do me a favor, let the court reporter know your name so we will make sure that your comments are properly attributed.

MR. LOCASCIO: Thank you. My name is Jim Locascio and I am at the University of South Florida College of Marine Science. So thanks everybody for coming back in and sitting down after probably thinking we are all done.

So the reason I wanted to make a comment was just to mention that I am only now becoming more familiar in detail with the project. I have known about it a little bit. But the laboratory that I work in is based on acoustics, acoustic monitoring, biological sounds produced under water and also the reception of animals who use sound to communicate.

So there is -- in our field there is a lot of new exciting discoveries being made in some areas that we are interested in investigating. And, of course, the environmental consequences of sound

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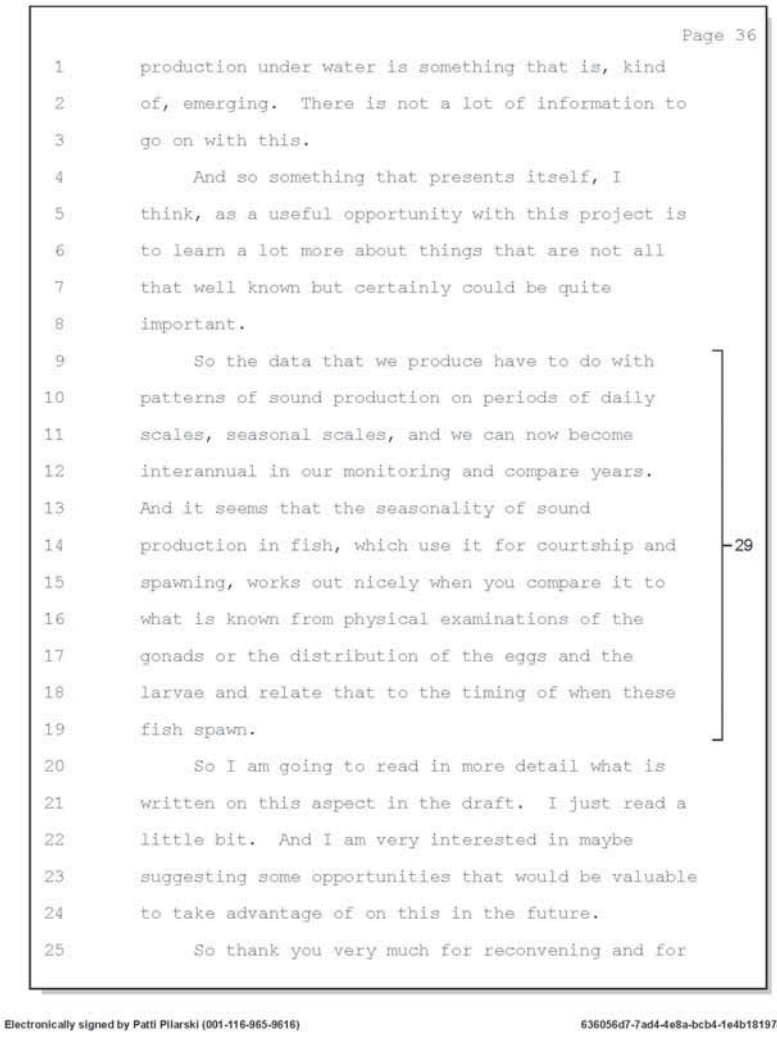

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production under water is something that is, kind of, emerging. There is not a lot of information to go on with this.

And so something that presents itself, I think, as a useful opportunity with this project is to learn a lot more about things that are not all that well known but certainly could be quite important.

So the data that we produce have to do with patterns of sound production on periods of daily scales, seasonal scales, and we can now become interannual in our monitoring and compare years. And it seems that the seasonality of sound production in fish, which use it for courtship and spawning, works out nicely when you compare it to what is known from physical examinations of the gonads or the distribution of the eggs and the larvae and relate that to the timing of when these fish spawn. 29

So I am going to read in more detail what is written on this aspect in the draft. I just read a little bit. And I am very interested in maybe suggesting some opportunities that would be valuable to take advantage of on this in the future.

So thank you very much for reconvening and for

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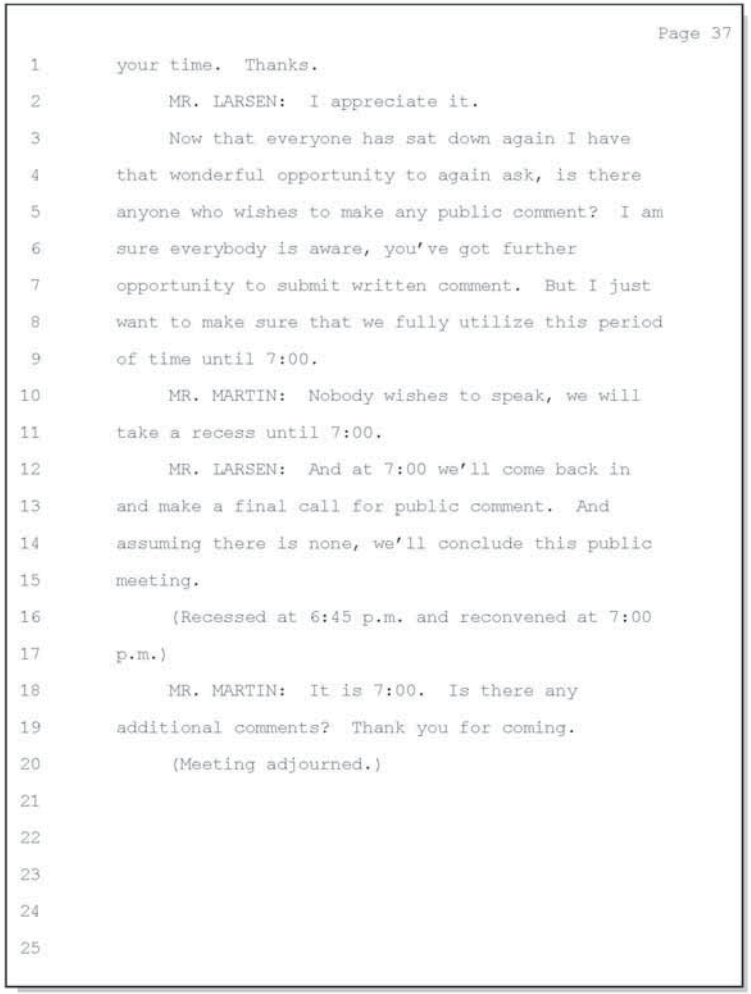
29. Comment noted. If granted a license, the Maritime Administration and USCG would require a mitigation and monitoring plan. This plan would include mitigation and monitoring for noise impacts. Details would be determined after the license with input from resource agencies as necessary.



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your time. Thanks.

MR. LARSEN: I appreciate it.

Now that everyone has sat down again I have that wonderful opportunity to again ask, is there anyone who wishes to make any public comment? I am sure everybody is aware, you've got further opportunity to submit written comment. But I just want to make sure that we fully utilize this period of time until 7:00.

MR. MARTIN: Nobody wishes to speak, we will take a recess until 7:00.

MR. LARSEN: And at 7:00 we'll come back in and make a final call for public comment. And assuming there is none, we'll conclude this public meeting.

(Recessed at 6:45 p.m. and reconvened at 7:00 p.m.)

MR. MARTIN: It is 7:00. Is there any additional comments? Thank you for coming.

(Meeting adjourned.)

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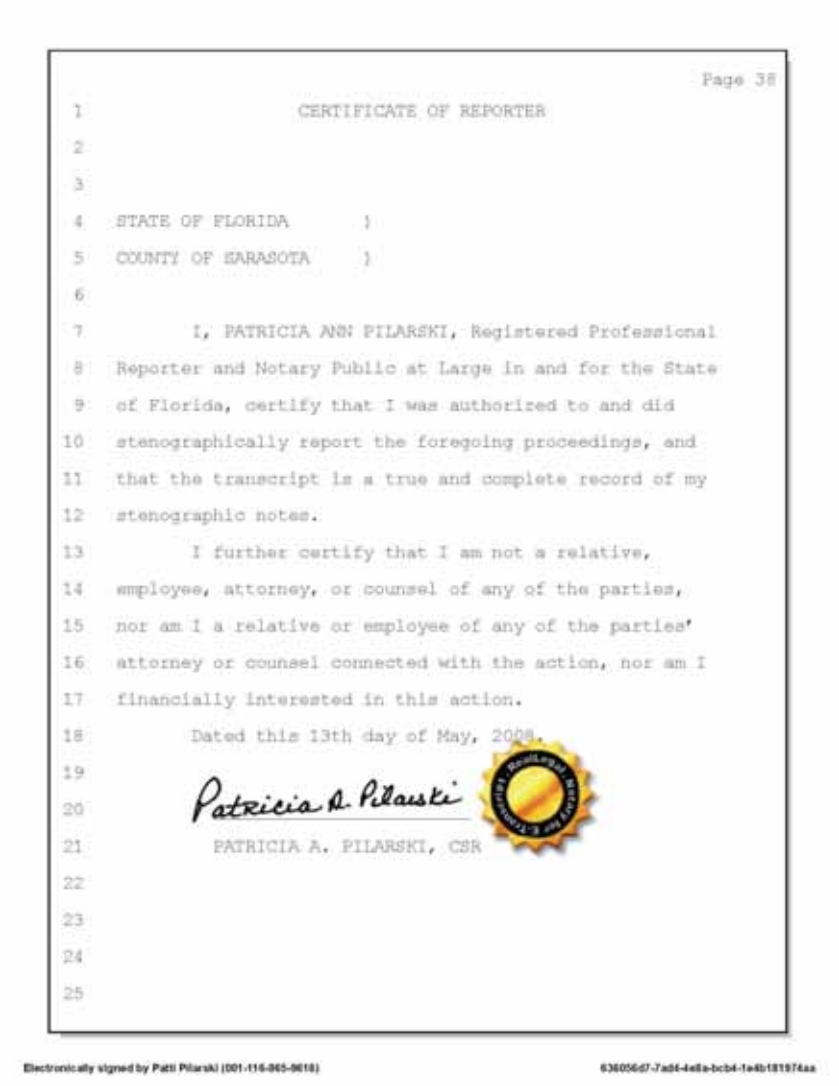

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CERTIFICATE OF REPORTER

STATE OF FLORIDA)
COUNTY OF SARASOTA)

I, PATRICIA ANN PILARSKI, Registered Professional Reporter and Notary Public at Large in and for the State of Florida, certify that I was authorized to and did stenographically report the foregoing proceedings, and that the transcript is a true and complete record of my stenographic notes.

I further certify that I am not a relative, employee, attorney, or counsel of any of the parties, nor am I a relative or employee of any of the parties' attorney or counsel connected with the action, nor am I financially interested in this action.

Dated this 13th day of May, 2008.

Patricia A. Pilarski

PATRICIA A. PILARSKI, CSR

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anticipated 13:10
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FINAL
ENVIRONMENTAL IMPACT STATEMENT
ADDRESSING THE
PORT DOLPHIN LLC LIQUEFIED NATURAL GAS
DEEPWATER PORT LICENSE APPLICATION

VOLUME II: APPENDICES

A. Scoping Outreach

B. Review of the Draft Environmental Impact Statement

VOLUME III: APPENDICES

C. Agency Consultation

D. Principal Laws and Executive Orders

E. Biological Assessment

F. Detailed Maps

G. Ichthyoplankton Assessment

H. Essential Fish Habitat Assessment

I. Unanticipated Discovery Plan for Cultural Artifacts and Human Remains

J. Independent Risk Assessment

K. LNG Incident Summary

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7 trees preserved for the future



21 lbs waterborne waste not created



3,131 gallons wastewater flow saved



346 lbs solid waste not generated



682 lbs net greenhouse gases prevented



5,220,360 BTUs energy not consumed

Appendix C
Agency Consultation

- NOAA, NMFS Consultation
- USFWS
- Florida SHPO
- Florida DEP
- Florida FWC

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August 9, 2007 F/SER46:MS

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Dear Mr. Prescott:

The National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS), has received the July 12, 2007, Notice of Intent (NOI) and your agency's July 16, 2007, letter and accompanying Proposed Action Fact Sheet to prepare an environmental impact statement (EIS) and request public comment for the proposed Port Dolphin Energy LLC liquefied natural gas (LNG) Terminal Deepwater Port (Port Dolphin) license application (72 FR 133 USCG-2007-28532). The NOI indicates that the U.S. Coast Guard (USCG) and the Maritime Administration (MARAD) intend to prepare an EIS for the construction and operation of an LNG deepwater port facility that would be located in water depth of 100 feet, approximately 28 miles southwest of Tampa Bay, off Manatee County, Florida. Port Dolphin would consist of two permanent unloading buoys for the mooring of up to two LNG shuttle and regasification vessels (SRV). Each unloading buoy would connect to a 36-inch diameter, 41.4-mile long gas transport pipeline that would be constructed from the offshore port to landward portions of existing pipelines in Manatee County, Florida.

In response to the USCG and MARAD's request for comments on resources and issues to be addressed in the EIS for this proposed action, NMFS offers the following recommendations in the context of essential fish habitat (EFH) and fish populations in the Gulf of Mexico:

EFH

Based on our review of the Port Dolphin license application, knowledge of the project area, and participation in the public meetings, the deepwater port and associated pipeline would operate in and be constructed through marine and estuarine EFH in the project area. Summaries of occurrences for life history stages and habitat utilization of federally managed fish and invertebrate species in the project area may be found in Volume 1 the of March 2004 Final EIS for the Generic Essential Fish Habitat Amendment of the Gulf of Mexico. Detailed information on EFH for federally managed shrimp, red drum, reef fish, and coastal migratory pelagic species is provided in the 2005 generic amendment of

the Fishery Management Plans (FMPs) for the Gulf of Mexico prepared by the Gulf of Mexico Fishery Management Council (GMFMC). Information on EFH for highly migratory species (HMS) is contained in the Atlantic Billfish and Atlantic Tunas, Swordfish, and Sharks FMPs prepared by the Secretary of Commerce. The generic amendment and HMS FMPs were prepared as required by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

To fully address EFH and associated fisheries in the project area, we recommend the EIS include sections titled "Essential Fish Habitat" and "Marine Fishery Resources" that describe the potential project impacts on each category of EFH (including, but not limited to: marine non-vegetated water bottoms, continental shelf features, and water column; estuarine submerged aquatic vegetation, mangrove wetlands, estuarine water column) and marine and estuarine fishery species within the project area. These sections should analyze the potential impacts of the proposed project on EFH and dependent federally managed species and life stages, and should fully evaluate alternative measures to avoid, minimize, and offset adverse impacts. EFH regulations at 50 CFR Section 600.810(a) define an adverse effect to EFH as any impact that reduces the quality and/or quantity of EFH, including the loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components. The EIS should analyze impacts to benthic and prey species in the discussion of impacts to EFH. This descriptive and analytical information, coupled with a statement of the agency's conclusions regarding the effects of the action on EFH and marine fishery species, would provide the basic details necessary for an EFH assessment pursuant to the requirements of 50 CFR 600.920(e). The GMFMC also should be provided an opportunity for comment on EFH-related issues under provisions of the Magnuson-Stevens Act.

Individual and Cumulative Operational Impacts to Marine Fishery Resources
In our April 13, 2007, correspondence to your office following our review of the Port Dolphin license application, we identified the need for additional data and further analyses necessary for evaluation of project impacts on NMFS' marine and estuarine trust resources. In this regard, the EIS should evaluate the impacts to marine and estuarine fisheries associated with construction, operation, and decommissioning of the proposed Port Dolphin LNG deepwater port and associated pipeline. As proposed, the facility would utilize up to approximately 9.5 million gallons of seawater per day (MGD) for regasification of LNG aboard each SRV under normal conditions, with an additional 2.3 MGD of ballast water required during SRV off-loading, for a total water use of nearly 24 MGD for regasification operations aboard two SRVs.

NMFS has concerns with the entrainment of marine organisms at facilities utilizing seawater, and calculations of ichthyoplankton impacts resulting from these operations should be addressed in the EIS. Natural mortality of fish eggs and larvae is high, and a fishery's stock success can significantly be affected by the survival and transport of relatively few remaining recruits to their nursery habitats. NMFS considers mortality caused by the proposed deepwater port as a potentially significant additional mortality factor to the natural conditions that affect the sustainability of marine and estuarine fisheries. If it is found that the proposed LNG facility results in the loss of a significant

number of the few recruits otherwise destined for survival, the facility could have a substantial negative effect on economically important fisheries in the Gulf of Mexico. Information necessary to complete an assessment to determine impacts from impingement and entrainment includes:

a) Numbers of eggs, larvae, and juveniles expected to be entrained or impinged (and killed) by species;
b) Daily natural mortality estimates by life stage during the first year of life by species, including hatching success. This allows an estimation of survival from viable egg to age of entrainment; and
c) Age-structured population model estimates of recruits to age-1 and population fecundity. This allows stock-level estimates of egg production (viable eggs) and overall survival from viable egg to recruitment at age-1.

Based on ichthyoplankton impact calculations provided in the Port Dolphin license application utilizing data from the four Southeast Area Monitoring and Assessment Program (SEAMAP) stations closest to the project area, NMFS does not find that the data have been analyzed to a level necessary to determine the significance of entrainment impacts. NMFS recommends that more detailed modeling of entrainment losses, utilizing additional ichthyoplankton data which may be available from the State of Florida, private or public marine science institutions, or inclusion of additional SEAMAP stations in the eastern Gulf of Mexico, be performed and results provided in the EIS. The more detailed analysis should identify impacts to commercially, recreationally, and ecologically important fish species of a size that might be entrained in the SRV water intake systems. NMFS also notes that ichthyoplankton surveys performed in the Port Dolphin project vicinity identified families of fish which contain species under formal rebuilding programs through the reef fish, coastal migratory pelagics, and red drum FMPs. Consequently, species with rebuilding programs can be greatly impacted by relatively small increases in harvest or other sources of mortality. NMFS recommends that the impacts of fish mortality resulting from the proposed offshore port operations on fishery stocks, particularly those under a fishing moratorium (e.g., red drum) or undergoing rebuilding efforts, be analyzed thoroughly in the EIS.

Alternatively, and in consideration of further minimizing potential project entrainment impacts on fishery resources, NMFS recommends that the evaluation and utilization of entirely closed loop SRV regasification systems should also be included in the EIS. Specifically, a discussion of the utilization of SRVs similar in design as were modified for and will be used in shipboard regasification operations at the Neptune LNG LLC project (USCG Docket Number SACG-2005-22611), should be evaluated in the EIS. In that project, Neptune LNG SRVs would have originally required the consumption of 7 MGD for ballasting, regasification operations, engine cooling, and ship services. However, design modifications to these SRVs significantly reduced seawater consumption to approximately 2 MGD. Further, ballast water would be recirculated through a freshwater heat exchanger to supply cooling water needs for the vessel.

Once a thorough analysis of entrainment impacts has been completed, NMFS recommends that mitigative measures be developed and proposed to ensure that unavoidable entrainment impacts are fully offset. The mitigation plan should be linked to a plan for adaptive management of the deepwater port to identify and require operational or mechanical modifications to minimize adverse fishery impacts. NMFS looks forward to coordinating with the USCG/MARAD and the applicant in the development of such a plan.

Mooring Area and Pipeline Impacts to EFH

The Port Dolphin license application provided information on anticipated marine and estuarine habitat impacts from the proposed construction of a 41.4-mile long gas transport pipeline and two offshore SRV mooring areas. From our previous review of the license application, construction of the southern mooring array in the proposed location would affect approximately 11 acres of hard bottom habitat (EFH). NMFS recommends that a more rigorous alternatives analysis be undertaken and included in the EIS, to determine impact minimization and avoidance opportunities. The additional evaluation is necessary to determine whether a realignment of the southern array's anchor placement/mooring cable corridors can be made, thereby reducing or eliminating potential hard bottom impacts. Furthermore, extensive, high-relief hard bottom features exist in the proposed pipeline route and are especially prominent in an area approximately 19 miles east-northeast of the center of the proposed port location. In this area, zones of low-relief hard bottom and sand habitat may provide an opportunity to reduce high-relief hardbottom impacts from pipeline installation. NMFS recommends that the EIS include results from additional and more detailed bottom surveys to determine where modifications of the pipeline route could be made to avoid or further reduce impacts to higher-relief hard/live bottom habitats.

To address unavoidable benthic impacts, the basic components of a compensatory mitigation plan to offset unavoidable adverse impacts to hard/live bottom habitats as a result of the project should be developed and incorporated in the EIS. The compensatory mitigation plan for impacts to hard bottom marine habitats should include a description of the overall mitigation plan; quantification of anticipated hard/live bottom impact acreage and proposed mitigation acreage; scientific criteria for determining mitigation success; a project and mitigation implementation schedule; targeted hard/live bottom climax communities expected in mitigation area(s), including their acreage and configurations; comprehensive 5-year monitoring and reporting schedules; and contingency plans by which equivalent mitigation would be completed if the proposed mitigation fails.

Additional non-quantified impacts to hardbottom areas may also occur from pipeline installation vessels' anchor cables that may contact hard/live bottom areas. NMFS recommends that appropriate mitigative measures be identified and that details outlining anchoring plans be described in the EIS. Also, to potentially eliminate project impacts on estuarine fishery resources and significantly reduce impacts on marine live/hardbottom habitats resulting from installation of the 41.4-mile long pipeline component of the project, NMFS recommends that the EIS include an analysis and discussion of the

practicability of connecting the proposed LNG delivery pipeline to the existing Gulfstream Natural Gas LLC north of the project area.

Alternatives Analysis
The Port Dolphin EIS should evaluate a full range of deepwater port design alternatives, with emphasis on the utilization of an entirely closed loop shipboard regasification system and modified offshore pipeline route. NMFS recommends that evaluation of these project modifications be included in the project's EIS and believes their implementation would further minimize ichthyoplankton entrainment and hardbottom habitat impacts in the Gulf of Mexico. Other alternative designs for the SRV seawater intakes (e.g., the use of variable depth or dynamically positioned water intakes) should be evaluated in relation to the vertical distribution of eggs, larvae, and juveniles of marine fishery species in the water column. The analysis of the design alternatives should include quantification of impacts to marine fishery populations as compared to other potential impacts (e.g., economic, safety, and air quality impacts).

Endangered Species Act Consultation
The Port Dolphin project area is within the known distribution limits of a federally listed threatened species under purview of NMFS. In accordance with the Endangered Species Act of 1973, as amended, it is your responsibility to review this proposal and identify actions that may affect endangered or threatened species. Determinations involving listed species should be reported to our Protected Resources Division at the letterhead address. If it is determined that the activities may adversely affect any species listed as endangered or threatened under Protected Resources Division purview, formal consultation must be initiated.

Thank you for the opportunity to provide comments on environmental issues concerning the proposed permitting of the Port Dolphin LNG Project. If we may be of further assistance, please contact Mr. Mark Sramek at the letterhead address above, by telephone at (727) 824-5311, or e-mail at Mark.Sramek@noaa.gov.

Sincerely,

Miles M. Croom

Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

cc:
F/SER46 – Ruebsamen
SER – Keys
F/SER3 – Bernhart
GMFMC – Rester
F/HC – Smith
PPI – Kokkinakis
F – Emily Lindow

5

U.S. Department of Homeland Security
United States Coast Guard

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United States Coast Guard

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16613
August 24, 2007

Mr. Mark Sramek
Fishery Management Specialist
U.S. Department of Commerce, National Oceanic and Atmospheric Administration
National Marine Fisheries Service, Southeast Regional Office (F/SER25)
263 13th Avenue South
St. Petersburg, FL 33701

Subject: Port Dolphin Energy LLC Deepwater Port Environmental Impact Statement

Dear Mr. Sramek:

As stated in our notice of intent dated July 12, 2007, the U.S. Coast Guard (USCG) and Maritime Administration are preparing a Draft Environmental Impact Statement (EIS) to assist in the review of the Port Dolphin Energy LLC (Port Dolphin) application for a deepwater port license to own, construct and operate a natural gas deepwater port in the Gulf of Mexico. The proposed deepwater port would be located in the Federal waters of the Outer Continental Shelf (OCS) in the St. Petersburg (PB) blocks: PB545, PB589, and PB590, approximately 28 miles offshore off the west coast of Florida to the southwest of Tampa Bay, in a water depth of approximately 100 feet. The EIS will be prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 [U.S.C.] 4321, *et seq.*), and pursuant to the requirements of the Deepwater Port Act (33 [U.S.C.] 1501, *et seq.*). The Port Dolphin application is available for viewing and downloading from the DOT Docket Management System Web Page <http://dms.dot.gov>, Docket Number "USCG-2007-28532."

In accordance with Section 305(d)(2) of the Magnuson-Stevens Fishery Conservation and Management Act, as amended, we seek to consult with National Marine Fisheries Service (NMFS) Habitat Conservation Division regarding the presence of essential fish habitat (EFH) that may be affected by the Proposed Action. We will also consult with the NMFS Protected Resources Division and U.S Fish and Wildlife Service regarding the presence of threatened and endangered species under their respective jurisdictions.

In order to fully assess the potential impacts associated with the Proposed Action on EFH we are requesting a list of species of concern that have EFH designated within the region of influence (ROI) and a list of any additional concerns that NMFS may have regarding the potential impacts of the Proposed Action.

16613
August 21, 2007

Subject: Port Dolphin Energy LLC Deepwater Port Environmental Impact Statement

Finally, engineering-environmental Management, Inc. (e^2M) is providing the USCG with technical assistance as our contractor in the preparation of the EIS/EFH Assessment. We would appreciate your cooperation with e^2M staff, with regard to this matter. We look forward to working with your office on this project. Please send any comments/correspondence to the U.S. Coast Guard to:

Patience Whitten
U.S. Coast Guard, Commandant (CG-3PSO-5)
Deepwater Ports Standards Division
2100 Second Street, SW
Washington, DC 20593-0001

Thank you for your assistance. If you have questions about the proposed Port Dolphin deepwater port or about the EIS, please contact Patience Whitten at patience.k.whitten@uscg.mil or (202) 372-1453.

Sincerely,

M.A. Prescott

M.A. PRESCOTT
Chief, Deepwater Ports Standards Division
U.S. Coast Guard
By direction

H. Keith Lesnick

H. KEITH LESNICK
Director, Office of Deepwater Port Licensing and Offshore Activities
U.S. Maritime Administration

cc: Mr. Miles Croom, NMFS SERO
Mr. Rickey Ruebsamen, NMFS SERO

U.S. Department of Homeland Security

United States Coast Guard

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16613
August 24, 2007

In Reply Refer To:
Docket No. USCG-2007-28532

Mr. David Bernhart
Assistant Regional Administrator for Protected Resources
U.S. Department of Commerce, National Oceanic and Atmospheric Administration
National Marine Fisheries Service, Southeast Regional Office (F/SER3)
263 13th Avenue South
St. Petersburg, FL 33701

Subject: Port Dolphin Energy LLC Deepwater Port Environmental Impact Statement

Dear Mr. Bernhart:

As stated in our notice of intent dated July 12, 2007, the U.S. Coast Guard (USCG) and Maritime Administration are preparing a Draft Environmental Impact Statement (EIS) to assist in the review of the Port Dolphin Energy LLC (Port Dolphin) application for a deepwater port license to construct and operate a natural gas deepwater port in the Gulf of Mexico. The proposed deepwater port would be located in the Federal waters of the Outer Continental Shelf (OCS) in the St. Petersburg (PB) blocks: PB545, PB589, and PB590, approximately 28 miles offshore off the west coast of Florida to the southwest of Tampa Bay, in a water depth of approximately 100 feet. The EIS will be prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 [U.S.C.] 4321, *et seq.*), and pursuant to the requirements of the Deepwater Port Act (33 [U.S.C.] 1501, *et seq.*). The Port Dolphin application is available for viewing and downloading from the DOT Docket Management System Web Page <http://dms.dot.gov>, Docket Number "USCG-2007-28532."

In accordance with Section 7 of the Endangered Species Act (ESA), as amended, we seek to informally consult with National Marine Fisheries Service (NMFS), Protected Resources Division, regarding the presence of marine mammals and federally-listed threatened and endangered species that may be affected by the Proposed Action. We will also consult with the U.S. Fish and Wildlife Service regarding the presence of threatened and endangered species and migratory bird species under their jurisdiction and NMFS Habitat Conservation Division regarding essential fish habitat (EFH).

Pursuant to the ESA, we will include the Biological Assessment (BA) as an appendix to the EIS for this proposed project. In order to fully assess the potential impacts associated with the Proposed Action on threatened and endangered species, we are requesting a list of species of concern that occur within the region of influence (ROI) and a list of any additional concerns that NMFS may have regarding the potential impacts of the Proposed Action.

16613
August 21, 2007

Subject: Port Dolphin Energy LLC Deepwater Port Environmental Impact Statement

Finally, engineering-environmental Management, Inc. (e^2M) is providing the USCG with technical assistance as our contractor in the preparation of the EIS/BA. The USCG has designated e^2M as the non-Federal representative for consultation purposes for this action. We would appreciate your cooperation with e^2M staff, with regard to this matter. We look forward to working with your office on this project. Please send any comments/correspondence to the U.S. Coast Guard to:

Patience Whitten
U.S. Coast Guard, Commandant (CG-3PSO-5)
Deepwater Ports Standards Division
2100 Second Street, SW
Washington, DC 20593-0001

Thank you for your assistance. If you have questions about the proposed Port Dolphin deepwater port or about the EIS, please contact Patience Whitten at patience.k.whitten@uscg.mil or (202) 372-1453.

Sincerely,

M.A. PRESCOTT
Chief, Deepwater Ports Standards Division
U.S. Coast Guard
By direction

H. KEITH LESNICK
Director, Office of Deepwater Port Licensing and Offshore Activities
U.S. Maritime Administration

cc: Mr. Eric Hawk, NMFS SERO
Mr. Kyle Baker, NMFS SERO
Michael Barnette, NMFS PRD

U.S. Department of Homeland Security
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16613
August 24, 2007

David Hankla, Field Supervisor
6620 Southpoint Drive, South
Suite 310
Jacksonville, FL 32216

Subject: Port Dolphin Energy LLC Deepwater Port Environmental Impact Statement

Dear Mr. Hankla:

As stated in our notice of intent dated July 12, 2007, the U.S. Coast Guard (USCG) and Maritime Administration are preparing a Draft Environmental Impact Statement (EIS) to assist in the review of the Port Dolphin Energy LLC (Port Dolphin) application for a deepwater port license to own, construct and operate a natural gas deepwater port in the Gulf of Mexico. The proposed deepwater port would be located in the Federal waters of the Outer Continental Shelf (OCS) in the St. Petersburg (PB) blocks: PB545, PB589, and PB590, approximately 28 miles offshore off the west coast of Florida to the southwest of Tampa Bay, in a water depth of approximately 100 feet. The EIS will be prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 [U.S.C.] 4321, *et seq.*), and pursuant to the requirements of the Deepwater Port Act (33 [U.S.C.] 1501, *et seq.*). The Port Dolphin application is available for viewing and downloading from the DOT Docket Management System Web Page <http://dms.dot.gov>, Docket Number "USCG-2007-28532."

In accordance with Section 7 of the Endangered Species Act (ESA), as amended, we seek to informally consult with U.S. Fish and Wildlife Service (USFWS), regarding the presence of federally-listed threatened and endangered species that may be affected by the Proposed Action. We will also consult with the National Marine Fisheries Service (NMFS) regarding the presence of threatened and endangered species under their jurisdiction and NMFS Habitat Conservation Division regarding essential fish habitat (EFH).

Pursuant to the ESA, we will include the Biological Assessment (BA) as an appendix to the EIS for this proposed project. In order to fully assess the potential impacts associated with the Proposed Action on threatened and endangered species, we are requesting a list of species of concern that occur within the region of influence (ROI) and a list of any additional concerns that USFWS may have regarding the potential impacts of the Proposed Action.

16613
August 21, 2007

Subject: Port Dolphin Energy LLC Deepwater Port Environmental Impact Statement

Finally, engineering-environmental Management, Inc. (e^2M) is providing the USCG with technical assistance as our contractor in the preparation of the EIS/BA. The USCG has designated e^2M as the non-Federal representative for consultation purposes for this action. We would appreciate your cooperation with e^2M staff, with regard to this matter. We look forward to working with your office on this project. Please send any comments/correspondence to the U.S. Coast Guard to:

Patience Whitten
U.S. Coast Guard, Commandant (CG-3PSO-5)
Deepwater Ports Standards Division
2100 Second Street, SW
Washington, DC 20593-0001

Thank you for your assistance. If you have questions about the proposed Port Dolphin deepwater port or about the EIS, please contact Patience Whitten at patience.k.whitten@uscg.mil or (202) 372-1453.

Sincerely,

M.A. PRESCOTT
Chief, Deepwater Ports Standards Division
U.S. Coast Guard
By direction

H. KEITH LESNICK
Director, Office of Deepwater Port Licensing and Offshore Activities
U.S. Maritime Administration

Florida Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

August 31, 2007

Docket Management Facility (USCG – 2007 – 28532)
U.S. Department of Transportation
West Building, Ground Floor
Room W12-140
1200 New Jersey Street, SE
Washington, DC 20590

RE: Maritime Administration and U.S. Coast Guard - Notice of Intent to Prepare a Draft Environmental Impact Statement for Port Dolphin Energy LLC, Port Dolphin Liquefied Natural Gas Deepwater Port License Application – USCG – 2007 – 28532

Dear Mr. Prescott:

Pursuant to Section 403.061(40), *Florida Statutes*, the Florida Department of Environmental Protection (Department) has reviewed and coordinated a state review of the above referenced Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended. The NOI was issued in the July 12, 2007 Federal Register in response to an environmental review of the Deepwater Port (DWP) license application submitted by Port Dolphin Energy LLC (Port Dolphin).

The State of Florida received the Deepwater Port License Application submitted by Port Dolphin Energy LLC on July 9, 2007. In conjunction with the receipt of the application, Governor Crist received notification that Florida has been designated as an adjacent coastal state pursuant to the Deepwater Port Act (33 U.S.C. 1501 et seq.). As an adjacent state, the Florida Governor will have 45 days from the last public hearing in which to transmit approval or disapproval of the proposed deepwater port to the Secretary of the Department of Transportation. Issuance of the license is dependent on Florida's approval of the project.

Project Overview

Port Dolphin proposes to own, construct, and operate a deepwater port in federal waters of the Outer Continental Shelf approximately 28 miles southwest of Tampa Bay, off Manatee County, FL in about 100 feet of water depth. The DWP would consist of a permanently moored unloading system with two submersed buoys separated by approximately three miles. Each buoy would be secured to the bottom using eight mooring lines attached to anchor points on the seabed. The buoys will be designed to moor and unload specialized Liquified Natural Gas (LNG) shuttle and regasification vessels (SRV). Each buoy is proposed to connect via a flexible riser and flowline to a Y intersection and then a 36 inch pipeline approximately 42 miles in length that would connect onshore in Port Manatee, Manatee County, Florida with Gulfstream Natural Gas System, LLC and Tampa Electric Company (TECO) System.

Compliance with State Permitting

The proposed project will require an Environmental Resource Permit under Chapter 373, *Florida Statutes*, and an easement from the State of Florida Board of Trustees of the Internal Improvement Trust Fund in accordance with Chapter 253, *Florida Statutes*, for the use of a corridor for construction, installation and maintenance of the pipeline within state territorial waters. The applicant must provide reasonable assurance that the project is not contrary to the public interest and will not violate state water quality standards. The applicant must also comply with the requirements and conditions considered during the state's review of the environmental resource permit application.

Compliance with the Coastal Zone Management Act

Pursuant to the Coastal Zone Management Act (CZMA), 16 U.S.C. §§1451-1464, as amended, and its implementing regulation,15 C.F.R. 930, Subpart D, applicants for federal licenses and permits for activities that affect land or water uses or natural resources of Florida's coastal zone must include in their applications the consistency certification required by 15 C.F.R. 930.57. Applicants are also required by the CZMA and 15 C.F.R. 930.58 to provide the state with the information needed to support the statements of consistency. The data and information should include a detailed description of the project including its associated facilities, as discussed below, and its effects on the relevant enforceable policies included in the Florida Coastal Management Program (FCMP).

For the state-regulated portion of the project, the Environmental Resource Permit (ERP) will serve as the Coastal Zone Management Act federal consistency review. The state's evaluation of the consistency of the federal waters portion of the proposed project with the FCMP will be conducted in conjunction with the state's review of the draft and final EIS documents. Because the state's consistency evaluation and final consistency decisions will depend upon the information and data provided during the EIS and ERP processes, it is essential for the state and federal reviews to be well-coordinated and based on the same information.

The detailed data and information necessary to support a consistency certification with the enforceable policies of the Florida Coastal Management Program in state and federal waters and uplands include (1) complete descriptions and evaluations of all aspects of the proposed activities including location, duration, alignment alternatives and construction; (2) complete characterizations and descriptions of the environmental resources and physical conditions in the area, including benthic and water column habitats; (3) a thorough assessment of the potential direct and indirect effects to the environmental, cultural, social and economic resources, including essential fish habitats, fisheries, and protected species; (4) a discussion of plans to avoid and minimize impact to important resources; (5) a discussion of mitigation for unavoidable impacts to resources; (6) an assessment of the cumulative impacts of the proposed project in combination with other activities in the vicinity; and (7) a final evaluation of the proposed project's consistency with the FCMP accompanied by a signed consistency certification.

More detailed discussion of specific information needed for the state to complete its review of the proposed DWP is included below.

Need for the Deepwater Port

A complete and thorough needs analysis for the DWP and accompanying natural gas pipeline should be evaluated in the Draft Environmental Impact Statement (DEIS). The needs

analysis should include a discussion of the capacity of existing pipelines as well as pipelines/DWP proposed for the foreseeable future.

Construction Techniques

The preferred pipeline route includes two horizontal directional drill (HDD) installations in the nearshore and landfall portions of the proposed route. The DEIS should include documentation supporting the technical feasibility of successfully completing HDD installations and contingency plans addressing possible problems with the installations and how they will be resolved.

Frac-outs occurring during construction and the potential ecological effects are of concern to Florida. The DEIS should thoroughly discuss measures to assure that frac-outs will not occur during the HDD and pipeline installations. Measures to correct impacts to water quality and habitats should an event occur should also be discussed. The DEIS should also include a description of how the spoils excavated at the HDD entrance and exit sites will be handled and disposed of, methodologies and results from sedimentation models, and estimates of impacts calculated from these modeling efforts.

Pipeline Safety

The draft EIS should describe how the pipeline will be designed to withstand stresses during installation, testing, and operations; including thickness, protection systems, and conformity with the safety requirements of the Department of Transportation, Office of Pipeline Safety.

Resource Impacts

The State of Florida is concerned that the project could result in significant direct and indirect long-term impacts to soft and hard bottom marine communities. The draft EIS should provide location of the DWP and all preferred alternatives with respect to bottom habitats and evaluate direct and indirect impacts that could occur from the installation and/or operation of the DWP.

Detailed maps should be included that will depict where the benthic resources are located in relation to both temporary and permanent structures associated with the DWP. All permanent, temporary and secondary impacts to habitats, especally live and hardbottom, from the installation and operation of the DWP should be examined and quantified. The DEIS should describe how these impacts will be avoided or minimized. Avoiding impacts to resources is preferred. However, for those impacts that cannot be avoided, minimization to the greatest degree possible is paramount. The State will require copies of videos and photographs showing the preferred and all alternative routes, as well as maps detailing the location of videos and photographs taken.

The DEIS should clearly explain the justification for the preferred route and how it best avoids and minimizes encroachments and impact to benthic habitats. The license application only analyzed the preferred route and DWP location. No benthic habitat data was provided regarding the other proposed north and south routes. The presumption that the preferred route would provide the least impacts because it is the shortest route can not be verified without properly surveying the alternative routes. The DEIS should include a discussion of benthic habitats along the alternate routes and a comparison with the preferred route. In addition, discussions of the

preferred route, as described in the license application should include documentation why the route south of Passage Key is preferred and not north of Passage Key.

The biological survey protocol should adequately identify affected resources and ecosystems, especially those that may be unique to the area, in order that they may be more properly mitigated for where necessary. In the license application data from surveys were qualified and quantified using the *Regulatory Basis of Review Mitigation Protocol Offshore Southeast Florida.* This document was developed for projects occurring on the Southeast coast of Florida, where coral reefs were a resource of concern, thus the habitat classifications reflect those habitats in and around coral reefs. The State is currently working with Port Dolphin consultants to adapt these mitigation protocols to better reflect important live and hardbottom habitats in the Gulf of Mexico off Southwest Florida.

The DEIS should also provide a discussion of the air quality impacts that would likely to occur as a result of the DWP including possible nutrient loading via the air/water interface.

The DEIS should provide a detailed description of the water intake of the DWP. This should include the overall need, how much intake will be needed for each vessel and the frequency of each vessel at the DWP. Descriptions of the intake pipes, operations including impingement and entrainment should be included as well. Effects and/or impacts of any biocides, if applicable, used in ballast or intake water systems should also be evaluated in the DEIS.

The potential for impacts to fishery resources of the area through impacts to icthyoplankton resulting from ship water intake activities should also be addressed in the DEIS. Because information regarding ichthyoplankton resources in the vicinity of the DWP is very limited, the state remains concerned that increased water intake from the SRV ships could significantly affect icthyoplankton communities. Please see the attached letter and memo from the Florida Fish and Wildlife Conservation Commission (FWC) for more detailed discussion of concerns and issues.

The DWP will likely increase the number of foreign ships to offshore waters near the Florida coast and therefore increase the potential for the introduction of non-indigenous species in the area through ship ballast discharge. The introduction of non-indigenous species should be thoroughly investigated in the DEIS and measures to limit their introduction should be evaluated.

Fishing activities

The FWC suggests that impacts to fishing activities occurring in the offshore area affected by the DWP should be addressed and include discussions of mitigation alternatives for the loss of fishing grounds.

Accident Management

The DEIS should provide an accident management plan that outlines procedures for notification and actions that are required in the event of an incident at the DWP. This plan should detail the role the state will be expected to play in response to an incident; including identifying port and state responders; identifying training needed; as well as timing for training and who will provide the training.

Discharges, including sanitation waste, fuel spills, hydraulic leaks, LNG leaks and other material from lay barges, supply vessels and other watercraft may affect water or air quality. The

DEIS should describe potential discharges and measures proposed to protect water and air quality in the event of such discharges.

A hydrocarbon spill contingency plan should be included for offshore activities. Within in the DEIS, a worst-case, offshore spill should be evaluated which is based on the maximum quantities and types of hydrocarbons stored or used onboard the lay vessel(s) or the SRVs. Trajectories of a maximum quantity accidental spill should be modeled using worst cast local currents and winds. Model results presented in the DEIS should include estimate of time for the spill to contact natural resources. Procedures and times to respond to a spill, including the protection and clean-up of affected resources, should be described in the DEIS. In the case of a LNG spill or accident air quality impacts should also be considered.

Storm Handling Plan

A Storm Handling Plan (SHP) should be developed that includes measures to ensure that resources are not damaged by the movement of construction equipment and staged pipeline segments during storms or other weather related events. The SHP should include contingencies for securing templates, marine risers, the lateral guidance system and the pullstring on the seafloor. The SHP should also include measures to ensure resources are not damaged when the DWP is operational.

Conflicting Uses and Cumulative Impacts

The DEIS should also examine the cumulative impacts to hardbottom, live-bottom, seagrasses, and sand/soft bottom habitats. These impacts should consider all impact producing uses of the seafloor including but not limited to Manatee Harbor dredging, offshore disposal site, fisheries impacts, artificial reefs and any other foreseeable project that could occur in conjunction with the DWP.

There are many possible conflicting uses occurring on the continental shelf in the area of the proposed project. The DEIS should include a discussion on how the proposed pipeline will affect and be affected by uses, such as military activities, artificial reefs, sand borrow areas, fisheries activities and ocean dredged material disposal sites.

Alternatives

The DEIS should thoroughly evaluate a range of alternatives for the proposed project including alternative routes and alternative construction techniques. Information regarding alternatives provided in the application often contains only cursory analyses. The DEIS should also include discussion on the feasibility of an offshore interconnect with the Gulfstream Natural Gas System LLC pipeline, which would eliminate the need for another onshore pipeline significantly reducing resource impacts.

Mitigation

The DEIS should also address mitigation and mitigation alternatives for unavoidable impacts to important habitats both onshore and offshore including hardbottom, live-bottom, seagrasses, coral and soft coral/sponge communities. The DEIS should also discuss long-term monitoring of the project area and any mitigation sites.

We appreciate the opportunity to provide comments on the NOI. Comments received from the FWC and Tampa Bay Regional Planning Council are enclosed for your consideration. Comments from the Florida Department of State were sent directly to the Coast Guard, but are also included here for convenience. As more detailed additional information becomes available regarding the proposed project, Florida will notify you of any further concerns or issues that should be addressed at that time. Should you have any questions, please contact Ms. Shana Kinsey or Ms. Debby Tucker at (850) 245-2163.

Cordially,

Lynn Griffin
Coastal Program Administrator

cc: Patience Whitten, USCG
Ilsa Johansson, FDEP
Lisa Gregg, FFWCC
Donna Kendall, FDEP
Ray Martin, USCG
Chris Hannan, MARAD
Fredrick Gaske, FL DOS

Florida Fish and Wildlife Conservation Commission

Commissioners
Rodney Barreto
Chair
Miami
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Ronald M. Bergeron
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Managing fish and wildlife resources for their long-term well-being and the benefit of people.

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August 29, 2007

Ms. Debby Tucker
Outer Continental Shelf Program
Florida Department of Environmental Protection
3900 Commonwealth Blvd., MS 47
Tallahassee, FL 32399-3000

Re: Notice of Intent to prepare Environmental Impact Statement in Evaluation of a Deepwater Port License Application Submitted by Port Dolphin Energy LLC (Port Dolphin), SAI #FL200707093612C

Dear Ms. Tucker:

The Division of Marine Fisheries Management of the Florida Fish and Wildlife Conservation Commission (FWC) has coordinated agency review of the proposed Port Dolphin Liquefied Natural Gas (LNG) Deepwater Port and associated pipeline project, and provide the following comments and recommendations with regards to the preparation of an Environmental Impact Statement (EIS) by the United States Coast Guard and the Maritime Administration.

Our informational needs relate to the following issues: potential reduction in fishing areas, the potential to introduce new species, law enforcement, impacts to fish habitat, impacts to marine fisheries due to entrainment of plankton, and alternatives to be considered.

Background

The Notice of Intent indicates that the U.S. Coast Guard and the Maritime Administration intend to prepare an EIS for the construction and operation of an LNG deepwater port facility that would be located in water depth of 100 feet, approximately 28 miles southwest of Tampa Bay, off Manatee County, Florida. Port Dolphin would consist of two permanent unloading buoys for the mooring of up to two LNG shuttle and regasification vessels. Each unloading buoy would connect to a 36-inch diameter, 41.4-mile long gas transport pipeline that would be constructed from the offshore port to landward portions of existing pipelines in Manatee County, Florida.

Fishing Activities

We recommend that the EIS provide mitigation alternatives for loss of fishing grounds to the fishing community due preclusion of these areas as they become designated security and safety zones.

Introduction of Non-Indigenous Species

We recommend that the EIS address the potential for the introduction of non-indigenous species through the discharge of ballast water. The proposed LNG deepwater port would increase the number of ships that come from foreign areas, and we would like to know what practices will be employed to prevent the introduction of non-indigenous species into the waters offshore of Florida.

Law Enforcement

We recommend that the EIS provide information that outlines the extent of obligation on FWC Law Enforcement resources to provide support for routine security or incident response and management for Port Dolphin. The information should include projected personnel needs, training needs for such personnel, and equipment necessary to meet such obligations.

We would also like to take this opportunity to stress the importance of continued participation by FWC Division of Law Enforcement representatives in all future project meetings concerning (but not limited to) domestic security issues, risk assessments, and development of any incident response or management plans.

Habitat

The primary benthic communities expected to be affected by this project are hard bottom with both hard and soft corals, shallow and deep-water seagrasses, and live-bottom communities. Adverse effects to these benthic resources include impacts due to plowing and burial of the pipeline or covering the pipeline with concrete mats. Additional benthic impacts may occur from the construction of the shuttle and regasification vessel anchoring system, as well as the Standard Triangulation Language buoy landing pad.

The application materials are substantial, but almost all of the information is directed at the proposed route, with little or no marine resource information provided for the alternate northern and southern routes. Although it may be presumed that the proposed pipeline route would result in fewer adverse effects because it is the shortest route, without some level of reconnaissance information of the resources present in the other two pipeline routes, this presumption cannot be confirmed. In order to determine if adverse effects would be greater or less to the resources of Florida, additional information verifying that the northern and southern routes are less desirable is necessary.

We recommend that the applicant investigate alternate routes around significant hardbottom communities or that the applicant reconsider other avoidance methodologies such as directional drilling to preserve these natural communities and lessen the damage and eventual mitigation that will be required to replace these resources and their functions. Additionally, we would like to see evidence that the proposed concrete mats have functioned as suggested in previous pipeline projects. There is evidence in coral restoration projects that concrete mats have moved during storm events resulting in damage to nearby hardbottom resources.

Lastly, the application materials note that deepwater seagrass (*Halophila decipiens*) is found in the waters associated with the proposed pipeline; however, we found no quantification in the document of how much, if any, was located during the surveys performed for the proposed route. We recommend that applicant provide information regarding presence or absence of this resource, or the applicant's inability to adequately detect it due to the diminutive nature of this seagrass species.

Plankton

We recommend that the EIS include additional data regarding potential impacts to plankton resources, and analysis of such data. The information that is presently available is not sufficient to be able to appropriately evaluate potential project impacts. Please see the enclosed memo containing an analysis of current plankton data and identification of plankton data collection needs for this project.

Alternatives

We recommend that the EIS include an offshore interconnect with the Gulfstream pipeline as an alternative and also provides an analysis of this alternative.

We appreciate the opportunity to provide input on the development of an EIS for the Port Dolphin LNG deepwater port and pipeline project. Should you require additional assistance regarding our comments, please contact Lisa Gregg at (850) 487-0554 or at lisa.gregg@myfwc.com.

Sincerely,

Mary Ann Poole

Mary Ann Poole, Director
Office of Policy and Stakeholder Coordination

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ENV 1-3-2
Port Dolphin_876
Enclosure

FLORIDA FISH & WILDLIFE CONSERVATION COMMISSION
MEMORANDUM

To: **Ray Martin**
Port Dolphin Project Manager
Deep Water Ports Standards Division
U.S. Coast Guard

Patience Whitten
Deep Water Ports Standards Division
U.S. Coast Guard

Through: **Lisa Gregg**
Port Dolphin Agency Project Lead
Division of Marine Fisheries Management
Florida Fish and Wildlife Conservation Commission

From: **Mark Leiby**
Fish and Wildlife Research Institute
Florida Fish and Wildlife Conservation Commission

Date: **August 27, 2007**

Subject: **Plankton data issues for Port Dolphin LNG DWP**

The larvae of virtually all the recreationally and commercially important species of bony fishes and crustaceans in the Gulf of Mexico and the South Atlantic Bight are part of the planktonic community (Richards, 2006 and references therein, Boltovskoy, D. 1999 and references therein) The eggs and larvae stages of a majority of these species occur over the continental shelf (Richards, 2006 and references therein)

A scientifically valid, *a priori* assessment of impacts to the plankton community which might be a result of the construction and operation of Port Dolphin's proposed LNG facility cannot be made using currently available data

The Port Dolphin deep water port license application (Section 4.2.3.4, pp. 4-35 to 4-37), and the "Analysis of SEAMAP data for Port Dolphin (Draft)" reference qualitative data from the ichthyoplankton survey conducted in the eastern Gulf of Mexico from 1971-1974 by Houde et al., but these data are not included in the analyses. The analyses rely solely on ichthyoplankton data from four SEAMAP stations (Stas. B110, B111, B119 and B120) for quantitative data

The FWC is of the opinion that the SEAMAP ichthyoplankton data from these four stations is not a sufficient basis for assessing Port Dolphin's potential impact on the plankton community near the proposed project, and offers the following discussions for your consideration

SEAMAP DATA

A. **Areal Coverage:** The distance between SEAMAP plankton stations, and the distance of each station from the proposed Port Dolphin project precludes using SEAMAP data to assess potential, localized impacts.

SEAMAP stations are laid out in a rectangular grid. The grid lines, which run North/South and East/West, are located at 0.5° (30 minute) intervals of latitude and longitude. The stations are located at the intersection of the grid lines, and are slightly more than 30 statute miles apart (Figure 1). Consequently, each SEAMAP station lies in the center of a rectangle that encompasses a little more than 1,000 square miles of surface area (Figure 1).

A fine-scale sampling grid centered on all of the proposed Port Dolphin deep water port site alternatives will be necessary to obtain sufficient plankton data for analysis.

B. **Temporal Coverage:** Interannual variation in the abundance of eggs and larvae is frequently quite pronounced (Table 1 this document and Rose, 2000). Distinguishing natural variation from the possible environmental impact of a LNG facility will require multiple years of sampling and data analysis. An estimate of the number of years of pre-EIS sampling that will be necessary to obtain enough base-line data to assess possible environmental impacts from the proposed LNG facility will have to be determined by careful statistical analysis of the only available data, which is the SEAMAP ichthyoplankton data from the SEAMAP stations located on the west Florida shelf between 26° and 29°N (Figure 2).

Species of interest spawn at different times of the year. Some species, e.g. tarpon (*Megalops atlanticus*) and bluefin tuna (*Thunnus thynnus*) have relatively restricted spawning seasons (one to three months). Consequently, year-round, monthly sampling is necessary for preparing a minimally acceptable impact assessment

None of the four SEAMAP stations, which are closest to the proposed Port Dolphin site, have even one year of year-round sampling (Table 2).

C. **Discrete Depth Samples:** Current patterns near the proposed Port Dolphin facility are complex. The speed and direction of long-shore, on-shore and offshore water currents vary with annual variations in wind direction, wind speed, and wind duration. The Loop Current and its effects on the West Florida shelf vary on a fairly regular basis. Local water currents are affected by regular and semi-regular upwelling events. These and other factors result in vertical stratification of the water column as well as variability in Ekman and deep-water Ekman transport. Consequently, discrete depth sampling is necessary to assess potential, localized impacts.

SEAMAP plankton samples, which are oblique tows from near the bottom to the surface, cannot elucidate vertical stratification of the water column.

D. **Faunal Coverage:** An initial impact assessment needs to include data on the planktonic species of economically important crustaceans as well as data on ichthyoplankton.

Generally, only the ichthyoplankton are identified and enumerated from SEAMAP plankton samples.

DATA COLLECTION NEEDS

Plankton Sampling Time Frame: To be determined by careful statistical analysis of the SEAMAP ichthyoplankton data from the SEAMAP stations which are located on the west Florida shelf between 26° and 29°N (Figure 2).

Plankton Sampling Design: The following plankton-sampling program closely follows the program designed by Dr. Monty Graham and his colleagues at the Dauphin Island Sea lab for the Compass Port project. It has been slightly modified to reflect the differences between the Port Dolphin and the Compass Port locations.

Plankton sampling gear should be a multiple opening and closing net system, such as the Mininess, equipped with 0.333-millimeter mesh. The net system should include the electronics necessary to provide real-time displays of conductivity, temperature and depth. The net system should include two real-time flowmeter displays. One of the flowmeters should be inside the mouth of the net and one should be outside of the net. This flowmeter arrangement makes it possible to assess filtration efficiency and net clogging in real-time, as well as to quantify the volume of water filtered. The volume of water filtered by each net is necessary for zooplankton quantification.

Plankton sampling should be conducted in a six mile square area (36 square miles) centered on the proposed Port Dolphin site (Figure 3). The sampling area should be divided into four quadrants, each quadrant being 3 miles square (9 square miles). Each quadrant should be sub-divided into 25 equal sized plats measuring 0.6 x 0.6 miles (0.36 square miles) (Figure 3)

Two of the 25 plats in each quadrant should be randomly selected for plankton sampling each month (i.e., eight plankton stations each month). Eight samples should be taken at each station (i.e. 64 samples each month). Seven of the samples should be discrete-depth plankton samples taken at depth intervals of approximately 15 feet, and one sample should be an oblique tow from near bottom to the surface (i.e., seven stratified layers plus one oblique integrated sample),

Diel variations of plankton should be measured every three months. Seven discrete depth samples and one oblique sample should be taken at one randomly selected station within one mile of the center of the proposed Port Dolphin facility site. These samples should be taken at approximately six-hour intervals over a three-day period (i.e. 96 samples).

Tow speed should be maintained at 1.5 – 2 knots. Tow duration for each sample should be ten minutes unless a comparison of the two, real-time, flowmeter readings indicates that net filtration efficiency has below 75%.

Figure 1

Yellow square outlines 36 square mile sampling area. See Figure 3 for more detailed view

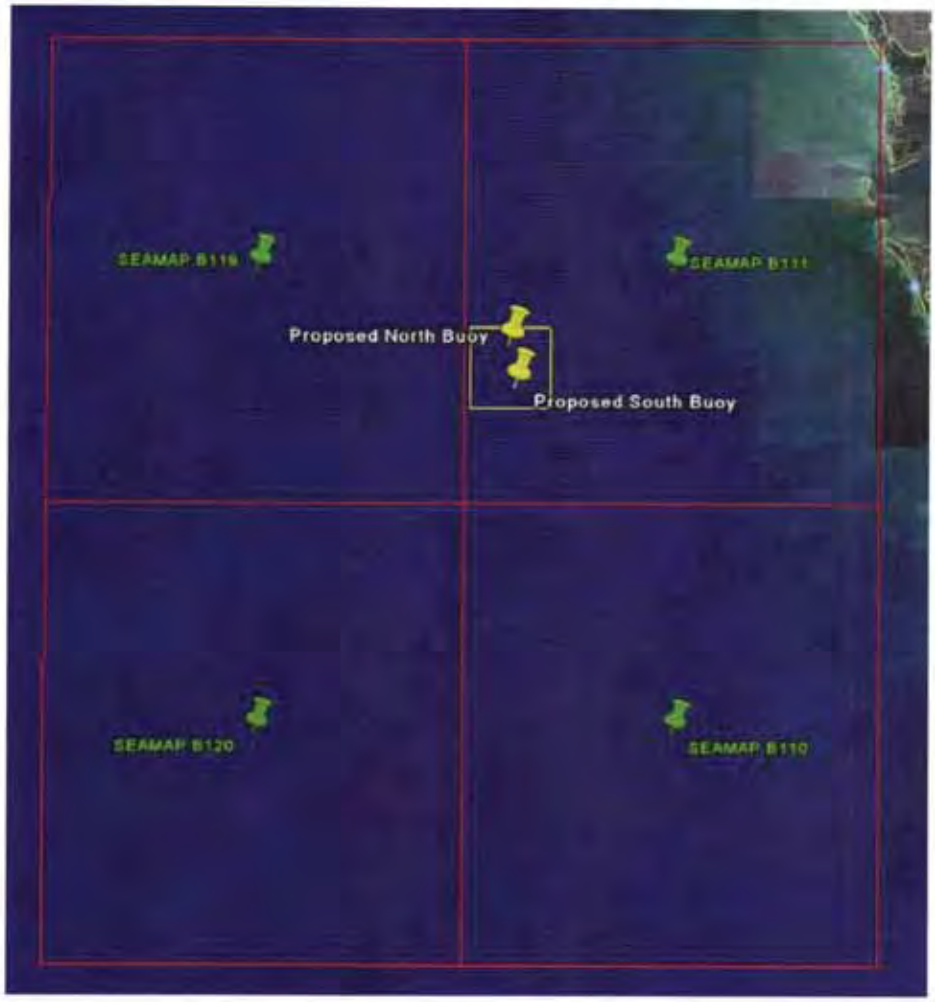

Figure 2
SEAMAP Stations on the West Florida Shelf



Figure 3

Six-mile square sampling grid divided into four quadrants
Each quadrant contains 25 equal sized blocks having a surface area of 0.36 square miles

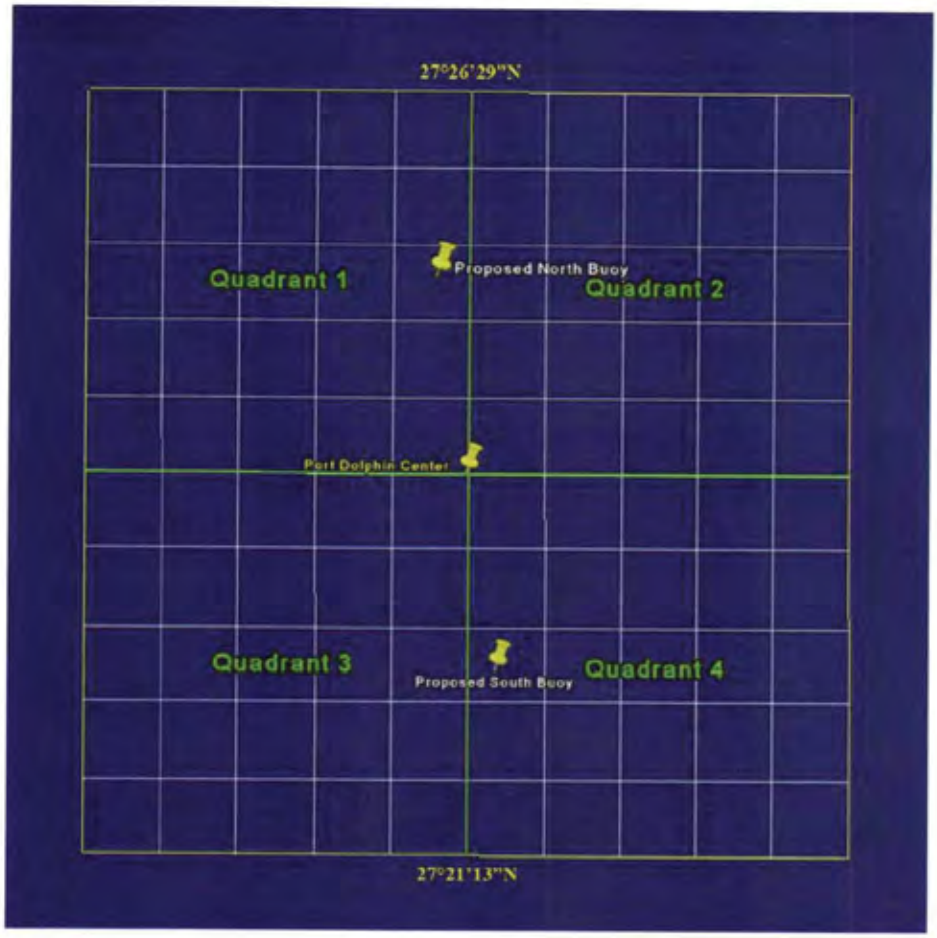

Table 1

SEAMAP Standard Station B001: 29.00°N, 88.00°W

	Data Summary				Raw Data				
Sample Date	Sample Time	Number of Taxa per 100 Cubic Meters of Water	Number of Specimens per 100 Cubic Meters of Water	Number of Fish Taxa in Sample	Number of Fish Specimens in Sample	Volume of Water Filtered in Cubic Meters	Displacement Volume of Sample in milliters	Displacement Volume of Sample per 100 Cubic Meters of Water
5/26/1994	0057	13.0	91.3313	42	295	323.0	18	5.5728
5/18/1996	0059	6.4	47.9651	22	165	344.0	22	6.3953
5/2/1991	0136	8.0	85.1064	30	320	376.0	40	10.6383
5/23/1993	0157	13.8	95.7958	46	319	333.0	40	12.0120
6/15/1993	0313	10.6	64.1638	31	188	293.0	18	6.1433
5/13/1997	0409	10.5	79.3651	33	250	315.0	12	3.8095
5/5/1993	0414	17.3	73.0769	36	152	208.0	83	39.9038
5/31/1995	0959	10.3	41.9355	35	143	341.0	26	7.6246
5/12/1992	1322	13.1	103.0488	43	338	328.0	28	8.5366
5/7/2005	1614	9.5	91.6667	25	242	264.0	16	6.0606
5/5/1994	1617	8.0	65.0909	22	179	275.0	8	2.9091
5/7/1998	1633	4.1	20.9503	19	97	463.0	14	3.0238
5/10/1995	1636	7.7	24.9258	26	84	337.0	20	5.9347
5/13/2002	1650	13.3	61.5686	34	157	255.0	20	7.8431
5/30/2003	2239	11.5	24.6914	28	60	243.0	10	4.1152
5/29/2005	2347	20.1	152.2523	67	507	333.0	40	12.0120

Table 2

SEAMAP Stations closest to Proposed Port Dolphin Buoys							
SEAMAP Sta. B111		SEAMAP Sta. - B110		SEAMAP Sta. - B119		SEAMAP Sta. - B120	
27°30'N, 83°00'W		27°00'N, 83°00'W		27°30'N, 83°30'W		27°00'N, 83°30'W	
Approx. 13 Statute Miles From North Buoy		Approx. 14 Statute Miles From South Buoy		Approx. 19 Statute Miles From North Buoy		Approx. 21 Statute Miles From South Buoy	
Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall
1982		1982		1982		1982	
1983		1983		1983		1983	
August 1984 27°15'N, 83°15'W							
		1985		1985		1985	
	1986		1986 (2)		1986		1986
1987			1987	1987	1987	1987	1987
		1988		1988		1988	
			1989		1989		1989
			1990	1990	1990		
				1991			
					1994		1994
	1996				1996		1996
	1997		1997		1997		1997
	1999		1999		1999		1999
	2000				2000		2000
	2001 (2)				2001		
	2002		2002		2002		

References

Boltovskoy, D. 1999. South Atlantic Zooplankton, Vols. 1 & 2. Backhuys Publishers, Leiden, The Netherlands.

Richards, W. J. 2006. Early Stages of Atlantic Fishes. An Identification Guide for the Western Central North Atlantic. Taylor and Francis/CRC Publishers. 2 Volumes. 2640pp.

Rose, K. A. 2000. Why are quantitative relationships between between emvironmental quality and fish populations so elusive? Ecological Applictions 10(2): 367-385.

Attention: Shana Kinsey and Debby Tucker

See comments below from Suzanne Cooper, Environmental Planner, Tampa Bay Regional Planning Council.

Should you have any questions regarding her comments, she can be reached at suzanne@tbrpc.org or 727/570-5151 ext. 32.

Jessica White
IC&R Coordinator

Jessica White
Senior Planner
Tampa Bay Regional Planning Council
Program Coordinator
Telework Tampa Bay
4000 Gateway Centre Blvd., Suite 100
Pinellas Park, FL 33782
Phone: 727/570-5151 ext. 38
Fax: 727/570-5118
Website: www.tbrpc.org
Telework website: www.teleworktampabay.org

From: Suzanne T. Cooper
Sent: Tuesday, August 07, 2007 3:31 PM
To: Jessica
Subject: Port Dolphin

Jessica – The only comments I have on the clearinghouse request is:

The potential for environmental impacts exist in association with the pipeline planned to enter and cross the shallow areas of Tampa Bay. The EIS should thoroughly investigate the potential impacts to hard bottom communities, fisheries, and other organisms, as well as identify sufficient minimization and mitigation measures to prevent primary and secondary impacts to the resources of Tampa Bay.

Suzanne T. Cooper, AICP
Principal Planner
Tampa Bay Regional Planning Council
4000 Gateway Centre Blvd., Suite 100
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727-570-5151 x 32
FAX 727-570-5118
SunCom 513-5066 x 32
suzanne@tbrpc.org

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. Raymond. W. Martin
Port Dolphin Project Manager
Deepwater Ports Standards Division
U. S. Coast Guard
2100 Second Street, S.W.
Washington, DC 20593-0001

September 12, 2007

Re: Port Dolphin Energy LLC Application for Deepwater Port
Outer Continental Shelf off of Florida's West Coast
Archaeological Assessment
DHR Project File No. 2007-6248B

Dear Mr. Martin:

Our office received and reviewed the above referenced survey in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended and *36 CFR Part 800: Protection of Historic Properties*, and with this agency's responsibilities under Section 267.061, *Florida Statutes*. The State Historic Preservation Officer is to advise Federal and State agencies as they identify historic properties (listed or eligible for listing, in the *National Register of Historic Places*), assess effects upon them, and consider alternatives to avoid or minimize adverse effects.

We reviewed the archaeological assessment entitled *Höegh LNG Project Proposed LNG Facility and Proposed 36-Inch Gas Pipeline, Block 545, St Petersburg Area, Gulf of Mexico, to Tampa Bay, Florida*. Staff from the Bureau of Archaeological Research, Underwater Archaeology, assisted in the review of this report. However, we cannot complete our review of this project as the report does not meet our report standards and there is missing information.

As a portion of this archaeological investigation took place within Florida State Waters, a Chapter 1A-32, *Florida Administrative Code (FAC)* permit should have been obtained prior to the commencement of fieldwork. This authorization will need to be obtained from this agency as an after-the-fact permit. The contact person for obtaining a 1A-32 permit is Andrea White, who can be reached at (850) 245-6325. One of the requirements of a 1A-32 permit and Chapter 267, *Florida Statutes*, is that the resultant survey meets the reporting requirements of Chapter 1A-46, *FAC*. This would include copies of project maps, survey log sheet, etc. Once the required permit has been obtained and the missing information forwarded for our review, we shall attempt to expedite our assessment of this report.

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ Director's Office (850) 245-6300 • FAX: 245-6436
☐ Archaeological Research (850) 245-6444 • FAX: 245-6452
✓ Historic Preservation (850) 245-6333 • FAX: 245-6437
☐ Historical Museums (850) 245-6400 • FAX: 245-6433
☐ Southeast Regional Office (561) 416-2115 • FAX: 416-2149
☐ Northeast Regional Office (904) 825-5045 • FAX: 825-5044
☐ Central Florida Regional Office (813) 272-3843 • FAX: 272-2340

Lastly, should the boundaries of the proposed project be modified to include areas which were not subjected to underwater archaeological investigations, additional archaeological work will be necessary.

If you have any questions concerning our comments, please do not hesitate to contact Susan Harp at (850) 245-6333. Thank you for your interest in protecting Florida's historic resources.

Sincerely,

Frederick P. Gaske

Frederick P. Gaske, Director, and
State Historic Preservation Officer

Xc: Ms. Debby Tucker, DEP
Ms. Andrea White, BAR

09/21/07 FRI 10:03 FAX 001

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701
(727) 824-5317; FAX 824-5300
http://sero.nmfs.noaa.gov

September 20, 2007 F/SER46:MS/mt

Ms. Patience Whitten
U. S. Coast Guard, Commandant (CG-3PSO-5)
Deepwater Ports Standards Division
2100 Second Street, SW
Washington, D. C. 20593-0001

Dear Ms. Whitten:

The National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS), has received your agency's August 24, 2007, letter concerning the preparation of an environmental impact statement (EIS) for the proposed Port Dolphin Energy LLC liquefied natural gas Terminal Deepwater Port (Port Dolphin) license application (72 FR 133 USCG-2007-28532). Port Dolphin would be located in water depth of 100 feet, approximately 28 miles southwest of Tampa Bay, off Manatee County, Florida.

Your letter indicates your agency seeks to consult with NMFS regarding the presence of essential fish habitat (EFH) in the project area potentially affected by the proposed action. To assist your agency in determining impacts associated with Port Dolphin, we are providing a list identifying fish/invertebrate species, life stages, and EFH categories of the project area (see enclosure).

To fully address EFH and associated fisheries in the project area, we recommend the EIS include sections titled "Essential Fish Habitat" and "Marine Fishery Resources" that describe the potential project impacts on each category of EFH (e.g., marine non-vegetated water bottoms, continental shelf features, water column, and estuarine submerged aquatic vegetation, mangrove wetlands, estuarine water column) and marine and estuarine fishery species within the project area. These sections should analyze the potential impacts of the proposed project on EFH and dependent federally managed species and life stages and should fully evaluate alternative measures to avoid, minimize, and offset adverse impacts. Section 600.810(a) of the EFH regulations defines an adverse effect to EFH as any impact that reduces the quality and/or quantity of EFH, including the loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components. The EIS should analyze impacts to benthic and prey species in the discussion of impacts to EFH. This descriptive and analytical information, coupled with a statement of your agency's conclusions regarding the effects of the action on EFH and marine fishery species, would provide the basic details necessary for an EFH assessment pursuant to the requirements of 50 CFR 600.920(e). The Gulf of Mexico

Fishery Management Council should also be provided an opportunity for comment on EFH issues under provisions of the Magnuson-Stevens Fishery Conservation and Management Act.

Further, the project area is within the known distribution limits of a federally listed threatened species under purview of NMFS. In accordance with the Endangered Species Act of 1973, as amended, it is your responsibility to review this proposal and identify actions that may affect endangered or threatened species. Determinations involving listed species should be reported to our Protected Resources Division at the letterhead address. If it is determined that the activities may adversely affect any species listed as endangered or threatened under Protected Resources Division purview, formal consultation must be initiated.

Thank you for the opportunity to provide these comments on environmental issues concerning the proposed permitting of the Port Dolphin LNG Project. If we may be of further assistance, please contact Mr. Mark Sramek at the letterhead address above, by telephone at (727) 824-5311, or e-mail at Mark.Sramek@noaa.gov.

Sincerely,

W. Mark Thompson

for Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

Enclosure

cc:
F/SER4
F/SER3
F/SER46 - Ruebsamen
SER - Keys
GMFMC - Rester
F/HC - Smith
PPI - Kokkinakis
FWC- Gregg

2

EFH Requirements for Species Managed by the Gulf of Mexico Fishery Management Council: Ecoregion 1, Florida Keys to Tarpon Springs, FL.

Species	Life Stage	System[1]	EFH
Pink shrimp[2]	eggs	M	sand/shell bottom
	larvae	M	planktonic, sand/shell bottom, SAV
	juvenile	E	sand/shell substrate
	adults	M	sand/shell substrate
Stone crab	eggs	E/M	<18 m N & <27 m S of Cape Sable; soft/shell/hard bottoms, SAV, oyster reefs
	larvae	E/M	<18 m N & <27 m S of Cape Sable; planktonic
	juvenile	E/M	<18 m N & <27 m S of Cape Sable; sand/shell/hard bottoms, SAV
	adults	M	<18 m N & <27 m S of Cape Sable; sand/shell/hard bottoms, SAV, reefs
Spiny lobster	eggs	M	9-18 m N of Naples, <27 m S of Cape Sable; reefs
	larvae	M	9-18 m N of Naples, <27 m S of Cape Sable; planktonic, SAV
	juvenile	M	9-18 m N of Naples, <27 m S of Cape Sable; SAV, hard bottoms, reefs
	adults	M	9-18 m N of Naples, <27 m S of Cape Sable; SAV, hard bottoms, reefs
Red drum	eggs	M	planktonic
	larvae/postlarvae	E	planktonic, SAV, sand/shell/soft bottom, emergent marsh
	juvenile	M/E	<5 m; SAV, sand/shell/soft/hard bottom, emergent marsh
	adults	M/E	9-18 m S of Cape Sable and N of Naples (other areas 1-46 m); SAV, pelagic, sand/shell/soft/hard bottom, emergent marsh
Red grouper	eggs	M	20-100 m; planktonic
	larvae	M	20-100 m; planktonic
	juvenile	M/E	<50 m; hard bottoms, SAV, reefs
	adults	M	3-190 m; reefs, hard bottoms
Black grouper	eggs	M	18-28 m: planktonic
	larvae	M	10-150 m; planktonic
	juvenile	M/E	SAV, hard bottoms, reefs
	adults	E/M	10-150 m; hard bottoms, mangrove, reefs
Gag grouper	eggs	M	50-120 m; planktonic
	larvae	M	50-120 m; planktonic
	juvenile	M/E	<50 m; SAV, reefs, hard bottom
	adults	M	20-100 m; hard bottom, reefs

[1] E=estuarine, M=marine

[2] Shrimp EFH is generally less than 64 meters, but varies in some parts of the ecoregion, refer to the 2005 fishery management plan and final environmental impact statement.

EFH Requirements Florida Keys to Tarpon Springs, FL -- Continued

Species	Life Stage	System	EFH
Goliath grouper	eggs	M	36-46 m; planktonic
	larvae	M	36-46 m; planktonic
	postlarvae/juvenile	M/E	<3 m; mangrove, SAV, hard bottom, reefs
Misty grouper	eggs	M	150-183 m; planktonic
	larvae	M	150-183 m; planktonic
Nassau grouper	eggs	M	planktonic
	larvae	M	2-50 m; planktonic
	juvenile	M	SAV, reefs
Snowy grouper	eggs	M	30-183 m; planktonic
	larvae	M	30-183 m; planktonic
	juvenile	M	17-60 m; reefs
Warsaw grouper	eggs	M	40-183 m; planktonic
	larvae	M	40-183 m; planktonic
	juvenile	M	20-30 m; reefs
Yellowedge grouper	eggs	M	35-183 m; planktonic
	larvae	M	35-183 m; planktonic
	juvenile	M	35-183 m; hard bottom
	adults	M	35-183 m; reefs bottom
Yellowfin grouper	eggs	M	2-183 m; planktonic
	larvae	M	2-183 m; planktonic
	juvenile	M/E	2-4 m; SAV, hard bottom
Yellowmouth grouper	eggs	M	20-183 m; planktonic
	larvae	M	20-183 m; planktonic
	juvenile	M/E	18-24 m; mangroves, reefs
Red hind	eggs	M	18-110 m; planktonic
	larvae	M	18-110 m; planktonic
	postlarvae/juvenile	M	2-110 m; reefs
	adults	M	18-110 m; reefs, hard/sand/shell bottom
Rock hind	eggs	M	2-100 m; planktonic
	larvae	M	2-100 m; planktonic
	juvenile	M	2-110 m; reefs
Speckled hind	eggs	M	146-183 m; planktonic
	larvae	M	146-183 m; planktonic
Scamp	eggs	M	60-183 m; planktonic
	larvae	M	60-183 m; planktonic
	juvenile	M	hard bottoms, reefs, mangrove
Schoolmaster	eggs	M	<90 m; planktonic
	larvae	M	<90 m; planktonic
	juvenile	M/E	<90 m; SAV, mangrove, emergent marsh, reefs, hard bottom
Red snapper	eggs	M	18-37 m; planktonic
	larvae	M	18-37 m; planktonic
	juvenile	M	17-183 m; hard/soft/sand/shell bottom
	adults	M	7-146 m; reefs, hard/sand/shell bottoms

EFH Requirements Florida Keys to Tarpon Springs, FL -- Continued

Species	Life Stage	System	EFH
Vermilion snapper	eggs	M	<183 m; planktonic
	juvenile	M	<183 m; reefs, hard bottom
	adult	M	<183 m; reefs, hard bottom
Gray snapper	eggs	M	<180 m; planktonic, reefs
	larvae	M/E	<180 m; planktonic, reefs
	postlarvae/juvenile	E/M	<180 m; SAV, mangrove, emergent marsh
	adults	E/M	<180 m; mangrove, emergent marsh, reefs, sand/shell/soft/hard bottoms
Yellowtail snapper	eggs	M	1-183 m; planktonic
	juvenile	M/E	1-183 m; SAV, mangrove, soft bottom, reefs
	adults	M	1-183 m; reefs, hard bottom, shoals/banks
Lane snapper	eggs	M	4-132 m; planktonic
	larvae	M/E	4-132 m; reefs, SAV
	juvenile	E/M	<20 m; SAV, mangrove, reefs, sand/shell/soft bottom
	adults	M	4-132 m; reefs, sand/shell bottom, shoals/banks, shelf edge
Blackfin snapper	eggs	M	40-183 m; planktonic
	juvenile	M	12-40 m; hard bottom
Cubera snapper	eggs	M	10-85m; planktonic
	juvenile	M/E	<85 m; SAV, mangrove, emergent marsh
Dog snapper	eggs	M	planktonic
	larvae	M	planktonic
	juvenile	M/E	SAV, mangrove, emergent marsh
Mutton snapper	eggs	M	reefs
	larvae	M	reefs
	juvenile	M/E	reefs, mangrove, SAV, emergent marsh
	adult	E/M	reefs, SAV, shoals/banks, shelf edge 25-95 m spawning
Queen snapper	eggs	M	95-183 m; planktonic
	larvae	M	95-183 m; planktonic
Hogfish	juvenile	M/E	3-30 m; SAV
Dwarf sand perch	juvenile	M	hard bottom
Greater amberjack	eggs	M	1-183 m; planktonic
	larvae	M	1-183 m; planktonic
	juvenile	M	1-183 m; drift algae (Sargassum)
	adults	M	1-183 m; pelagic, reefs
Lesser amberjack	eggs	M	planktonic
	larvae	M	planktonic
	juvenile	M	55-130 m; drift algae (Sargassum)
Almaco jack	eggs	M	15-160 m; planktonic
	juvenile	M	15-160 m; drift algae (Sargassum)

EFH Requirements Florida Keys to Tarpon Springs, FL – Continued

Species	Life Stage	System	EFH
Banded rudderfish	eggs	M	planktonic
	larvae	M	10-130 m; planktonic
	juvenile	M	10-130 m; drift algae (Sargassum)
Blackline tilefish	eggs	M	60-183 m; planktonic
	larvae	M	60-183 m; planktonic
Blueline tilefish	eggs	M	60-183 m; planktonic
	larvae	M	60-183 m; planktonic
Goldface tilefish	eggs	M	60-183 m; planktonic
	larvae	M	60-183 m; planktonic
Golden tilefish	eggs	M	80-183 m; planktonic
	larvae	M	80-183 m; planktonic
	juvenile	M	80-183 m; hard/soft bottom, shelf edge/slope
Gray triggerfish	eggs	M	10-100 m; reefs
	larvae	M	drift algae (Sargassum)
	postlarvae/juvenile	M	10-100 m; drift algae (Sargassum), mangroves, reefs
King mackerel	adults	M	35-180 m; pelagic
Spanish mackerel	adults	E/M	<75 m; pelagic
Cobia	adults	M	<70 m; pelagic
Coral	all stages	M	plankton, reefs

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701
(727) 824-5312, FAX 824-5309
http://sero.nmfs.noaa.gov

SEP 24 2007

F/SER3:KPB

Patience Whitten
United States Coast Guard, Commandant (CG-3PSO-5)
Deepwater Ports Standards Division
2100 Second Street, S.W.
Washington, DC 20593-0001

Dear Ms. Whitten:

The National Marine Fisheries Service (NMFS) has received your August 21, 2007, letter, regarding the Port Dolphin Energy LLC (Port Dolphin) application for a deepwater port license to construct and operate a liquefied natural gas (LNG) terminal in the Gulf of Mexico (GOM). You have indicated that a biological assessment (BA) will be prepared as an appendix to the environmental impact statement that will be conducted for the project. You have requested a list of threatened and endangered species under the purview of NMFS and any comments we may have regarding the project that should be addressed in the BA.

Section 7 of the ESA requires that federal agencies consult on the effects of their actions that may affect endangered and threatened species. NMFS may coordinate and provide assistance to applicants and federal agencies prior to initiation of consultation by means of a conference, technical assistance, or informal consultation under the Endangered Species Act (ESA). Based on similar LNG proposals, we believe that there is a potential for some aspects of the Port Dolphin project to affect listed species. Although a BA has yet to be prepared and any conclusions regarding the likelihood of effects occurring cannot be determined at this time, we can provide you with a species list and potential impacts based on our preliminary review of the project. In an April 13, 2007, letter, we provided the following recommendations:

- the inclusion of the endangered smalltooth sawfish (*Pristis pectinata*), including potential effects of the action on the species;
- additional information on potential trenching impacts to protected sea turtle species and smalltooth sawfish;
- additional information on potential effects to sea turtles via entanglement from vertical buoy lines, loss of foraging habitat resulting from anchor sweep and pipeline burial, and acoustic impacts resulting from pile driving of the anchoring system;

- all vessels used during installation/commissioning, routine operations, and decommissioning should follow the enclosed *Vessel Strike Avoidance Measures and Injured or Dead Protected Species Reporting* (attached);

- Construction conditions to be followed during construction activities (please note our previous recommendation was only for sea turtles and smalltooth sawfish, but the conditions may require modification to include additional measures from specific activities (e.g., pile driving and pipeline construction) and dolphin species if necessary); and

- additional information to evaluate potential affects on listed species from various aspects of installation/commissioning and decommissioning.

Please consider the following comments in supplement to those previously provided.

Listed Species and Action Area

Species listed under the ESA and protected under the Marine Mammal Protection Act (MMPA) under the purview of NMFS should be considered in the potential effects of the proposed LNG expansion. Primarily sea turtles and smalltooth sawfish are found in the terminal and pipeline areas (Table 1), and only non-listed species of marine mammal including bottlenose dolphins (*Tursiops truncatus*) and Atlantic spotted dolphins (*Stenella frontalis*). However, LNG tankers (LNGTs) traffic may affect many other species of marine mammals while in transit to and from the terminal.

The action area of the project includes all areas to be affected directly or indirectly by the action, and not merely the immediate area involved in the action (50 CFR 402.02). The action area is considered to be all terrestrial and aquatic environments affected by the construction and operation of the LNG terminal and pipelines. The estuarine and marine portion of the project area is considered to be all the areas affected both directly and indirectly by the construction, operation, and decommissioning of the proposed terminal. Therefore, listed marine mammals have the potential to be affected by collisions and noise anywhere on the high seas where they operate in these species' habitats. All the species in Table 1 are recommended for inclusions in an effects analysis from vessel operation in the BA prepared for this project.

Table 1. Threatened and endangered species in the Gulf of Mexico potentially affected by Port Dolphin.

Common Name	Scientific Name	Status
Sea turtles		
Kemp's ridley sea turtle	*Lepidochelys kempii*	endangered
leatherback sea turtle	*Dermochelys coriacea*	endangered
hawksbill sea turtle	*Eretmochelys imbricata*	endangered

Common Name	Scientific Name	Status
green sea turtle	*Chelonia mydas*	threatened
loggerhead sea turtle	*Caretta caretta*	threatened
Cetaceans		
sperm whale	*Physeter macrocephalus*	endangered
humpback whale	*Megaptera novaeangliae*	endangered
fin whale	*Balaenoptera physalus*	endangered
sei whale	*Balaenoptera borealis*	endangered
blue whale	*Balaenoptera musculus*	endangered
Fishes		
smalltooth sawfish	*Pristis pectinata*	endangered

Pipeline Construction

Pipeline construction has the potential to alter habitat conditions and habitat utilization of smalltooth sawfish and sea turtles. Smalltooth sawfish are usually found in shallow waters very close to shore over muddy and sandy bottoms of the project area. The occurrence of smalltooth sawfish in the deeper depths of the terminal site is believed to be low; however, pipeline construction may affect this species and its habitat. Although smalltooth sawfish may be found anywhere in coastal waters near the construction area, mangrove habitat is important to this species, especially juveniles. This species may also respond to pipeline construction activity by avoiding the area. Avoidance behavior may result in temporary or long-term abandonment of important foraging habitat that may affect individuals. Factors affecting the magnitude of avoidance behavior may include the availability and proximity of prey and shelter in adjacent habitats to the project area.

Although the exact pipeline route has not yet been determined, it appears likely to cross smalltooth sawfish habitat and possibly mangroves. Impacts to coastal habitats should be minimized to the greatest extent practicable, including avoiding any loss of mangroves. Possible actions that may result in habitat effects include, but are not limited to, jetting of sediments to lay the pipeline, anchoring of the jetting and lay barges, dragging and sweeping of the anchor cables, and impacts associated with a pipeline making landfall.

In addition to effects to smalltooth sawfish, impacts associated with sea turtle nesting beaches and foraging sea turtles should be considered in the impact analysis. Sea turtles may be found anywhere throughout the construction area. Although some impacts to benthic prey species would be expected, the greater potential impact to sea turtles may be the annoyance and possible exclusion of sea turtles from a foraging area during construction. The types of impacts expected, including their duration and magnitude of impact of individuals should be assessed.

For both smalltooth sawfish and sea turtles, the EIS alternatives considered should take into consideration the magnitude of the effects associated with the installation and operation of the pipeline. It is recommended that alternative pipeline routes and installation methods be considered that would result in minimal impacts to both protected species and their habitats. The rationale for the preferred alternative should be clearly stated in regard to minimizing impacts to protected species.

Marine Debris Reduction

Previously USCG/MARAD-licensed LNG terminals have required a marine debris training and certification program for offshore personnel to further implement existing laws prohibiting the unauthorized discharge of any material into marine waters. The USCG has used the provisions in MMS NTL 2007-G03, which has been developed in coordination between NMFS and MMS, to reduce expected impacts to protected species from offshore oil and gas operations. Pursuant to this NTL companies are required to provide all offshore workers on the OCS an annual training on marine debris laws and requirements, post signs, and provide documentation to the licensing agency of all personnel that have received the marine debris training. We recommend that these requirements also be required of Port Dolphin should a license be issued. NMFS has been a partner in developing training materials with the Offshore Operators Committee (OCC) and the materials currently available to meet the certification and training requirements can be found at www.offshoreoperators.com/marinedebris.

Vessel Operation

Vessels transmit noise through water and cumulatively are a significant contributor to increases in ambient noise levels in many areas and affect local noise levels when considered as a point source. Increases in ambient noise are believed to be a potential threat for marine animals such as mysticetes, sea turtles, and fishes, which have greatest hearing sensitivities at lower frequencies that overlap with the main frequency level of energy produced by vessels. However, the potential for disturbance from noise resulting from individual LNGTs associated with the terminal would be limited to within proximity of a vessel's noise field. It is recommended that the effects of vessel noise on behavioral reactions and masking of calls be considered in the BA from both the perspective of sources of noise from LNGTs associated with Port Dolphin and the cumulative effects of vessel noise in the ocean.

Pile Driving

Although Port Dolphin has not identified the type of piles yet, it expects to use either steel piles or suction piles. The 70-in-diameter, 20-30 m long (65-98 ft), steel piles would require installation with a percussive hammer, which can produce loud underwater noise levels. Steel piles are usually removed below the mudline with the use of explosives, and could injure or kill protected species if explosives are used during decommissioning. If steel piles are used, noise impacts to protected species would be expected, and the methods of removal would need to be considered to estimate any potential impacts that may occur during decommissioning.

Port Dolphin has identified suction pies as an alternative to percussive-driven steel piles. If alternative suction pile anchors are used, noise is expected to be below injurious or harassing levels; however, the pile diameters of 4-5 m (14-16 ft) will impact a greater area of seafloor. An additional benefit of suction anchors is that they can be removed without the use of explosives during decommissioning of the terminal. If steel piles are driven in by percussive hammers, noise modeling will be required to minimize any potentially adverse effects on listed species. Please note that incidental takes of bottlenose dolphins and Atlantic spotted dolphins are not authorized through the ESA section 7 process. If you believe there is a potential for impacts to marine mammals, please contact Kenneth Hollingshead of our Headquarters Protected Resources staff at (301) 713-2055 for additional information regarding an MMPA take authorization. If feasible, it is recommended that suction piles be used for the mooring structures for the proposed terminal to minimize the potential for adverse impacts to protected species.

Impingement and Entrainment

The impacts of cooled seawater discharges and the potential effects of the impingement and entrainment of eggs and larvae of protected species' prey from LNGTs and warming water intakes should be discussed. Previously, we have not found any adverse impacts from seawater intakes from LNGTs and LNG terminals on protected species; however, there is little scientific information available regarding the potential impacts to listed species from these activities. LNG terminal water intake designs may vary, resulting in different levels of impacts expected between projects (e.g., the mesh, size, intake velocities, water treatment, amount of water withdrawn, and thermal discharges). Due to the uncertainty regarding these impacts, NMFS recommends the potential effects be analyzed in the BA.

There may be other impacts we have not yet identified due to the early planning stages of this project. Project modifications and additional project details we result in new impacts that we have identified above. Thank you for the opportunity to comment and early coordination on this project. Please contact Kyle Baker, fishery biologist, at (727) 551-5789 or at Kyle.Baker@noaa.gov with any questions about this letter.

Sincerely,

David Bernhart
Assistant Regional Administrator
for Protected Resources

Enclosure
cc: F – Lindow
F/SER4 - Croom

Ref: T/SER/2007/05902
File: 1514-22.H

5

Vessel Strike Avoidance Measures and Reporting for Mariners
NOAA Fisheries Service, Southeast Region

Background

The National Marine Fisheries Service (NMFS) has determined that collisions with vessels can injure or kill protected species (e.g., endangered and threatened species, and marine mammals). The following standard measures should be implemented to reduce the risk associated with vessel strikes or disturbance of these protected species to discountable levels. NMFS should be contacted to identify any additional conservation and recovery issues of concern, and to assist in the development of measures that may be necessary.

Protected Species Identification Training

Vessel crews should use an Atlantic and Gulf of Mexico reference guide that helps identify protected species that might be encountered in U.S. waters of the Atlantic Ocean, including the Caribbean Sea, and Gulf of Mexico. Additional training should be provided regarding information and resources available regarding federal laws and regulations for protected species, ship strike information, critical habitat, migratory routes and seasonal abundance, and recent sightings of protected species.

Vessel Strike Avoidance

In order to avoid causing injury or death to marine mammals and sea turtles the following measures should be taken when consistent with safe navigation:

1. Vessel operators and crews should maintain a vigilant watch for marine mammals and sea turtles to avoid striking sighted protected species.
2. When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel.
3. When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible.
4. When small cetaceans are sighted while a vessel is underway (e.g., bow-riding), attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.
5. Reduce vessel speed to 10 knots or less when mother/calf pairs, groups, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the

vicinity; therefore, prudent precautionary measures should always be exercised. The vessel should attempt to route around the animals, maintaining a minimum distance of 100 yards whenever possible.

6. Whales may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel and when safety permits, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.

Additional Requirements for the North Atlantic Right Whale

1. If a sighted whale is believed to be a North Atlantic right whale, federal regulation requires a minimum distance of 500 yards be maintained from the animal (50 CFR 224.103 (c)).

2. Vessels entering North Atlantic right whale critical habitat are required to report into the Mandatory Ship Reporting System.

3. Mariners should check with various communication media for general information regarding avoiding ship strikes and specific information regarding North Atlantic right whale sighting locations. These include NOAA weather radio, U.S. Coast Guard NAVTEX broadcasts, and Notices to Mariners. Commercial mariners calling on United States ports should view the most recent version of the NOAA/USCG produced training CD entitled "A Prudent Mariner's Guide to Right Whale Protection" (contact Kristin.Thoms@noaa.gov for more information regarding the CD).

4. Injured, dead, or entangled right whales should be immediately reported to the U.S. Coast Guard via VHF Channel 16.

Injured or Dead Protected Species Reporting

Vessel crews should report sightings of any injured or dead protected species immediately, regardless of whether the injury or death is caused by your vessel.

Report marine mammals to the Southeast U.S. Stranding Hotline: 877-433-8299
Report sea turtles to the NMFS Southeast Regional Office: 727-824-5312

If the injury or death of a marine mammal was caused by a collision with your vessel, responsible parties should remain available to assist the respective salvage and stranding network as needed. NMFS' Southeast Regional Office should be immediately notified of the strike by email (takereport.nmfsser@noaa.gov) using the attached vessel strike reporting form

NMFS Southeast Region Vessel Strike Avoidance Measures and Reporting for Mariners, revised August 2007.

Observed or Noted Strike Resulting in Death or Injury of a Right or Other Large Whale

Incident Date/Time

Date (mm/dd/yyyy): _____ Time (local): _____

Incident Location

Latitude (N): _____ Longitude (W): _____

Environmental Conditions

1. Lighting
   - ☐ Daylight
   - ☐ Twilight
   - ☐ Night
2. Weather
   - ☐ Clear
   - ☐ Rain
   - ☐ Snow
   - ☐ Fog
   - ☐ Other _____
3. Visibility
   - ☐ Good
   - ☐ Fair
   - ☐ Poor
   - ☐ Visibility Distance: _____
4. Air Temperature (C or F)
5. Wind
   a. Speed (knots)
   b. Direction (degrees)
6. Wave
   a. Height (m/f)
   b. Swell (m/f)
7. Water depth (m/f)

Vessel Information

1. Vessel Make
2. Vessel Model
3. Length of Vessel
4. Engine Make
5. Engine Horsepower
6. **Prop Diameter**

6. Comments on how collision may have been avoided

Animal Information

1. Was animal sighted prior to incident

   a. Behavior

   b. Direction of travel

2. Behavior of animal following the collision

3. Portion of animal struck
   - ☐ Head
   - ☐ Midsection
   - ☐ Tail
   - ☐ Unknown

4. Description of wounds on animal. Please use drawings to mark the location of wounds. Include an estimate of length and depth of wounds.

7. **Prop Pitch**

8. **Number of prop blades**

9. Distance between prop shafts (center to center)

Navigation Information at Time of Incident

1. Vessel activity
   - ☐ Moored, docked, anchored, or fixed
   - ☐ Drifting
   - ☐ On Plane
   - ☐ Underway, but off plane
2. Autopilot On/Off
3. **Vessel Speed (knots)**
   a. **How determined?**
4. **Engine RPMs**
5. Vessel Course (degrees)
6. Position/Location of watchstanders?
   - ☐ Bridge
   - ☐ Bow
   - ☐ Other
7. Number of watchstanders?

Incident Information

1. Part of vessel that struck whale(s)
   - ☐ Bow
   - ☐ Propeller
   - ☐ Unknown
   - ☐ Other
2. Whale size
3. Number of whales present
4. Description of what was seen, felt, heard etc.

5. Comments on damage to vessel

-----Original Message-----
From: lisa.gregg@myfwc.com [mailto:lisa.gregg@myfwc.com]
Sent: Tuesday, December 18, 2007 3:19 PM
To: Martin, Raymond
Subject: RE: Port Dolphin - ichthyo analysis

Ray:

I have elevated the response so it will take a bit longer (especially with the holidays and everyone's vacation schedule). I may have it by the end of the week.

Lisa

-----Original Message-----
From: Raymond.W.Martin@uscg.mil [mailto:Raymond.W.Martin@uscg.mil]
Sent: Monday, December 17, 2007 12:45 PM
To: Gregg, Lisa
Subject: RE: Port Dolphin - ichthyo analysis

Lisa - Do you have an update on when we will receive a response? Ray

-----Original Message-----
From: lisa.gregg@myfwc.com [mailto:lisa.gregg@myfwc.com]
Sent: Friday, November 30, 2007 4:12 PM
To: Martin, Raymond
Cc: Debby.Tucker@dep.state.fl.us; ric.ruebsamen@noaa.gov; Mark Sramek; dbeckham@e2m.net; apoole@e2m.net; vwhalon@e2m.net; Tone, Kevin; Whitten, Patience; Leiby, Mark
Subject: RE: Port Dolphin - ichthyo analysis

Ray:

Mark and I have been working on the response and hope to have it to you next week. Patience had called me about leaving the Coast Guard so I was aware that I needed to send you all correspondence.

Thanks,
Lisa

_____

From: Martin, Raymond [mailto:Raymond.W.Martin@uscg.mil]
Sent: Fri 11/30/2007 3:03 PM
To: Gregg, Lisa
Cc: Debby.Tucker@dep.state.fl.us; ric.ruebsamen@noaa.gov; Mark Sramek; dbeckham@e2m.net; apoole@e2m.net; vwhalon@e2m.net; Tone, Kevin; Whitten, Patience; Leiby, Mark
Subject: RE: Port Dolphin - ichthyo analysis

Lisa,

Has any progress been made identifying the taxa that you believe would be more representative for the Port Dolphin proposed site?

Port Dolphin anticipates providing responses to all the remaining outstanding data gaps by the middle of December.

Patience has accepted a position with another agency and her last day at CGHQ is next week so please ensure all Port Dolphin correspondence is sent to me.

Thanks,
Ray
(202)372-1449

-----Original Message-----
From: lisa.gregg@MyFWC.com [mailto:lisa.gregg@MyFWC.com]
Sent: Friday, November 02, 2007 9:51 AM
To: Whitten, Patience; Leiby, Mark
Cc: Debby.Tucker@dep.state.fl.us; ric.ruebsamen@NOAA.GOV; Mark Sramek; dbeckham@e2m.net; apoole@e2m.net; vwhalon@e2m.net; Martin, Raymond; Tone, Kevin
Subject: RE: Port Dolphin - ichthyo analysis

Patience:

I didn't want you to think we had overlooked your request. Mark is out of the office for a few weeks but we will get back to ASAP upon his return.

Thanks,
Lisa

-----Original Message-----
From: Patience.K.Whitten@uscg.mil [mailto:Patience.K.Whitten@uscg.mil]
Sent: Monday, October 22, 2007 4:55 PM
To: Gregg, Lisa; Leiby, Mark
Cc: Debby.Tucker@dep.state.fl.us; ric.ruebsamen@noaa.gov; Mark Sramek; dbeckham@e2m.net; apoole@e2m.net; vwhalon@e2m.net; Martin, Raymond; Tone, Kevin
Subject: Port Dolphin - ichthyo analysis

Dear Lisa,

One of the issues discussed during our conference call on September 28, 2007 was e²M's efforts to refine the study area for SEAMAP data relevant to the ichthyoplankton impact assessment for Port Dolphin. As a follow-up to this, please find attached a map that shows the revised study area. To screen the SEAMAP samples, the data was first queried by latitude and longitude for a rectangle that extended 0.75 degrees north and south of the proposed project location and 0.75 degrees east and west. Then the data query was screened to include only samples that were in water depths greater than 65 feet. The area shown on the map that roughly parallels the coast represents the resultant study area.

The screening resulted in identification of 143 samples. This number is comparable with evaluations conducted for other Gulf of Mexico LNG Deepwater Port projects. The taxa identified in the samples are listed below, in order of relative density. The taxa with the highest relative densities are on top. Please note that these data are preliminary and have been subjected to limited QA. This is the raw "TAXONOMIC" field from the "ichsarwk" data set.

The field is described as: "13-character containing abbreviated SEAMAP taxonomic code. At the species level the first 7 characters refer to the genus and the last 6 characters refer to the species. At taxonomic levels greater than species the whole field is used to identify a taxon."

You previously stated that the four species used in evaluations of other Gulf of Mexico projects were not all valid for this area. If possible, please identify the taxa that you believe would be more representative for the Port Dolphin proposed site. It is very important that we identify representative species soon so we can determine if sufficient life history data is available for each species to allow quantitative analysis. In identifying representative species, it would be most helpful if you could explain your reasoning for selecting each species, as is done in the impact analyses for

other projects. For the reasons explained above, we would appreciate receiving a response at your earliest convenience.

Thank you for your assistance in this effort. Please feel free to contact me if you have any questions.

TAXONOMIC:

GOBIIDAE
SARDINEAURITA
DECAPTEPUNCTA
OPISTHOOGLINU
SYNODONTIDAE
SCORPAENIDAE
UNID.FISH
OPHIDIIDAE
BREGMACEROS
PERCIFORMES
SYACIUM
CLUPEIDAE
LUTJANIDAE
SYACIUMPAPILL
CLUPEIFORMES
BOTHIDAE
CALLIONYMIDAE
SERRANIDAE
LABRIDAE
BOTHUS
GERREIDAE
SERRANIPUMILI
SYMPHURUS
CERATIOIDEI
DIPLECTRUM
APOGONIDAE
APOGON
DIAPHUS
RHOMBOPAURORU
CALLIONYMUS
SCARIDAE
BALISTIDAE
PRIONOTUS
TETRAODONTIFO

SPHOEROIDES
PRIACANTHIDAE
CITHARICHTHYS
TRIGLIDAE
SPARIDAE
CHLOROSCHRYSU
HAEMULIDAE
LUTJANUS
ETROPUS
MONACANTHIDAE
CENTROPRISTIS
ENGRAULIDAE
CARANGIDAE
ETROPUSCROSSO
TETRAODONTIDA
POMACENTRIDAE
EUTHYNNALLETT
SPARISOMA
OPHICHTHIDAE
BLENNIIDAE
CITHARIGYMNOR
CONGRIDAE
CENTROPSTRIAT
GRAMMISTIDAE
ANGUILLIFORME
SCOMBRIDAE
CERATIOIDEA
THUNNUS
CARAPUS
SCOMBERCAVALL
STEPHANOLEPIS
MYCTOPHIDAE
PEPRILUPARU
SELAR CRUMEN
ETRUMEUTERES
SPHYRAENA
PARALEPIDIDAE
GRAMMISTINAE
PLEURONECTIFO
AUXIS
OPISTOGNATHID
CYCLOTHONE

CARAPUSBERMUD
CYCLOPSETTA
LAGODONRHOMBO
PRISTIPAQUILO
HARENGUJAGUAN
STROMATEIDAE
BLENNIOIDEI
OPHICHTGOMESI
LUTJANUGRISEU
PEPRILUS
HYGOPHUM
CYNOGLOSSIDAE
CARAPIDAE
SYNODUSFOETEN
MULLIDAE
SCORPAENIFORM
PEPRILUBURTI
EXOCOETIDAE
MICRODESMIDAE
GONOSTOMATIDA
MYCTOPHUM
MELAMPHAIDAE
OPHICHTREX
SCIAENIDAE
HOLOCENTRUS
EPINEPHELINAE
MURAENIDAE
VINCIGUNIMBAR
SYNGNATHUS
CITHARICORNUT
MONACANTHUS
DECAPTERUS
CYCLOPSFIMBRI
MAUROLIMUELLE
MONACANHISPID
ALUTERUS
CERATOSCOPELU
CAPROIDAE
CORYPHAENA
PSENES
HYPLEURGEMINA
PSEUDOMFUGESA

MYCTOPHIFORME
ENGYOPHSENTA
ALUTERUSCHOEP
HOLOCENTRIDAE
NETTASTOMATID
ANTHIINAE
SARDINELLA
SERRANUS
HYGOPHUREINHA
MACRORHAMPHOS
ANTIGONIA
THUNNUSTHYNNU
SOLEIDAE
SERIOLA
OPHICHTHUS
HOWELLA
BENTHOSEMA
ANTHIAS
ACANTHURUS
OPISTOGNATHUS
OSTRACIIDAE
PSEUDOMYROPHI
NOTOLYCVALDIV
MALACANTHIDAE
CALLECHMURAEN
MUGIL
KATSUWOPELAMI
LUTJANUCAMPEC
SYNGNATHIDAE
CUBICEPS
SCOMBERMACULA
CERATOSMADERE
STEPHANHISPID
DIOGENIATLANT
RYPTICUS
ANTHIASNICHOL
TRACHIPTERIDA
MENTICIRRHUS
CLINIDAE
BAIRDIECHRYSO
SYMPHURPLAGIU
CITHARISPILOP

GADIFORMES
GONOSTOMA
VINCIGUATTENU
BREGMACEROTID
ECHIODODAWSON
CYNOSCIARENAR
HYPSOBLHENTZI
MYROPHINAE
POMACANTHIDAE
ISTIOPHORIDAE
LAMPANYCTUS
ARIOMMA
FISTULARIA
LEIOSTOXANTHU
LETHARCVELIFE
SUDIS
CHAETODONTIDA
ALUTERUHEUDEL
STERNOPTYCHID
SCOMBEROMORUS
ARGENTINIDAE
BREVOORGUNTER
POMATOMSALTAT
ACANTHURIDAE
CARANX CRYSOS
DIPLOSPMULTIS
PEPRILUALEPID
CHIASMODONTID
SELENE VOMER
MONACANCILIAT
OGCOCEPHALIDA
BENTHOSSUBORB
PHAENOMLONGIS
SALMONIFORMES
ANCHOA
PSEUDOGRAMMA
BROTULA
LOPHIIFORMES
SCOMBROIDEI
URANOSCOPIDAE
GONICHTCOCCOI
LETHARCALICUL

BERYCIFORMES
NESIARCNASUTU
STELLIFLANCEO
VINCIGUERRIA
LIOPROPOMA
MONOLENE
PERISTEDION
MELANOSTOMIID
MUGILIDAE
SCIAENOOCELLA
CHLOROSCOMBRU
MYROPHIPUNCTA
ACROPOMATIDAE
ANCHOA HEPSET
CENTROBNIGROO

Patience Whitten
US Coast Guard Hqtrs
Deepwater Ports Stnds Div (G-PSO-5)
Room 1210
2100 Second Street SW
Washington, DC 20593

Fax: 202-372-1926

PLEASE NOTE NEW E-MAIL ADDRESS & PHONE NUMBER:

e-mail address: Patience.K.Whitten@uscg.mil
phone#: 202-372-1453

If you have sent an email to the signatory above that asserts some form of confidentiality, please read the following: assertions that information in an email transmission may be confidential does not exempt it from disclosure to the public or to any other party that the Coast Guard deems a necessary participant in the handling of said material. Claims of confidentiality must identify specific information believed to be confidential or otherwise protected from disclosure. The Coast Guard may release any and all information not clearly identified as protected, unless it independently determines the information should not be released. The Coast Guard will make determinations of confidential or otherwise protected information in accordance with the Freedom of Information Act.

January 30, 2008

Mr. Mark Prescott
Chief, Deepwater Ports Standards Division
U.S. Coast Guard
2100 Second Street, S.W.
Washington, DC 20593-0001

Dear Mr. Prescott:

The Florida Fish and Wildlife Conservation Commission (FWC) is supportive of developing alternative energy projects that would benefit Florida, and therefore has been working closely with the U.S. Coast Guard on plans for both the proposed Calypso liquefied natural gas (LNG) deepwater port (DWP) in the Atlantic off of Florida, and the proposed Port Dolphin LNG DWP in the Gulf of Mexico. It is the responsibility of the FWC to ensure that facilities supporting alternative energy sources are designed, constructed and operated in a way that does not result in adverse consequences to the State's fish and wildlife resources.

With respect to the proposed Port Dolphin facility, I would like to call your attention to, and find a resolution for, issues that FWC staff has consistently raised regarding the applicability of the data that the U.S. Coast Guard staff plans to use to assess potential impacts to fishery resources. Our concerns revolve around the reliance on data from the Southeast Area Monitoring and Assessment Program (SEAMAP) and application of such data in the age-one-equivalent model to assess potential impacts to fishery resources.

While we do not dispute the quality of SEAMAP data for the purposes for which it was collected, our staff believe that SEAMAP data are inappropriate for use in any impact assessment model. SEAMAP data collection is not seasonally distributed, the methodology does not include discrete depth sampling, and it does not include egg identification data to support an impact assessment model. In addition, the larvae of some of the species (e.g., gag grouper, striped mullet, sheepshead, tarpon) of particular importance to Florida's recreational and commercial fisheries are known to be present in the proposed project area, but are not represented in the SEAMAP data which is likely due to the deficiencies previously stated.

Our staff discussed their concerns about using SEAMAP data in conjunction with the age-one-equivalent model with Dr. Joanne Lyczkowski-Schultz and Dr. Terry Henwood at the National Marine Fisheries Service laboratory in Pascagoula. Dr. Lyczkowski-Schultz is the NMFS Pascagoula ichthyoplankton expert who was involved with the development of the age-one-equivalent model. Dr. Terry Henwood is acting director of the NMFS Pascagoula laboratory, and an experienced fisheries statistician. Drs. Lyczkowski-Schultz and Henwood both agreed that the age-one-equivalent model is not applicable to the Central-West Florida shelf because the SEAMAP ichthyoplankton database from the West Florida Shelf does not contain the data necessary for the model.

Florida Fish and Wildlife Conservation Commission

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Managing fish and wildlife resources for their long-term well-being and the benefit of people.

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Hearing/speech impaired:
(800) 955-8771 (T)
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MyFWC.com

On October 22, 2007, we received an email from Ms. Patience Whitten of your staff requesting assistance in selecting fish taxa that would represent species present at the proposed Port Dolphin project site. This email made it apparent that regardless of stated FWC concerns, the Coast Guard intends to pursue the use of SEAMAP data and the age-one-equivalent model for impact assessment purposes.

It is important I convey to you that until we can reach resolution regarding our concerns about the assessment of impacts to Florida's marine fisheries from the proposed Port Dolphin project, the FWC will not be able to help develop the appropriate avoidance, minimization, and compensatory mitigation plans that would allow us to support construction and operation of this port.

The FWC appreciates the opportunity to plan this and other similar projects with the U.S. Coast Guard in a manner that meets Florida's energy needs and also protects our marine resources. FWC staff stands ready to work with the U.S. Coast Guard, the National Marine Fisheries Service, other relevant agencies, and the applicant to resolve these issues.

If you have any questions or need any additional information, please contact Mark Robson, Director of our Division of Marine Fisheries Management at (850) 487-0554 or mark.robson@myfwc.com .

Sincerely,

Kenneth D. Haddad
Executive Director

kdh/lg

cc: Secretary Michael Sole

FLORIDA FISH & WILDLIFE CONSERVATION COMMISSION
MEMORANDUM

TO: **Ray Martin, USCG**
Project Manager, Port Dolphin LNG DWP

FROM: **Lisa Gregg, FWC**
Agency Project Lead, Port Dolphin LNG DWP

DATE: **January 30, 2008**

SUBJECT: **Marine fishery resource impact assessment**

The following is an FWC staff summary of the outstanding issues regarding the assessment of potential impacts to marine fisheries resources associated with the proposed Port Dolphin Liquefied Natural Gas (LNG) Deep Water Port (DWP) project.

Issue #1: Adequacy of fish taxa to be used for the ichthyoplankton assessment. On October 22, 2007, FWC staff received an email from Ms. Patience Whitten requesting assistance in selecting fish taxa that would represent species present at the proposed Port Dolphin project site. The first sentence of Ms. Whitten's email states, "One of the issues discussed during our conference call on September 28, 2007 was e²M's efforts to refine the study area for SEAMAP data relevant to the ichthyoplankton impact assessment for Port Dolphin." The refinement referred to in the email consisted of increasing the number of SEAMAP ichthyoplankton stations from a larger portion of the Central-West Florida Shelf thereby increasing the number of SEAMAP samples to 143. The email states, "This number is comparable with evaluations conducted for other Gulf of Mexico LNG Deepwater Port projects." A taxonomic list, arranged in descending order of abundance, was included with the email. This list does not include any information on which SEAMAP stations or samples were queried to produce the list. The list does not include any information on how many of the 143 samples each taxon occurred in, nor does it provide data on how many specimens of each taxon are present in the samples where they do occur. Nevertheless, Ms. Whitten requested that FWC "please identify the taxa that you believe would be more representative for the Port Dolphin proposed site." The Taxonomic list contains 217 taxa. Only 1/3 (72) of these taxa are species. The remaining 2/3 are genera, subfamilies, families, suborders or orders; consequently, they are not germane to species-based analyses.

Issue #2: Appropriateness of the age-one-equivalent model. The Coast Guard and e^2M requested that FWC select representative taxa from the list they provided so that SEAMAP ichthyoplankton data for the selected taxa could be used in an age-one-equivalent model. The model, which was developed by the Coast Guard and staff of the National Marine Fisheries Service, was used in Draft Environmental Impact Statements for several proposed LNG facilities off the coasts of Louisiana and Mississippi. The purpose of the model is to use egg and larval data to estimate the potential impacts of proposed LNG facilities on fishery stocks of select taxa.

On October 16, 2007, FWC Senior Ichthyologist Mark Leiby discussed our concerns about the applicability of the model with Dr. Joanne Lyczkowski-Schultz and with Dr. Terry Henwood at the NMFS Pascagoula laboratory. Dr. Lyczkowski-Schultz is the NMFS Pascagoula ichthyoplankton expert who was involved with the development of the age-one-equivalent model. Dr. Terry Henwood is

acting director of the NMFS Pascagoula laboratory, and an experienced fisheries statistician. Drs. Lyczkowski-Schultz and Henwood both agreed that the age-one-equivalent model is not applicable to the Central-West Florida shelf because the SEAMAP ichthyoplankton database from the West Florida Shelf does not contain the data necessary for the model.

Issue #3: Inappropriate application of SEAMAP data and the age-one-equivalent model. FWC's primary reasons for stating that a scientifically valid, *a priori* assessment of impacts to the plankton community, which might be a result of the construction and operation of the proposed Port Dolphin LNG facility, cannot be made using the SEAMAP database and the age-one-equivalent model are as follows:

- The SEAMAP database does not contain any zooplankton data. Consequently, it is not possible to determine whether the proposed facility could have a significant impact on the larvae of commercially and recreationally important decapod crustaceans (e.g., crabs and shrimp).

- The distance between SEAMAP plankton stations, and the distance of each station from the proposed Port Dolphin project precludes using SEAMAP data to assess potential, localized impacts. The complex current patterns on the Central-West Florida shelf produce frontal systems. Fish larvae are frequently concentrated at frontal systems. These frontal systems may, or may not, be present in the vicinity of the proposed Port Dolphin site but not at the SEAMAP ichthyoplankton stations. A fine-scale sampling grid centered on all of the proposed Port Dolphin deep-water port site alternatives is necessary to obtain sufficient, reasonably accurate, plankton data for analysis.

- The age-one-equivalent model requires data on the number of eggs per-unit-volume for each taxon being evaluated. It is extremely difficult, or impossible, to identify the eggs of most fish taxa. Consequently, fish eggs taken in SEAMAP samples are not included in the SEAMAP database.

- The age-one-equivalent model requires reliable information on natural mortality rates for the eggs and larvae of the taxa being evaluated. This vital information is unavailable for most, perhaps all, of the 72 species on the taxonomic list provided by Ms. Whitten.

- SEAMAP ichthyoplankton samples on the Central-West Florida Shelf are depth-integrated samples, not discrete-depth samples. In order to use the SEAMAP ichthyoplankton data in an age-one-equivalent model, it is necessary to assume that the larvae of the species being evaluated are randomly distributed throughout the sampled water column. Since the complex current patterns on the Central-West Florida shelf produce vertical stratification of the water column, it is not valid to assume that the larvae of species being evaluated are randomly distributed throughout the water column.

- It is not possible to be reasonably certain that accurate abundance estimates of larval fish taxa have been obtained without year-round sampling. Reasonably accurate abundance estimates are necessary for the age-one-equivalent model. For example, commercially and recreationally important species such as *Mycteroperca microlepis* (gag grouper), *Mugil cephalus* (striped mullet), *Archosargus probatocephalus* (sheepshead) and *Megalops atlanticus* (Atlantic tarpon) are offshore spawners, but they are not represented on the taxonomic list provided by Ms. Whitten. *Mycteroperca microlepis, M. cephalus* and *A. probatocephalus* are primarily winter spawners (Coleman et al. 1996; Crabtree et al. 1992; Crabtree 1995; Ditty et al. 2006; Ditty and

Shaw 1996; Powell and Greene 2006; Mark Leiby pers. obs.). *Megalops atlanticus* is primarily a summer spawner (Smith 1989; Mark Leiby pers. obs.). These and other commercially and recreationally important species may be absent from or rare on the taxonomic list because SEAMAP ichthyoplankton sampling is concentrated in the spring and the fall. Approximately 42% of the SEAMAP ichthyoplankton samples on the Central-West Florida Shelf were taken in April, May and June. Approximately 51% of the samples were taken in September, October and November. Approximately 6% of the samples were taken in December.

We are of the opinion that FWC staff have consistently stated and restated concerns that 1) SEAMAP data is not appropriate, and 2) the age-one-equivalent model is not an appropriate method, for assessing the potential impacts of the proposed Port Dolphin facility on the plankton community. These concerns have been raised during every project meeting or discussion with the Coast guard and/or the applicant beginning in May 2006, but most expressly in our December 11, 2006, email regarding ichthyoplankton data syntheses, our August 29, 2007, letter to the Florida Department of Environmental Protection regarding preparation of an Environmental Impact Statement (provided to the Coast Guard as an attachment to the State of Florida letter), and during the September 28, 2007 conference call. Nevertheless, it appears that the Coast Guard and e^2M seem intent on using inappropriate data and methodology. The rationale that has been provided for this approach is "SEAMAP ichthyoplankton data is the only available data," and "that's the way we've done it for other Gulf Coast projects". We feel this has not been an appropriate response to stated FWC concerns as it does not provide a solution to obtaining the data necessary to determine potential impacts from this proposed project. We are concerned that unless the considerable data gaps that FWC staff has identified are addressed, the result will be a significantly incomplete DEIS which may unfortunately result in a lack of FWC support for this project.

We look forward to working with the Coast Guard and the applicant to resolve these issues.

REFERENCES

Coleman, F.C., C.C. Koenig and L.A. Collins. 1996. Reproductive styles of shallow water grouper (Pisces: Serranidae) in the eastern Gulf of Mexico and the consequences of fishing spawning aggregations. Environmental Biology of Fishes 47: 129-141.

Crabtree, R.E. 1995. Relationship between lunar phase and spawning activity of tarpon, *Megalops atlanticus*, with notes on the distribution of larvae. Bulletin of Marine Science 56: 895-899.

Crabtree, R.E., E.C. Cyr, R.E. Bishop, L.M. Falkenstein and J. M. Dean. 1992. Age and growth of tarpon, *Megalops atlanticus*, larvae in the eastern Gulf of Mexico, with notes on relative abundance and probable spawning areas. Environmental Biology of Fishes 35: 361-370.

Ditty, J.G., T. Farooqi, and R.F. Shaw. 2006. pp 891-899 *in* Richards, W. J., editor. Early Stages of Atlantic Fishes. CRC Press. Publ.

Ditty, J.G. and R.F. Shaw. 1996. Spatial and temporal distribution of striped mullet (*Mugil cephalus*) and white mullet (*M. curema*, Family Mugilidae) in the northern Gulf of Mexico, with notes on mountain mullet, *Agonostomus monticola*. Bulletin of Marine Science 59: 271-288.

Powell, A.B. and M.D. Greene. 2006. pp. 1651-1668 *in* Richards, W.J., editor. Early Stages of Atlantic Fishes. CRC Press. Publ.

Smith, D.G. 1989. pp 961-972 *in* Böhlke, E.B., editor. Fishes of the Western North Atlantic. Part Nine. Volume 2: Leptocephali.

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

2100 Second Street, S.W.
Washington, DC 20593-0001
Staff Symbol: CG-5225
Phone: (202) 372-1440
Fax: (202) 372-1926

16613
February 1, 2008

Mr. Mark Sramek
Fishery Management Specialist
U.S. Department of Commerce, National Oceanic and Atmospheric Administration
National Marine Fisheries Service, Southeast Regional Office (F/SER25)
263 13th Avenue South
St. Petersburg, FL 33701

Dear Mr. Sramek:

As a participating agency in the review of deepwater port licenses we respectfully request NOAA's advice regarding the ichthyoplankton assessment for the proposed Port Dolphin deepwater port. Enclosed is a letter from the Florida Fish and Wildlife Conservation Commission (FWC) dated January 30, 2008, responding to our October 22, 2007 request for FWC input on this issue. As you are probably aware, we have been actively seeking FWC input on this issue for several months. Also attached is a memo from Lisa Gregg dated January 30, 2008.

As you are aware, the impacts on fisheries resources are assessed, in part, through the use of an ichthyoplankton model developed with NOAA after considerable consultation. It has provided a fair and consistent method for conducting assessments of proposed deepwater ports in the Gulf of Mexico. Additionally it is the basis, with some modification, for the assessments of deepwater ports proposed in the Northeast and California. The FWC letter and memo express concern with the adequacy of SEAMAP data and age-one-equivalent modeling that is integral to this model. The concerns are supported by referencing discussions with National Marine Fisheries Service personnel. However, it had been our understanding that not withstanding some shortcomings with SEAMAP data that NOAA was supportive of following the established processes for estimating fisheries impacts.

We note that Miles Croom's letter of August 9, 2007, regarding the Port Dolphin license application recommended using any additional data available for the State of Florida. FWC's recent correspondence was in response to the request of October 22, 2007 to determine what additional information the State of Florida desired. The correspondence has not identified any additional data sources or alternative methodologies for accomplishing the fisheries assessment.

The Deepwater Port Act sets a required timeline for the processing of license applications. Our intent is to go forward with publication of the draft environmental impact statement using the best available data and methodology. If NOAA has concerns with the methodology or is aware of additional specific data that should be considered we request to be advised of this as soon as possible. Recommendations from NOAA and the State of Florida can be incorporated into the NEPA and DWPA process as we move forward or the deepwater port license, if issued.

16613
February 1, 2008

Subject: Port Dolphin Energy LLC Deepwater Port Environmental Impact Statement

The proposed assessment methodology will provide the public and decision-makers with a proven, consistent quantitative and qualitative estimate of the relative impact of this proposed project on fisheries resources. Further, the deepwater port licensing process provides sufficient flexibility to ensure these estimates are reasonable and provides that the State can recommend conditions to any license granted to insure that the State's coastal environment is protected should future monitoring reveal unanticipated impacts.

If you have any comments on the FWC correspondence or any other input please contact me or Mr. Mark Lumen at (202) 372-1444.

Sincerely,

M. A. PRESCOTT
Chief, Deepwater Ports Standards Division
U.S. Coast Guard
By direction

Encl: (1) FWC letter of January 30, 2008
(2) FWC Memo of January 30, 2008

cc: Mr. Keith Lesnick, Maritime Administration
Mr. Miles Croom, NMFS SERO
Ms. Shelby Mendez, NOAA Office of Program Planning and Integration

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

February 18, 2008

Mr. Bruce Nodine
Southeastern Archaeological Research, Inc.
315 N.W. 138 Terrace
Jonesville, Florida 32669

Re: DHR Project File No.: 2008-00136
Received by DHR: January 23, 2007
FERC Docket Nos.: CP07-191-000 and CP07-192-000
Cultural Resource Assessment Survey of the Reroute of the Port Dolphin Permitting Project, Manatee County, Florida

Dear Mr. Nodine:

Our office received and reviewed the above referenced survey report in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties*, and *18 C.F.R., Part 380,* for assessment of possible adverse impact to cultural resources (any prehistoric or historic district, site, building, structure, or object) listed, or eligible for listing, in the National Register of Historic Places (NRHP).

Between January and December 2007, Southeastern Archaeological Research, Inc. (SEARCH) conducted an archaeological and historical Phase I survey of the Port Dolphin Deepwater Port revised pipeline corridor on behalf of Continental Shelf Association, Inc. SEARCH identified two archaeological occurrences but no other cultural resources within the project corridor during the investigation.

SEARCH did not relocate one archaeological site (8MA1228) that was previously recorded within the project corridor. The site was originally recorded as an isolated find and was likely fully collected during the investigation in which it was initially recorded.

SEARCH determined that the proposed pipeline will have no effect on cultural resources listed, or eligible for listing, in the NRHP. SEARCH recommends no further investigation of the project corridor.

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

❒ Director's Office (850) 245-6300 • FAX: 245-6436
❒ Archaeological Research (850) 245-6444 • FAX: 245-6452
❒ Historic Preservation (850) 245-6333 • FAX: 245-6437
❒ Historical Museums (850) 245-6400 • FAX: 245-6433
❒ South Florida Regional Office (561) 416-2115 • FAX: 416-2149
❒ North Florida Regional Office (850) 245-6445 • FAX: 245-6435
❒ Central Florida Regional Office (813) 272-3843 • FAX: 272-2340

Based on the information provided, our office concurs with these determinations and finds the submitted report complete and sufficient in accordance with Chapter 1A-46, *Florida Administrative Code.*

However, for future projects conducted in accordance with federal permitting, Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties*, and *18 C.F.R., Part 380* must be cited.

For any questions concerning our comments, please contact April Westerman, Historic Preservationist, by electronic mail at amwesterman@dos.state.fl.us, or by phone at (850) 245-6333. We appreciate your continued interest in protecting Florida's historic properties.

Sincerely,

Frederick P. Gaske

Frederick P. Gaske, Director, and
State Historic Preservation Officer

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701
(727) 824-5317; FAX 824-5300
http://sero.nmfs.noaa.gov

March 3, 2008 F/SER46:MS/mt

Mr. Mark Prescott, Chief
Deepwater Ports Standards Division
United States Coast Guard, CG-3PSO-5
2100 Second Street, SW
Washington, D.C. 20593-0001

Dear Mr. Prescott:

The National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS), has received the United States Coast Guard's (USCG) February 1, 2008, letter requesting our advice regarding the ichthyoplankton assessment for the proposed Port Dolphin deepwater port (Port Dolphin) license application. Port Dolphin would be located in a water depth of 100 feet, approximately 28 miles southwest of Tampa Bay, off Manatee County, Florida.

Your letter included two enclosures from the Florida Fish and Wildlife Conservation Commission (FWC), both dated January 30, 2008. In their letter, FWC expressed concern with the adequacy of utilizing available Southeast Area Monitoring and Assessment Program (SEAMAP) data and age-one equivalency modeling to estimate ichthyoplankton impacts for Port Dolphin.

While NMFS recognizes age-one equivalency models utilizing SEAMAP data have been used in other offshore liquefied natural gas terminals proposed and constructed throughout the Gulf of Mexico, we remain concerned with the sufficiency of the SEAMAP data near the Port Dolphin site. By letters of April 13, 2007, and August 9, 2007, NMFS expressed similar concerns as FWC about the adequacy of the available SEAMAP data. We also recommended that more detailed modeling of entrainment losses utilizing additional ichthyoplankton data for the eastern Gulf of Mexico be included in the project environmental impact statement (EIS).

To address this issue, NMFS staff participated via teleconference in an interagency meeting on February 11, 2008, concerning the Port Dolphin project. During that meeting, FWC reiterated their concern with the USCG's proposed utilization of SEAMAP data in the age-one equivalency model. FWC believes utilization of this data in an impact assessment model is inappropriate given: 1) the limited seasonal distribution of sampling events; 2) distances between the project site and nearest SEAMAP stations; 3) lack of discrete depth sampling; 4) lack of egg identification data; and 5) deficiencies

in ichthyological data representative of larval gag grouper, mullet, tarpon, and sheepshead, which are known to be present in the project area. Additional discussions during that meeting identified existing fisheries studies within the eastern Gulf of Mexico as potential data sources for zooplankton, egg, and larvae abundance and distribution information which may be used to complete the necessary equivalency models. Furthermore, the applicant agreed to investigate the development of an empirical transport model that could use data from existing grouper family studies in the Gulf of Mexico.

The NMFS continues to recommend that a revised ichthyoplankton modeling effort be conducted utilizing other existing data sources in addition to the SEAMAP samples to analyze and identify potential entrainment and impingement impacts to commercially, recreationally, and ecologically important fish and invertebrate species from operation of the Port Dolphin facility. To assist the applicant, we have enclosed a preliminary list of published studies that may be useful in model development. This list is by no means comprehensive, and we recommend the applicant also conduct a literature search for other relevant studies conducted in the eastern Gulf of Mexico.

NMFS also notes that existing SEAMAP surveys performed in the Port Dolphin project vicinity identified families of fish, which include overfished species managed under federal fishery management plans. Natural mortality of fish eggs and larvae is quite high, and stock success of managed fisheries can hinge on the survival and transport of relatively few recruits to their nursery habitats. NMFS considers mortality caused by the proposed Port Dolphin project as an additional mortality factor to the natural conditions that affect the sustainability of overfished stocks. If it is found that the proposed facility kills a measurable number of the few recruits otherwise destined for survival, the Port Dolphin facility could have a negative effect on managed fisheries. Therefore, NMFS recommends that the impacts from the proposed offshore port operations on fishery stocks, particularly those under a fishing moratorium (e.g., red drum) or undergoing rebuilding efforts, be analyzed thoroughly in the draft EIS.

In order to determine potential impacts on fishery resources and to fully assess ichthyoplankton impacts from the Port Dolphin project, NMFS continues to recommend additional data sources for zooplankton, egg, and larvae abundance and distribution be used in conjunction with SEAMAP data to complete the necessary age-one equivalency models. Once a thorough analysis of ichthyoplankton impacts has been completed, mitigative measures may need to be developed to ensure that unavoidable entrainment and impingement impacts are fully offset. These mitigation measures should include an adaptive management plan for the deepwater port that identifies and requires operational or mechanical project modifications to minimize adverse fishery impacts. NMFS looks forward to continued coordination with the USCG and the applicant in the development and implementation of such a plan.

Lastly, the project area is within the known distribution limits of a federally listed threatened species under purview of NMFS. In accordance with the Endangered Species Act of 1973, as amended, it is your responsibility to review this proposal and identify

actions that may affect endangered or threatened species. Determinations involving listed species should be reported to our Southeast Regional Office, Protected Resources Division, at the above letterhead address. If it is determined that the proposed activities may adversely affect any species listed as endangered or threatened and under Protected Resources Division purview, formal consultation must be initiated.

Thank you for the opportunity to provide these comments concerning the proposed licensing of the Port Dolphin project. If we may be of further assistance, please contact Mr. Mark Sramek at the letterhead address above, by telephone at (727) 824-5311, or by electronic mail at Mark.Sramek@noaa.gov.

Sincerely,

Miles M. Croom

Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

Enclosure

cc:
F - Lindow
F/SER4 - Swafford
F/SER3 - Bernhart
GMFMC - Rester
F/HC - Smith
FWC- Gregg
FDEP - Johansson

Potential Data Sources for the Port Dolphin Age-One Equivalency Modeling/Empirical Transport Modeling

Behringer, D.W., R.L. Molinari, and J.F. Festa, 1977: The variability of anticyclonic current patterns in the Gulf of Mexico, Journal of Geophysical Research, 82(34), 5469-5476.

Bullock, L.H., M.F. Godcharles, R.E. Crabtree. 1996. Reproduction of yellowedge grouper, *Epinephelus flavolimbatus,* from the eastern Gulf of Mexico. Bulletin of Marine Science 59(1): 216-224.

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http://oceanexplorer.noaa.gov/explorations/02mexico/background/currents/currents.html

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April 1, 2008

VIA E-MAIL

Mr. Raymond W. Martin
Deepwater Ports Standards Division (CG-3PSO-5)
U. S. Coast Guard Headquarters
Room 1508
2100 Second Street, S.W.
Washington, D.C. 20593-0001

Regarding: Port Dolphin Energy LLC Liquefied Natural Gas Deepwater Port License Application, Public Docket USCG-2007-28532. 72 Fed. Reg. 34,741 (June 25, 2007).

Dear Mr. Martin:

Enclosed please find a .PDF file of the March 26, 2008, two page letter of Director Frederick P. Gaske, Division of Historical Resources, Florida Department of State, confirming the avoidance areas to be used for anomalies identified during the Port Dolphin Energy LLC archaeological survey. DHR Project File No. 2008-1251; 2007-6248.

Please let us know any questions.

Very truly yours,

J. Michel Marcoux
of counsel for Port Dolphin Energy LLC

cc., w. encl.: Mr. R. Wisløff; Mr. G. Castro; Ms. K. Olsen
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FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

March 26, 2008

J. Michel Marcoux
Bruder, Gentile & Marcoux, L.L.P.
1701 Pennsylvania Avenue, N.W.
Suite 900
Washington, D.C. 20006-5807

Re: *Archaeological Assessment of Marine Remote Sensing Surveys Conducted for the Port Dolphin Project, Gulf of Mexico and Tampa Bay, Manatee County* and *Archaeological Assessment of A Marine Remote Sensing Re-Route Survey Conducted For the Port Dolphin Project, Tampa Bay, Manatee and Hillsborough Counties, Florida*
DHR Project File No. 2008-1251; 2007-6248

Dear Mr. Marcoux:

Our office received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended and *36 CFR Part 800: Protection of Historic Properties*, and with this agency's responsibilities under Section 267.061, *Florida Statutes*. The State Historic Preservation Officer is to advise Federal and State agencies as they identify historic properties (listed or eligible for listing, in the *National Register of Historic Places*), assess effects upon them, and consider alternatives to avoid or minimize adverse effects.

Staff of the Underwater Archaeology Program and Compliance and Review Section of the Division of Historical Resources reviewed the above referenced two cultural resource surveys and find them to be complete and sufficient. We note that the results of the survey of the original route indicated that three unidentified side scan sonar anomalies and fifteen magnetic anomalies may be the remains of historic shipwrecks. The consultant recommends avoidance of these areas by a distance of at least 300 feet and 200 feet respectively. In addition, the recommendation is to avoid the boundaries of the relict channels by 250 feet. The alternate route study identified one side scan sonar contact associated with five magnetic anomalies which may represent shipwreck locations. An avoidance distance of 1,000 feet is recommended, along with avoiding the edges of buried relict fluvial channels, in which prehistoric archaeological resources may be present, by 200 feet. This agency concurs with these recommendations.

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❒ Director's Office (850) 245-6300 • FAX: 245-6436
❒ Archaeological Research (850) 245-6444 • FAX: 245-6452
✓ Historic Preservation (850) 245-6333 • FAX: 245-6437
❒ Historical Museums (850) 245-6400 • FAX: 245-6433
❒ South Regional Office (561) 416-2115 • FAX: 416-2149
❒ North Regional Office (850) 245-6445 • FAX: 245-6435
❒ Central Regional Office (813) 272-3843 • FAX: 272-2340

The archaeological survey for the re-route of the proposed pipeline to avoid the Terra Ceia Aquatic Preserve encountered one unidentified side scan sonar anomaly associated with three magnetic anomalies which may represent the remains of historic shipwrecks. It is the consultant's recommendation that these anomalies be avoided by 500 feet. This agency concurs with this recommendation.

Thus, conditioned upon the avoidance of the referenced unidentified side scan sonar and magnetic anomalies which are addressed in more detail in the reports, and the avoidance of relict channels, it is the opinion of this office that the proposed project will have no effect on historic properties listed, or eligible for listing in the National Register of Historic Places, or otherwise of historical or archaeological value.

If you have any questions concerning our comments, please do not hesitate to contact Susan Harp at (850) 245-6333. Thank you for your interest in protecting Florida's historic resources.

Sincerely,

Frederick P. Gaske

Frederick P. Gaske, Director

Xc: Mr. Jason Burns, SEARCH, Inc.
Ms. Debby Tucker, DEP

DRAFT

NOAA/NATIONAL MARINE FISHERIES SERVICE
SOUTHEAST REGION
HABITAT CONSERVATION DIVISION

Southeast Regional LNG Monitoring Plan Considerations

This document presents a list of considerations for monitoring plans that would be required as a condition of licensing at liquefied natural gas (LNG) facilities licensed by either the Federal Energy Regulatory Commission (FERC) or the U. S. Coast Guard and the Maritime Administration (USCG/MARAD). This document has been developed by the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS), Southeast Regional Office, Habitat Conservation Division, with the advice of the Southeast Fisheries Science Center (SEFSC). These monitoring plan considerations are intended to address potential impacts that may occur to living marine resources and essential fish habitat (EFH) as described pursuant to the Magnuson-Stevens Fishery Conservation and Management Act. Impacts to resources managed under other authorities, such as the Endangered Species Act or the Marine Mammal Protection Act, are not addressed in this document. Background information was compiled from: guidance on evaluating cooling water structures (EPA 1977); case studies developed for the 316(b) Phase II regulations (EPA 2002); a 316(b) resource assessment for the Morro Bay Power Plant (Tenera 2001); research presented at an American Fisheries Society symposium on "Fisheries, Reefs, and Offshore Development" (Hernandez and Shaw 2003); and comments provided by the SEFSC on the draft fisheries monitoring plan for the proposed El Paso (now Excelerate) Energy Bridge deepwater LNG terminal (Thompson 2004).

Monitoring requirements for LNG facilities are based on the need to determine the impacts of terminal and pipeline installation and operations on resources of concern. For facilities utilizing open-loop regasification systems, those impacts potentially represent direct threats to marine fishery organisms through impingement, entrainment, and water quality changes, as well as indirect threats to those species through EFH degradation and loss. The purpose of monitoring is to determine the level of impacts to marine fishery species and EFH and to identify the need for potential mitigative actions, if monitoring shows impacts to be individually or cumulatively significant.

The following questions are those most necessary to answer via monitoring to determine whether individual or cumulative impacts to marine fishery species and their EFH are occurring as a result of LNG construction or operation. Monitoring data are also needed to identify mitigative actions. Questions 1 through 5 relate to monitoring requirements specific to LNG facilities that utilize an open-loop system (i.e., one that cycles large volumes of ambient water through a heat exchanging device to regasify LNG for transmission).

1. Does entrainment represent a significant impact to marine fishery species, including economically important crustaceans?
2. Are the densities of entrained fish eggs and larvae significantly different (less) than those densities in the natural system adjacent to the terminal(s)?

3. Does impingement represent a significant impact to marine fishery species?
4. What are the physical and chemical characteristics of the discharge plume?
5. Does the discharge plume have a significant impact on benthic marine communities in the vicinity of the terminal?
6. Does the installation of other terminal features (e.g., pipelines, gravity-based structures, etc.) have an impact on EFH?
7. Taken in combination with other LNG proposals and habitat impacting activities, what are the cumulative impacts to EFH and marine fishery resources and the overall health of Gulf of Mexico ecosystems?

Question 1: Monitoring the Impacts to Marine Fishery Species from Entrainment

To accurately assess the impacts of entrainment on the early life stages of marine fishery species, it is important to determine the existing densities of fish and crustacean eggs and larvae (hereafter referred to as ichthyoplankton) at the LNG facility site and the quantity of that ichthyoplankton stock that is subject to entrainment. Therefore, it is necessary to collect reference ichthyoplankton samples near the facility as well as ichthyoplankton entrainment samples directly from the open-loop regasification system.

Sampling Gear
Sampling gear should have known performance characteristics under the conditions in which it is to be utilized. New gear, or gear that has not been tested under the conditions in which it is to be used, should be tested and compared against standard gear under project-specific conditions.

The NMFS recommends using bongo nets or a Tucker trawl with opening/closing mechanisms. A net mesh size of 0.333 millimeter should be used, similar to that used to collect SEAMAP ichthyoplankton samples (Thompson 2004). The mouth of the net must be large enough to filter an adequate volume of water per sample (see below). The minimum mouth diameter of the net should be 0.6 meter. All nets should include flow meters.

Monitoring Duration
While 15 to 25 years is required for many cyclic biological phenomena to become evident, a study of this length may not be feasible, though it may be possible to obtain data from historical studies. The U. S. EPA (1977) has suggested that three years is sufficient for detecting an exceptional/outlier year, though this length of time has been criticized for being too short to understand events in the context of long-term trends.

The NMFS recommends five years as a required minimum initial period for monitoring of LNG entrainment impacts on marine fishery species. At the end of this five-year period, a determination should be made regarding the necessity for additional monitoring and/or modifications to the monitoring protocol. Such a determination, made by the U.S. Coast Guard and the Maritime Administration (USCG/MARAD) in consultation with the NMFS and the applicant, should be based on the analysis and findings of the initial, five-year sampling period.

Sampling Frequency

It is important to design the entrainment monitoring plan such that it captures temporal variability in organism abundance at the seawater intake structure of an LNG facility. Organism abundance may vary over a 24-hour (diel) period, throughout the course of lunar cycles, and from season to season. Many studies have shown that certain species migrate vertically in the water column over a 24-hour period. To accurately assess potential impacts to marine fishery species, it is critical to sample at night as well as during the day to determine the position of fish eggs and larvae in the water column. The monitoring plan should consider and account for differences in expected catch efficiency based on the time of day. Night tows frequently produce larger catches, which may be due to gear avoidance abilities in relation to light level as well as diel differences in abundance. The monitoring plan also should consider and account for differences in ichthyoplankton abundance and expected catch efficiency based on lunar cycles (Hernandez and Shaw 2003). Studies have shown that larval abundance is often higher during the new moon (Rooker *et al.* 1996; Victor 1986), possibly due to increases in spawning and settlement success by minimizing mortality from visual predators (Thresher 1984). In addition, gear avoidance capabilities may be lower during the new moon due to reduced visibility (Rooker *et al.* 1996). The monitoring plan also should capture the entire seasonal cycle of organisms present at the intake structure, as densities of different species and life stages fluctuate throughout the year.

The NMFS recommends 24-hour sampling be conducted, usually on a monthly basis. The recommended frequency of sampling over the diel cycle is at least four times daily: at dawn, mid-day, dusk, and mid-night. Because the location of the proposed terminal could differentially affect various species of concern, the sampling frequency should be adjusted to target those species of concern. For example, for terminals in nearshore waters where red drum are more common and have greater potential impact from terminal operations, sampling should be conducted every two weeks from mid-August to mid-October. Failure to sample at that frequency could mean that the peak of the red drum spawning season and highest densities of eggs and larvae are missed completely, and that all results from that year of sampling would be of little use for that important species. Where platforms are further offshore, the spawning of red snapper or grouper species might be of more concern and therefore targeted for greater sampling frequency.

Concerning the frequency of sampling during each trip, there is often substantial variability in ichthyoplankton data. Such variability would affect the ability to identify significant differences among important variables. Therefore, a power analysis may be necessary to allow for a determination of the number of samples necessary to achieve a specified degree of precision. The discrimination power of the survey should be adequate for the purposes for which the data are intended. Lacking such a power analysis, the NMFS recommends that minimally, all samples be taken in triplicate.

Sampling Locations and Volumes

The density of the ichthyoplankton of some fishery species has been shown to vary with depth. Therefore, the location of the seawater intake in the water column has been identified as a

potential mitigative feature reducing entrainment. For this reason, ichthyoplankton reference samples should be taken at different locations in the water column in order to identify species density by depth. The NMFS recommends that oblique bongo or Tucker trawl net tows covering each third (i.e., top, middle, and bottom third) of the water column be employed to collect reference ichthyoplankton samples (Thompson 2004).

Based on tidal cycle and current flows, all ichthyoplankton reference samples should be taken up-current from the intake structure to ensure that monitoring results are not affected by entrainment of fish eggs and larvae resulting from LNG terminal operations. Therefore, the exact location of sampling in relation to the LNG terminal likely will change daily and seasonally to ensure samples are always taken up-current from the terminal.

The volume of water sufficient for each ichthyoplankton sample is dependent on the actual densities of eggs and larvae in the area surrounding the intake. Sample volume should be determined based on the least dense species/life stage of concern. Initially, as large a sample as can be handled should be collected. The NMFS recommends a target of 500 cubic meters of water be filtered per sample. Such a volume could be filtered during one sampling effort through the use of 1 or more nets, with the samples (and flow meter counts) being combined.

Net Extrusion Analysis

The standard 0.333-millimeter mesh nets employed in ichthyoplankton studies are a compromise used to reduce net clogging and sorting times. However, there is substantial evidence that small fish larvae are extruded through nets of this mesh size. Therefore, the NMFS recommends triplicate plankton tows be collected with a smaller mesh size net (about 0.200 millimeter) for comparison with the 0.333 millimeter net to determine extrusion rates and to derive a gear efficiency factor (Thompson 2004). As with the larger mesh nets, a power analysis should be conducted to determine the appropriate number of samples to be taken. With the exception of mesh size, all other variables must be the same in this sampling effort. These smaller mesh samples will be taken at approximately the same time and with the same frequency and depth as the larger mesh samples. The proposed duration of this portion of the study would be one year, with a determination to be made based on a review of data variability and usefulness as to whether additional sampling efforts using 0.200 millimeter mesh nets are necessary.

Data Analysis

Data collection must be conducive to biostatistical analyses. It is important to determine the means for data reduction and analysis in the early stages of plan design. Standards should be established to consistently report findings (e.g., as number(s) of organisms per unit volume).

The NMFS recommends all ichthyoplankton samples be sorted and identified to species or the lowest possible taxonomic level. This level of identification should be consistent with current analyses of SEAMAP samples, except that larval crustacean data also should be processed similarly to the fish eggs and larvae. All fish eggs should be counted and identified, if possible. Larval stages of economically important crustaceans also should be identified to the lowest possible taxonomic level, counted and data analyzed. The methodology developed by the

USCG/MARAD and the NMFS should be used to analyze the monitoring data and extrapolate the results to age-one equivalents and fishery production of the appropriate fishery species. Raw data and all data analyses should be provided annually to the NMFS.

Question 2: Monitoring the Differences in Densities between Entrained Fish Eggs and Larvae and the Natural Environment

Some LNG license applicants have suggested that features such as screen size, flow velocity, and laminar flow reduce entrainment of fishery species. It is thus necessary to determine if fish egg and larval densities are significantly less in entrained waters than source waters. The NMFS recommends entrainment ichthyoplankton samples be taken directly from the open-loop regasification system at a point downstream from the seawater intake point. The mechanism for collecting these samples would depend upon the intake design and internal flow rate, but a system similar to high-speed plankton samplers used on moving ships may have to be designed. Triplicate samples should be collected concurrently with upstream sampling and the same approximate volume of water should be filtered. Data from those samples should be compared against samples taken during the same date, time of day and at the same depth as the intake pipe.

Question 3: Monitoring the Impacts to Marine Fishery Species from Impingement

It is unclear whether impingement represents a significant impact to marine fishery species. Through the utilization of marine life exclusion devices, relatively low seawater intake velocities (frequently less than 0.5 ft/sec), and other mitigative features, it is possible that most larger life stages of marine fishery species can avoid impingement. However, the degree to which impingement could occur and the potential impacts to marine fishery species resulting from impingement are unknown. Therefore, monitoring of impingement rates for at least a relatively short period of time is justified.

The NMFS recognizes that impingement monitoring of organisms in offshore, deeper waters that can occasionally be turbid may be difficult. However, efforts should be made to quantify the impacts of impingement on fish and crustaceans. In fresh water systems, complete daily counts of impinged organisms may be obtained by collecting organisms from the intake screen backwash material in collection baskets placed over intake structure(s) (EPA 1977). If it is not feasible to sample the entire intake structure due to size, a portion of the structure could be sampled and the results from that area extrapolated to the entire structure(s).

The NMFS is cognizant that the methodology developed for fresh water systems may not be feasible in the marine environment. Methods such as: 1) collecting the impinged species from the backwash coming off a known size of a screen and extrapolating that catch to the entire screen; and/or, 2) using video cameras to record impingement on the screen should be considered. Both methodologies have their drawbacks. As such, the NMFS is willing to leave the development and selection of a specific methodology to the recommendation of the licensee and their experts. Whatever methodology is proposed should be based on samples collected as least as frequently as every two weeks, and should quantify impingement, on a species level,

throughout an entire 24-hour period. Those data then should be used to extrapolate impacts to species of concern throughout the year.

At the end of a one-year monitoring period, a determination should be made regarding the necessity for additional monitoring and/or modifications to the monitoring protocol. Such a determination should be made by the USCG/MARAD in consultation with the NMFS and the applicant.

Question 4: Monitoring the Physical and Chemical Characteristics of the Discharge Plume

Water discharged from the open-loop regasification system will be approximately 10 to 20 degrees Fahrenheit cooler than ambient sea water temperatures. This temperature differential makes the discharged water denser than ambient sea water and causes the plume to sink through the water column to the sea floor. Discharged water also will contain biocides, such as sodium hypochlorite or copper. It is necessary to determine how the chemical and physical properties of the discharge plume are altered as the plume moves away from the outfall, as well as the geographical extent of the discharge plume, to determine its potential impact to benthic organisms.

The NMFS recommends that water quality testing be conducted monthly over various tidal conditions to determine the behavior of the discharge plume. Physical and chemical properties of the discharge plume also should be tracked and recorded in a grid pattern at varying distances and water depths from the outfall. The geographic extent of discharge plume monitoring should be determined by the distance required for temperature and the concentrations of chemical additives to become indistinguishable from ambient seawater levels (using standard analytical techniques). The NMFS recommends that computer generated graphical depictions which show the geographic extent and physical/chemical properties of the discharge plume under various flow and tidal direction/velocity scenarios be developed from the monitoring data. Discharge plume modeling should be conducted until the model has been verified to a high level of predictability for all tidal cycles and seasons. Such a determination should be made by the USCG/MARAD in consultation with the NMFS and the applicant.

Question 5: Monitoring Benthic Impacts Caused by the Discharge Plume

It is possible that the chronic discharge of large quantities of cold water containing biocides would have adverse impacts on the benthic community near the outfall site.

To monitor the impacts of the discharge plume on the benthos, the NMFS recommends collecting sediment grabs with a Peterson dredge or similar sampling equipment at varying distances (approximately every 50 to 100 feet) from the outfall. Triplicate benthic samples should be taken monthly for a year prior to facility construction to determine spatial and temporal variations in the densities of benthos. Because the exact distance and trajectory of discharge plume impact, measured from the outfall pipe will not be known, pre-construction samples should be taken every 45 degrees throughout a 360-degree circle around the platform

location. The locations of samples taken should be recorded on a Global Positioning System (GPS) to allow that area to be sampled repeatedly over time. Initially, the geographic extent of benthic monitoring should be larger than the estimated area of impact of the discharge plume.

After the development of the outfall model, the NMFS, in consultation with the applicant, will develop the recommended sampling grid points based on the results of the model. At a minimum, benthic samples should be taken monthly during the preconstruction period and for one year after the LNG facility becomes operational. Samples should be taken annually for an additional five years, to determine the level of short-term and/or long-term impacts to the benthic community. The geographic extent of benthic monitoring after facility operations commence should be determined by the geographic extent of the discharge plume monitoring (i.e., by the distance required for temperature and the concentrations of chemical additives to return to ambient seawater levels). At the end of the 1- and 5-year monitoring periods, a determination should be made regarding the necessity for additional monitoring and/or modifications to the monitoring protocol. This determination should be made by the USCG/MARAD in consultation with the NMFS and the applicant.

Macrobenthos and benthic infauna should be identified to the lowest possible taxonomic level, counted, and weighed. Any notable degradation of benthic communities should be reported with sample data. Both sediment and porewaters from benthic samples should be tested for levels of biocides (e.g., sodium hypochlorite and copper) and their marine by-products (e.g., bromoform), as well as levels of other potential marine pollutants discharged by the facility (e.g., brine solution, petroleum, and lubricants).

Question 6: Monitoring of the Impacts Associated with the Installation of Related Terminal Features

LNG facilities must transport the regasified product to market through pipelines. These pipelines begin at the terminal and may tie-in with other natural gas pipelines located either offshore or onshore. Often, these pipelines are proposed to be constructed on productive water bottoms and/or through wetlands, both of which may be designated as EFH supportive of marine fishery resources. If a pipeline impacts EFH, the NMFS recommends the habitat be restored after the pipeline has been constructed. Alternatively, NMFS may recommend a different pipeline route that would avoid or minimize impacts on EFH.

Monitoring of the pipeline right-of-way (ROW) is necessary to document pre-construction conditions as well as the level of successful restoration and the need for remedial actions. The following constitutes typical monitoring recommendations associated with the installation of pipelines in areas classified as EFH:

1. The licensee should conduct a pre-construction survey of the pipeline ROW and all work areas to document pre-project conditions. The survey should include a GIS analysis using recent aerial photographs of the project area with the pipeline ROW superimposed on the photograph and identify all habitat types using Cowardin codes (Cowardin et al.

1979) or other accepted measures. The survey also should identify elevations of all wetland areas crossed and include a description of major wetland vegetative communities. Where shell reefs may be impacted, the survey should document the geographic extent and productivity of those shell reefs.

2. Ground photographs of those portions of the pipeline ROW which cross marsh should be taken prior to construction and immediately after construction. The photographs should be taken at 500-ft intervals from the center of the ROW with two photographs being taken at each location, one in each direction. GPS should be used during photography such that pre- and post- construction photographs could be taken from the same locations.

3. Following one growing season after construction, the licensee should undertake a post-construction survey similar to that taken prior to construction. The intent of the post-construction survey is to identify areas where pre-construction contours were not successfully restored or where vegetative or shell reef communities did not become re-established.

4. All monitoring information should be provided to the NMFS within 3 months of its development.

Question 7: Monitoring of cumulative impacts of LNG terminals on EFH and marine fishery species.

The analyses of the results of monitoring plans for each individual terminal should be used to estimate the cumulative impacts of LNG operations in the Gulf of Mexico on EFH and living marine resources (with particular emphasis on age-1 equivalents of important fishery species and their forage species). Efforts to apply the results of individual monitoring studies to predict probable cumulative fishery impacts resulting from the operation of other existing LNG facilities should be made. The methodology developed by the USCG/MARAD and NMFS should be used to analyze the monitoring data, develop cumulative impact estimates, and predict the impacts on age-1 equivalents and equivalent yield of the appropriate fishery species. Raw data, all data analyses, and any assumptions necessary to prepare the cumulative impact assessment should be provided to NMFS for review.

Reporting of Monitoring Result

1. Monitoring methodologies, sample locations, monitoring results and analysis, and any resulting recommendations for change of facility operations or monitoring protocols are to be prepared and submitted to the federal licensing agency and the NMFS annually.

2. Annual reports are to be submitted by March 30 and will encompass the previous calendar year (or portion of a year if monitoring was not conducted for an entire 12 month period).

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U.S. Coast Guard
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Washington, DC 20593-0001

DEPT OF TRANSPORTATION
DOCKETS
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Re: Draft Environmental Impact Statement on the Port Dolphin LLC Liquified Natural Gas Deepwater Port License Application (Docket No. USCG-2007-28532)

Dear Mr. Prescott:

The National Oceanic and Atmospheric Administration (NOAA) is pleased to provide comments on the Draft Environmental Impact Statement (DEIS) of the lead agencies, U.S. Coast Guard and the Maritime Administration, dated April 18, 2008 for the Port Dolphin LLC Liquefied Natural Gas Deepwater Port License Application (Docket No. USCG-2007-28532). According to the DEIS, Port Dolphin LLC is proposing to own, construct and operate a deepwater port in the Federal waters of the Outer Continental Shelf in lease blocks designated by the Minerals Management Service (MMS) as St. Petersburg (PB) blocks: PB545, PB589, and PB590. These blocks are approximately 28 miles off the west coast of Florida to the southwest of Tampa Bay, in a water depth of approximately 100 feet. Port Dolphin would consist of a permanently moored unloading buoy system with two submersible buoys separated by a distance of approximately 3 miles. The buoys would be designed to moor a specialized type of liquefied natural gas (LNG) vessel called a Shuttle and Regasification Vessel (SRV).

The comments and recommendations enclosed are based on NOAA's National Marine Fisheries Service's (NMFS) special expertise and responsibility to protect essential fish habitat under the Magnuson-Stevens Fishery Conservation and Management Act and to protect listed species under the Endangered Species Act and protected species under the Marine Mammal Protection Act. These comments and recommendations also reflect NMFS' views as to the possible effects of the operation of the proposed facility on the marine environment.

In licensing and regulatory matters, decisions and judgments are made based on the best scientific data available at that time. Where data is abundant, precise requirements may be in order. Where available scientific data is not comprehensive, precision is not always possible, and more projections and judgments are used. While NOAA has certain scientific data relevant to the effects of the operation of the proposed facility on ocean resources, marine species and habitat, they are not necessarily comprehensive on all matters related to the projected effects of the facility operation. In fact, in certain areas the available scientific data are quite sparse. Therefore, estimated ranges of effects are included in portions of the comments and

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recommendations.

It should also be noted that the Deepwater Port Act provides that a license condition should require the best technology available to prevent or minimize "adverse impact on the marine environment." The enclosed comments describe what NOAA considers to be significant adverse impacts on the marine environment.

Sincerely,

for Rodney F. Weiher, Ph.D.
NOAA NEPA Coordinator
Office of Program Planning and Integration

Enclosure

cc: Keith Lesnick, Maritime Administration

UNITED STATES DEPARTMENT OF COMMERCE
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NATIONAL MARINE FISHERIES SERVICE
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MAY 29 2008

F/SER46: MS

Mr. Mark Prescott, Chief
Deepwater Ports Standards Division
Commandant (CG-5223)
U.S. Coast Guard
2100 Second Street, SW
Washington, DC 20593-0001

Re: Draft Environmental Impact Statement for the Port Dolphin LLC Deepwater Port License Application (Docket No. USCG-2007-28532)

Dear Mr. Prescott:

Thank you for providing the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) the opportunity to comment on the draft Environmental Impact Statement (DEIS) for the Port Dolphin, LLC Deepwater Port liquefied natural gas facility, dated April 2008 (docket number USCG-2007-28532). According to the DEIS, Port Dolphin, LLC is proposing to construct and operate a liquefied natural gas regasification facility in the Gulf of Mexico approximately 25 miles off the west coast of Florida, southwest of Tampa Bay.

These comments address issues related to the Magnuson-Stevens Fishery Conservation and Management Act (MSA), Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA) and the National Environmental Policy Act (NEPA). The enclosed comments and recommendations are intended to facilitate the consultation processes of the ESA, satisfy our commenting requirements under the MSA, and ensure a full analysis is conducted under NEPA.

If there are questions on MSA issues, please contact Rusty Swafford at (409) 766-3699. For questions related to the ESA or MMPA, please contact Kyle Baker at (727) 551-5789.

Sincerely,

Phil Steele for

Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosure

ENCLOSURE – NOAA's National Marine Fisheries Service
Comments and Recommendations
Draft Environmental Impact Statement
Port Dolphin LLC, Liquefied Natural Gas Deepwater Port

Below, the National Marine Fisheries Service (NMFS) offers comments pursuant to its responsibilities under the National Environmental Policy Act, the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the Endangered Species Act (ESA), and the Marine Mammal Protection Act (MMPA). NMFS is using the Draft Environmental Impact Statement (DEIS) to: 1) provide comments for the improvement of the Final Environmental Impact Statement (FEIS), 2) to provide the United States Coast Guard (USCG) with Essential Fish Habitat (EFH) conservation recommendations, and 3) to make recommendations on additional information needed to further the ESA consultation.

National Environmental Policy Act

Federal agencies that have jurisdiction by law or special expertise with respect to any environmental impact resulting from an agency action are required to comment on draft environmental impact statements. *See* 40 C.F.R. §1503.2. NOAA maintains expertise and jurisdiction by law over the nation's marine resources and offers the following comments and recommendations on the DEIS for the Port Dolphin LLC, Deepwater Port (Port Dolphin). This document contains comments and recommendations from the National Oceanic and Atmospheric Administration's (NOAA) NMFS regarding the DEIS, dated April 2008, on the Port Dolphin License Application. These comments and recommendations are provided to the USCG and the Maritime Administration (MARAD) pursuant to the interagency Memorandum of Understanding Related to the Licensing of Deepwater Ports.

Description of the Proposed Action

Port Dolphin, LLC, proposes to construct and operate a liquefied natural gas (LNG) deepwater port facility located in the Gulf of Mexico, approximately 28 miles southwest of Tampa Bay, off Manatee County, Florida. Port Dolphin would consist of two, permanent mooring unloading buoys connected to a 36-inch diameter, 41-mile long gas transport pipeline constructed from the offshore port to landward portions of existing natural gas pipelines in Manatee County. The proposed mooring buoys would be sited approximately three miles apart in water depth of approximately 100 feet. The two mooring buoys would have eight mooring lines connected to eight pile-driven anchor points on the seafloor. Up to two shuttle and regasification vessels (SRV) would moor at Port Dolphin to offload regasified LNG between four to eight-day evolutions. When not connected to an SRV, the mooring buoys would be submerged 60 to 70 feet below the sea surface. A marker buoy and retrieval line would be used to locate and recover the buoy as an SRV arrives at the deepwater port. The unloading buoy would be removed from its submerged position and hoisted in through a moon-pool in the forward part of the SRV where it would be positioned in a receiving cone within the hull trunk. After the buoy is locked in position, unloading of regasified LNG would begin. The SRVs would be equipped to transport, store, vaporize, and meter natural gas. A closed-loop, glycol-

water heat transfer media would be used to vaporize the LNG. Natural gas flowlines from Port Dolphin would connect to a 36-inch diameter gas transmission line, which would interconnect with the existing Gulfstream Pipeline natural gas transmission line located approximately 46 miles east of the project site.

As proposed, Port Dolphin activities would require approximately 9.8 million gallons of seawater per day (MGD) for LNG regasification operations aboard each SRV. An additional 2.3 MGD of ballast seawater would also be required during SRV off-loading, requiring approximately 24 MGD for regasification activities aboard two SRVs. It is expected between 45 and 90 SRVs would utilize Port Dolphin for LNG vaporization annually, requiring some 540 million to 1.1 billion gallons of seawater annually. Deepwater port construction is expected to take 11 months to complete, with operations planned to commence in the second quarter of 2011.

Magnuson-Stevens Fishery Conservation and Management Act (16 U. S. C. SS 1801 et seq.)

Below are NMFS' recommendations regarding the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). For each of the issues discussed below, NMFS is available to assist USCG, MARAD, or the project applicant in identifying relevant studies and information sources that may assist in completing subsequent environmental impact statements (EIS).

Alternative Technologies

The DEIS describes LNG vaporization alternatives available for use aboard SRVs at Port Dolphin. In summary, the applicant proposes the use of a closed-loop vaporization system, utilizing an intermediate water-glycol fluid to regasify LNG prior to offloading. The proposed Calypso LNG (Calypso) project off the east coast of Florida has proposed the use of a similar, closed loop vaporization system aboard special regasification ships (SRS) moored at one of two buoys. The Calypso SRS include a system capable of vaporizing the LNG in a closed-loop system and cooling the electricity-generating engines. The Calypso SRS also include an open-loop mode used when LNG is not being vaporized, and a closed-loop mode not requiring any seawater intake. To further minimize ichthyoplankton impacts, NMFS recommends the final EIS include discussions and evaluations of entirely closed-loop LNG vaporization alternatives, which use a small portion of LNG to effectively heat and regasify LNG for offloading. Further, additional discussion is warranted why the SRS vaporization technology used for Calypso would not be available for Port Dolphin. We believe utilization of an entirely closed-loop regasification system would reduce necessary seawater consumption to 2.3 MGD for vessel ballasting, and eliminate ichthyoplankton impacts resulting from the consumption of 9.8 MGD per SRV.

Recommendations for information needs in the final EIS

Based on our review of the DEIS, NMFS provides the following additional recommendations for improving the final EIS:

1. Additional detail describing alternative vaporization technologies as noted above, under "Alternative Technologies," is needed for the discussion comparing environmental impacts and environmental costs from alternative closed-loop vaporization technologies;

2. The EIS should include an analysis of anticipated ichthyoplankton impacts potentially affected by Loop Current anomalies in the project area. In addition, the analysis should identify trends in abundance, distribution, and seasonal timing of ichthyoplankton in the project area resulting from subsea and surface currents; and

3. The EIS should include a breakout of the expected volumes and rates of seawater used by the number and type of diesel engine(s) specifically required for propulsion, LNG vaporization, and hotel services of an SRV while moored at the Dolphin Port facility.

Essential Fish Habitat (EFH) Consultation Background

The NMFS, Southeast Region, Habitat Conservation Division previously provided the USCG and Federal Energy Regulatory Commission (FERC) comments and recommendations on Port Dolphin as follows:

1. USCG license application completeness review (April 13, 2007);
2. USCG Notice of Intent to prepare an EIS for the project (August 9, 2007);
3. USCG request to consult with NMFS regarding the presence of EFH in the project area (September 20, 2007);
4. FERC scoping notice for onshore components of the project pipeline (February 12, 2008);
5. USCG request for advice on an ichthyoplankton assessment for the DWP (March 3, 2008); and
6. interim DEIS comments (March 14, 2008).

NMFS also provided USCG staff with informal comments regarding Port Dolphin through numerous electronic mail messages and has participated as a cooperating agency in interagency conference calls and public scoping meetings.

EFH Assessment

Adverse Impacts to Ichthyoplankton from Port Operation

The DEIS indicates two 11.4-megawatt (MW) diesel engines would be used to supply electrical power while the SRV is moored; one 5.7-MW diesel engine would be needed for propulsion and electrical power generation when the SRV is underway, positioning, and providing hotel services at the DWP. NMFS requests a breakout of the expected volumes and rates of seawater used by the number and type of diesel engine(s) specifically required for propulsion, LNG vaporization, and hotel services of an SRV while moored at the DWP. Such data would be used by NMFS to more accurately determine ichthyoplankton entrainment impacts solely attributable to LNG vaporization.

Discrepancies exist in the numbers of animal egg and entrainment estimates for bay anchovy and gulf menhaden between the interim DEIS and DEIS (see Table 4.2-8). Accordingly, NMFS recommends the discrepancies in Table 4.2-8 be resolved and the table be revised, if needed, prior to publishing the final EIS.

The methodology to evaluate impacts of seawater intakes associated with deepwater ports in the Gulf of Mexico was previously developed for the Gulf Landing Deepwater Port License Application EIS and was used to determine impacts resulting from Port Dolphin. Four fish species (red drum, red snapper, gulf menhaden, bay anchovy), represented in the Southeast Area Monitoring and Assessment Program (SEAMAP), were selected to represent broad categories of the species included in the SEAMAP data. Based on previous discussions with NMFS and the Florida Fish and Wildlife Conservation Commission, two additional fish species, gag grouper and sheepshead, were selected based on economic and ecological importance, availability of life history data, and the similarity to other population types. It is assumed impacts on other species in the Port Dolphin project area would be similar to impacts on these representative species.

Between 1984 and 2002, 143 samples were taken in the SEAMAP study area, and eggs and larvae were collected between May and November. Although the DEIS concludes the 17 years of SEAMAP data represents the best available data for conducting the ichthyoplankton analysis and utilizes methodology developed with our agency for the Gulf Landing Deepwater Port Application, NMFS remains concerned with utilization of the existing SEAMAP data in the age-1 equivalency model because of limited seasonal distribution of SEAMAP sampling events. To offset the lack of year-round data, SEAMAP data used for age-1 equivalency calculations in the DEIS was adjusted for seasonality by weighting the data using values in literature. Table 4.1 in Appendix E summarizes existing ichthyoplankton data limitations and describes corresponding assumptions or data adjustments to overcome these limitations. For example, to offset the lack of year-round data, SEAMAP data used for age-1 equivalency calculations in the DEIS was adjusted for seasonality by weighing the data using values in literature. NMFS recommends the final EIS include a discussion of the weighted seasonality adjustment and literature used to make these adjustments.

Further, NMFS previously expressed concern regarding the distances between the project site and nearest SEAMAP stations. To expand the sampling area, sample size was increased by increasing the study area to habitat representative of the study area based on depth and distance from shore. NMFS remains concerned with the appropriateness of the SEAMAP indicator species and relative remote sample sites for determining ichthyoplankton impacts at the project area.

In addition, our review of the SEAMAP ichthyoplankton data reveals high densities of Spanish sardine (*Sardinella aurita*) in the Port Dolphin project area. Spanish sardine are an important forage species for many commercially and recreationally important fish in the eastern Gulf of Mexico, and significant impacts on their ichthyoplankton from entrainment at Port Dolphin has the potential to reduce the availability of forage resources to higher trophic-level species. Further, because pink shrimp (*Farfantepenaeus duorarum*) and spiny lobster (*Panulirus argus*) larvae are planktonic and may be found in the project area, these species also have the potential to be affected by entrainment at the

project site. To determine anticipated losses on Spanish sardine, pink shrimp, and spiny lobster as a direct result of shipboard LNG vaporization, we recommend the final EIS include annual egg and larval entrainment estimates for each of these species, and lower and upper ranges of age-1 equivalents and equivalent yields for Spanish sardine, pink shrimp and spiny lobster. Annual equivalent yield estimates for pink shrimp and spiny lobster should be expressed as a percentage of total Florida west coast landings for these species.

The DEIS includes a discussion indicating eddies from the Loop Current in the Gulf of Mexico have the potential to transport deepwater fish larvae onto the Florida shelf. The applicant is conducting Loop Current modeling to assess what effect these phenomena may have on larval transport into the project area. The results of this modeling effort, when available, should be considered in the ichthyoplankton impact analysis for the final EIS.

In order to determine potential impacts on fishery resources and to fully assess ichthyoplankton impacts from the Port Dolphin project, NMFS continues to recommend additional data sources for zooplankton, egg, and larvae abundance and distribution be used in conjunction with SEAMAP data to complete the necessary age-1 equivalency models. We further recommend these additional data sources from existing fishery studies in the Gulf of Mexico be utilized in the development of an empirical transport model to be included in the final EIS.

Adverse Impacts to EFH from Port Construction

In reviewing Figure 3.2-3 depicting hardbottom habitats at the proposed mooring buoy sites, it appears the figure erroneously depicts the original mooring array anchor configuration. NMFS received a copy of the applicants' letter dated December 14, 2007, regarding "Deepwater Port Application Addendum - Project Design Changes and Corresponding Impacts –December 2007." Attached to that letter was an optimized buoy anchoring arrangement and associated tables indicating reduced acreages of benthic habitats affected by anchor sweep during routine SRV mooring operations.

In reviewing the Executive Summary and Section 4 of the DEIS, NMFS notes varying acreage values listed for anticipated impacts on benthic resources in the mooring array and pipeline areas. Specifically, the Executive Summary indicates approximately 300 acres of impacts on benthic impacts would occur from port and pipeline installation from the project. Further, Table 4.2-1 indicates approximately 8,786 acres of soft and hardbottom habitats would be affected from port construction activities. NMFS recommends the applicant's proposed December 2007 revised mooring array be selected as the preferred alternative and that the associated impact tables in the final EIS also be revised to reflect the reduced benthic resource impacts.

The two mooring buoys would have eight mooring lines connected to eight pile-driven anchor points in the seafloor. Approximately 30 acres of recurring, long-term impacts to benthic habitats would be caused by cable sweeping during SRV mooring activities. To avoid impacts to these habitats from cable sweep, NMFS recommends the use of mid-line buoys to reduce sweep impacts.

Because benthic marine habitats are categories of EFH, NMFS disagrees with the statement that impacts on benthic resources in the project area would be minor. Live/hard bottom habitats in the project area provide EFH for several life stages of federally managed fish and invertebrate species, including: juvenile and adult red grouper; adult black grouper; adult lane, red and yellowtail snapper; juvenile vermillion snapper; adult spiny lobster; juvenile Spanish mackerel; and postlarval bluefish. In addition to providing EFH for federally managed species, live and hard bottoms provide nursery, foraging, and refuge habitat for other commercially, recreationally, and ecologically important fish and shellfish. Potential impacts to live and hard bottom habitats at Port Dolphin, as well as in the pipeline corridors, would alter fishery habitat and diminish ecological diversity within the Gulf of Mexico and Tampa Bay. Accordingly, NMFS recommends a compensatory mitigation plan for unavoidable impacts to hard bottom marine habitats be developed and coordinated with state and federal resource agencies.

Baseline Pre-project sampling

Because Port Dolphin construction activities would take 11 months to complete, and operations are expected begin in 2011, NMFS recommends a minimum three-year pre-project baseline ichthyoplankton survey be developed and coordinated with state and federal natural resources agencies to determine existing, size-specific, year-round characteristics of the ichthyoplankton resources present at the Port Dolphin site. Since Port Dolphin may be operational in approximately three years, pre-project ichthyoplankton data collection should begin as soon as possible, be performed throughout the year, and may be conducted concurrent with port and pipeline construction. Acquired data can then be used to quantitatively assess potential impacts of port operation on identified fishery resources and, if determined necessary, adaptive management mitigation options to further reduce such impacts could be implemented.

Submerged Aquatic Vegetation (SAV)

The DEIS indicates SAV occurs approximately 75 feet southwest of the proposed horizontal directional drill exit location in Tampa Bay. Because SAV is dynamic and may colonize areas of unvegetated substrates, a thorough seagrass survey should be conducted prior to construction to determine the current status and location of seagrass in the area of horizontal directional drill (HDD) exit location. NMFS recommends pre-project SAV surveys be conducted up to 500 feet from the proposed HDD exit location during peak SAV abundance, which is May 1 through September 30.

Mitigation for Adverse Impacts to Ichthyoplankton and EFH

Once a thorough analysis of the ichthyoplankton entrainment impacts has been completed utilizing the collected baseline data, NMFS recommends that mitigative measures be developed and implemented to ensure that unavoidable entrainment impacts are fully offset. The mitigation plan should be linked to an adaptive management plan for the deepwater port that would identify and require operational or mechanical modifications to minimize adverse fishery impacts. Further, a mitigation plan which offsets the

anticipated unavoidable impacts to benthic habitats from the reduced mooring array should be developed and coordinated with review agencies for inclusion in the final EIS. NMFS looks forward to coordinating with the USCG/MARAD and the applicant in the development of such plans.

EFH Conservation Recommendations

1. A minimum three-year baseline survey should be developed and coordinated with state and federal natural resource agencies to determine existing, site-specific, year round characteristics of the fish and invertebrate ichthyoplankton resources present at the Port Dolphin site. Data collection should begin as soon as possible and may be conducted concurrent with port and pipeline construction. Acquired data can then be used to quantitatively assess potential impacts of port operations on identified fishery resources and, if determined necessary, to develop and implement adaptive management mitigation options to further reduce such impacts.

2. A conceptual compensatory mitigation plan for impacts to hard bottom marine habitats should include the following elements: 1) description of the mitigation plan, 2) quantification of anticipated hard bottom impact acreage versus proposed mitigation acreage and justification for the proposed mitigation acreage; 3) scientific criteria for determining mitigation success; 4) a project and mitigation implementation schedule; 5) targeted hard bottom climax communities expected in mitigation area(s), including their acreage and configurations; 6) materials and methods to be used to achieve the intended mitigation; 7) comprehensive five-year monitoring and reporting schedules; and 8) contingency plans by which equivalent mitigation would be completed if the proposed mitigation fails.

Please be advised that the Magnuson-Stevens Act and the regulations to implement the EFH provisions (50 CFR Section 600.920) require the USCG to provide a written response to this letter. That response must be provided within 30 days and at least 10 days prior to final agency action. A preliminary response is acceptable if final action cannot be completed within 30 days. The USCG's final response must include a description of measures to be required to avoid, mitigate, or offset the adverse impacts of the activity. If the USCG's response is inconsistent with these EFH conservation recommendations, the USCG must provide an explanation of the reasons for not implementing these recommendations.

Endangered Species Act (16 U.S.C. §§ 1531 *et seq.*) and Marine Mammal Protection Act (16 U.S.C. §§ 1361 *et seq.*)

NMFS' Protected Resources Division has previously provided comments on this project on April 13, 2007, September 24, 2007, and March 14, 2008. The following comments and recommendations are in addition to those previously provided regarding protected species under the Endangered Species Act and Marine Mammal Protection Act.

Adverse Effects from Port Construction and Operation

The DEIS estimates the distance from pile driving and pipeline laying/burying activities in which injury (permanent threshold shift or PTS) and behavioral harassment may occur to protected species. Although JASCO (2008) is referenced, no source levels, frequencies, or duration of the noise are provided, nor is modeling provided to demonstrate how these zones of influence were estimated. From NMFS' review of the literature, no measurements of pile driving noise have been taken from any LNG deepwater port in the southeast United States, or from any other marine construction project in the Gulf of Mexico. Although the DEIS states that the same type of hammer type will be used as referenced in JASCO Research Limited (2005), the amount of noise produced is highly dependent on the force required to drive the pile, which is dependent upon various factors such as pile diameter and substrate being driven through, as well as the pile type (e.g., concrete or steel). Additionally, the propagation environment (e.g., water depth and substrate type) will also determine how the noise is transmitted through the water. Due to the uncertainty in the assumptions used in estimating the noise characteristics and propagation in the project area, we are unable to clearly determine the level and magnitude of potential effects to protected species at this time.

Page 4-13 of Appendix G states that sawfish are uncommon in the project area. NMFS agrees that the density of sawfish may be lower in the terminal construction area; however, the majority of sightings of this species are reported in inshore areas where pipeline construction will occur. This section should be clarified to reflect these differences in species abundance between project areas and the greater likelihood of interactions or impacts occurring to this species in the inshore construction areas.

General Comments

Table 3-1 (Appendix G, page 3-1) incorrectly lists green sea turtles as threatened in Florida. Green sea turtles are listed as threatened throughout much of their range, with the exception of the Florida breeding population. The table should be corrected to list their status as endangered with the following footnote: The green sea turtle Florida breeding population is listed as endangered; however, the species in the Atlantic is threatened throughout the rest of its range.

NMFS recently changed our marine mammal stranding hotline number. The number given in Appendix G (page 6-6) is incorrect. Although the old number is still temporarily functional, the new stranding number should be given as 1-877-433-8299.

On page 4-10 of Appendix G, harassment distances from SRV and LNG tanker noise during offloading or construction vessel noise associated with Port Dolphin are not estimated. These noise sources are discussed in the DEIS and should appear in these tables (note, the tables are on page 4-9).

On page 4-10 of Appendix G, it is stated that the applicant might need to seek an incidental harassment authorization for sperm whales. In previous comments provided, NMFS has indicated it is unlikely sperm whales will be affected due to their offshore association with deeper water off the west coast of Florida; however, Atlantic spotted dolphins and bottlenose dolphins are common to the area and should be included in the analysis.

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The continuous noise levels associated with the diesel electric propulsion system of the SRV and LNG thrusters should be included in Tables 4-2 and 4-3. The diesel electric propulsion system of the LNG tankers and thruster noise levels should be included in the table of noise levels. Modeling for all noise levels should be explained in greater detail (e.g., the transmission loss assumed, the specific mode, used, source data from which source levels were derived, and any other assumptions).

Mitigation and Recommendations
The following best management practices (BMPs) and measures are proposed by the USCG to avoid or reduce the potential for adverse effects to protected species:

- MMS NTL 2005-G14 Marine Trash and Debris Awareness and Elimination;
- BMPs to avoid entanglement of sea turtles, smalltooth sawfish, and marine mammals;
- BMPs to reduce accidental discharges of marine debris;
- BMPs to reduce adverse effects to water quality;
- NMFS Sea turtle and smalltooth sawfish construction guidelines;
- NMFS Vessel Strike Avoidance Guidance for Mariners; and
- BMPs to reduce the effects of noise.

NMFS believes all of our previous comments regarding impacts to listed species and marine mammals have been sufficiently addressed and (impacts sufficiently?) reduced by the implementation of the above measures detailed in the DEIS with the exception of noise resulting from construction and operation of the Port Dolphin LNG terminal. NMFS recommends the following issues be addressed before section 7 consultation can be initiated under the ESA:

1. Construction vessels will result in 900 trips from Port Manatee, with 360 to 600 supply vessel trips associated with construction. These vessel trips will result in increased noise in the project area. NMFS recommends that the noise level characteristics (frequency, duration, and source level) be quantified with the other noise sources listed in the DEIS.

2. Please provide additional information regarding source levels and modeling of transmission loss used to estimate zones of influence stated in the DEIS.

3. NMFS has previously commented on alternatives that should be considered (e.g., press in piles and pile driving sleeves). Aside from ramping up during pile driving, it remains unclear what type of mitigation measures are being proposed to reduce noise from noise-producing activities, if any. Please state any measures proposed and their effectiveness at reducing noise in the marine environment, if known.

4. NMFS is not aware of noise measurements for the noise sources discussed above and recommends that field measurements be planned to characterize this and other operational noise sources. NMFS' March 14, 2008, letter from the Protected Resources Division recommended that noise-reduction methods be

utilized, that noise levels be measured in the field to verify noise measurements from construction and operation activities and the effectiveness of any noise-reduction methods or technologies be utilized during construction. To date, there are no measurements of pile driving noise from offshore LNG terminals and all modeling has been based on other studies from areas and projects that may not be comparable to the methods being proposed for Port Dolphin. In addition to pile driving, other potential noises of concern include those from pipeline laying, vessel construction operations, and SRV and thruster noise during LNG tanker offloading during terminal operation. David Mann at the University of South Florida (USF), college of Marine Science is installing autonomous recorders in waters off west Florida, including the project area. NMFS recommends Port Dolphin utilize this existing study to monitor noise levels as part of ESA consultation with NMFS to address uncertainties in the noise estimates used in the DEIS, and to monitor the effectiveness of any noise-reduction methodologies proposed. NMFS is available to assist in the design of a monitoring protocol to measure construction noise and further information regarding the current study underway at USF.

Based on the information provided in the DEIS, an incidental take authorization under MMPA section 101 (a)(5) is necessary for Atlantic spotted dolphins and bottlenose dolphins. Atlantic spotted dolphins and bottlenose dolphins are common to the project area. A publication is available on these dolphin species in the proposed project area,[1] and studies are ongoing by these authors at Mote Marine Laboratory on these species. Please contact Kenneth Hollingshead of our Protected Resources Division at (301) 713-2289 for additional information regarding an incidental take authorization. Additional information is also available at http://www.nmfs.noaa.gov/prpermits/incidentat.htm

The USCG requested informal section 7 consultation under the ESA on August 24, 2007. Although most of our previous comments regarding impacts to listed species and marine mammals have been sufficiently addressed, our comment regarding noise impacts, modeling, and field measurements have not been sufficiently addressed for us to initiate section 7 consultation under the ESA. Once these remaining comments are sufficiently addressed, NMFS believes we will be able to initiate section 7 consultation with the USCG on Port Dolphin.

[1] Griffin, R.B. and N.J. Griffin. 2003. Distribution, habitat partitioning, and abundance of Atlantic spotted dolphins, bottlenose dolphins, and loggerhead sea turtles on the western Gulf of Mexico continental shelf. Gulf of Mexico Science 2003(1): 23-34.

U.S. Department of Homeland Security
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16613
June 26, 2008

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U.S. Department of Commerce, National Oceanic and Atmospheric Administration
National Marine Fisheries Service, Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5511

Subject: Port Dolphin Deepwater Port Environmental Impact Statement Essential Fish Habitat (EFH) Consultation

Dear Dr. Crabtree:

In accordance with Section 305(b)(4)(A) of the Magnuson-Steven Fishery Conservation and Management Act (MSA), U.S. Coast Guard and Maritime Administration have reviewed the recommendations provided by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) in response to the EFH Assessment as presented in the draft Environmental Impact Statement (EIS) for the Port Dolphin Deepwater Port Application. Per the implementing regulation at 50 CFR 600.920(k) this letter fulfills our requirement to respond to NOAA Fisheries within 30 days of receipt of its recommendations.

Your comment letter dated May 29, 2008 included the following EFH conservation recommendations to avoid, minimize, or mitigate adverse effects on EFH:

EFH Conservation Recommendations

1. A minimum three-year baseline survey should be developed and coordinated with state and Federal natural resource agencies to determine existing, site-specific, year-round characteristics of the fish and invertebrate ichthyoplankton resources present at the Port Dolphin site. Data collection should begin as soon as possible and may be conducted concurrent with port and pipeline construction. Acquired data can then be used to quantitatively assess potential impacts of port operations on identified fishery resources and, if determined necessary, to develop and implement adaptive management mitigation options to further reduce such impacts.

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Subject: Port Dolphin Deepwater Port Environmental Impact Statement Essential Fish Habitat (EFH) Consultation

Dear Dr. Crabtree:

In accordance with Section 305(b)(4)(A) of the Magnuson-Steven Fishery Conservation and Management Act (MSA), U.S. Coast Guard and Maritime Administration have reviewed the recommendations provided by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) in response to the EFH Assessment as presented in the draft Environmental Impact Statement (EIS) for the Port Dolphin Deepwater Port Application. Per the implementing regulation at 50 CFR 600.920(k) this letter fulfills our requirement to respond to NOAA Fisheries within 30 days of receipt of its recommendations.

Your comment letter dated May 29, 2008 included the following EFH conservation recommendations to avoid, minimize, or mitigate adverse effects on EFH:

EFH Conservation Recommendations

1. A minimum three-year baseline survey should be developed and coordinated with state and Federal natural resource agencies to determine existing, site-specific, year-round characteristics of the fish and invertebrate ichthyoplankton resources present at the Port Dolphin site. Data collection should begin as soon as possible and may be conducted concurrent with port and pipeline construction. Acquired data can then be used to quantitatively assess potential impacts of port operations on identified fishery resources and, if determined necessary, to develop and implement adaptive management mitigation options to further reduce such impacts.

16613
June 26, 2008

Subject: Port Dolphin Deepwater Port Environmental Impact Statement EFH Consultation

2. A conceptual compensatory mitigation plan for impacts to hard bottom marine habitats should include the following elements: 1) description of the mitigation plan; 2) quantification of anticipated hard bottom impact acreage versus proposed miligation acreage and justification for the proposed mitigation acreage; 3) scientific criteria for determining mitigation success; 4) a project and mitigation implementation schedule; 5) targeted hard bottom climax communities expected in mitigation area(s), including their acreage and configurations; 6) materials and methods to be used to achieve the intended mitigation; 7) comprehensive five year monitoring and reporting schedules; and 8) contingency plans by which equivalent mitigation would be completed if the proposed mitigation fails.

We would like to thank NMFS for these recommendations and its continued input as a federal cooperating agency in preparation of the EIS. The EFH assessment is an integral part of the EIS being prepared for the project. Once completed, the analysis will contain a complete discussion of the effects of the proposed activity and description of what measures will be required to avoid, mitigate, or offset any adverse impacts from the proposed activity. As a result, the U.S. Coast Guard and the Maritime Administration expect that the final EIS will address the NMFS conservation recommendations. Other comments in your letter that are not specifically EFH recommendations will be addressed in the FEIS.

We will send you a final letter with detailed responses to your recommendations at least 10 days prior to the final decision of the proposed action, thereby fulfilling our obligations under the MSA. Should you have any questions regarding this response for the Port Dolphin project review, please contact Mr. Ray Martin at 202-372-1449.

Sincerely,

M.A. PRESCOTT
Chief, Deepwater Ports Standards Division
U.S. Coast Guard
By direction

cc: Mr. Keith Lesnick, Maritime Administration
Mr. Rusty Swafford, NMFS
Mr. Kyle Baker, NMFS

U.S. Department of Homeland Security
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16613
May 26, 2009

Dr. Roy E. Crabtree
Regional Administrator
U.S. Department of Commerce, National Oceanic and Atmospheric Administration
National Marine Fisheries Service, Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5511

Subject: Port Dolphin Deepwater Port Environmental Impact Statement Essential Fish Habitat (EFH)

Dear Dr. Crabtree:

In accordance with Section 305(b)(4)(B) of the Magnuson-Steven Act (MSA), U.S. Coast Guard and Maritime Administration have reviewed the recommendations provided by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) in response to the EFH Assessment as presented in the draft Environmental Impact Statement (EIS) for the Port Dolphin Deepwater Port Application. Per the implementing regulation at 50 CFR 600.920(k) our preliminary response was provided on June 26, 2008. This letter fulfills our requirement to respond to the NMFS' EFH Conservation Recommendations.

Your comment letter dated May 29, 2008 included the following EFH conservation recommendations to avoid, minimize, or mitigate adverse effects on EFH:

EFH Conservation Recommendations

1. A minimum three-year baseline survey should be developed and coordinated with state and Federal natural resource agencies to determine existing, site-specific, year-round characteristics of the fish and invertebrate ichthyoplankton resources present at the Port Dolphin site. Data collection should begin as soon as possible and may be conducted concurrent with port and pipeline construction. Acquired data can then be used to quantitatively assess potential impacts of port operations on identified fishery resources and, if determined necessary, to develop and implement adaptive management mitigation options to further reduce such impacts.

16613
May 26, 2009

Subject: Port Dolphin Deepwater Port Environmental Impact Statement EFH Consultation

2. A conceptual compensatory mitigation plan for impacts to hard bottom marine habitats should include the following elements: 1) description of the mitigation plan; 2) quantification of anticipated hard bottom impact acreage versus proposed mitigation acreage and justification for the proposed mitigation acreage; 3) scientific criteria for determining mitigation success; 4) a project and mitigation implementation schedule; 5) targeted hard bottom climax communities expected in mitigation area(s), including their acreage and configurations; 6) materials and methods to be used to achieve the intended mitigation; 7) comprehensive five year monitoring and reporting schedules; and 8) contingency plans by which equivalent mitigation would be completed if the proposed mitigation fails.

Coast Guard/Maritime Administration Response

1. If a license is issued, Port Dolphin Energy LLC will be required to conduct site-specific, year-round surveying to collect data on existing fish and invertebrate ichthyoplankton populations. Data collection should begin as soon as a license is issued, and continue for a minimum of three years, one of which must be completed prior to the start of operations. Surveying shall be developed and coordinated with state and Federal natural resource agencies. This would be consistent with requirements placed on other LNG deepwater ports licensed by the Maritime Administration, specifically, the Northeast Gateway and Neptune projects off of Massachusetts and the Gulf Gateway project off of Louisiana.

   Requiring Port Dolphin Energy LLC to acquire a minimum of three years of baseline survey data prior to operations is inconsistent with the intent of the Memorandum of Understanding (MOU) on Deepwater Port Licensing of May 20, 2004 signed by the participating agencies. The MOU is based on National Energy Policy and Presidential Executive Order (EO) 13212 issued on May 18, 2001. EO 13212 requires that executive departments and agencies take appropriate actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy. Federal agencies are directed to expedite their reviews of authorizations for energy-related projects and to take other action necessary to accelerate the completion of such projects, while maintaining safety, public health and environmental protections.

   The potential impacts to fish and invertebrate ichthyoplankton populations are presented in Appendix G of the Port Dolphin Deepwater Port License Application EIS.

2. If a license is issued, Port Dolphin Energy LLC will be required to develop a Prevention, Monitoring, and Mitigation Plan to assess, minimize, and mitigate impacts on marine fisheries species (including ichthyoplankton) associated with port operations. The plan would be developed in consultation with NMFS and other cooperating agencies, as appropriate, and subject to approval by the Maritime Administrator. The requirements for

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May 26, 2009

Subject: Port Dolphin Deepwater Port Environmental Impact Statement EFH Consultation

this plan are contained in Appendix H of the Port Dolphin Deepwater Port License Application EIS. In addition, Port Dolphin has included a draft monitoring and mitigation plan for both state and federal waters in their December 2008 submission to the Florida Department of Environmental Protection that includes the elements described in the EFH Conservation Recommendation number 2 above. A final plan would be developed in coordination with appropriate state and federal agencies.

If you have any questions you may contact me at (202) 372-1440 or Ms. Yvette Fields at (202) 366-0926.

Sincerely,

M.A. Prescott
Chief, Deepwater Ports Standards Division
U.S. Coast Guard
By direction

Yvette M. Fields
Director, Office of Deepwater Ports and
Offshore Activities
Maritime Administration

cc: Mr. Rusty Swafford, NFMS
Mr. Mark Sramek, NMFS
Dr. Rodney Weiher

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Appendix D
Principal Laws and Executive Orders

Table of Applicable Laws and Executive Orders [1]

Title, Citation	Summary
Archaeological and Historical Preservation Act, 16 U.S.C. 469	Protects and preserves historical and archeological data. Requires Federal agencies to identify and recover data from archeological sites threatened by a proposed action(s).
Clean Air Act, 42 U.S.C. 7401–7671q, as amended	Establishes Federal standards for air pollutants. Prevents significant deterioration in areas of the country where air quality meets Federal standards.
Clean Water Act, 33 U.S.C. 1251–1387 (also known as the Federal Water Pollution Control Act)	Comprehensively restores and maintains the chemical, physical, and biological integrity of the nation's waters. Implemented and enforced by the U.S. Environmental Protection Agency (USEPA).
Coastal Barrier Resources Act, 16 U.S.C. 3501–3510	Discourages coastal barrier island degradation by prohibiting direct or indirect Federal financial funds (including flood insurance) for development, except for emergency life-saving activities.
Coastal Zone Management Act of 1972, 16 U.S.C. 1451–1464	Establishes a policy to preserve, protect, develop, and, where possible, restore and enhance the resources of the nation's coastal zone. Encourages and assists states in developing and implementing coastal zone management programs.
Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601–9675 (also known as "Superfund")	Provides for liability, compensation, cleanup, and emergency response for hazardous substances released into the environment and cleanup of inactive hazardous substances disposal sites. Establishes a fund financed by hazardous waste generators to support cleanup and response actions.
Deepwater Port Act of 1974, 33 U.S.C. 1501–1524	Assigns responsibility to the Secretary of Transportation to license the construction and operation of all oil and natural gas deepwater ports beyond the U.S. territorial sea and off the U.S. coast.
Endangered Species Act of 1973, 16 U.S.C. 1531–1543, as amended	Protects threatened, endangered, and candidate species of fish, wildlife, and plants and their designated critical habitats. Prohibits Federal action that jeopardizes the continued existence of endangered or threatened species. Requires consultation with U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) Fisheries and a biological assessment when such species are present in an area affected by government activities.

Title, Citation	Summary
Fish and Wildlife Coordination Act, 16 U.S.C. 661–667e, as amended	Authorizes the Secretaries of the Interior and Commerce to provide assistance to and cooperate with Federal and state agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals, as well as to study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife. The 1946 amendments require consultation with the USFWS and the state fish and wildlife agencies involving any waterbodies that are proposed or authorized, permitted, or licensed to be impounded, diverted, or otherwise controlled or modified by any agency under a Federal permit or license.
Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1801–1883, as amended	Establishes regional fisheries councils that set fishing quotas and restrictions in U.S. waters. Requires Federal agencies to consult with NOAA Fisheries on all actions (authorized, funded, or undertaken) that might adversely affect essential fish habitat.
Marine Mammal Protection Act of 1972, 16 U.S.C. 1361–1389, 1401–1407, 1538, 4107	Establishes a moratorium on the taking and importation of marine mammals. Prohibits harassing, hunting, capturing, collecting, or killing of marine mammals or attempting such actions. Requires permits for taking marine mammals. Requires consultations with USFWS and NOAA Fisheries if impacts on marine mammals are possible.
Marine Protection, Research, and Sanctuaries Act of 1972, 33 U.S.C. 1401–1445	Regulates dumping of materials into ocean waters. Provides a permitting process to control ocean dumping of dredged materials. Establishes the marine sanctuaries program.
Maritime Transportation Security Act of 2002, Pub. L. 107–295	Extends the Deepwater Port Act application to include facilities and operations related to natural gas.
Migratory Bird Treaty Act, 16 U.S.C. 703–712	Implements various treaties for protecting migratory birds; the taking, killing, or possession of migratory birds is unlawful.
National Environmental Policy Act of 1969, 42 U.S.C. 4321–4370e, as amended	Requires Federal agencies to use a systematic approach when assessing environmental impacts of government activities. Proposes an interdisciplinary approach in a decisionmaking process designed to identify unacceptable or unnecessary impacts to the environment.
National Historic Preservation Act, 16 U.S.C. 470–470x-6	Requires Federal agencies to consider the effect of any federally assisted undertaking or licensing on any district, site, building, structure, or object eligible for inclusion, or listed in the National Register of Historic Places (NRHP). Provides for the nomination, identification (through NRHP listing), and protection of significant historical and cultural properties.

Title, Citation	Summary
National Marine Sanctuaries Act, 16 U.S.C. 1431 *et seq.*	Authorizes the Secretary of Commerce to designate national marine sanctuaries based on statutory criteria and stipulated factors to be considered by the Secretary as a basis for designation. Stipulates consultation requirements with various Federal agencies, Congressional committees, state agencies, and regional fishery councils.
Natural Gas Act of 1938, 15 U.S.C. 717	Designates the Federal Energy Regulatory Commission—an independent agency within the Department of Energy—to regulate the transmission and sale of natural gas for resale in interstate commerce.
Natural Gas Pipelines and Safety Act of 1968 and Hazardous Liquid Pipeline Safety Act of 1979, as amended, 49 U.S.C. 601	The Natural Gas Pipelines and Safety Act of 1968 authorizes the Department of Transportation to regulate pipeline transportation of natural (flammable, toxic, or corrosive) gas and other gases as well as the transportation and storage of liquefied natural gas (LNG). The Hazardous Liquid Pipeline Safety Act of 1979 authorizes the Department of Transportation to regulate pipeline transportation of hazardous liquids (crude oil, petroleum products, anhydrous ammonia, and carbon dioxide). Both of these Acts have been recodified as 49 U.S.C. Chapter 601.
Noise Control Act of 1972, 42 U.S.C. 4901–4918	Establishes a national policy to promote an environment free from noise that jeopardizes health and welfare. Authorizes the establishment of Federal noise emissions standards and provides relevant information to the public.
Nonindigenous Aquatic Nuisance Prevention Control Act of 1990, 16 U.S.C. 4701–4751	Establishes aquatic nuisance species.
Northwest Atlantic Fisheries Convention Act of 1995, 16 U.S.C. 5601–5610	Implements provisions of international conventions and establishes regulatory framework.
Occupational Safety and Health Act of 1970, 29 U.S.C. 651–678	Establishes standards to protect workers, including standards on industrial safety, noise, and health standards.
Outer Continental Shelf Lands Act of 1953, 43 U.S.C. 1331–1356, as amended	Defines the Outer Continental Shelf as all submerged lands lying seaward of state coastal waters that are 3 miles offshore. Delegates leasing authority to the Secretary of the Interior to promulgate regulations in an effort to reduce waste and conserve natural resources.
Port and Waterways Safety Act, 33 U.S.C. 1221–1232	Sets boat operating and towing safety requirements and established enforcement provisions. Authorizes the U.S. Coast Guard (USCG) to establish vessel traffic service/separation schemes for ports, harbors, and other waters subject to congested vessel traffic.

Title, Citation	Summary
Resource Conservation and Recovery Act, 42 U.S.C. 6901–6992k	Establishes requirements for safely managing and disposing of solid and hazardous waste and underground storage tanks.
Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, July 14, 1982, 47 FR 30959 (6/16/82), as supplemented	Requires Federal agencies to consult with state and local governments when proposed Federal financial assistance or direct Federal development impacts interstate metropolitan urban centers or other interstate areas.
EO 12898, *Environmental Justice,* February 11, 1994, 59 FR 7629 (2/16/94), as amended	Requires certain Federal agencies, to the greatest extent practicable permitted by law, to make environmental justice part of their missions by identifying and addressing disproportionately high and adverse health or environmental effects on minority and low-income populations.
EO 13089, *Coral Reef Protection*, June 11 1998, 64 FR 232 (12/3/99)	Mandates that all Federal agencies whose actions might affect U.S. coral reef ecosystems (1) identify their actions that might affect U.S. coral reef ecosystems; (2) use their programs and authorities to protect and enhance the conditions of such ecosystems; and (3) to the extent permitted by law, ensure that any actions they authorize, fund, or carry out will not degrade the conditions of such ecosystems. Federal agencies shall, subject to the availability of appropriations, provide for the implementation of measures needed to research, monitor, manage, and restore affected ecosystems, including measures reducing impacts from pollution, sedimentation, and fishing.
EO 13148, *Greening the Government Through Leadership in Environmental Management*, April 21, 2000, 65 FR 24595 (4/26/00)	Designates the head of each Federal agency to ensure that all necessary actions are taken to integrate environmental accountability into agency day-to-day decision making and long-term planning processes, across all agency missions, activities, and functions. Establishes goals for environmental management, environmental compliance, right-to-know (informing the public and their workers of possible sources of pollution resulting from facility operations) and pollution prevention, and similar matters.
EO 13175*, Consultation and Coordination with Indian Tribal Governments,* November 6, 2000, 65 FR 67249 (11/09/00)	Requires Federal agencies to establish an accountable process that ensures meaningful and timely input from tribal officials in developing policies that have tribal implications.

Title, Citation	Summary
EO 13186*, Responsibilities of Federal Agencies to Protect Migratory Birds,* January 10, 2001, 66 FR 3853 (1/17/01)	Requires each agency to ensure that environmental analyses of Federal actions (required by the National Environmental Policy Act or other established environmental review processes) evaluate the effects of actions and agency plans on migratory birds, emphasizing species of concern. Agencies must support the conservation intent of migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities, and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.
EO 11593, *Protection and Enhancement of the Cultural Environment*, May 13, 1971, 36 FR 8921 (5/15/71)	Requires all Federal agencies to locate, identify, and record all cultural resources, including significant archeological, historical, or architectural sites.

[1] This table only reflects those laws and EOs that might reasonably be expected to apply to the Proposed Action and alternatives.

Other laws and Executive Orders relevant to consideration of licensing of deepwater ports include, but are not limited to:

- Abandoned Shipwreck Act, 43 U.S.C. 2102, et seq.
- American Indian Religious Freedom Act, 42 U.S.C. 1996, et seq.
- Antiquities Act, 16 U.S.C. 433, et seq.; Archeological Resources Protection Act, 16 U.S.C. 470 aa-ll, et seq.
- Architectural Barriers Act, 42 U.S.C. 4151, et seq.
- Community Environmental Response Facilitation Act, 42 U.S.C. 9620, et seq.
- Department of Transportation Act, P.L. 89-670, 49 U.S.C. 303, Section 4(f), et seq.
- Emergency Planning and Community Right-to-Know Act, 42 U.S.C. 11001–11050, et seq.
- Environmental Quality Improvement Act, P.L. 98-581, 42 U.S.C. 4371, et seq.
- Farmlands Protection Policy Act, P.L. 97-98, 7 U.S.C. 4201, et seq.
- Federal Insecticide, Fungicide, and Rodenticide Act, P.L. 86-139, 7 U.S.C. 135, et seq.
- Federal Records Act, 44 U.S.C. 2101-3324, et seq.
- Fish and Wildlife Act of 1956, P.L. 85-888, 16 U.S.C. 742, et seq.
- Flood Disaster Protection Act, 42 U.S.C. 4001, et seq.
- Native American Graves Protection and Repatriation Act, 25 U.S.C. 3001, et seq.
- Pollution Prevention Act of 1990, 42 U.S.C. 13101-13109, et seq.
- Safe Drinking Water Act, P.L. 93-523, 42, U.S.C. 201, et seq.
- Toxic Substances Control Act, 7 U.S.C. 136, et seq.

- Wild and Scenic Rivers Act, P.L. 90-542, 16 U.S.C. 1271, et seq.
- EO 12902, dated March 8, 1994, *Energy Efficiency and Water Conservation at Federal Facilities*, 59 FR 11463
- EO 12114, dated January 9, 1979, *Environmental Effects Abroad of Major Federal Actions*, 44 FR 1957
- EO 12088, dated October 13, 1978, *Federal Compliance with Pollution Control Standards*, 43 FR 47707, as amended by EO 12580, dated January 23, 1987, and revoked (in part) by EO 13148, dated April 21, 2000
- EO 13132, dated August 4, 1999, *Federalism*, 64 FR 43255
- EO 11988, dated May 24, 1977, *Floodplain Management and Protection*, 42 FR 26951, as amended by EO 12148, dated July 20, 1979, 44 FR 43239
- EO 13007, dated May 24, 1996, *Historic Sites Act*, 16 U.S.C. 46, et seq.; Indian Sacred Sites, 61 FR 26771
- EO 12372, dated July 14, 1982, *Intergovernmental Review of Federal Programs*, 47 FR 30959, as amended by EO 12416, April 8, 1983, 48 FR 15587; supplemented by EO 13132, August 4, 1999, 64 FR 43255
- EO 13112, dated February 3, 1999, *Invasive Species*, 64 FR 6183, as amended by EO 13286, February 28, 2003, 68 FR 10619
- EO 13158, dated May 26, 2000, *Marine Protected Areas*, 65 FR 2490
- EO 11514, dated March 5, 1970, *Protection and Enhancement of Environmental Quality*, 35 FR 4247, as amended by EO 11541, July 1,1970, 35 FR 10737 and EO 11991, May 24, 1977, 42 FR 26967
- EO 13045, dated April 21, 1997, *Protection of Children from Environmental Health and Safety Risks*, 62 FR 19885, as amended by EO 13229, October 9, 2001, 66 FR 52013 and EO 13296, April 18, 2003, 68 FR 19931
- EO 11990, dated May 24, 1977, *Protection of Wetlands*, 42 FR 26961, as amended by EO 12608, September 9, 1987, 52 FR 34617
- EO 12962, dated June 7, 1995, *Recreational Fisheries*, 60 FR 307695
- EO 13123, *Greening the Government Through Efficient Energy Management*, dated June 3, 1999, 64 FR 30851

Appendix E
Biological Assessment

BIOLOGICAL ASSESSMENT

FOR THE

PORT DOLPHIN LLC
DEEPWATER PORT LICENSE APPLICATION

Prepared by

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Prepared for

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United States Coast Guard
Deepwater Ports Standards Division (G-PSO-5)
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JUNE 2009

ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
ABR	auditory brainstem response
AP	Aquatic Preserve
BA	Biological Assessment
bcfd	billion cubic feet per day
BMP	best management practices
BO	Biological Opinion
BOET	Bienville Offshore Energy Terminal
CBC	Christmas Bird Count
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
dB	decibel
DMF	Division of Marine Fisheries
DWPA	Deepwater Port Act of 1974
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EI	environmental inspector
EIS	Environmental Impact Statement
ERG	Electroretinography
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FDEP	Florida Department of Environmental Protection
FMP	Fishery Management Plan
FPL	Florida Power and Light Company
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Fish and Wildlife Research Institute
GIS	Geographical information system
GMFMC	GOM Fishery Management Council
GOM	Gulf of Mexico
GOMESA	Gulf of Mexico Energy Security Act
GPS	Global Positioning System
HDD	horizontal directional drill
Hz	hertz
kHz	kilohertz
km	kilometer
km/h	kilometers per hour
LNG	liquefied natural gas
LNGC	liquefied natural gas carrier
LOOP	Louisiana Offshore Oil Port
m	meter
m/s	meters per second
m^3	cubic meter
MGD	million gallons per day
mg/L	miligrams per liter
mi	mile
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MMscfd	million standard cubic feet per day
MPEH	Main Pass Energy HubTM
mph	miles per hour
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act of 1976
NAAQS	National Ambient Air Quality Standards
NGA	Natural Gas Act
NM	nautical mile
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NWR	National Wildlife Refuge
OCS	Outer Continental Shelf
OEP	Office of Energy Projects
OSHA	Occupational Safety and Health Administration
PB	St. Petersburg (lease block)
PBR	potential biological removal rates
PTS	permanent threshold shift
RMS	Root Mean Square
ROW	right-of-way
SCR	selective catalytic reduction
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SPL	sound pressure level
SRV	shuttle and regasification vessel
STL	submerged turret loading
STSSN	Sea Turtle Stranding and Salvage Network
TECO	Tampa Electric Company
TM	tympanic-membrane
TTS	temporary threshold shift
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
ZOI	zone of influence

BIOLOGICAL ASSESSMENT
SUPPORTING THE
PORT DOLPHIN LLC DEEPWATER PORT LICENSE APPLICATION
ENVIRONMENTAL IMPACT STATEMENT

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1. Introduction

The Endangered Species Act (ESA) of 1973 (16 United States Code (U.S.C.) 1531–1534) establishes protection and conservation of threatened and endangered species and the ecosystems upon which they depend. The ESA is administered by the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS). Under the ESA, an "endangered species" is defined as any species in danger of extinction throughout all or a significant portion of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. Critical habitat is designated under the ESA as "a specific geographic area that is essential for the conservation of a threatened or endangered species and that could require special management or protection." Critical habitat can include an area that is not occupied by a species, but is needed for the recovery of that species.

Under Section 7 of the ESA, Federal agencies must consult with the USFWS and NMFS (as appropriate) when any action the agency carries out, funds, or authorizes (such as through a permit) could affect a listed endangered or threatened species or their critical habitat. Candidate species and proposed critical habitat are also considered. The process usually begins as informal consultation. A Federal agency, in the early stages of project planning, approaches the USFWS and NMFS (as appropriate) and requests informal consultation. Discussions between the two agencies may include what types of listed species may occur in the Proposed Action area, and what effect the Proposed Action might have on those species.

If it appears that the agency's action might affect a listed species, that agency could prepare a Biological Assessment (BA) to assist in its determination of the project's effect on a species. If the action agency determines that the project is not likely to adversely affect federally listed species and the critical habitat or proposed critical habitat and the USFWS and NMFS (as appropriate) concur, then no further action is necessary.

The U.S. Coast Guard (USCG) and Maritime Administration initiated informal consultation with both the USFWS and NMFS on August 24, 2007, in conjunction with Port Dolphin Deepwater Port License Application Environmental Impact Statement (EIS). The USCG and Maritime Administration have prepared this BA to assist in determining the impacts of the proposed Port Dolphin Deepwater Port and to facilitate ESA Section 7 consultation for the Port Dolphin License Application EIS. The conclusion of this BA is that the Proposed Action is not likely to adversely affect federally listed species.

In accordance with ESA regulations (50 CFR Part 402.12[f]) and guidance, this BA includes (1) a description of the proposed agency action and any alternatives being considered; (2) a description of the federally listed species potentially affected by the Proposed Action; (3) an analysis of the Proposed Action's potential effects on protected species and critical habitat, including direct, indirect, and cumulative effects; (4) proposed mitigation measures; and (5) copies of pertinent reports, including any EIS, environmental assessment (EA), or other analyses prepared, or any other relevant information.

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2. Description of the Proposed Action

2.1 Overview

The Applicant proposes to construct, own, and operate a deepwater port, named Port Dolphin (herein referred to as the Port), in the Federal waters of Minerals Management Service (MMS) St. Petersburg (PB) lease blocks PB545, PB546, PB547, PB548, PB504, PB505, PB506, PB507, PB463, and PB589, approximately 45 kilometers (km) (28 nautical miles [NM]) southwest of Tampa, Florida in the Gulf of Mexico (GOM), in water with a bottom depth of approximately 30.5 meters (m) (100 feet). The proposed location of the Port is shown in **Figure 2-1**. The Port would be connected to existing onshore natural gas distribution pipeline systems in Manatee County, Florida, approximately 73.9 km (46 mi) east of the Port location.

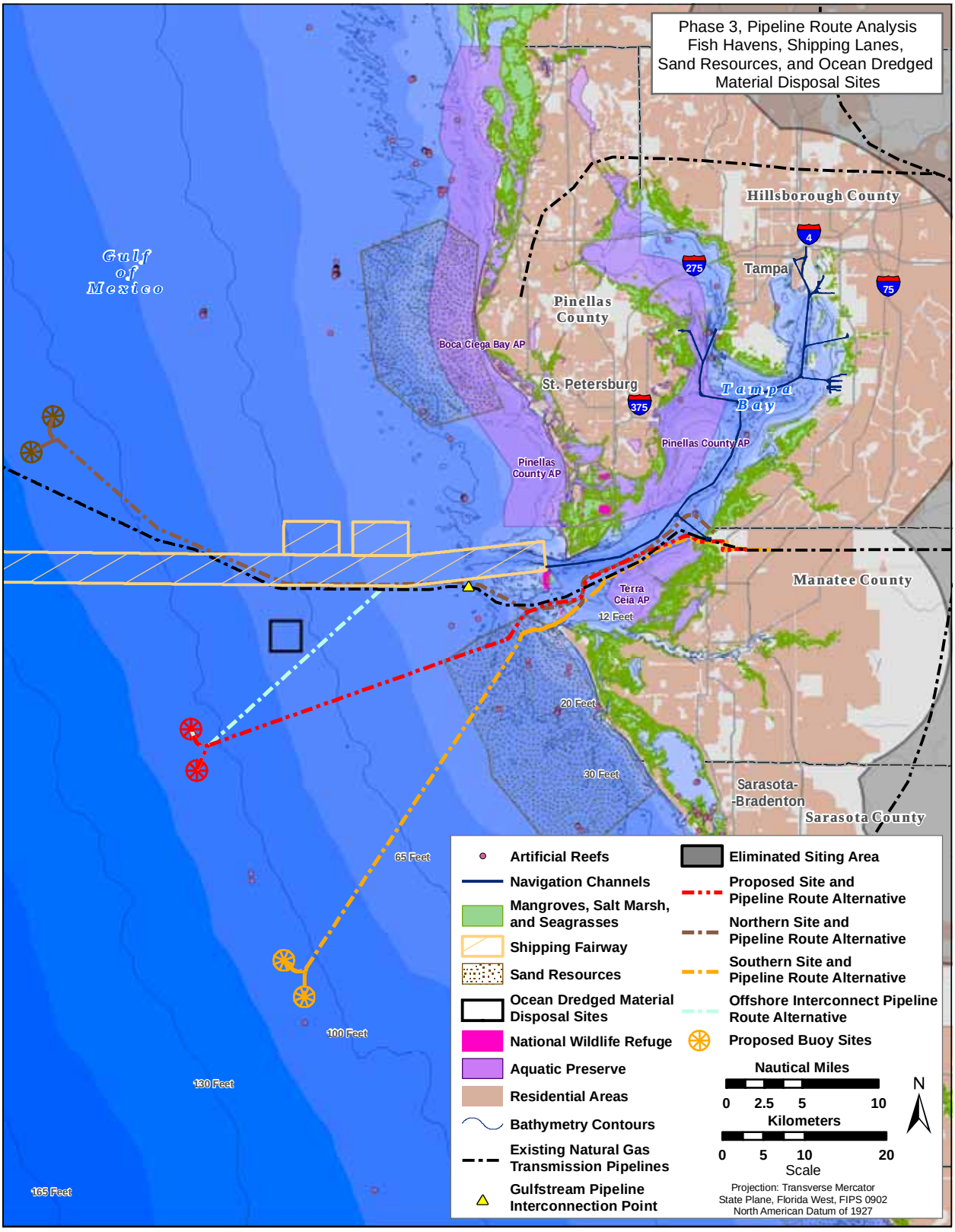
The Port would be capable of mooring shuttle and regasification vessels (SRVs) with capacities of either approximately 145,000 cubic meters (m^3) or 217,000 m^3. Up to two SRVs would temporarily moor at the Port by means of a submerged turret loading (STL) buoy system. Two unloading buoys would be separated by a distance of approximately 5 km (3.1 NM). The unloading buoys would moor each SRV on location throughout the unloading cycle. Each unloading buoy would have eight mooring lines consisting of wire rope and chain. The mooring lines would connect each unloading buoy to eight anchor points consisting of driven piles on the seafloor. An SRV would typically moor at the deepwater port for between 4 and 8 days, depending on SRV size, vaporizer throughput, and send-out rate. The two separate buoys would allow natural gas to be delivered in a continuous flow, without interruption, by having a brief overlap between arriving and departing SRVs.

When not connected to an SRV, the unloading buoy would be submerged and held on the unloading buoy landing pad by the mooring lines with the top of the buoy approximately 18.3 to 21.3 m (60 to 70 feet) below the sea surface. A marker buoy and retrieval line would be used to locate and recover the buoy as an SRV arrives at the Port. The unloading buoy would be retrieved from its submerged position by means of a winch and recovery line. The unloading buoy would be hoisted into a trunk constructed in the forward part of the SRV where it would be located in a receiving cone. After the buoy is locked in position, unloading of natural gas would begin.

The SRVs would be equipped to store, transport, and vaporize liquefied natural gas (LNG), and to meter natural gas that would then be sent out through conventional subsea pipelines. Each SRV would have insulated LNG storage tanks within its hull. Each tank would be equipped with an in-tank pump to circulate and transfer LNG, at a temperature of -160 degrees Celsius (°C) (-256 degrees Fahrenheit [°F]), to the vaporization facilities on the deck of the SRV. The vaporization system would have a closed-loop, glycol/water-brine cycle with recirculating heat exchangers.

The Port would have an average throughput capacity of 800 million standard cubic feet per day (MMscfd) and a peak capacity of approximately 1,200 MMscfd. At the average throughput capacity, 50 SRV round trips per year would be required to supply the Port with LNG. However, the Port can handle up to 90 SRV round trips per year. Natural gas would be sent out by means of two flexible risers and two subsea flowlines leading to a single 36-inch gas transmission line. The gas transmission line would extend approximately 67.6 km (42 NM) to the east to landfall in Manatee County.

Onshore, the pipeline would proceed east across Port Manatee property through a tidally influenced conveyance ditch through Reeder Road to just west of the CSX railroad for approximately 1,981 m (6,500 feet). At that point the pipeline would turn south on the west side of U.S. Highway 41 and proceed



Source of Proposed Piplines: ConShelf 2007. Source of Florida Gas Transmission Pipeline: ConShelf 2007. Source of Eliminated Siting Area: e²M Inc 2008.

Figure 2-1. Port Dolphin Project Location, Tampa Bay, Florida

south for approximately 481 m (1,580 feet) through the Florida Power and Light Company (FPL) tank farm before turning east again. It would cross the CSX railroad and parallel the FPL Transmission Line right-of-way (ROW) across U.S. Highway 41. The pipeline would end at the collocated interconnection with the Gulfstream and Tampa Electric Company (TECO) pipelines within industrial property owned by Port Dolphin. From those two interconnection points, natural gas would be transported to serve residential, commercial, and industrial consumers, primarily in the west-central parts of Florida.

LNG delivered to the Port would be obtained from LNG supply at locations including the Caribbean, Africa, and the Middle East. The Applicant intends to procure LNG from supplies available through LNG supply markets. Construction of the Port components would be expected to take approximately 11 months beginning with offsite fabrication of project components starting in August 2010, with startup of commercial operations in mid-2011. Construction of the onshore pipeline would commence in summer 2010 and be completed in approximately 3 months. The Port would be designed, constructed, and operated in accordance with applicable codes and standards and would have an expected operating life of approximately 25 years.

The functions of the Port would be to temporarily moor SRVs, vaporize LNG, meter natural gas, and send out natural gas by pipeline. The major fixed components of the Port would be two unloading buoy systems in a water depth of approximately 30.5 m (100 feet); eight mooring lines consisting of wire rope and chain connecting each unloading buoy to anchor points on the seafloor; eight driven pile anchor points; one flexible pipe riser to each buoy; riser manifolds; one flowline from the north buoy approximately 3.2 km (2 miles) in length; one flowline from the south buoy approximately 3.2 km (2 NM) in length; a single 36-inch offshore natural gas transmission line (approximately 67.6 km [42 NM]) to landfall in Manatee County; and a continuation of the 36-inch natural gas pipeline from its landfall point for 6.4 km (4 NM) to the collocated Gulfstream and TECO Interconnection Station where it would tie into metering facilities, transition manifolds, hot taps, and connecting pipes tying into the existing Gulfstream and TECO pipelines. These components are further described in subsequent subsections.

The Port would be designed to have a 25-year service life. At the end of that time the principal elements of the Port would be decommissioned. The unloading buoys, umbilicals, PLEM and mooring lines would be removed. Anchor piles would be abandoned in place. The ends of the pipeline would be cut, plugged and buried under at least 1 m (3 feet) of cover. The pipeline would be abandoned in place. Aboveground portions of the onshore pipeline would be removed.

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3. Protected Species

Species listed under the ESA are considered in the potential effects of the Proposed Action. The Action Area is considered to be all terrestrial and aquatic environments affected by the construction and operation of the LNG terminal and pipelines. The estuarine and marine portion of the project area is considered to be all the areas affected both directly and indirectly by the construction, operation, and decommissioning of the proposed terminal. ESA-listed species occurring in the offshore waters (mouth of Tampa Bay to the Terminal Area) of the GOM and the Tampa Bay area are included in **Table 3-1**.

3.1 Marine Mammals

Under the authority of the Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. §§ 1361 et seq.), the Secretary of Commerce is responsible the protection of all marine mammals except walruses, polar bears, sea otters, manatees, and dugongs which are the responsibility of the Secretary of the Interior. These responsibilities have been delegated to NMFS and the USFWS, respectively, and include providing overview and advice to regulatory agencies on all Federal actions that might affect these species.

Seven of the marine mammal species occurring in the coastal and offshore vicinity of Tampa Bay are federally listed under the ESA. They include one sirenian (West Indian manatee) and six cetacean species (blue, fin, sei, North Atlantic right, humpback, and sperm whales) (see **Table 3-1**). The GOM is outside the normal distributional range of the sei whale, blue whale, and fin whale. Although the sperm whale is common in the GOM, it is found only around and seaward of the shelf break in the GOM (Würsig et al. 2000); which would be approximately 79 NM from the Project area. Only the West Indian manatee is common within Tampa Bay; rare occurrences of the North Atlantic right whale, West Indian manatee, and humpback whale are possible in the offshore waters of the proposed Project area.

Humpback Whale. Humpback whales are not usually encountered in the GOM (Weller et al. 1996). In the North Atlantic Ocean, humpbacks are found from spring through fall on feeding grounds from south of New England to northern Norway (NMFS 1991). The Gulf of Maine is one of the principal summer feeding grounds for humpback whales in the North Atlantic; the largest numbers of humpback whales are present from mid-April to mid-November. During the winter, most of the North Atlantic population of humpback whales is believed to migrate south to calving/breeding grounds in the West Indies region (Smith et al. 1999, Stevick et al. 2003). Not all of the stock migrates to the West Indies every winter; significant numbers of animals are found in mid- and high-latitude regions along the U.S. Atlantic Coast during the winter months (Waring et al. 2008). In recent years, there have been a number of wintertime humpback sightings in coastal waters of the southeastern United States including the GOM (Weller et al. 1996, Waring et al. 2008). Humpbacks occurring in the GOM are likely juveniles that have wandered there from the nearby Caribbean Sea and Atlantic Ocean during the breeding season or on their migration northward (Weller et al. 1996, Jefferson and Schiro 1997), although a review of the available records suggests that such occurrences in the GOM could actually occur during any time of the year.

Humpback whales feed on a wide variety of invertebrates and small schooling fishes. The most common invertebrate prey are euphausiids (krill); the most common fish prey are herring, mackerel, sand lance, sardines, anchovies, and capelin (*Mallotus villosus*) (Clapham and Mead 1999). Humpback whales are classified as endangered under the ESA (NMFS 1991) and, therefore, are considered to be a strategic stock (Waring et al. 2008). The NOAA Stock Assessment Report states that the best estimate of abundance for the Gulf of Maine stock of humpback whales is 847 individuals (Waring et al. 2008). Potential biological removal rates (PBR) for the Gulf of Maine humpback whale stock is 1.1 whales (Waring et al. 2008). There is no critical habitat designated for the humpback whale anywhere in its range.

Table 3-1. Likelihood of Occurrence of ESA-Listed Species within the Offshore Waters (Mouth of Tampa Bay to the Terminal Area), Inshore Waters (Inside the Mouth of Tampa Bay), and Onshore (Along the Onshore Pipeline Route) Areas of the Port Dolphin Project

Common Name	Scientific Name	ESA Status	Critical Habitat		Likelihood of Occurrence		
			Designated for Species?	Located Within or Adjacent to Proposed Action Area?	Offshore Waters	Nearshore Waters	Onshore
Cetaceans							
Blue whale	*Balaenoptera musculus*	E	N	N	not expected	not expected	NA
Fin whale	*Balaenoptera physalus*	E	N	N	not expected	not expected	NA
Humpback whale	*Megaptera novaeangliae*	E	N	N	rare	not expected	NA
North Atlantic right whale	*Eubalaena glacialis*	E	Y	N	rare	not expected	NA
Sei whale	*Balaenoptera borealis*	E	N	N	not expected	not expected	NA
Sperm whale	*Physeter macrocephalus*	E	N	N	not expected	not expected	NA
Sirenians							
West Indian manatee	*Trichechus manatus latirostris*	E	Y	N	rare	common	NA
Birds							
Audubon's crested caracara	*Polyborus plancu audubonii*	T	N	N	NA	NA	not expected
Florida scrub-jay	*Aphelocoma coeruluscens*	T	N	N	NA	NA	not expected
Piping plover	*Charadrius melodus*	T	Y	Y	NA	NA	common
Red-cockaded woodpecker	*Picoides borealis*	E	N	N	NA	NA	not expected
Wood stork	*Mycteria americana*	E	N	Y	NA	NA	common

Common Name	Scientific Name	ESA Status	Critical Habitat		Likelihood of Occurrence		
			Designated for Species?	Located Within or Adjacent to Proposed Action Area?	Offshore Waters	Nearshore Waters	Onshore
Reptiles							
Eastern indigo snake	*Dymarchon corais couperi*	T			NA	NA	not expected
Green sea turtle	*Chelonia mydas*	T[a]	Y	N	common	common	not expected
Hawksbill sea turtle	*Eretmochelys imbricata*	E	Y	N	uncommon	common	not expected
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	N	N	common	common	not expected
Leatherback sea turtle	*Dermochelys coriacea*	E	Y	N	common	common	not expected
Loggerhead sea turtle	*Caretta caretta*	T	N	N	common	common	not expected
Olive ridley sea turtle	*Lepidochelys olivacea*	T[a]	N	N	not expected	not expected	not expected
Fishes							
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	T	Y	N	Rare	rare	NA
Smalltooth sawfish	*Pristis pectinata*	E	P	N	Rare	sporadic [b]	NA

Notes:

E – Federally listed as endangered; T – Federally listed as threatened, P – Proposed, Y – Yes, N – No, NA – Not Applicable

a. Although the species as a whole is listed as threatened, the Florida and Mexican Pacific nesting stocks of the green turtle and the Mexican Pacific nesting stocks of the olive ridley turtle are listed as endangered. Since the nesting areas for turtles encountered at sea often cannot be determined, a conservative approach to management requires the assumption that all greens in the GOM are endangered.

b. Smalltooth sawfish are expected to be rare in the Terminal area and offshore areas of the Pipeline, but will have a greater likelihood for interaction in the shallower, inshore areas of the Pipeline, during construction. There are few documented captures of smalltooth sawfish north of Charlotte Harbor (which is approximately 40 NM south of Tampa Bay) on Florida's west coast (NMFS 2009a). However, recent work to document sawfish encounters has increased the numbers of reported occurrences in the upper half of the west coast of the Florida Peninsula and in the area north of Charlotte Harbor (NMFS 2009a). As of 2008, there had been 20 encounters of smalltooth sawfish in 10 years (FMNH 2008).

North Atlantic Right Whale. The North Atlantic right whale is the most endangered large whale species in the world (Perry et al. 1999; IWC 2001a, 2001b; NMFS 2005) with between 350 and 400 known individuals left in the western North Atlantic population (Kraus et al. 2005, Waring et al. 2008). PBR for this population is set to zero (Waring et al. 2008).

North Atlantic right whales are most often sighted in nearshore and continental shelf waters between Florida and Nova Scotia. North Atlantic right whales feed on zooplankton and tend to prefer large calanoid copepods such as *Calanus* sp. (Kenney et al. 1985, Beardsley et al. 1996). Typical feeding grounds for right whales are areas where bottom topography, water column structure, currents, and tides combine to physically concentrate zooplankton into extremely dense patches. The majority of the North Atlantic right whale population leaves the feeding grounds for unknown habitats in the winter but returns to the feeding grounds coinciding with the return of cow-calf pairs (Waring et al. 2008). North Atlantic right whales are typically found in Cape Cod Bay in February through April; in Canadian feeding grounds from June through November; and in coastal waters off North Carolina, Georgia, and Florida from November through March (Waring et al. 2008).

Right whales on the winter calving grounds are most often found in very shallow nearshore waters, in cooler temperatures inshore of a mid-shelf front (Kraus et al. 1993, Ward 1999). Most sightings of right whales have occurred within five high use areas including the coastal waters of the southeastern United States (Georgia and Florida), Cape Cod and Massachusetts Bays, the Great South Channel, the Bay of Fundy, and the Nova Scotian Shelf (Winn et al. 1986, NMFS 2005). Calving occurs from December through March (NMFS 2005). Based on these areas of high occurrence, critical habitat has been designated for feeding grounds off Cape Cod and calving grounds off the Atlantic coast of Florida and Georgia (59 FR 28805). However, there are also rare occurrences in the GOM and nearshore sightings have included individual whale as well as mother-calf pairs (Moore and Clark 1963, Layne 1965, Smith and Windham-Reid 2004, NOAA and FWC 2006, Zoodsma 2006). These records likely represent extralimital strays from the wintering grounds or might even reflect a more extensive historic range beyond the known calving and wintering ground in the waters of the southeastern United States (Jefferson and Schiro 1997, Waring et al. 2008).

West Indian Manatee. The Florida manatee is a subspecies of the endangered West Indian manatee. It inhabits coastal marine, brackish, and freshwater habitats from Virginia to Brazil and is exclusively herbivorous, feeding on both submergent and emergent aquatic vegetation (Würsig et al. 2000, USFWS 2001). During 2009, a preliminary count of 3,807 manatees statewide was reported; 1,654 on the west coast of the state (FWC 2009). The Southwest Management Unit, which inhabits all areas between the Pasco-Hernando County line southward to Whitewater Bay in Monroe County, has declined at an estimated rate of 1.1 percent per year over the 8-year period prior to 2002 (USFWS 2007a). The manatee count for Tampa Bay, which in the past has topped 300 individuals, turned out to be just 176 in 2009 (Pittman 2009). It should be noted, however, that some of Tampa Bay's manatees might have traveled north to Crystal River or south to the Caloosahatchee River at the time of the survey (Pittman 2009).

Sightings of manatees tend to be restricted to warm freshwater, estuarine, and extremely nearshore coastal waters. Manatees occur in very shallow waters of 2 to 4 m (7 to 13 feet) deep, generally close to shore (< 1 km) and in close proximity to seagrass beds (USFWS 2001). Historically, the winter range of the manatee was thought to focus on south Florida, with some animals ranging north of Charlotte Harbor on Florida's west coast and north of Sebastian on Florida's east coast (USFWS 2001). In summer, they inhabit estuaries and coastal bays, but in winter they migrate to warmer waters, or seek warmwater refugia, with appropriate food sources (Gannon et al. 2007, Laist and Reynolds 2005). During the cold months, manatees frequently aggregate at warmwater discharges of powerplants and at natural warmwater springs during the passage of cold fronts because they cannot tolerate water temperatures less that 20 °C (68 °F) (Irvine 1983, Laist and Reynolds 2005). During warm interludes, manatees leave these areas to feed on nearby seagrass beds (Hartman 1979, Stith et al. 2007).

During the winter months most manatees in Tampa Bay are typically found around the TECO Big Bend power plant discharge at Apollo Beach and the Florida Power Corporation's Bartow power plant discharge in St. Petersburg (Frisch et al. 2003). The number of manatees using Tampa Bay has steadily

increased in the past decade, likely as a result of improved habitat and the presence of power plants that provide warmwater refuges for manatees wintering in the bay. More than 350 individuals have been counted in the bay in the winter months. About 150 animals are found in the bay in the summer, when the entire Florida West Coast population is more scattered (TBEP 2006).

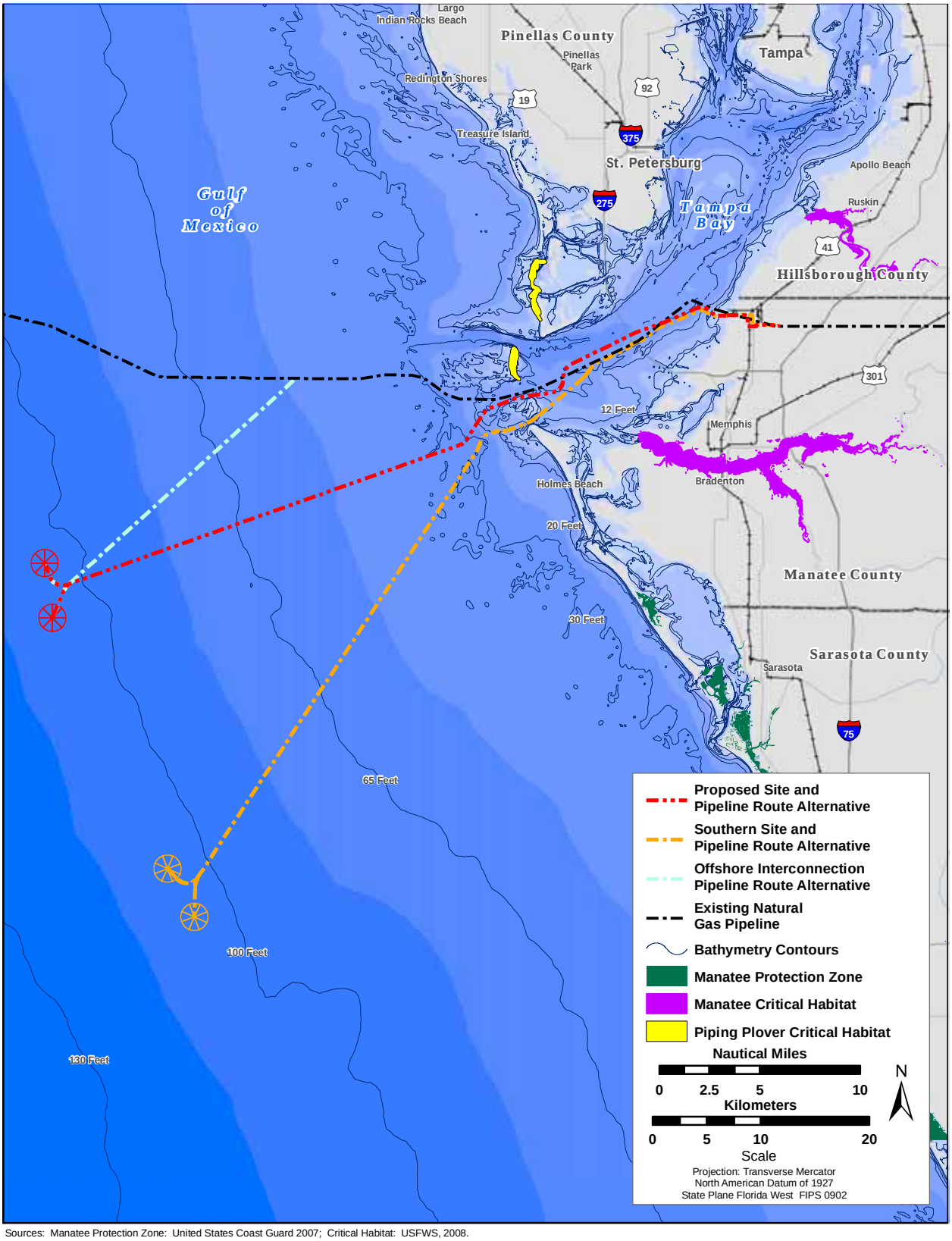
Vessel strikes can contribute to more than 30 percent of the documented annual mortalities of manatees (Ackerman et al. 1995). From 1998 through 2001, watercraft collisions attributed to 89 manatee deaths (approximately 26 percent) in Hillsborough, Manatee, and Pinellas counties (Frisch et al. 2003). During the period 2000 through 2006, 58 manatee deaths in Hillsborough, Manatee, and Pinellas counties were attributed to watercraft collisions (27, 14, and 17, respectively) (FWC MMPL 2007). In 2006, nearly one manatee per month was killed by watercraft in the three Tampa Bay counties (FWC MMPL 2007). However, these reported deaths do not take into account the latent impacts on feeding, mating, or birthing that are a direct result of a boat strike (Nowacek et al. 2004); therefore, the actual mortality due to watercraft is likely higher than expected..

Critical habitat for the manatee has been designated in two areas of the project area: the Little Manatee River downstream from the U.S. Highway 301 Bridge in Hillsborough County, and the Manatee River downstream from the Lake Manatee Dam in Manatee County. The nearest designated critical habitat areas for manatees are (1) the Manatee River, which is approximately 5 km (2.69 NM) ; and (2) the Little Manatee River, which is approximately 13 km (7 NM) away from the nearest point on the pipeline route.

In addition to the critical habitat areas, a number of manatee protection areas have been created in the Tampa Bay region. Several year-round slow-speed zones have been created through state or local regulations, and two no-entry areas have been created around the power plant outfalls at Tampa Electric's Big Bend complex and the Bartow plant at Weedon Island. In addition, extensive shoreline speed zones are in place in Hillsborough County from Tampa's Rocky Point area south to the Gandy Bridge, from the Alafia River to E.G. Simmons Park south of Ruskin, in Terra Ceia Bay, the Manatee River, and in Pinellas County north of the Courtney Campbell Causeway to Oldsmar. Finally, Pinellas County has implemented seagrass protection zones at Fort DeSoto Park, Weedon Island, and north of the Courtney Campbell Causeway that also serve to protect manatees feeding and resting in the shallow grass beds (TBEP 2006). Manatee protection zones within the Tampa Bay area are illustrated in **Figure 3-1**. The proposed pipeline would be constructed about 11.5 NM from a manatee protection area.

Marine Mammal Hearing. When considering the potential impact of various types of noise on the marine environment, it is necessary to understand that different kinds of marine life are sensitive to different frequencies of sound. Information on hearing in marine mammals is based on the frequencies of sounds produced, behavioral observations, anatomical evidence, and extrapolations from what is known about other marine mammal hearing. Marine mammal hearing varies among species; however, as a group, marine mammal hearing ranges are generally from 0.01 to 200 kilohertz (kHz). Broad generalizations can be made about groups of marine mammals. For example, most toothed whales (Odontocetes) hear well in ultrasonic ranges, with functional hearing from 0.15 kHz to 180 kHz. Some toothed whales are able to hear frequencies as high as 200 kHz (NRC 2003). Southall et al. (2007) delineated three groups of cetaceans based on similarities in their hearing: low-frequency cetaceans (0.007 kHz to 22 kHz), mid-frequency cetaceans (150 Hz to 160 kHz), and high-frequency cetaceans (0.2 kHz to 180 kHz).

Data on the hearing abilities of cetaceans are sparse, particularly for the larger cetaceans such as the baleen whales. The auditory thresholds of some of the smaller toothed whales (Odontocetes) have been determined in captivity (Ljungblad et al. 1982, Thomas et al. 1988, Houser et al. 2008). It is generally believed that cetaceans should at least be sensitive to the frequencies of their vocalizations. Comparisons



Sources: Manatee Protection Zone: United States Coast Guard 2007; Critical Habitat: USFWS, 2008.

Figure 3-1. Piping Plover Critical Habitat and Manatee Protection Zones and Critical Habitat in the Vicinity of Port Dolphin

of the anatomy of cetacean inner ears and models of the structural properties and the response to vibrations of the ear's components in different species provide an indication of likely sensitivity to various sound frequencies. The ears of small-toothed whales are structurally optimized for receiving high-frequency sound, while baleen whale inner ears are best optimized for low to infrasonic frequencies (Ketten 1992, 1997). As such, baleen whales are considered to be low-frequency cetaceans (Southall et al. 2007).

Ketten et al. (1992) concluded that, based on the ear morphology and studies on other manatee subspecies (Klishin et al. 1990, Popov and Supin 1990), manatees likely hear best in the lower frequencies (1 kHz to 5 kHz) and are not likely to hear above 20 kHz. More recently, a behavioral audiogram for a sirenian revealed peak sensitivity of hearing between 16 and 18 kHz with functional hearing limits between 0.4 kHz and 46 kHz (Gerstein et al. 1999, Gerstein 2002).

3.2 Sea Turtles

NOAA's NMFS and the USFWS share responsibility for implementing the Endangered Species Act (ESA). Marine turtle species under NMFS' Jurisdiction include the green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*), loggerhead (*Caretta caretta*), and olive ridley (*Lepidochelys olivacea*) sea turtles. All six species found in U.S. waters are currently listed as either threatened or endangered under the ESA (see **Table 3-2**).

Table 3-2. ESA-Listed Sea Turtle Species with Potential Occurrence in the Port Dolphin Project Area

Common Name	Scientific Name	ESA Status
Family Cheloniidae		
Green sea turtle	*Chelonia mydas*	T *
Hawksbill sea turtle	*Eretmochelys imbricata*	E
Kemp's ridley sea turtle	*Lepidochelys kempii*	E
Loggerhead sea turtle	*Caretta caretta*	T
Olive ridley sea turtle	*Lepidochelys olivacea*	T*
Family Dermochelyidae		
Leatherback sea turtle	*Dermochelys coriacea*	E

Source: Meylan et al. 2003

Notes:

E – Federally listed as endangered under the ESA of 1973.

T – Federally listed as threatened under the ESA of 1973.

* Although the species as a whole is listed as threatened, the Florida and Mexican Pacific nesting stocks of the green turtle and the Mexican Pacific nesting stocks of the olive ridley turtle are listed as endangered. Since the nesting areas for turtles encountered at sea often cannot be determined, a conservative approach to management requires the assumption that all greens in the GOM are endangered.

In the GOM, the number of turtle sightings is highest in continental shelf waters in summer and fall but sightings occur in the shelf and deeper waters throughout the study area in winter and spring (McDaniel et al. 2000). Reports by Lohoefener et al. (1990), Davis et al. (2000), McDaniel et al. (2000), and Mullin and Davis (2001) indicate that sea turtles are far more abundant in GOM waters east of the mouth of the Mississippi River than in waters to the west. Coastal waters of the GOM also serve as developmental

habitat for juvenile Kemp's ridleys (Musick and Limpus 1997). Loggerhead sea turtles are the most abundant sea turtle in Florida and the GOM (FWRI 2006, NMFS and USFWS 2008). Leatherbacks are the most abundant along the northern GOM continental slope (Viada 2000). It is likely that leatherback sea turtles would occur within offshore waters of the Project area. The hawksbill turtle occurs along all of the Gulf states and along the eastern seaboard as far north as Massachusetts, but sightings north of Florida are rare. Although hawksbill sea turtles are the least common sea turtle in the GOM, they have been recorded in waters of all of the states along the GOM (NMFS and USFWS 1993). Although there are currently no records for olive ridleys in the Tampa Bay area, extralimital occurrences are documented for the Florida Keys (Foley et al. 2003).

Sea turtle life history stages include eggs, hatchling, juvenile, and adult (MMS 2002a). In general, sea turtles nest along the entire GOM coastline; however, nesting activity in the Project area is described below. Hatchling sea turtles move offshore in a swimming frenzy immediately after hatching. Post-frenzy hatchling sea turtles move to areas of convergence or to *Sargassum* mats and undergo passive oceanic migrations (Wyneken 2001). Juvenile sea turtles actively recruit to nearshore nursery habitat and move into adult foraging habitat when approaching sexual maturity. At the onset of nesting, adults move between foraging habitats and nesting beaches. Mating habitat depends on species and might occur off nesting beaches or remotely. Females reside near nesting beaches during nesting season (MMS 2002a).

Although data on the seasonality of the various species in the bay are limited, it appears that at least the loggerhead and ridley are year-round residents; this could eventually prove to be the case for the green turtle, as well. The hawksbill, a more tropical species than the others, appears to be rare in the bay.

The bay serves as habitat for several life history stages of marine turtles, including foraging adults, foraging juveniles and subadults, and nesting females. Recent research has revealed that Tampa Bay is an important nursery area for young Kemp's ridley sea turtles (TBEP 2006). The Gulf waters adjacent to Anna Maria Island, Egmont Key, and all of Pinellas County can be expected to be visited by both reproductive males and females during the mating and nesting season (Meylan et al. 2003).

Loggerheads, greens, and leatherbacks nest regularly on Florida's beaches (Meylan et al. 1995, Meylan et al. 2006). Approximately 350 sea turtles nest annually on beaches surrounding Tampa Bay (TBEP 2006). Nearly all ocean-facing (Gulf) sandy beaches in the Tampa Bay area are used as nesting habitat by sea turtles (Meylan et al. 2003). The most pristine nesting beach in the TBEP area is Egmont Key, which lies in the mouth of Tampa Bay. An average of 44 loggerhead nests has been documented on the key annually from 1989 to2001 (Meylan et al. 2003).

Surveys conducted by the Fish and Wildlife Research Institute (FWRI) recorded sightings of marine turtles in all sectors of Tampa Bay, with higher densities in the southern part of the bay, particularly in the area around Terra Ceia, just south of the Sunshine Skyway Bridge (Meylan et al. 2003). Based on stranding records, aerial surveys, and incidental captures, the occurrence of sea turtles in the Tampa Bay area suggests that turtles are common inhabitants of the bay. Their great mobility and tendency to remain submerged most of the time contribute to their inconspicuous nature. The following species were observed during the surveys (in decreasing order of abundance): loggerheads, Kemp's ridleys, greens, and hawksbills.

Strandings of dead or injured marine turtles along Florida's coastline are monitored by FMRI as part of the Sea Turtle Stranding and Salvage Network (STSSN). A total of 298 records of dead or injured turtles exist for the inshore waters of the Tampa Bay area for 1980 through 2001. Loggerhead turtles are by far the species most frequently documented. Strandings of loggerheads were most numerous from March through June, with a smaller peak in October and November. Green turtle strandings were documented primarily outside the summer months, with a peak in February and March. Strandings of Kemp's ridleys

have occurred in all months, with no obvious seasonal pattern. Dead or injured loggerheads and Kemp's ridleys have been recovered in all sectors of the bay; green turtle strandings have been far more restricted in distribution, with most occurring near the mouth of the bay. All hawksbill strandings have been in the outer bay area (Meylan et al. 2003).

Although they are all now protected by law from harvesting, it is clear from stranding records that numerous mortality factors are still operating. Many are human-related, such as boat collisions, entanglement, and incidental catch. Boat-related injuries (including propeller wounds and possible boat collision injuries), were the most frequently observed carcass anomaly for loggerheads; 16 Kemp's ridleys and 1 hawksbill also showed evidence of boat injuries. Seven cases of entanglement were reported, affecting all species (Meylan et al. 2003).

The 2005, 2006, and 2007 reports of sea turtle strandings are preliminary data and are subject to change; therefore they are not referenced here. In 2004, sea turtle strandings in the Tampa Bay region accounted for 13.5 percent of the total offshore strandings and 14.7 percent of the inshore strandings in the entire GOM (see **Table 3-3**). A total of 107 sea turtle strandings were verified in the offshore and inshore areas of Tampa Bay, with loggerhead strandings accounting for 70 percent of the total.

Table 3-3. Offshore and Inshore Sea Turtle Strandings in Tampa Bay and the Entire GOM Region in 2004

Sea Turtles	Offshore		Inshore	
	Tampa Bay	GOM	Tampa Bay	GOM
Green	13	89	9	103
Hawksbill	1	20	0	1
Kemp's ridley	5	94	3	26
Leatherback	1	13	0	2
Loggerhead	55	322	20	77
Olive ridley	NA	NA	NA	NA
Unknown	0	19	0	8
Total	75	557	32	217

Source: STSSN 2004
Notes:
The Tampa Bay area was characterized by the "zone 5" designation on the STSSN zone map.
NA – Not applicable because, although there are no records of this species in the area, only extralimital occurrences are recorded in the Florida Keys

There are no designated critical habitats or migratory routes for sea turtles in the GOM. However, NMFS recognizes many coastal areas as preferred habitat (i.e., important habitats for the species within a specific geographic area) for sea turtles. For example, nearshore or inshore areas are preferred habitat for green sea turtles, while bays are preferred habitat for Kemp's ridley sea turtles (MMS 2002a). *Sargassum* mats are also recognized as preferred habitat for juvenile sea turtles.

Green Sea Turtle. Green sea turtles are found throughout the GOM, where they inhabit shallow waters (except when migrating) inside reefs, bays, and inlets and tend to be found in areas with marine grass and algae (USFWS 2002b). Green turtles nest on both island and continental beaches between 30ºN and 30ºS latitudes (Witherington et al. 2006). Early life stages are spent in open ocean pelagic habitats (bottom

depths > 200 m), feeding primarily on planktonic animals (Musick and Limpus 1997). After several years of the early developmental stage, green sea turtles leave oceanic/pelagic habitats and recruit to neritic/benthic habitats (bottom depth < 200 m) also known as developmental areas, (where they forage on seagrasses and algae (Musick and Limpus 1997). During maturation, juveniles can pass through multiple developmental habitats in coastal waters (Witherington et al. 2006). Sexually mature turtles migrate between foraging areas and nesting areas every few years (Hirth 1997). Green turtles nest in Florida from June to late September on Florida's east coast. Nesting has been reported on Anna Maria Island (2002) and Longboat Key North (2003) in Manatee County and Fort DeSoto County Park (1994) and north Pinellas County Beaches (2000) in Pinellas County (FMRI 2006).

It is expected that green sea turtles would occur within offshore and nearshore waters of the Project area. The green sea turtle is currently listed as a threatened species internationally and as an endangered species in Florida. No critical habitat has been designated in the GOM.

Hawksbill Sea Turtle. The hawksbill turtle has a circumglobal distribution in tropical, and to a lesser extent, subtropical seas of the Atlantic, Pacific, and Indian oceans (MTSG 2007). Early juveniles occur in open ocean habitats in *Sargassum* or flotsam lines (Meylan and Redlow 2006). They recruit into a neritic (shallow waters extending to about 200 m) developmental foraging habitat that can comprise coral reefs or other hardbottom habitats, seagrass, algal beds, or mangrove bays and creeks (Musick and Limpus 1997). As they increase in size, immature hawksbills typically inhabit a series of developmental habitats, with some tendency for larger turtles to inhabit deeper sites (Van Dam and Diez 1997, Bowen et al. 2007). Hawksbills use caves, crevices, and ledges for resting (Meylan and Redlow 2006). Coral reefs and hardbottom areas are generally recognized as the resident foraging habitat for juveniles and adults (Meylan and Redlow 2006). Adult hawksbills feed on encrusting organisms such as sponges, tunicates, bryozoans, algae, mollusks, and a variety of other items such as crustaceans and jellyfish (Bjorndal 1997). Older juveniles and adults are more specialized and feed primarily on sponges. Sponges compose as much as 95 percent of their diet in some locations (Witzell 1983, Meylan 1988).

Nesting within the continental United States is limited to southeastern Florida and the Florida Keys (Viada 2000). One hawksbill nest was found on Longboat Key, in Manatee County, in 1980 (FMRI 2006). In most locations, nesting occurs between April and November, but varies depending on the area.

It is expected that hawksbill turtles would occur within nearshore waters of the Project area. The hawksbill is listed as endangered. No critical habitat has been designated in the GOM.

Kemp's Ridley Sea Turtle. The Kemp's ridley is restricted to the North Atlantic (Marquez-M. 1994). Adults are largely confined to the GOM, with moderate numbers along the U.S. Atlantic Coast as far north as Nova Scotia (Lazell 1980; Morreale et al. 1992). Offshore water temperatures play a major role in determining the number of Kemp's ridleys present in the North Atlantic Ocean. During the winter, Kemp's ridleys could migrate to warmer waters and then return to their former habitat or bury themselves in mud bottoms to avoid low temperatures (Márquez-M. 1994). Seasonal coastal migration occasionally brings them to overwinter in central to south Florida. Although Kemp's ridleys can be observed in Florida waters year-round, the highest abundances have been documented during December through March (Henwood and Ogren 1987). Kemp's ridley turtles overwintering in Florida waters are expected to move north as water temperatures increase, foraging along the way, and return south to Florida in the fall when temperatures cool. These seasonal movements can continue until turtles reach sexual maturity, at which time turtles might return to breeding grounds in the GOM (Henwood and Ogren 1987). Kemp's ridley turtles feed primarily on portunids and other types of crabs but are also known to prey on mollusks, shrimp, fish, and plant material (Márquez-M. 1994, Schmid and Barichivich 2006).

Kemp's ridleys travel near the coast and are considered relatively common within all sectors of Tampa Bay (Meylan et al. 2003). Stranding and capture records indicate that Kemp's ridleys were most often encountered in west Florida in the late spring and summer. This temporal pattern is likely due to migration or winter dormancy (Mahmoudi et al. 2002).

Nesting occurs primarily on a single nesting beach at Rancho Nuevo, Tamaulipas, Mexico (USFWS and NMFS 1992), with a few additional nests in Texas, Florida, and the Carolinas (Schmid and Barichivich 2006). Nesting occurs from April into July (NMFS 2002). Kemp's ridley nests were recorded within Pinellas County on Madeira Beach in 1989 (Meylan et al. 2003), 1994, and twice in 2002 (FMRI 2006).

It is expected that Kemp's ridley turtles would occur within offshore, nearshore, and coastal waters of the Project area. The Kemp's ridley is currently listed as an endangered species and is considered the most endangered sea turtle in the world (USFWS and NMFS 1992). No critical habitat has been designated in the GOM.

Leatherback Sea Turtle. The leatherback sea turtle is the most abundant sea turtle on the northern GOM continental slope (Viada 2000). They are the largest, deepest diving, most migratory, widest ranging, and most pelagic sea turtle (USFWS 2002a). There is limited information available regarding the habitats utilized by early juvenile leatherbacks because this age class is entirely oceanic. However, scientists are relatively certain that these individuals do not associate with floating debris or vegetation (NMFS and USFWS 1998). Late juvenile and adult leatherback turtles are known to range from mid-ocean to the continental shelf and nearshore waters (Schroeder and Thompson 1987, Shoop and Kenney 1992, Grant and Ferrell 1993, Starbird et al. 1993). Hatchlings and smaller-sized juveniles are limited to tropical waters, where temperatures are above 26 ºC (Eckert 2002). Juvenile and adult foraging habitats include both coastal feeding areas in temperate waters and offshore feeding areas in tropical waters (Frazier 2001). Leatherbacks are highly migratory and can be found within convergence zones and upwelling areas in the open ocean, along continental margins, and in archipelagic waters (Morreale et al. 1996, Shoop and Kenney 1992). Leatherback sea turtles tend to stay in temperate waters to forage, with only the females returning to tropical beaches to lay eggs (NMFS and USFWS 1998). The diet of the leatherback sea turtle generally consists of gelatinous zooplankton such as cnidarians (jellyfish and siphonophores) and tunicates (salps and pyrosomas) in the pelagic environment (Bjorndal 1997, James and Herman 2001, Stewart and Johnson 2006).

The leatherback has a wide nesting distribution in the tropical Pacific and Atlantic, especially on mainland shores, but with a somewhat widespread island nesting in the Antilles (TEWG 2007). Global abundance estimates of breeding female leatherbacks range from 70,000 to 115,000, and the number of nests reported in Florida ranges from 39 to 188 since 1979. Leatherbacks nest in Florida from April through July, but they are observed along Florida's west coast during all months except February and April. Sightings in southwestern Florida have been concentrated between 27 and 166 km from shore (Mahmoudi et al. 2002).

It is likely that leatherback sea turtles would occur within offshore waters of the Project area. Leatherbacks are listed as endangered but no critical habitat has been designated in the GOM.

Loggerhead Sea Turtle. Loggerhead sea turtles occur in subtropical and temperate regions of the Atlantic, Pacific, and Indian oceans (Dodd 1988). Although the major nesting concentrations in the United States are found in South Florida, loggerheads nest from Texas to Virginia. The loggerhead turtle occurs worldwide in habitats ranging from coastal estuaries to waters far beyond the continental shelf (Dodd 1988). Long-term in-water studies indicate that late juvenile loggerheads reside in particular developmental foraging areas for many years (NMFS and USFWS 2008). Loggerheads often associate with natural and artificial hard substrates (e.g., live hard bottom, artificial reefs, shipwrecks, oil/gas

structures), which provide an abundance of prey, as well as sheltered locations where they can rest (Dodd 1988, Makowski et al. 2006). Seasonal movements of juvenile loggerheads along the Atlantic coast, from more northerly resident areas during warmer months to more southerly or offshore resident areas during colder months, have been well-documented (NMFS and USFWS 2008). Results from satellite telemetry have demonstrated that a small proportion of the juvenile stage might return to the oceanic zone particularly in the winter (Mansfield 2006). Loggerhead turtle diet changes with age and size of the individual. The gut contents of post-hatchlings found in masses of *Sargassum* contained parts of *Sargassum*, zooplankton, jellyfish, larval shrimp and crabs, and gastropods (Richardson and McGillivary 1991). Juvenile and subadult loggerhead turtles are omnivorous, foraging on pelagic crabs, mollusks, jellyfish, and vegetation captured at or near the surface (Dodd 1988). Adults are generalized carnivores that forage on nearshore benthic invertebrates (Dodd 1988).

About 14,000 female loggerheads nest in the southeastern United States annually, and this species accounts for approximately 98 percent of the total sea turtle nesting activity in Florida. In 2006, 377 loggerhead nests were found in Manatee, Hillsborough, and Pinellas counties (191, 21, and 165 respectively) (FMRI 2006). Nests are documented annually on the barrier islands off Pinellas and Manatee counties, with Egmont Key providing the most pristine nesting beach remaining (an average of 44 loggerhead nests has been documented on the key annually from 1989 through 2001) (Meylan et al. 2003). Florida's west coast is also a major feeding area for non-nesting loggerheads. Nesting females remain in shallow areas near beaches during the nesting season. They then disperse to feeding grounds throughout the Bahamas, Cuba, Dominican Republic, north along the eastern U.S. coast and south through the Florida Keys and GOM (late April to September).

It is expected that loggerhead sea turtles would occur within offshore, nearshore, and coastal waters of the Project area. The loggerhead is currently listed as a threatened species.

Sea Turtle Hearing. Sea turtle hearing sensitivity, in air and underwater, is not well-studied. Sea turtles do not have an external ear; rather the tympanum is a continuation of the facial tissue (Moein Bartol and Musick 2003). Reception of sound is also through bone conduction, with the skull and shell acting as receiving structures (Lenhardt et al. 1983). Sea turtles appear to hear best in the lower frequencies (< 1 kHz) (Moein Bartol and Ketten 2006). The effective dynamic hearing range for sea turtles is probably between 0.1 to 1 kHz (Ridgway et al. 1969, Lenhardt 1994, Moein et al. 1994, Moein Bartol et al. 1999). Also, calculated in-water hearing thresholds appear to be high (160 to 200 dB re 1 µPa) (Lenhardt 1994). Research based on brain physiology indicates that sea turtles are able to hear sounds with frequencies ranging from 0.08 to 2 kHz, with maximum sensitivity levels reported between 0.1 and 0.8 kHz and 0.3 and 0.4 kHz (Lenhardt 1994, NRC 2003). Moein Bartol et al. (1999) reported that juvenile loggerhead turtles hear sounds between 0.25 (lowest frequency that could be tested due to equipment) and 1.0 kHz (most sensitive at 0.25k Hz) using the auditory brainstem response (ABR) technique, while Lenhardt (2002) found that adults can hear sounds from 0.030 kHz to 1 kHz (most sensitive at 0.4 to 0.5 kHz) using startle response (i.e., contract neck or dive) and ABR techniques. Loggerhead sea turtle hearing ranges from 0.25 to 0.75 kHz with peak sensitivity at 0.25 kHz (Richardson et al. 1995). ABR data analyzed in Moein Bartol and Ketten (2006) found that subadult green turtles detect frequencies between 0.1 and 0.8 kHz and that their most sensitive hearing was between 0.2 and 0.7 kHz. Moein Bartol and Ketten (2006) also found that two juvenile Kemp's ridley turtles had a more restricted range of between 0.1 and 0.5 kHz with their most sensitive hearing between 0.1 and 0.2 kHz (Moein Bartol and Ketten 2006).

Lenhardt (2002) found that at received levels from 151 to 161 dB re 1 µPa, adult loggerheads showed a marked response (i.e., increase swimming speeds) and avoided areas where low-frequency air guns were being used at up to 175 dB re 1 µPa. However, they eventually habituated to these received levels. During the same trials, one turtle exhibited temporary threshold shift (TTS) of more than 15 decibels (dB)

for up to 2 weeks after exposure to these received levels (Lenhardt 2002). Juveniles also have been found to avoid low-frequency sound (less than 1 kHz) produced by airguns (O'Hara and Wilcox 1990). In a separate study, green and loggerhead sea turtles exposed to seismic air guns began to noticeably increase their swimming speed, as well as swimming direction, when received levels reached 155 dB re: 1 μPa^2-s for green turtles and 166 dB re: 1 μPa^2-s for loggerhead turtles (McCauley et al. 2000). In terms of sound production, nesting leatherback turtles have been recorded producing sounds (sighs or belch-like sounds) up to 1.2 kHz with most energy ranging from 0.3 to 0.5 kHz (Mrosovsky 1972, Cook and Forrest 2005).

3.3 Coastal and Marine Birds

The USFWS is responsible for coastal and marine bird protection and recovery under the authority of the ESA. The federally listed birds that occur in the Project area are identified in **Table 3-4**. Of these species, only the piping plover (*Charadrius melodus*), listed as threatened, and wood stork (*Mycteria americana*), listed as endangered, are known to inhabit or frequent coastal areas and waters of the inner continental shelf.

Table 3-4. Federally Listed Birds in Hillsborough, Manatee, Pinellas Counties, Florida

Common Name	Scientific Name	Federal Status
Audubon's Crested Caracara	*Polyborus plancu audubonii*	T
Piping Plover	*Charadrius melodus*	T, CH
Florida Scrub-jay	*Aphelocoma coeruluscens*	T
Wood Stork	*Mycteria americana*	E
Red-cockaded Woodpecker	*Picoides borealis*	E

Source: USFWS 2007b

Notes: T = Threatened; E = Endangered; CH = Critical Habitat

Piping Plover. Piping plovers are migrant shorebirds that overwinter along the southeastern U.S. and GOM coasts. Piping plovers from all three breeding populations winter along South Atlantic, Gulf Coast, and Caribbean beaches and barrier islands, primarily on intertidal beaches with sand or mud flats with no or very sparse vegetation. Plovers depart for the wintering grounds from mid-July through late October. Breeding and wintering plovers feed on exposed wet sand in wash zones; intertidal ocean beaches; wrack lines; washover passes; mud-, sand-, and algal flats; and shorelines of streams, ephemeral ponds, lagoons, and salt marshes by probing for invertebrates at or just below the surface. They use beaches adjacent to foraging areas for roosting and preening (USFWS 2007c). Christmas Bird Count (CBC) census surveys during the 2006 to 2007 season recorded only three individuals within the St. Petersburg survey area, and none within the Alafia Banks Sanctuary, the Tampa survey area, and the Bradenton survey area (Audubon Society 2007).

Critical habitat for the wintering piping plover occurs along the Florida GOM shorelines. Six units of piping plover critical habitat occur within Pinellas and Hillsborough counties (USFWS 2007b). The closest unit to the Project area is on Egmont Key, Hillsborough County (FL-21). The Proposed Route is approximately 800 m (2,625 feet) from Passage Key National Wildlife Refuge (NWR) and 1,750 m (5,742 feet) from Egmont Key NWR. The majority of the unit is within Egmont Key NWR. This unit includes the entire island to mean lower low water (MLLW).

Wood Stork. Wood storks are the only storks that regularly inhabit North America. These wading birds are year-round residents of Florida and Georgia, though sightings occur within the other Gulf coastal

states. Wood storks frequent freshwater and brackish coastal wetland habitats. This endangered species nests at a single site in Tampa Bay, the Dot-Dash colony at the mouth of the Braden River. During the 1994 through 2001 census, numbers varied from about 40 to 160 pairs annually, with the high in 2000. In 1994 the colony was abandoned following disturbance by jet skiers, and numbers were reduced in 1995; possibly increasing with improved protection of colony by Audubon (Paul and Paul 2003). CBC census surveys during the 2006 to 2007 season recorded 110 individuals within the St. Petersburg survey area, 83 individuals within the Alafia Banks Sanctuary, 30 individuals within the Tampa survey area, and 208 individuals within the Bradenton survey area (Audubon Society 2007). The wood stork is currently listed as endangered. No critical habitat has been designated for wood storks in the GOM.

3.4 Fish Species

Under the authority of the ESA, USFWS and NMFS are responsible for the protection and recovery of endangered and threatened fish species. NMFS has jurisdiction over most marine and anadromous fish listed under the ESA. Marine fish spend their entire life in salt water; anadromous fish are born in freshwater, migrate to the ocean to grow into adults, and then return to freshwater to spawn. USFWS has jurisdiction over freshwater fish. NMFS has jurisdiction over smalltooth sawfish (a marine/estuarine fish). USFWS and NMFS share jurisdiction over Gulf sturgeon (an anadromous fish). The only ESA-listed species that have the potential to occur in the Project area are smalltooth sawfish (*Pristis pectinata*) and Gulf sturgeon (*Acipenser oxyrinchus desotoi*). Smalltooth sawfish are expected to be rare in the Terminal area and offshore areas of the Pipeline, but will have a greater likelihood for interaction in the shallower, inshore areas of the Pipeline, during construction. There are few documented captures of smalltooth sawfish north of Charlotte Harbor (which is more than approximately 40 NM south of Tampa Bay) on Florida's west coast (NMFS 2009a). However, recent efforts to document sawfish encounters have increased the numbers of reported occurrences in the upper half of the west coast of the Florida Peninsula and in the area north of Charlotte Harbor (NMFS 2009a). As of 2008, there had been 20 encounters of smalltooth sawfish in Tampa Bay in 10 years (FMNH 2008). Gulf sturgeon are expected to be rare in both the Terminal and Pipeline areas.

Smalltooth Sawfish. Endangered smalltooth sawfish (*Pristis pectinata*) is one of seven sawfish species that occur worldwide in tropical and subtropical rivers, lakes, and coastal areas. Like sharks and rays, smalltooth sawfish are elasmobranchs, and share life history characteristics similar to sharks. They are long-lived, slow-growing, slow to mature, and bear few young. These traits make all sawfish vulnerable to overfishing and slow to recover from depletion (NMFS 2009a).

Smalltooth sawfish range from Brazil through the Caribbean and Central America, the GOM, and the Atlantic coast of the United States, and have also been recorded in Bermuda. Forms of smalltooth sawfish have been reported from the eastern Atlantic in Europe and West Africa; the Mediterranean; South Africa; and the Indo-West Pacific, including the Red Sea, India, Burma, and the Philippines. However, it is unknown whether populations outside the Atlantic are truly smalltooth sawfish or closely related species. Pacific Coast records of smalltooth sawfish off Central America need to be confirmed (NMFS 2009a).

The range of the smalltooth sawfish in the Atlantic has been reduced over the past century. The northwestern extent of this species' Atlantic range is located in the waters of the eastern United States. Records of this species north of Florida occur during spring and summer periods (May to August). These are likely seasonal migrants, wanderers, or colonizers from a historic Florida core population to the south (NMFS 2009a). Peninsular Florida has been the U.S. region with the largest numbers of capture records of smalltooth sawfish and seems to be the primary area where the species historically occurred year-round. The region where the largest numbers of smalltooth sawfish occur is in southern and southwestern Florida from Charlotte Harbor through the Dry Tortugas (NMFS 2009a).

Smalltooth sawfish occur on the west coast of Florida, north of Charlotte Harbor, but historically appear to never have been as common in this region as in the east coast lagoons and South Florida. One of the earliest published records from the west coast was reported in 1883 from the Cedar Keys off the northwestern Florida peninsula and hundreds of smalltooth sawfish reported on the Gulf coast of peninsular Florida in the late 1800s. Other 1800s captures were documented in Tampa Bay and in the southwestern coast off Charlotte Harbor and San Carlos Bay. Records of capture since that time period have been limited. There are few documented captures of sawfish from the area north of Charlotte Harbor. However, the recent work to document sawfish encounters has increased the numbers of reported occurrences in the upper half of the west coast of the Florida Peninsula and in the area north of Charlotte Harbor (NMFS 2009a).

Smalltooth sawfish are found very close to shore in muddy and sandy bottoms, seldom descending to depths greater than 10 m (32 feet). They are often found in sheltered bays, on shallow banks, and in estuaries or river mouths. Most encounters of smalltooth sawfish occurred on mud substrates. One study reports encounters by substrate as type as 61 percent on mud, 11 percent on sand, 10 percent seagrass, 7 percent limestone, 4 percent rock, 4 percent coral reef, and 2 percent sponge. Smalltooth sawfish are also reported to be associated with mangroves, seagrasses, and the shorelines. Encounter data have also demonstrated that smaller smalltooth sawfish occur in shallower water, and larger sawfish occur regularly at depths greater than 10 m (32 feet) (NMFS 2009a).

The primary reason for the decline of the smalltooth sawfish population has been bycatch in various commercial and recreational fisheries. The secondary reason for the decline of the smalltooth sawfish population is habitat loss and degradation. Other threats to the species include entanglement in marine debris, injury from saw removal, pollution, and disturbance of natural behavior by divers and other marine activities (NMFS 2009a). NMFS listed the U.S. population of the smalltooth sawfish as an endangered species on April 1, 2003 (68 FR 15674–15680). There is no critical habitat currently designated for smalltooth sawfish. NMFS proposed two units of critical habitat on November 20, 2008, approximately 40 NM from the Project area in Charlotte Harbor and south (73 FR 70290–70308). Critical habitat is not proposed within the Project area.

Gulf Sturgeon. The threatened Gulf sturgeon is an anadromous fish with a partially cylindrical body imbedded with bony plates or scutes (USFWS and GSMFC 1995). The current population levels of Gulf sturgeon (*Acipenser oxyrinchus desotoi*) in rivers other than the Suwannee and Apalachicola are unknown, but are thought to be reduced from historic levels. Historically, the subspecies occurred in most major rivers from the Mississippi River to the Suwannee River, and marine waters of the central and eastern GOM to Florida Bay (USFWS and GSMFC 1995).

Tampa Bay was the location of the first recorded significant sturgeon fishery on the GOM coast; however it only lasted 3 years from 1886 through 1889, when only seven sturgeon were caught. Sturgeon catches have been reported sporadically since 1890. In the Tampa Bay basin, a commercial netter incidentally caught and released a Gulf sturgeon, one mile west of Redington Beach near St. Petersburg in December 1992. Before this time, the most recent Gulf sturgeon catch reported from Tampa Bay was collected in December 1987 near Pinellas Point. Recent sightings have been limited to coastal Alabama, Mississippi, and the Florida Panhandle (USFWS 2004a).

As anadromous fish, Gulf sturgeon feed in estuarine waters and spawn in fresh water. Subadult and adult Gulf sturgeon are believed to spend 8 to 9 months in rivers and 3 to 4 months (the cooler months) in estuaries. Gulf sturgeon that are less than 2 years old remain in estuaries throughout the year. In the Suwannee River, the primary habitat is limestone and sand. In the rivers, Gulf sturgeon are known to congregate below springs and areas of turbulent flows. Open water habitats are believed to be muddy and soft bottom and possibly seagrass (USFWS and GSMFC 1995).

The decline of Gulf sturgeon was likely caused by overexploitation and exacerbated by damming of rivers (USFWS and GSMFC 1995). Critical habitat for Gulf sturgeon was designated in March 2003 (68 FR 13370–13494). There is no critical habitat for Gulf sturgeon in the Project area. The closest critical habitat for Gulf sturgeon is approximately 90 NM from the Project area.

3.5 Terrestrial Resources

Threatened and endangered species have been observed in the Project area. **Table 3-5** provides a list of federally threatened and endangered species that occur in Manatee County. The habitat types for these species can be found either within or adjacent to the proposed onshore route.

Table 3-5. Federally Listed Species Potentially Occurring in the Proposed Onshore Route

Common Name	Scientific Name	Federal Status
Audubon's crested caracara	*Caracara cheriway*	T
Wood stork	*Mycteria americana*	E
Eastern indigo snake	*Dymarchon corais couperi*	T

Source: USFWS 2007b

Notes: T = Threatened; E = Endangered

Audubon's Crested Caracara. The caracara is a large, long-legged, hawk-like bird that is often seen on the ground. It is a scavenger and has a varied diet and often seen eating fresh kills or carrion with vultures. Caracaras are found in open grassland habitats such as dry prairies and improved rangeland. Breeding is from January through March. The nest is bulky and constructed of slender vines and sticks and is usually found in a cabbage palm (Farrand and Bull 1994).

Wood Stork. Wood storks are the only storks that regularly inhabit North America. These wading birds are year-round residents of Florida and Georgia, though sightings occur within the other Gulf coastal states. Wood storks frequent freshwater and brackish coastal wetland habitats. This endangered species nests at a single site in Tampa Bay, the Dot-Dash colony at the mouth of the Braden River (Paul and Paul 2003). During the field survey of the tidally influenced canal (south conveyance ditch) in the Project area and adjacent mangrove site, multiple wood storks were observed (Port Dolphin 2007b).

Eastern Indigo Snake. The eastern indigo snake is a large, docile, nonpoisonous snake growing to a maximum length of about 8 feet. The color in both young and adults is shiny bluish-black, including the belly, with some red or cream coloring about the chin and sides of the head. They feed on an assortment of amphibians, reptiles, and small mammals. Most notably found in dryer habitats (like gopher tortoise burrows), these creatures also inhabit hydric hammocks and areas around ponds. In wetter habitats that lack gopher tortoise burrows, Eastern indigo snakes can take shelter in hollowed root channels, hollow logs, or the burrows of rodents. In central and coastal Florida, they are mainly found within many of the State's high, sandy ridges. The Eastern indigo snake has been observed laying eggs in gopher tortoise burrows in high pineland areas, and in stump holes in flatwoods and pond edge habitats. Based on observations of captive indigos at Auburn University, mating begins in November, peaks in December, and continues into March. Clutches averaging eight to nine eggs laid in late spring hatch approximately 3 months later. The snakes remain active to some degree throughout the winter, often emerging from their dens whenever air temperatures exceed 50 °F (USFWS 1991).

4. Potential Effects on Federally Listed Species

As discussed in **Section 3.1**, the Maritime Administration has the responsibility under the ESA to determine whether or not the Project would adversely affect federally listed threatened or endangered marine mammals and their critical habitat. In accordance with Section 7 of the ESA, the Maritime Administration initiated informal consultation with the USFWS and NMFS on August 24, 2007.

Potential impacts on ESA-listed species could occur during Project installation, operation, and decommissioning, and would be associated with seafloor disturbance and turbidity, hydrostatic testing, increased vessel traffic, noise, entanglement, lighting, pipeline intake and discharges, routine discharges, marine debris, and potential hydrocarbon or LNG spills.

Minimization measures to reduce potentially adverse impacts on protected marine mammals are described in **Section 6**. Various Federal and state agencies have requested specific measures including monitoring in order to minimize or offset potential impacts on natural resources. The Applicant has also committed to several best management practices (BMPs) and minimization practices during construction and operations to reduce potential impacts. Determinations of effect submitted by the USCG to USFWS and NMFS are summarized in **Table 4-1** and discussed throughout **Sections 4, 5,** and **6** of this BA.

4.1 Marine Mammals

ESA-listed marine mammals with documented occurrence in the northern GOM are listed in **Tables 3-1** and **4-1**. Of these species, only the West Indian manatee regularly occurs in the project area. The humpback whale and North Atlantic right whale are sporadically sighted in the northern GOM, including along the west coast of Florida. Sperm whale, while common in the GOM, only occurs seaward of the 200-m isobath (Jochens et al. 2008), and the closest approach of the 200-m isobath to the project area is 146 km (79 NM). Sei whale, blue whale, and fin whale would be considered extralimital (beyond their normal range) in the northern GOM (Würsig et al. 2000), but areas within their normal range would be traversed by SRVs en route to the proposed port. The West Indian manatee is the only marine mammal species with designated critical habitat in the northern GOM (see **Section 3** for more details).

4.1.1 Construction Impacts

Seafloor Disturbance. Installation of Port components and pipelines would temporarily disrupt benthic habitat in the immediate vicinity of the construction areas. Manatees could be indirectly impacted if aquatic vegetation were displaced or destroyed by construction activities. The pipeline route does not pass through any manatee protected areas including manatee protection zones and manatee critical habitat (see **Figure 3-1**). The proposed pipeline's route would be constructed within a half of a mile of the Terra Ceia Aquatic Preserve (AP), about 7.2 km (4.5 mi) from manatee critical habitat and about 21.2km (13.2 mi) from a manatee protection area. In the nearshore areas, seagrass was observed predominantly near Manbirtee Key, the spoil island near Port Manatee, and in water with a bottom depth shallower than 2 m (7 feet) (Port Dolphin 2007b). The nearest seagrasses are 23 m (75 feet) to the southwest and distances greater than 59 m (194 feet) to the northeast of the horizontal directional drill (HDD) exit point. Therefore, adverse impacts from seafloor disturbance during construction on West Indian manatee would be unlikely, and minor if they did occur. Seagrasses would be avoided and mitigated based on the BMPs and the Project-specific Wetland and Waterbody Construction and Mitigation Procedures Plan. The plan would be developed in coordination with appropriate regulatory agencies and implemented prior to and during construction activities. The specific recovery plan would address mitigating unavoidable impacts on wetlands and waters of the United States (inland, coastal, and seagrasses). Neither manatees nor their

Table 4-1. Determinations of Effect* Under ESA for Threatened and Endangered Species in the Project Area

Common Name	Scientific Name	ESA Status	Determination of Effect*
Cetaceans			
Blue whale	*Balaenoptera musculus*	E	May affect, but not likely to adversely affect
Fin whale	*Balaenoptera physalus*	E	May affect, but not likely to adversely affect
Humpback whale	*Megaptera novaeangliae*	E	May affect, but not likely to adversely affect
North Atlantic right whale	*Eubalaena glacialis*	E	No effect
Sei whale	*Balaenoptera borealis*	E	May affect, but not likely to adversely affect
Sperm whale	*Physeter macrocephalus*	E	May affect, but not likely to adversely affect
Sirenians			
West Indian manatee	*Trichechus manatus latirostris*	E	May affect, but not likely to adversely affect
Birds			
Audubon's crested caracara	*Polyborus plancu audubonii*	T	No effect
Florida scrub-jay	*Aphelocoma coeruluscens*	T	May affect, but not likely to adversely affect
Piping plover	*Charadrius melodus*	T	May affect, but not likely to adversely affect
Red-cockaded woodpecker	*Picoides borealis*	E	No effect
Wood stork	*Mycteria americana*	E	May affect, but not likely to adversely affect
Reptiles			
Eastern indigo snake	*Dymarchon corais couperi*	T	May affect, but not likely to adversely affect
Green sea turtle	*Chelonia mydas*	E[a]	May affect, but not likely to adversely affect
Hawksbill sea turtle	*Eretmochelys imbricata*	E	May affect, but not likely to adversely affect
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	May affect, but not likely to adversely affect
Leatherback sea turtle	*Dermochelys coriacea*	E	May affect, but not likely to adversely affect
Loggerhead sea turtle	*Caretta caretta*	T	May affect, but not likely to adversely affect
Olive ridley sea turtle	*Lepidochelys olivacea*	E[a]	No effect

Common Name	Scientific Name	ESA Status	Determination of Effect*
Fishes			
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	T	No effect
Smalltooth sawfish	*Pristis pectinata*	E	May affect, but not likely to adversely affect

Notes:

E – Federally listed as endangered; T – Federally listed as threatened

* These determinations of effect have been made by the USCG based upon best professional judgment and consultation with cooperating agencies. ESA consultation with NMFS and FWS is ongoing at this time. Consultation documents generated after the publication of the FEIS will be posted on the docket at *www.regulations.gov*, docket # USCG-2007-28532.

a. Although the species as a whole is listed as threatened, the Florida and Mexican Pacific nesting stocks of the green sea turtle and the Mexican Pacific nesting stocks of the olive ridley turtle are listed as endangered. Since the nesting areas for turtles encountered at sea often cannot be determined, a conservative approach to management requires the assumption that all green sea turtles in the GOM are endangered.

b. Smalltooth sawfish are expected to be rare in the Terminal area and offshore areas of the Pipeline, but will have a greater likelihood for interaction in the shallower, inshore areas of the Pipeline, during construction. There are few documented captures of smalltooth sawfish north of Charlotte Harbor (which is approximately 40 NM south of Tampa Bay) on Florida's west coast (NMFS 2009a). However, recent work to document sawfish encounters has increased the numbers of reported occurrences in the upper half of the west coast of the Florida Peninsula and in the area north of Charlotte Harbor (NMFS 2009a). As of 2008, there had been 20 encounters of smalltooth sawfish in 10 years (FMNH 2008).

feeding areas would be directly impacted by seafloor disturbance with the use of BMPs and mitigation measures.

The potential for impacts on cetaceans from seafloor disturbance would be via indirect impacts by disturbing feeding grounds. Threatened and endangered baleen whales, including humpback whales and North Atlantic right whales, are only sporadically sighted in the GOM and have not been observed to feed there. Feeding grounds for both the humpback whale and North Atlantic right whale are off the northeastern United States. Therefore, adverse impacts on threatened and endangered whale species would be unlikely to result from seafloor disturbance during construction. Short-term, minor, indirect, adverse impacts on threatened and endangered marine mammals could occur as a result of seafloor disturbance caused during construction.

***Turbidity*.** The main source of water quality impacts would be pipeline trenching, which would produce turbidity along the pipeline route. Other sources of turbidity include pipeline burial, as well as anchoring of the lay barge, placement of the pipeline and mattresses, and HDD of the shore approach. The clamshell dredge method to be used during the Proposed Action is expected to produce much less turbidity than jetting (ASA 2008). As indicated in **Section 4.1.1**, turbidity modeling (SSFATE) conducted by the Applicant was used to estimate the area in which sediment concentrations would continue to exceed 100 mg/L after 30 minutes. Under worst-case conditions, it is estimated that sediment concentration would exceed 100 mg/L for less than 2 hours (ASA 2008). Turbidity modeling indicates that turbidity plumes would be short-lived and remain fairly close to their source (ASA 2008). The total areal extent of the turbidity plumes created during pipeline installation is estimated to be approximately 4,679 acres (1,894 hectares) (ASA 2008). However, the actual distance from the source would depend on the source (e.g., HDD, dredge) and prevailing conditions (e.g., weather and tide). Water turbidity appears to have little or no direct impact on manatees or threatened and endangered whales, as they are sighted in both clear and muddy waters (Hartman 1979). However, suspended sediments in the water column reduce light availability and, therefore, seagrass production (SCDNR 1995), and seagrass beds serve as feeding areas for manatees. Due to the temporary nature of water quality changes following construction

activities, impacts on manatee feeding areas are expected to be negligible. Manatees and threatened and endangered whales could be indirectly impacted as a result of any hazardous substances in sediment being resuspended and bioaccumulated in food items from contaminated suspended sediments. Due to the temporary nature of water quality changes following construction activities, impacts on manatees or threatened or endangered whales are expected to be negligible. Additionally, threatened and endangered baleen whales are only sporadically sighted in the GOM and have not been observed to feed there, and feeding grounds for both the humpback whale and North Atlantic right whale are off the northeastern United States. Due to the short-term nature of potential indirect effects and the low potential for whales to be in the vicinity, turbidity during construction would not likely adversely affect ESA-listed marine mammals.

Hydrostatic Pipeline Integrity Testing. During the construction phase, seawater would be used for hydrostatic testing of the offshore pipeline and flowlines. The seawater would be taken onboard a marine vessel at five locations along the route. Hydrostatic testing is a one-time temporary event that will require filling the pipeline twice. Hydrostatic integrity testing might entrain and subsequently kill plankton (via the seawater intake system). To assist in leak detection during testing, an environmentally benign dye, Hydro Tag Green Fluorescent Dye, would be added to the flooding and test water. Hydro Hib P would be added as a corrosion inhibitor; it is widely used in the offshore pipeline industry and has been approved by the USEPA and certified by USEPA-approved laboratories. Hydro Hib P requires no neutralization and the treated water can be discharged into the sea (subsea) through specially designed diffusers. This is intended to release the treated seawater into a larger volume of water than if diffusers were not used. As the test water is released to the sea, the concentration will be immediately diluted well below the toxicity limit via the diffusers, thereby further rendering the test water as uninhibited or "Non-Toxic." The hydrostatic test water discharge would occur offshore from a marine vessel at one of the STL buoy locations rather than at Port Manatee. No water quality impacts are expected from the water additives.

Manatees feed primarily on aquatic vegetation, so no impacts are expected on this species. There is no evidence of feeding by humpback or North Atlantic right whales during their rare occurrences in the GOM as feeding grounds are off the northeastern United States for these two species. Therefore, adverse impacts are not expected on ESA-listed marine mammals from hydrostatic pipeline integrity testing.

Vessel Traffic. Construction activities associated with the Proposed Action would result in increased vessel traffic in the Tampa Bay region. As specified by the Applicant, approximately 1,800 vessel trips would be required during construction (Port Dolphin 2008). Twelve types of vessels might be used during construction (weather contingent); the supply vessel (360 to 600 total trips) and material barges (720 to 900 total trips) represent the most frequent vessel movements. Frequency of vessel movements ranges from 2 trips per year for jack-up and dragline barges to approximately 900 trips per year for material barges. Expected vessel traffic during construction would consist of approximately 1,796 trips over the 11-month construction period. Approximately 125,000 boats were registered in Manatee, Hillsborough, and Pinellas counties in 2006, of which approximately 2,800 are considered commercial and include charter vessels and commercial fishing vessels (HSMV 2005). From a broader perspective, upwards of 1,000 commercial vessels pass through the Straits of Florida daily, and there are tens of thousands of vessel transits annually in the GOM. The worldwide commercial fleet was estimated to include at least 81,867 vessels in 1999 and is reportedly increasing at about 12 percent per year (2003). Vessel traffic might affect marine mammals by direct collisions with vessels, wave action from boat wakes impacting seagrasses, noise (which might cause behavioral disturbance), and accidental hydrocarbon spills. Potential impacts of noise from vessel traffic are discussed in the following section on noise. Increased vessel traffic is likely to increase inadvertent petroleum hydrocarbons discharged into the water; those possible impacts are discussed in the marine mammal sections regarding hydrocarbon spills.

The largest problem presently faced by manatees in Florida is death or injury from boat strikes (USFWS 2001). Vessel collisions (particularly from small watercraft) are identified as a major source of mortality, where more than 30 percent of all documented deaths have been attributed to vessel strikes (Nowacek et al. 2004). Deaths from boat strikes involve all age classes and occur year-round over much of the manatee's range in the GOM (Nowacek et al. 2004). A large percentage of adult manatee carcasses bear scars from previous boat strikes and the healed, skeletal fractures of some indicate that they had survived previous traumatic impacts.

Many living manatees have been scarred by boat collisions, especially on the tail and back. Nonlethal injuries can reduce the breeding success of wounded females and could permanently remove some animals from the breeding population. Vessel traffic that disturbs manatees can cause them to leave preferred habitats and could alter biologically important behaviors such as feeding, nursing, or resting (FWC 2006).

To help reduce the chance of vessel strikes, the State of Florida has established manatee protection zones, including those in the Tampa Bay area. Two types of manatee protection areas also have been developed by USFWS: manatee sanctuaries and manatee refuges. Manatee sanctuaries are areas in which all waterborne activities are prohibited, and manatee refuges are areas where certain waterborne activities are restricted or prohibited (designation of refuges or sanctuaries, however, would not eliminate waterway property owner access rights). To date, FWS has established seven winter sanctuaries to protect manatees in association with the Crystal River NWR. The most recent was a 0.25-acre sanctuary established in 1997 at Three Sisters Spring run (FWC 2006). The pipeline route where construction activities would occur does not pass through any manatee protection zones (approximate closest distance from pipeline route to manatee protection areas is 11.5 NM).

Injuries and deaths resulting from ship collisions also represent a significant threat to several large whale populations (Laist et al. 2001, Jensen and Silber 2003). All types and sizes of vessels hit whales, but most lethal and serious injuries are caused by larger vessels. Laist et al. (2001) report that of 15 whales considered severely injured by ship strikes, 3 were struck by vessels less than 20 m (65.6 feet) long, 3 were struck by vessels 20 to 80 m (65.6 to 262.5 feet) long, and 9 were struck by vessels longer than 80 m (262.5 feet). Of the 23 whales killed by vessel collisions, at least 20 whales (87 percent) were struck by vessels more than 80 m (262.5 feet) long (Laist et al. 2001).

Vessel speed is a principal factor in the severity of injury or likelihood of mortality among whales struck by ships (Jensen and Silber 2003). Vessel speed at the time of strike was reported for 58 of the 292 strikes recorded in NOAA's Large Whale Ship Strike Database (Jensen and Silber 2003). The range of speeds at which vessels were operating when a whale was hit was 2 to 51 knots, with a mean speed of 18.1 knots. This category for the Proposed Action would include SRVs, which typically travel at speeds up to 19.5 knots in the open ocean. However, once approaching the vicinity of the terminal, SRVs would slow to about half-speed. The mean vessel speed which resulted in injury or mortality to the whale was 18.6 knots. The majority (79 percent) of these strikes occurred at speeds of 13 knots or greater. Of the 58 cases, 19 (32.8 percent) resulted in serious injury to the whale and 20 (34.5 percent) resulted in death. In total, 39 (67.2 percent) ship strikes in which ship speed was known resulted in serious injury or death (Jensen and Silber 2003). In a more recent study by Pace and Silber (2005) which evaluated 64 ship strike records in which vessel speed was known, there was strong evidence that the probability of death or serious injury increased rapidly with increasing speed. The predicted probability of death or serious injury increased from 45 percent to 75 percent as vessel speed increased from 10 to 14 knots, and exceeded 90 percent at 17 knots. Speeds of 25 knots and greater resulted in a 100 percent probability of death or serious injury. A reduction in speed from 18 knots to 12 knots would give whales an additional 2.6 seconds (at a distance of 50 m) to avoid a vessel.

Increases in vessel traffic (with no mitigation or monitoring) during construction could potentially increase the likelihood for collisions with ESA-listed marine mammals, thereby increasing the occurrence of serious injuries or mortality. While it is known that an increase in vessel traffic increases the risk of collision, the probability of that risk cannot be quantified. Any vessel strike of a threatened and endangered marine mammal would be considered a "take" under both the MMPA and ESA.

Additional indirect effects from increased vessel traffic include increased wave action due to vessel wakes and scarring of seagrass beds by propellers (EPC 2007). Seagrasses are important foraging areas for the manatee. Wakes affect seagrass beds by the increase of wave action which might play a role in the decline of longshore sandbars that help protect seagrasses (Lewis 2002), as well as increased turbidity that, as noted earlier, reduces light availability and, therefore, seagrass production. Turbidity modeling indicates that turbidity plumes would be short-lived (settle to close to background levels within 5 hours) and remain fairly close to their source (ASA 2008). It also indicates that sediment resuspended by plowing would not reach seagrass beds near the landfall. However, resuspended sediment from HDD pit excavation would reach seagrass beds south of the HDD pit. The seagrass beds would be exposed to suspended sediment levels of 0 to 5 milligrams per liter (mg/L) and the total area of seagrasses affected would be 1.93 acres (0.78 hectares). However, no measurable sediment accumulation on seagrasses is predicted (Port Dolphin 2008). As stated above, seagrass beds are dynamic, and a thorough seagrass survey would be conducted prior to construction to determine the current status and location of seagrass in the area of HDD exit location (Port Dolphin 2007b).

Seagrasses would be avoided and mitigated based on the BMPs and the Project-specific Wetland and Waterbody Construction and Mitigation Procedures Plan. The plan would be developed in coordination with appropriate regulatory agencies and implemented prior to and during construction activities. The specific recovery plan would address a preconstruction seagrass survey, consistent with NMFS recommendations and mitigating unavoidable impacts on wetlands and waters of the United States (inland, coastal, and seagrasses).

No direct impacts to manatees are expected, or indirectly to their feeding areas (i.e., seagrasses) when taking BMPs and mitigation measures into consideration. No adverse impacts on ESA-listed cetaceans are expected from construction-related vessel traffic since these species are only sporadically sighted in the GOM and have not been observed to feed there.

Based on NMFS recommendations, the Applicant has proposed BMPs for all vessels used during installation routine operations and decommissioning to reduce or avoid direct impacts of vessel traffic on marine mammals (see **Section 6**). In addition, to minimize potential indirect impacts, seagrasses would be avoided and mitigated based on the BMPs and the Project-specific Wetland and Waterbody Construction and Mitigation Procedures Plan. The plan would be developed in coordination with appropriate regulatory agencies and implemented prior to and during construction activities. The specific recovery plan would address a preconstruction seagrass survey, consistent with NMFS recommendations and mitigating unavoidable impacts on wetlands and waters of the United States (inland, coastal, and seagrasses).

Noise. Marine mammals rely heavily on the use of underwater sounds to communicate and gain information about their environment. Even in the absence of man-made sounds, the sea is noisy and ambient background noise can interfere with the ability of marine mammals to detect sound signals even when they are above its absolute hearing threshold. Ambient background noise includes natural contributions from wind, waves, precipitation, and other animals, as well as sounds from distant human activities such as shipping or oil exploration and production (Richardson et al. 1995). Ambient noise is highly variable over continental shelves, and this inevitably results in a high degree of variability in the range at which marine mammals can detect man-made sounds.

Known effects of noise on marine mammals have been reviewed by various sources (Richardson et al. 1995, Hildebrand 2005, NRC 2005, Nowacek et al. 2007, Weilgart 2007a, 2007b). Human-made sounds can affect the ability of marine mammals to communicate and to receive information about their environment. Such noise can interfere with or mask the sounds used and produced by these animals and thereby interfere with their natural behavior.

Observed effects of noise on marine mammals include changes in vocalizations; respiration, swim speed, diving, and foraging behavior; displacement; avoidance; shifts in migration path; stress; hearing damage; and strandings. The response threshold depends on whether habituation (gradual waning of behavioral responsiveness) or sensitization (increased behavioral responsiveness) occurs (Richardson et al. 1995); however, as noted by Wright et al. (2007a, 2007b) an interpretation of a reduction in behavioral responses to noise as acclimation will be a mistake in many situations, as alternative reasons for the observed results are much more likely. Sounds can cause reactions that might include disruption of marine mammals' normal activities (behavioral or social disruption) and, in some cases, short- or long-term displacement from areas important for feeding and reproduction (Richardson et al. 1995). Marine mammal responses to noise vary widely depending on the species, the context and duration of exposure, the properties of the stimuli (e.g., low-frequency versus high-frequency, continuous versus pulsive), the time of day or year, the reproductive state of the animal, the activity of the animal at the time of exposure, and the experience or prior exposure of the animal (NRC 2003, Richardson et al. 1995). Responses also vary widely among individuals of a species or group.

Disturbance is one of the main concerns of the potential impacts of man-made noise on marine mammals, but for many species and situations, there is no detailed information about reactions to noise. Behavioral reactions of marine mammals to sound are difficult to predict because they are dependent on a variety of factors. Preliminary research suggests that most small- and medium-sized toothed whales are unlikely to be displaced when exposed to prolonged or repeated underwater sound unless the overall received sound level exceeds 140 dB re 1µPa at 1 m. Baleen whales are probably more sensitive to low-frequency sounds and have been shown to react to sound levels of 120 dB re 1µPa at 1 m. Toothed whales also appear to exhibit a greater variety of reactions to man-made sound than baleen whales. While toothed whale reactions vary from approaching the vessel to strong avoidance, baleen whale reactions range from neutral to strong avoidance (Richardson et al. 1995).

The energetic consequences of one or more disturbance-induced periods of interrupted feeding or rapid swimming, or both, have not been evaluated quantitatively. Energetic consequences would depend on whether suitable food is readily available. Of the animals responding to noise, females in late pregnancy or lactating would probably be most affected. Human-made noise can cause temporary or permanent hearing impairment in marine mammals if the noise is strong enough. Such impairment would have the potential to diminish the individual's chance for survival.

Determining if short-term changes in behavior represent a biologically significant effect is difficult (Wright 2006). Immediate or short-term changes in behavior could represent short- or long-term effects on a population. Short-term changes in behavior can include many of the changes described in previous literature including increases in dive duration or changes in direction of travel. However, long-term impacts or effects include changes such as reduced health and viability of a population. For example, short-term changes in activity budgets that reduce amount of time feeding could represent long-term challenges by reducing energy acquisition. These short-term changes could also have a greater impact on a population depending on resource availability.

Nonauditory physical effects can also occur in marine mammals exposed to very strong underwater sound. Possible types of nonauditory physiological effects or injuries that, in theory, might occur include

stress, neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage.

The potential impacts of noise on marine mammals can be based on specific zones of influence (ZOIs): (1) the zone of audibility (within which the animal can hear the sound), (2) the zone of responsiveness (within which the animal reacts to the sound), (3) a zone of masking (within which the noise levels can interfere with other sounds and signals), and (4) the zone of hearing loss or discomfort (within which the animal's physical auditory structures are temporarily or permanently damaged). ZOI refers to the distances at which marine mammals are affected by man-made noise. Marine mammals usually do not respond overtly to audible but weak man-made sounds, so the zone of "responsiveness" is usually much smaller than the zone of audibility. Potential effects of noise on marine mammals include masking, behavioral disturbance, hearing impairment in the form of permanent or temporary threshold shifts (PTS and TTS, respectively), and nonauditory physiological effects (Richardson et al. 1995). Noise can also elicit behavioral responses such as cessation of feeding, resting, or social interaction; onset of alertness or avoidance; or attraction to the noise source. Behavioral responses vary widely both within and among species, and many marine mammals habituate easily to underwater noise (Watkins 1986). Alternatively, noise can be detectable but have no effect on an animal's behavior, hearing, or physiology.

Very high sound levels can rupture the eardrum or damage the small bones in the middle ear. Continuous sound exposure and loud sounds can temporarily or permanently affect the auditory sensitivity of animals by causing an upward shift in auditory threshold; such an effect is called a sound-induced threshold shift, or simply a threshold shift. A threshold shift can be either permanent, in which case it is termed a PTS, or it can be temporary, in which case it is termed a TTS. Still lower levels of sound can result in auditory masking, which can interfere with an animal's ability to hear other concurrent sounds.

Injury (Level A Harassment). Nonlethal injurious impact is defined as eardrum rupture (i.e., tympanic-membrane (TM) rupture). This is considered indicative of the onset of injury. This recognizes that TM rupture is not necessarily a life-threatening injury, but is a useful index of possible injury that is well-correlated with measures of permanent hearing impairment. This is often referred to as PTS.

The primary factors thought to cause a PTS are sound impulse duration, peak amplitude, and rise time. However, no data are available on noise levels that might induce PTS in marine mammals. Damage to a marine mammal's hearing apparatus could theoretically occur if an animal is exposed to sound impulses that have very high peak pressures, especially if they have very short rise times. Also, very prolonged exposure to a noise strong enough to elicit a TTS, or shorter-term exposure to noise levels well above the TTS level, could cause hearing impairment in marine mammals. For sound exposure at or somewhat above the TTS level, hearing sensitivity presumably recovers rapidly after exposure to the noise ends, and the received sound level from a single noise exposure must be far above the TTS level for there to be any risk of PTS. It has been suggested that PTSs caused by prolonged exposure to continuous man-made noise is not likely to occur in marine mammals for sounds with source levels less than 200 dB re 1μPa at 1 m (Richardson et al. 1995).

Level A harassment has an exposure criterion of 180 dB re 1 μPa^2-s.

TTS and Sub-TTS (Level B Harassment). There are two thresholds for noninjurious harassment, also known as Level B harassment. The first is TTS, which is a temporary, recoverable, loss of hearing sensitivity that is considered to result from the temporary, noninjurious distortion of hearing-related tissues. The duration of the TTS varies depending on the nature of the stimulus, but by definition, there is generally recovery of full hearing over time (Hastings and Popper 2005). A TTS is the mildest form of hearing impairment and occurs when exposure to a strong sound results in a nonpermanent elevation in hearing threshold making it harder for an animal to hear sounds. TTS can last from minutes or hours to

days and the magnitude of the TTS depends, upon other factors, on the level and duration of noise exposure. For sound exposures at or somewhat above the TTS level, hearing sensitivity usually recovers rapidly after exposure to the noise ends (Richardson et al. 1995). Only a few data on sound levels and durations necessary to elicit mild TTSs have been obtained for marine mammals. Although TTS studies on humans and terrestrial mammals provide insight on understanding the principles of TTS, it is unclear to what extent these data can be extrapolated to marine mammals (LGL and JASCO 2005).

The second threshold is termed "sub-TTS" and is used to account for behavioral disturbance significant enough to be judged as harassment, but occurring at lower sound energy levels than those that cause TTS. Behavioral modification has been defined to address a noise level or other activities that could potentially cause marine mammals to alter normal biological behavior. NMFS defines these behavior responses as modifications resulting from repeated noise exposures (below TTS) to the same animals (i.e., resident) over a relatively short period of time (Southall et al. 2007). Behavioral disturbance criteria for impulse/intermittent sounds is set at an sound pressure level (SPL) value of 160 dB re 1 µPa at 1 m and 120 dB re 1 µPa at 1 m for continuous noise (70 FR 18871–1875). The exposure zone for Level B harassment includes both behavioral effects and physiological effects and includes the region in which TTS is predicted to occur.

NMFS recognizes three general kinds of sounds: continuous (e.g., shipping sounds), intermittent (e.g., vibratory pile-driving sounds), and impulsive (e.g., conventional pile driving) (NMFS 2008a). Noise sources associated with construction activities of the Proposed Action include pipe laying, pipe burial, vessel traffic, and anchor installation. It should be noted that sounds from moving sources might be continuous, but for an animal at a given location, these sounds would be a transient impact on the animal as the vessel passes by. Marine mammal hearing capabilities are described in **Section 3**. Baleen whales (such as right whales and humpback whales) and the West Indian manatee are considered to be most sensitive to low-frequency sounds (about 7 hertz (Hz) to 22 kHz) (Southall et al. 2007). Manatees are considered to hear predominantly low frequency sounds (Gerstein et al. 1999). Therefore, all ESA-listed marine mammal species assessed for the Proposed Action are low-frequency hearing specialists (e.g., manatee, North Atlantic right whale, humpback whale).

The noise associated with construction would be broadband noise (over a wide range of frequencies, as described above) and most marine mammals present would be capable of hearing it. The frequencies (10 to 2,000 Hz) and source levels for noise associated with construction activities are presented in **Table 4-2**. Underwater noise would travel in all directions from the source. **Tables 4-3** and **4-4** present results of the noise modeling in terms of radii to threshold values of 120 dB to 190 dB Root Mean Square (RMS). **Table 4-3** presents modeling results which show the distance from noise sources that Level A and Level B harassment of marine mammals and other listed species could occur for offshore construction activities. **Table 4-4** presents the distance from noise sources that Level A and Level B harassment of marine mammals and other listed species could occur for inshore construction activities.

In order to take into account the differential hearing capabilities of various groups of marine mammals, the M-weighting frequency weighting approach described by Miller et al. (2005) was applied. The M-weighting filtering process is similar to the C-weighting method that is used for assessing impacts of loud impulsive sounds on humans. It accounts for sound frequencies extending above and below the most sensitive hearing range of marine mammals within each of five functional groups: low-frequency cetaceans, mid-frequency cetaceans, high-frequency cetaceans, pinnipeds in water, and pinnipeds in air (Southall et al. 2007); only low-frequency cetaceans would rarely occur in the area of the Proposed Action. Measurements on captive manatees (Gerstein et al. 1999) indicate a functional hearing range of 400 Hz to 46 kHz, which are within the bounds listed for pinnipeds. As such, M-weightings for pinnipeds are used as a precautionary approximation of impact for manatees.

Table 4-2. Third-Octave Band Source Levels for Construction Modeling Scenarios.

Freq (Hz)	Pile Driving[a]	Anchor Operations[b]	Pipe-laying[b]	Tug Anchor Pull[c]	Tug Half-Speed Transit[c]	Dredging[d]
	Source level (dB re μPa)					
10	202.0	175.6	164.7	202.8	188.7	153.0
12.5	202.0	170.0	166.2	196.5	182.7	153.0
16	192.0	162.7	162.7	193.1	174.1	153.0
20	187.0	158.3	165.5	191.1	167.5	153.0
25	184.0	151.8	169.0	196.7	165.2	165.0
31.5	186.0	149.1	159.6	188.8	172.2	162.0
40	188.0	146.6	156.2	177.3	182.2	169.0
50	184.0	147.9	157.7	176.4	170.2	172.0
63	188.0	153.3	154.3	179.2	167.1	171.0
80	198.0	153.2	152.2	178.8	164.9	172.0
100	200.0	156.4	153.0	178.1	161.8	179.0
125	204.0	162.2	159.8	176.7	166.0	178.0
160	208.0	155.6	152.5	175.9	167.6	180.0
200	209.5	151.4	149.8	173.5	167.5	179.0
250	209.0	151.7	152.2	178.8	164.8	177.0
315	204.0	143.6	142.4	172.8	165.2	177.0
400	204.5	145.2	147.2	165.4	165.2	176.0
500	205.0	145.8	144.8	170.7	169.8	173.0
630	198.0	145.5	142.7	168.8	159.9	170.0
800	195.0	150.5	147.5	165.1	158.6	169.0
1,000	194.0	150.8	148.7	164.2	163.6	169.0
1,250	195.0	142.7	141.7	167.3	161.0	169.0
1,600	194.0	138.6	136.1	165.9	164.9	169.0
2,000	192.0	143.2	139.3	166.5	164.2	169.0
Broadband	**216.2**	**177.2**	**173.9**	**205.2**	**190.8**	**187.7**

Source: JASCO 2008

Notes:

a. Source levels for the impact hammer estimated assuming a pulse length of 100 milliseconds from an MHU 3000 impact hammer.

b. Source levels for anchor operations and pipelaying operations estimated based on the Castoro II barge.

c. Source levels for tug anchor pull and half speed transit are based on the Britoil 51 tug.

d. Source levels for dredging are based on the Aquarius dredge.

Table 4-3. Distance from Broadband Noise Sources that Level A and Level B Harassment of Marine Mammals and other Listed Species Could Occur for Offshore Construction Activities

	Buoy Installation (distance from source)	Pile Driving (distance from source)	Pipe Laying (distance from source)	Pipe Burial (distance from source)
Sea Turtles and Low Frequency Hearing Cetaceans				
Level A	1 to 20 m	3 to 18 m	< 20 m	< 20 m
Level B	20 m to 3.8 km	18 m to 4.5 km	20 m to 7.4 km	20 m to 8.3 km

Source: JASCO 2008

Notes:

Level A harassment: intensities above 180 dB re 1 µPa at 1 m RMS

Level B harassment (impulse noises): intensities above 160 dB re 1 µPa at 1 m RMS

Level B harassment (continuous noises): intensities above 120 dB re 1 µPa at 1 m RMS

Table 4-4. Distance from Broadband Noise Sources that Level A and Level B Harassment of Marine Mammals and other Listed Species Could Occur for Inshore Construction Activities.

	Pile Driving (distance from source)	Pipe Laying: Passage Key (distance from source)	Pipe Laying: Tampa Bay (distance from source)	Pipe Burial: Tampa Bay (distance from source)
Low-Frequency Hearing Cetaceans				
Level A	7 to 30 m	< 20 m	< 20 m	< 20 m
Level B	30 m to 1.9 km	20 m to 1.6 km	20 to 6 km	20 to 6.7 km
Manatee				
Level A	6 m to 26 m	< 20 m	< 20 m	< 20 m
Level B	26 m to 1.8 km	20 m to 1.5 km	20 m to 6.0 km	20 m to 6.7 km

Source: JASCO 2008

Notes:

Level A harassment: intensities above 180 dB re 1 µPa at 1 m RMS

Level B harassment (impulse noises): intensities above 160 dB re 1 µPa at 1 m RMS

Level B harassment (continuous noises): intensities above 120 dB re 1 µPa at 1 m RMS

Manatees are common in nearshore areas associated with the Proposed Action. Right whales and humpback whales are not likely to occur anywhere in the Proposed Action area. Based on the types of noise and the distances affected, mitigation and monitoring measures would be taken to avoid both Level A and Level B harassment of ESA-listed marine mammals. Avoidance and mitigation measures are presented below and in **Section 6**. Overall, the amount of noise created during buoy installation, pipe laying, and pipe burial would be consistent with other man-made underwater noise sources in the area (e.g., commercial shipping, dredging). Continuous noise created by construction vessels could potentially mask sounds produced and received by marine mammals. Masking occurs when underwater noise interferes with an animal's ability to hear other concurrent sounds such as other group members, or predators. This can, in turn, affect an animal's ability to feed, mate, or travel efficiently and safely through an environment. While no data exist for the specific area associated with the Proposed Action, Phillips et al. (2006) found that ambient noise measurements near the mouth of the Crystal River, approximately 130 km (70 NM) north of the Proposed Action area, were 105 dB. While we cannot

quantifiably analyze the noise levels specifically in the Proposed Action area, a reasonable assumption is that the ambient noise levels will increase, but construction-related noise that contributes to the increase would be temporary.

Noise from Pile Driving. The hammer to be used for pile driving would be similar to the Menck MHU 3000 hydraulic hammer (JASCO 2008). Impact hammering noise source levels that were used for noise modeling were based on the LGL Limited and JASCO Research Limited (2005) underwater noise modeling report developed for the Neptune Deepwater Port EIS and are based on measurements and computations based on Greene and Davis (1999) and Malme et al. (1998) (Port Dolphin 2009a). There are only rare occurrences of the humpback whale, North Atlantic right whale, and West Indian manatee in the offshore component of the project (STL buoy locations). Pile driving would occur approximately 7.6 km from the nearest manatee critical habitat and approximately 21.7 km (11.5 NM) from the nearest manatee protection zone. Therefore, ESA-listed marine mammals are not likely to be adversely affected by pile driving and other noise related to buoy installation in offshore waters.

The following BMPs were proposed by the Applicant to reduce impacts associated with noise.

1. Anchors for the unloading buoys would be driven piles. Pile-driving would be confined to an approximately 2-week period. Bubble curtains, mufflers, sound-muffling devices, and engine covers would be used where appropriate to reduce the noise associated with pile driving and vessel noise. Additionally, engines and equipment would be turned off when not in use. To minimize excessive noise, engines on all equipment and vessels would be maintained in accordance with manufacturer's recommendations.
2. All vessel crew members and contractors would be requested to "ramp-up" (also known as "soft start" or "slow build up"), which entails the gradual increase in intensity of a sound source. Soft start (ramp-up) is a practiced mitigation measure used during pile driving (see recent NEPA documents and marine mammal permit authorizations (Thomsen et al. 2006; (documents for download, particularly bridge and wind farm construction projects that utilize pile driving, may be found at the NMFS LOA/IHA Applications for Public Review Web site: http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications) and seismic surveys (MMS 2007a; Weir and Dolman 2007, Abgrall et al. 2008). The intent of ramp-up is to either avoid or reduce the potential for instantaneous hearing damage to an animal (from the sudden initiation of an acoustic source at full power) that might be located in close proximity. Increasing sound levels are designed to warn animals of pending operations, and to allow sufficient time for those animals to leave the immediate area. There is ongoing discussion about its effectiveness and the level of safety it provides to marine mammals (Richardson et al. 1995, David 2006). Numerous sources including the Marine Mammal Commission, NMFS, and the MMS note that the effectiveness of soft start, although theoretically sound, has yet to be verified empirically (David 2006, Ragen 2008).

Humpback whales, right whales, and manatees are expected to be rare in the offshore Project areas. Manatees are expected to occur in the inshore Project areas. The proposed BMPs are expected to be effective in reducing the magnitude and extent of impacts of noise on marine mammals. The performance of the measures should be monitored during construction to verify their effectiveness. Therefore, the noise associated with the construction of the Port is not likely to adversely affect ESA-listed marine mammal species.

Noise from HDD. The noise from HDD activities, both onshore and offshore, is generated from the diesel engines that power the drilling and pull-in winches. The HDD could take between 3 to 4 weeks each to accomplish, during which the equipment would be running most of the time. However, the in-air noise near the HDD equipment is normally within 88 dB, which is a decibel level where ear protection is

not required as defined by Occupational Safety and Health Administration (OSHA) rules and regulations. It is anticipated that the noise generated by both onshore and offshore HDD operations would be less than that caused by ongoing large bulk carrier ships that traverse the shipping lanes in the same area of the planned HDD. With strict adherence to the proposed BMPs, there would be a full-time manatee watch during construction of the pipeline and all operations would cease when a manatee is sighted in the vicinity of the HDD. It should also be noted that most of the noise generated by the HDD operations is above the surface of the water (either on land or on a fixed jack-up vessel) and therefore noise generated by HDD operations would have to travel down the legs of the jack-up into the water, which would quickly dissipate and would have a minimal effect on manatees. Based upon the very low probability of their occurrence in nearshore waters during the short time period of HDD activities, no impacts are expected on ESA-listed whales from noise generated by HDD or other construction activities in nearshore waters.

Noise from Vessel Traffic During Construction. Vessels contribute noise primarily through propeller cavitation, propeller singing, and propulsion or other machinery (Richardson et al. 1995). Characteristic ship noise is a combination of narrowband, tonal sounds and broadband sounds with energy continuously over a wide range of frequencies (Richardson et al. 1995). Levels and frequencies of both tonal and broadband sounds tend to be related to vessel size; for example, large vessels create stronger and lower-frequency sounds (Richardson et al. 1995). For medium to large vessels, tones dominate up to about 50 Hz (Richardson et al. 1995). Broadband components can extend up to 100 kHz, peaking at 50 to 150 Hz (Richardson et al. 1995). Vessel noise (particularly from large ships) is a major contributor to low-frequency ambient noise in the ocean and is a major environmental concern (NRC 2003, 2005). During 2004, NOAA and a number of other government, industry, and academic partners convened the first formal meeting ("Shipping Noise and Marine Mammals: A Forum for Science, Management, and Technology") to consider the effects of sounds from large vessels on marine life. During 2007, NOAA convened a symposium to assess quieting applications for large commercial vessels.

Vessel traffic is considered continuous noise, and as noted earlier in the discussion of acoustic criteria, subject to level A and B thresholds for continuous noise (180 dB and 120 dB, respectively). Continuous noise from vessels is a main sound source during construction. Listed species that could be exposed to construction vessel noise include the West Indian manatee (for the inshore portion of pipeline construction) and any rare occurrences of the humpback whale and North Atlantic right whale (at the STL buoy locations and anywhere along the pipeline route). However, ESA-listed whale species are expected to be rare in the Project area. Although sounds created by construction equipment and vessels would be continuous during pipeline installation, activities would progress slowly along the route as the pipeline is laid, buried, and the trench backfilled. Thus, any one area would be subject to the maximum sound levels for only a day or two each time as the construction activities pass that area. The pipeline route does not pass through any manatee protection zones; the nearest point is 11.5 NM from a manatee protection zone.

The following types of vessels are likely to be involved during the two types of installation:

- Buoy installation. A large crane vessel and a cargo barge. Depending on the chosen installation method, one or several assisting installation vessels might be required for the installation.
- Pipeline installation. An inshore pipelaying barge and two smaller anchor-handling support vessels. Pipeline burial would most likely be done using an advanced burial plow and backfill plow system. Each crossing of the Gulfstream Pipeline would require two jack-up barges in the 200-Class range.

The noise associated with construction would be broadband noise (over a wide range of frequencies, as described above) and most marine mammals present would be capable of hearing it. The frequencies (10

to 2,000 Hz) and source levels for noise associated with construction activities are presented in **Table 4-2**. Underwater noise would travel in all directions from the source. **Tables 4-3** and **4-4** present results of the noise modeling in terms of radii to threshold values of 120 dB to 190 dB Root Mean Square (RMS). **Table 4-3** presents modeling results which show the distance from noise sources that Level A and Level B harassment of marine mammals and other listed species could occur for offshore construction activities. **Table 4-4** presents the distance from noise sources that Level A and Level B harassment of marine mammals and other listed species could occur for inshore construction activities.

In addition, the Project includes mitigation that would help reduce exposure of manatees to construction activities (see **Section 6**). Therefore, impacts on manatees are expected to be negligible.

In general, baleen whale reactions to transient vessel noise include changes in swimming direction and speed, respiration, dive cycle, and the frequency and kinds of vocalizations (Richardson et al. 1995). Baleen whales occasionally approach stationary or slow-moving boats, but they more commonly avoid them. Avoidance is strongest when boats approach directly or when vessel noise changes abruptly. Long-term reactions of baleen whales to vessel noise vary, but some species seem to show habituation to frequent boat traffic.

Based on proposed mitigation measures, the Proposed Action is not likely to adversely affect ESA-listed marine mammals.

Entanglement. It is possible that marine mammals might become entangled by anchors, anchor lines, or buoy lines deployed during construction. For example, as noted by NMFS (2007), entanglement in fishing vessel anchor lines has been documented historically; however, NMFS also notes that no information is available on the prevalence of such events. However, with strict adherence to proposed BMPs for detection of marine mammals in the area, the potential for entanglement associated with construction activities of the Proposed Action would be minimized, and adverse impacts unlikely.

Lighting. Construction activities would take place 24 hours per day, 7 days per week, during the installation period. For identification and safety purposes, construction and support vessels would be required to display lights when operating at night. The use of vessel lights during construction would be short-term, temporary, and transient. All lights would be installed and used in accordance with USFWS guidelines designed to reduce impacts on marine mammals (USFWS 2000). The Applicant has committed to using downshielding on lights used during construction, and has stated further that lighting would not be allowed to reflect on the water surface. Additionally, during installation an environmental coordinator would be on site to ensure no violations would occur. This would decrease attraction by fish and invertebrates to the area, as well as marine mammals that might be attracted by their presence, thereby reducing the vulnerability of ESA-listed marine mammals to possible disorientation, construction-related vessel strikes, noise impacts, predation, and entanglement. As such, adverse impacts on ESA-listed marine mammals from lighting during construction would be unlikely.

Marine Debris. Both entanglement in and ingestion of debris have caused death or serious injury to marine mammals (Laist 1997). The discharge and disposal of garbage and other solid debris from vessels by lessees is prohibited by the MMS (30 CFR 250.300) and the USCG (MARPOL Annex V, Public Law 100-220 [Statute 1458]) (33 CFR Part 151). The discharge of plastics, including ashes from burned plastics, is strictly prohibited and is therefore never authorized. All plastics must be returned to shore, and are tracked. These prohibitions on the discharge and disposal of garbage and other solid debris from vessels would be incorporated as enforceable conditions into the Deepwater Port Act (DWPA) license. The USCG would enforce MARPOL and the Deepwater Port License, if issued, and fines or penalties could be assessed where laws and regulations are violated. Based on the measures that would be

implemented to reduce the discharge of marine debris, it is unlikely that ESA-listed marine mammals would be adversely impacted marine debris associated with the construction of Proposed Action.

4.1.2 Operations Impacts

Seafloor Disturbance and Turbidity. Operations activities would cause long-term disturbances in both soft- and hard-bottom habitat. The placement of buoy system parts and concrete mattresses along the pipeline route, as well as anchor sweep would result in 16.32 acres of long-term disturbance on soft-bottom habitat and 19.42 acres of long-term disturbance on hard-bottom habitat. An additional 18.98 acres of soft substrate/sand habitat would be disturbed due to anchor sweep. It is anticipated that long-term STL buoy anchor chain sweep would cause the resuspension of fine sediments and result in a sediment drape within immediately adjacent areas. Turbidity associated with long-term chain scour is expected to be localized and in the lower portion of the water column. This area is not expected to recolonize because of long-term chain scour. Turbidity could spread from the immediate area of the proposed Port and affect different areas depending on the currents.

Removal of bottom habitat, along with resident benthic organisms within the area, affects not only the benthic communities, but also the fish assemblages that rely on the benthos for food, which in turn are preyed upon by marine mammals. Threatened and endangered baleen whales are only sporadically sighted in the GOM and have not been observed to feed there (feeding grounds for both the humpback whale and North Atlantic right whale are off the northeastern United States). Water turbidity appears to have little or no direct impact on manatees or threatened or endangered whales, as they are sighted in both clear and muddy waters (Hartman 1979). Additionally, manatees are expected to be rare in the offshore project area. Therefore, seafloor disturbance and turbidity associated with Port operation is not expected to result in adverse impacts associated on ESA-listed marine mammal species.

Vessel Traffic. A maximum of 90 SRVs could call on Port Dolphin per year. In the open ocean, where ESA-listed whales may occur, SRVs typically travel at speeds of up to 19.5 knots. However, once approaching the vicinity of the terminal, SRVs would slow to about half-speed. Manatees, which occur inshore, would not be affected by SRV traffic. [However, supply and crew vessels, which have the potential to affect manatees while en route in nearshore waters, are expected to call on the SRVs while at Port Dolphin.] Based on the estimated 90 calls a year, 938 supply vessel trips from 22 locations onshore in Tampa Bay are anticipated.

Increases in vessel traffic (with no mitigation or monitoring) could potentially increase the likelihood for collisions with ESA-listed marine mammals, thereby increasing the occurrence of serious injuries or mortality. Additional indirect effects from increased vessel traffic include increased wave action due to vessel wakes and scarring of seagrass beds by propellers, noise from vessel traffic (potential impacts and analyses discussed in detail under noise), and accidental hydrocarbon spills (potential impacts and analyses discussed in detail under hydrocarbon spills).

While it is known that an increase in vessel traffic increases the risk of collision, the probability of that risk cannot be quantified. Any vessel strike of a threatened and endangered marine mammal would be considered a "take" under both the MMPA and ESA. Based on NOAA and USFWS recommendations, the Applicant has proposed BMPs for all vessels used during installation routine operations, and decommissioning to reduce or avoid impacts of vessel traffic on marine mammals (see **Section 6**). Additionally, threatened and endangered baleen whales are only sporadically sighted in the northern GOM, and are not known to feed there. With adherence to the proposed BMPs associated with the Proposed Action, the potential for adverse impacts on ESA-listed marine mammals would be low.

Noise. Long-term underwater noise impacts would be created by the operation of various equipment and powering systems on the SRVs and other support vessels, the vaporization of the LNG at the mooring buoy, and the acoustic transponder.

Noise associated with SRVs and support vessels. An overlap is anticipated between arriving and departing SRVs; consequently, an SRV would be present most of the time. Under the Proposed Action, the Port would operate 24 hours a day, 365 days per year to provide a continuous supply of natural gas. Noise levels in the offshore area would be elevated when two SRVs are on buoys at the same time (separated by a distance of approximately 3.1 miles) (JASCO 2008). While SRVs are moored at the Port, main engines would not be operational, but shipboard machinery used to regasify or offload LNG, generate power, and maintain facilities, would produce continuous sources of noise. An additional noise source could include the sound produced by the flow of gas through the proposed flowline, although very little noise in the underwater environment would be expected (JASCO 2008).

Noise modeling was conducted for the SRVs for the offshore transit (full speed was assumed), buoy approach (half speed was assumed), and docking (three thrusters was assumed). However, it was later noted that a total of four thrusters could potentially be used. It was determined that the use of three thrusters rather than four thrusters would cause an increase of 1 or 2 dB re µPa and this difference would not be discernible due to ambient noise (Port Dolphin 2009b). Noise modeling indicates that overall, operational noise associated with the proposed Project is consistent with other man-made underwater noise sources in the area (e.g., commercial shipping, dredging). The source levels and frequencies for noise associated with operation are presented in **Table 4-5**. **Table 4-6** presents the distance from noise sources that Level A and Level B harassment of marine mammals and other listed species could occur associated with SRVs under the different operational scenarios.

The SRV traffic associated with the Project would contribute incrementally to the underwater noise environment of the world's oceans. The main sources of vessel noise are propeller cavitation, propeller singing, and propulsion; other sources include auxiliaries, flow noise from water dragging along the hull, and bubbles breaking in the wake (Richardson et al. 1995). Vessel traffic is a major contributor to noise in the world's oceans, especially at low frequencies between 5 and 500 Hz (NRC 2003). During 2004, NOAA and a number of other government, industry, and academic partners convened the first formal meeting ("Shipping Noise and Marine Mammals: A Forum for Science, Management, and Technology") to consider the effects of sounds from large vessels on marine life. During 2007, NOAA convened a symposium to assess quieting applications for large commercial vessels.

Although each vessel has a unique acoustic signature, individual vessels are indistinguishable at a distance. Above 300 Hz, the level of weather-related noise might exceed shipping noise. Wind, wave, and precipitation noise originating close to the point of measurement dominate frequencies from 500 to 50,000 Hz. The ambient noise frequency spectrum and level can be predicted fairly accurately for most shallow-water areas based primarily on known shipping traffic density and weather or sea conditions (wind speed, Beaufort wind force, or sea state) (Urick 1983, Zakarauskas 1986). Other anthropogenic sources of underwater noise include oil and gas drilling and production activities, seismic air guns, and SONARs. While the level of noise from ships is not of a magnitude likely to cause death, injury, or auditory trauma, the noise can affect the ability of marine mammals to communicate and receive information about their environment (Richardson et al. 1995). These sounds might frighten, annoy, or distract marine mammals and lead to physiological and behavioral disturbances. However, the incremental contribution of the planned SRV traffic to the level of vessel traffic in the GOM and the world ocean is minor. Moreover, compared to the world fleet, the SRVs would be newer ships, which tend to have several noise-mitigating characteristics such as quieter propulsion systems and deeper propellers that are less prone to cavitation (NRC 2003).

Table 4-5. Third-Octave Band Source Levels for Operational Modeling Scenarios (source depth is 6 m in all cases).

Frequency (Hz)	SRV, full speed transit	SRV, half speed transit	SRV, docking	SRV, docking, all 4 thrusters (not modeled)
10	171.0	162.4	171.5	172.7
12.5	171.0	162.4	171.5	172.7
16	171.0	162.4	171.5	172.7
20	171.0	162.4	171.5	172.7
25	171.0	162.4	171.5	172.7
31.5	171.0	162.4	171.5	172.7
40	171.0	162.4	171.5	172.7
50	171.0	162.4	171.5	172.7
63	171.0	162.4	171.5	172.7
80	171.0	162.4	171.5	172.7
100	171.0	162.4	171.5	172.7
125	169.1	160.5	169.6	170.7
160	167.0	158.4	167.4	168.6
200	165.0	156.4	165.5	166.7
250	163.1	154.5	163.6	164.7
315	161.1	152.5	161.6	162.7
400	159.0	150.4	159.5	160.6
500	157.1	148.5	157.5	158.7
630	155.1	146.5	155.5	156.7
800	153.0	144.4	153.5	154.6
1000	151.0	142.4	151.5	152.7
1250	149.1	140.5	149.6	150.7
1600	147.0	138.4	147.4	148.6
2000	145.0	136.4	145.5	146.7
Broadband	**182.1**	**173.5**	**182.6**	**183.7**

Source: Port Dolphin 2009b

It is anticipated that noise from support vessels would be comparable to noise generated by vessels already operating in the Tampa Bay area, and would be unlikely to produce a measurable increase in underwater noise levels. SRVs would not operate in nearshore areas where manatee occur; therefore, no impacts are expected on manatee from Project-related vessels during operation. ESA-listed whales are not expected to occur in the area of the proposed Port; however, SRVs in transit to the proposed Port would likely traverse areas where ESA-listed whales are known to occur.

Table 4-6. Distance from Noise Sources that Level A and Level B Harassment of Marine Mammals and other Listed Species Could Occur from SRV Operation.

	SRV Transit (distance from source)	SRV Buoy Approach (distance from source)	SRV Docking (distance from source)
Low-Frequency Hearing Cetaceans			
Level A	<0.01 km	NA	< 0.01 km
Level B	0.01 to 3.8 km	0.01 to 1.6 km	0.01 to 3.5 km
Manatee			
Level A	<0.01 km	NA	< 0.01 m
Level B	0.01 to 1.7 km	0.01 to 0.5 km	0.01 to 1.7 km

Source: JASCO 2008

Notes:

Level A harassment: intensities above 180 dB re 1 µPa at 1 m RMS

Level B harassment (impulse noises): intensities above 160 dB re 1 µPa at 1 m RMS

Level B harassment (continuous noises): intensities above 120 dB re 1 µPa at 1 m RMS

Noise associated with regasification. The source levels associated with the regasification process are expected to be low (nearly 110 dB in the water, near the vessel). There are no situations where the noise level exceeds 120 dB even a few meters from the vessel (LGL 2008). Therefore, no adverse effects on ESA-listed marine animals are expected from noise associated with regasification.

Noise associated with acoustic transponder. The acoustic transponder would emit a 30 kHz signal at 188 to 192 dB re µPa at 1 m when signaled by an incoming SRV. This signal is within the functional hearing range of the manatee, but not in its range of best hearing (6–20 kHz). Noise modeling indicates that this signal would drop to below 180 dB re µPa at approximately 3 m and to 160 dB re µPa at approximately 32 m. Manatees are not expected to occur in the offshore component of the study area and, as such, would not be impacted by the acoustic transponder. While rare occurrences of the North Atlantic right whale and humpback whale are anticipated, the transponder's frequency is higher than that of the hearing range for the humpback and North Atlantic right whales, as well as manatees. Therefore, no adverse effects on ESA-listed marine mammals are expected from noise associated with acoustic transponder.

Entanglement. It is possible that ESA-listed marine mammals might become entangled in anchors, anchor lines, or buoy lines associated with operations of the Port in offshore waters. For example, as noted by NMFS (2007), whale entanglement in fishing vessel anchor lines has been documented historically; however, NMFS also notes that no information is available on the prevalence of such events. With strict adherence to proposed BMPs, the potential for entanglement associated with construction activities of the Proposed Action would be minimized. Because right and humpback whales are expected to be rare in the Project area and manatees are expected to be rare in the offshore Project area, the potential for such an event would be very low. Therefore, no adverse effects on ESA-listed marine mammals are expected from entanglement during Port operation.

Lighting. SRVs would be guided to the submerged unloading buoys by two lighted buoys floating on the sea surface. The lighted buoys would include flashing yellow lights, with an average lighting level of 900 to 1,000 Candela. Once SRVs are securely moored, lighted buoys would be taken on board and turned off. Moored SRVs would be required to exhibit light signals appropriate for vessels at anchor. Deck lights would also be used to illuminate working decks during LNG regasification activities. Lighting

from the Port and buoys would likely attract marine mammals and food sources of marine mammals. This may lead to potential impacts on marine mammals that would then be affected by noise and vessel traffic associated with the Port. However, North Atlantic right whales and humpback whales are expected to be rare in the Project area and manatees are expected to be rare in the offshore Project area, where Port operations occur. Therefore, ESA-listed marine mammals are unlikely to be adversely affected by lighting associated with Port operation.

Seawater Intake and Cooling Water Discharge. Seawater would be taken in through one of two sea chests covered with a lattice screen and used to cool the ship's engines. Marine mammals would not be directly impacted because they would be able to swim faster than the seawater intake velocity, which would not exceed 0.15 meters per second (m/s) (0.5 feet/s). Average swimming speeds for ESA-listed marine mammal species in the area of the Proposed Action include 2.2 to 4.0 m/s (7.2 to 13.1 feet/s) for humpback whales and 4.5 m/s (14.8 feet/s) for North Atlantic right whales (Noren 2004). Hartman (1979) estimated a top swim speed of 6.25 m/s (20.5 feet/s) for manatees, though it should be noted that since manatees are rarely observed in offshore waters, the manatee would likely not be affected by seawater intake or discharge. Seawater intake might indirectly impact threatened and endangered marine mammals, since plankton species could be entrained and subsequently killed by the seawater intake system. Plankton mortality could indirectly impact invertebrate and fish populations that feed on plankton.

Cooling water would be discharged at 10 °C (18 °F) above ambient seawater temperature. Modeling indicates that cooling water temperature would be 1 °C (1.8 °F) above ambient temperature within 100 m (328 feet) of the discharge. The cooling water discharge is not expected to reach the seafloor. An increase in temperature could potentially result in short-term behavioral and physiological impacts. However, the cooling water plumes would compose a relatively small area close to the discharge point. In addition, North Atlantic right whales, humpback whales, and manatees are expected to be rare in the offshore Project area. Therefore, no adverse effects on ESA-listed marine mammals are expected from seawater intake and cooling water discharge

Other Routine Discharges. While SRVs are present at the Port, they would not discharge domestic waste, bilge water, or ballast water. In addition, on the SRVs, gutter bars would be replaced around equipment where oil leaks could occur (e.g., mooring winches, cranes). Rain water from these areas would be drained to a bilge holding tank. No rain water would be discharged overboard, from areas around equipment where oil leaks would occur, while at the buoy. The firewater system discharges consist of uncontaminated seawater from testing the firefighting system on the SRVs. Based on the infrequent nature of the discharge; its short duration; the lack of contaminants; and the rare potential for occurrence of right whales, humpback whales, and manatees in the offshore Project area, adverse effects on ESA-listed marine mammals from other routine discharges during operation would be unlikely.

Marine Debris. Both entanglement in and ingestion of debris have caused the death or serious injury of marine mammals (Laist 1997). The discharge and disposal of garbage and other solid debris from vessels by lessees is prohibited by the MMS (30 CFR 250.300) and the USCG (MARPOL Annex V, Public Law 100-220 [Statute 1458]) (33 CFR Part 151). The discharge of plastics, including ashes from burned plastics, is strictly prohibited and is therefore never authorized. All plastics must be returned to shore, and are tracked. These prohibitions on the discharge and disposal of garbage and other solid debris from vessels would be incorporated as enforceable conditions into the DWPA license. The USCG enforces MARPOL and the Deepwater Port License and fines or penalties could be assessed where laws and regulations are violated. In addition, North Atlantic right whales, humpback whales, and manatees are expected to be rare in the offshore Project area. Therefore, adverse effects on ESA-listed marine mammals from marine debris associated with the operation of the Port would be unlikely.

Planned and Unplanned Maintenance and Emergencies. Planned and unplanned maintenance, emergencies, repair, inspection, and surveys could both directly and indirectly affect marine mammals, including ESA-listed marine mammals, if they occur in the proposed project vicinity. Impacts would be expected to be similar in nature to some construction impacts (see **Section 4.1.1**). In general, the potential impacts of planned maintenance, repair, inspection, and surveys would be similar or of less magnitude than construction impacts with adherence to the same recommended mitigation measures, monitoring, and BMPs. Unplanned maintenance and emergencies are expected to occur infrequently. Therefore, impacts on marine mammals from planned and unplanned maintenance, emergencies, repair, inspection, and surveys would be expected to be low. In some cases when unplanned maintenance, repairs, or emergencies occur, it might not be possible to follow some of the recommended mitigation measures, monitoring, and BMPs. In these cases of unplanned maintenance and emergencies, resource agencies (NMFS, USFWS, and state agencies, as appropriate) would be informed. ESA consultation could potentially be reinitiated after emergency situations and for cases where mitigation measures and BMPs could not be followed.

Hydrocarbon Spills. An oil spill in coastal waters could affect the West Indian manatee, humpback whale, and North Atlantic right whale should they come into direct contact with the spill. Marine mammals can incidentally ingest floating or submerged oil or tar and consume oil-contaminated food (Geraci 1990, St. Aubin and Lounsbury 1990). Spilled oil can foul the baleen fibers of baleen whales, temporarily impairing food-gathering efficiency or resulting in the ingestion of oil or oil-contaminated prey (Geraci 1990). Spilled oil might affect the quality or availability of aquatic vegetation (St. Aubin and Lounsbury 1990). Because the distribution of this species is largely limited to coastal waters along the Florida peninsula, the West Indian manatee would be most vulnerable to a spill reaching the preferred river system and canals where it congregates.

Oil-spill response activities can affect marine mammals, either through exposure to response chemicals (e.g., dispersants or coagulants) applied to control or break down spilled surface oil or through disturbance by or collision with spill response vehicles. The chemicals used during a spill response are toxic, but are considered much less so than the constituents of spilled oil (NRC 1989); there is little information regarding their potential effects on marine mammals. The presence of, and noise generated by, oil-spill response equipment and support vessels could temporarily disturb marine mammals in the vicinity of the response action, with affected individuals likely leaving the area. Oil-spill response support vessels can also increase the risk of collisions between these vessels and marine mammals in the vicinity of the spill response.

Hydrocarbons stored on the SRVs would be small amounts. There would be no ship-to-ship fuel oil transfer and the Port would operate under the provisions of an approved oil spill contingency plan. SRVs and service vessels are designed with features to minimize the potential for oil spills. It would be unlikely that humpback whales and North Atlantic right whales would be found in the area surrounding the Port, where potential hydrocarbon spills from SRVs would have adverse effects on marine life; and manatee would not be expected in the Port vicinity at all. Manatee would potentially be affected by a spill from a support vessel if it occurred in nearshore waters; however, support vessels would be expected to carry only small amounts of hydrocarbons. Due to the small amounts of hydrocarbons on SRVs and support vessels, and the low likelihood of ESA-listed marine mammals being in the area of a potential spill, adverse effects on ESA-listed marine mammals from hydrocarbon spills during operation would be unlikely.

LNG Spills. All SRVs are designed with features to minimize the potential for LNG spills. However, if an LNG spill were to occur, potential impacts would include exposure to low-temperature LNG at the water surface, possibly resulting in frostbite or death, and asphyxiation by natural gas vapors above the surface of the water. These impacts would likely occur in the immediate vicinity of the spill location and

for a short period of time, as LNG would evaporate when exposed to ambient temperatures. Since LNG does not dissolve in water, no adverse toxic impacts would be expected after the LNG boiled off and the vapors dispersed. Due to the short timeframe within which adverse effects on marine life would occur from an LNG spill, and the low likelihood of ESA-listed marine mammals being in the area of a potential spill, adverse effects on ESA-listed marine mammals from LNG spills during operation would be unlikely.

4.1.3 Decommissioning

Under decommissioning, impacts measurably less than construction would be expected. In general, the reverse of the Port installation processes would occur; however, impacts would be less because driven piles would not be recovered and the pipeline would be abandoned in place. Port components would be removed from the seafloor or reused, as appropriate. Unlike construction, there would be no pile driving at the STL buoy locations, so this source of noise would be absent. The process would probably result in temporary turbidity increases in the immediate vicinity of the proposed decommissioning activities. These increases could indirectly affect ESA-listed marine mammals by impacting their prey species (see previous sections on turbidity). Additionally, the presence of additional vessels during decommissioning and typical debris-removal practices could potentially affect ESA-listed marine mammals (see previous sections on vessel traffic). Decommissioning activities would occur mainly in the STL buoy area and would not involve any activities along the pipeline route or in nearshore waters. Decommissioning involves no use of explosives. According to current data, North Atlantic right whales, humpback whales, and manatees are expected to be rare in the offshore Project areas where decommissioning activities would take place, and monitoring efforts during decommissioning would detect the presence of ESA-listed marine mammal species and mitigate any impacts. Therefore, decommissioning activities would be unlikely to have adverse effects on ESA-listed marine mammals.

Given that decommissioning would occur 25 years from now, it seems reasonable to expect that technologies for decommissioning and removal, as well as species distributions and the understanding of impacts on the marine ecosystem, might be different from current conditions. This issue will be addressed at the time of decommission (estimated at 2034), at which time the owner would be required to consult with appropriate Federal agencies, submit a decommissioning plan for review and approval, and adhere to all applicable and appropriate requirements. The owner would consult with the appropriate Federal agencies at the time and submit a decommissioning plan to the Secretary for approval.

4.2 Sea Turtles

The Maritime Administration has the responsibility under the ESA to determine whether or not the Project would adversely affect federally listed threatened or endangered sea turtles and their critical habitat. In accordance with Section 7 of the ESA, the Maritime Administration and USCG informally initiated consultation with the USFWS and NMFS on August 24, 2007. Minimization measures to reduce potentially adverse impacts on protected sea turtles are described in **Section 6**. Federally listed sea turtles with documented occurrence in the northern GOM are the following: green sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, loggerhead sea turtle and olive ridley sea turtle, also listed in **Tables 3-1** and **4-1**.

4.2.1 Construction Impacts

Seafloor Disturbance. Installation of Port components and pipelines would temporarily disrupt benthic habitat in the immediate vicinity of the construction areas. Of the six turtle species, the loggerhead, Kemp's ridley, green, and hawksbill are known to inhabit Tampa Bay and use benthic habitats for

foraging. Although sea turtles do not directly use such habitat, they might feed on benthic species that could be temporarily displaced or destroyed by construction activities. Construction would result in a short-term loss of soft-bottom foraging habitat and a long-term loss of hard- and live-bottom foraging habitat. Most soft-bottom areas disturbed during pipeline burial would be backfilled and remain usable as potential foraging habitat. The areal extent of seafloor disturbance is approximately 9,272 acres (3,756 hectares), of which about 33 percent or 3,025.54 acres (1,224.39 hectares) would be hard- or live-bottom habitats. Most of the damage would occur during pipeline installation, including plowing of the seafloor, placement of barge anchors, and anchor sweep. Damage to the hard-bottom substrate is considered irreversible. The recovery of benthic communities associated with damaged hard-bottom areas would be much slower than for soft-bottom areas due to the slow growth rate of corals and other hard-bottom epibiota.

Seagrass beds and macroalgae are also important foraging habitat for sea turtles. In offshore areas deepwater seagrass patches of paddlegrass and macroalgae would be impacted either directly by mechanical damage during plowing or indirectly by a reduction of photosynthesis due to sediment redeposition. These impacts are expected to be long-term to permanent. In the nearshore areas, seagrass was observed predominantly near Manbirtee Island, the spoil island near Port Manatee, and in water depths shallower than 2 m (7 feet) (Port Dolphin 2007b). The nearest seagrasses are 23 m (75 feet) to the southwest and greater than 59 m (194 feet) to the northeast of the HDD exit point. However, all impacts on seagrasses would be mitigated. Therefore, it is unlikely that sea turtles would be adversely affected.

It is possible that an inadvertent release of drilling fluid, called a frac-out, could occur during HDD activities. If a frac-out were to occur, short-term sediment transport, water quality impacts, and bottom disturbance would likely occur, which could indirectly affect sea turtles. The Federal Energy Regulation Commission (FERC) Procedures require the Applicant to develop an HDD Plan that includes a description of how a frac-out would be contained and cleaned up. The Applicant would file all HDD plans with the FERC staff prior to construction. The non-Federal agencies with jurisdiction over HDD in Tampa Bay include Florida Department of Environmental Protection (FDEP) (habitat and submerged lands), Florida Fish and Wildlife Conservation Commission (FWC) (habitat and species), Tampa Port Authority (habitat and submerged lands in Tampa Bay), and Tampa Bay Regional Planning Council (regional planning council). Although Tampa Bay Regional Planning Council does not have a permitting process, they are a commenting agency for all proposed land alterations within the Tampa Bay Region. Because of the required plan to contain and clean up a frac-out, it is unlikely sea turtles would be affected by a frac-out, should one occur.

Turbidity. Turbidity increases could cause sea turtles to avoid commonly used feeding or resting habitats. Adverse impacts on the seagrass beds and macroalgae could result from increases in turbidity. The main source of water quality impacts is pipeline trenching, which would produce turbidity along the pipeline route. Turbidity modeling indicates that the total areal extent of the turbidity plumes created during pipeline installation would be approximately 4,679 acres (1,894 hectares) (ASA 2008). The turbidity plumes would be short-lived and remain fairly close to their source.

Suspended sediments in the water column reduce light availability and, therefore, seagrass production. Seagrass beds serve as feeding areas for sea turtles, thus reduction in seagrass production would indirectly affect sea turtles. However, water quality changes following construction activities would be short-term, and thus changes in seagrass productivity, if any, would not be measurable. Therefore, adverse effects on sea turtles from construction-related turbidity is unlikely.

Hydrostatic Pipeline Integrity Testing. The proposed use of approximately 24 million gallons of filtered, surface seawater during flushing and hydrostatic testing of the pipeline would result in the entrainment of phytoplankton. The intake velocity (through-screen) for hydrostatic testing would be maintained below

0.15 m/s (0.5 feet/s). Average swimming speeds for sea turtle hatchlings are 0.44 m/s (1.43 feet/s) for green turtles, 0.36 m/s (1.17 feet/s) for loggerhead turtles, and 0.25 m/s (0.83 feet/s) for leatherback turtles (Wyneken 2001). These speeds are faster than both the average and maximum intake velocities, so hatchlings would likely be able to outswim the seawater intake if they were in the area. Therefore, no measurable direct impacts on sea turtles would be expected to occur as a result of seawater intake associated with the Project.

The following BMPs were proposed by the Applicant to reduce impacts associated with hydrostatic testing or to meet specific regulatory requirements.

1. Hydrostatic test water would be discharged offshore.
2. Fresh water for the onshore pipe would be discharged on land using industry standard filtering procedures prior to release.

These BMPs are expected to be effective in reducing the magnitude and extent of impacts of hydrostatic testing on sea turtles. However, the performance of the measures should be monitored during construction to verify their effectiveness.

Vessel Traffic. Sea turtles can be injured or killed if struck by a vessel, particularly if struck by an engaged propeller. Increased vessel traffic could result in a higher number of collisions between ships and sea turtles, thereby increasing the occurrence of serious sea turtle injuries or fatalities.

Although adult turtles are visible at the surface during the day and in clear weather, they can be difficult to spot from a moving vessel when resting below the water surface or during nighttime or periods of inclement weather. Sea turtles spend most of their lives submerged and thus are not visible by vessel operators. The average percentage of time spent submerged time is 89 percent for Kemp's ridleys and 91 percent for greens (Meylan et al. 2003). While the risk of a vessel striking a sea turtle cannot be quantified, it is known to exist because of data from turtle stranding networks. A total of 298 records of dead or injured turtles exist for the inshore waters of the Tampa Bay area for 1980 through 2001. Boat-related injuries (including propeller wounds and possible boat collision injuries), were the most frequently observed carcass anomaly for loggerheads; 16 Kemp's ridleys and 1 hawksbill also showed evidence of boat injuries (Meylan et al. 2003).

The ability of an animal to appropriately respond to an approaching source of danger is constrained by how soon the animal can detect the danger. Knowledge of the sensory biology of sea turtles indicates that sound and light offer the only potential cues for detecting an approaching vessel. In one study of green turtles, flight initiation distances did not exceed 12 m (39 feet), possibly indicating a dependence on visual cues rather than sound cues. The proportion of turtles that fled to avoid the vessel decreased significantly as vessel speed increased. Turtles fled frequently in encounters with slow vessels (4 km per hour [km/h] [2.5 miles per hour (mph)]), infrequently in encounters with moderate vessel (11 km/h [6.8 mph]), and rarely in encounters with a fast vessel (19 km/h [11.8 mph]) (Hazel et al. 2007).

High volumes of vessel traffic adjacent to shallow foraging habitat could be particularly dangerous for turtles because of the tendency to flee towards deeper water and to use deeper water to rest between foraging bouts. The collision risk for turtles in all areas is likely to be further exacerbated if water clarity is low and during the night (Hazel et al. 2007). Supply vessels and crew/survey vessels would make regular trips between Port Manatee and the construction site for approximately 11 months. It is possible for sea turtles to be present in nearshore areas where seagrass has been observed (i.e., Spoil Island near Port Manatee). Potential indirect impacts include disruption of sea turtles' activities (foraging and nesting) and, in some cases, short- or long-term displacement from areas important for feeding and reproduction. Short-term changes in activity budgets that reduce amount of time feeding could represent

long-term challenges by reducing energy acquisition. These short-term changes could also have a greater impact on a population depending on resource availability. The energetic consequences of one or more disturbance-induced periods of interrupted feeding have not been evaluated quantitatively. Energetic consequences would depend on whether suitable food is readily available.

Increases in vessel traffic during construction could potentially increase the likelihood for collisions with sea turtles, thereby increasing the occurrence of serious injuries or mortality. While it is known that an increase in vessel traffic increases the risk of collision, the probability of that risk cannot be quantified. Increases in vessel traffic during construction would be moderate in Egmont Channel in comparison with existing vessel traffic. These increases would last for the time of construction, approximately 11 months. Therefore, the risk of vessel strikes and impacts on behavior could occur on sea turtles that are present in areas where construction-related vessel traffic would occur. If a sea turtle were to be struck, it would be considered a "take" under the ESA. Therefore, mitigation measures would be taken to minimize the potential for vessel collisions during construction.

The following BMPs were proposed by the Applicant to reduce impacts associated with vessel traffic or to meet regulatory requirements.

1. All personnel associated with the Project shall be advised of the potential presence of sea turtles and the need to avoid collisions.
2. All vessel crew members and contractors would participate in a fisheries training for sea turtle presence and emergency procedures in the event a sea turtle is struck by a vessel.
3. All construction personnel are responsible for observing water-related activities for the presence of sea turtles.
4. All construction personnel shall be advised that there are civil and criminal penalties for harming, harassing, or killing sea turtles, which are protected under the ESA.
5. If a sea turtle is seen within 100 yards of the active daily construction/dredging operation or vessel movement, the following precautions shall be implemented to ensure its protection.
   - Cessation of operation of any moving equipment closer than 50 feet to a sea turtle
   - Operation of any mechanical construction equipment shall cease immediately if a sea turtle is seen within a 50-foot radius of the equipment
   - Activities may not resume until the sea turtle has departed the Project area of its own volition. Attempts to scare or encourage the protected species to leave the area would be prohibited.
6. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a 4-foot clearance from the bottom. All vessels would preferentially follow deepwater routes (e.g., marked channels) whenever possible.
7. During installation and decommissioning, lookouts are required to scan for surfacing turtles and report sightings to captain, who would notify the Environmental Coordinator.
8. Any collision with or injury to a sea turtle would be required to be reported immediately to the NOAA Fisheries Protected Resources Division (1-727-824-5312), the FWC Law Enforcement (1-850-488-6251), and the local authorized sea turtle stranding/rescue organization.
9. During construction of the facility, an Environmental Coordinator would be on site to document the effectiveness of the BMPs.

With strict adherence to the proposed BMPs, adverse impacts on sea turtles from increased vessel traffic during construction would be minimized.

Noise. The main noise sources include pile driving (at the STL buoy locations) and vessel engines. Pile driving would occur in offshore waters; therefore noise would not affect sea turtles in nesting areas onshore or breeding and foraging areas in nearshore waters approximately 30 miles from the STL buoy locations. However, noise impacts on breeding and foraging sea turtles are possible in offshore waters, including in the proposed Port location.

Noise modeling indicates that sea turtles in the Project area could hear the broadband noise (over a wide range of frequencies) associated with construction of the deepwater port and pipeline. **Table 4-3** presents the distance from noise sources that Level A and Level B harassment of listed species could occur for offshore construction activities. **Table 4-4** presents the distance from noise sources that Level A and Level B harassment of listed species could occur for inshore construction activities. Based on the types of noise and the distances affected, measures should be taken to reduce or avoid both Level A and Level B harassment on sea turtles.

The possibility of TTS exists for sea turtles. Lenhardt (2002) found that at received levels from 151 to 161 dB re 1 µPa, adult loggerheads showed a marked response (i.e., increase swimming speeds) and avoided areas where low-frequency air guns were being used at up to 175 dB re 1 µPa. However, they eventually habituated to these received levels. During the same trials, one turtle exhibited a TTS of more than 15 dB for up to 2 weeks after exposure to these received levels (Lenhardt 2002). Juveniles also have been found to avoid low-frequency sound (less than 1,000 kHz) produced by airguns (O'Hara and Wilcox 1990). TTS can last from minutes or hours to days and the magnitude of the TTS depends, upon other factors, on the level and duration of noise exposure. For sound exposures at or somewhat above the TTS level, hearing sensitivity usually recovers rapidly after exposure to the noise ends (Richardson et al. 1995). Because sea turtles would be expected to leave the area, auditory trauma such as TTS or PTS is unlikely. The Applicant has identified and committed to mitigation to reduce the likelihood of a sea turtle being exposed to the highest sound levels during pile driving. "Ramp-up" procedures would be used to gradually increase the sound intensity during pile driving and allow time for sea turtles to leave the area before the sound reaches its full intensity. The intent of ramp-up is to either avoid or reduce the potential for instantaneous hearing damage to an animal (from the sudden initiation of an acoustic source at full power) that might be located in close proximity. Numerous sources including the Marine Mammal Commission, NMFS, and the MMS note that the effectiveness of "soft start," although theoretically sound, has yet to be verified empirically (David 2006, Ragen 2008).

Behavioral responses to underwater noise can occur during pile driving. Avoidance behavior could reasonably be expected to occur at distances ranging from a few meters to a few hundred meters from a pile driver. Exposure to pile-driving noise could interrupt feeding, resting, or other behaviors or could cause a turtle to change its course of travel. The interruptions might continue for as long as the pile driving continues, or until the sea turtle could swim outside of the ZOI. Short-term changes in activity budgets that reduce amount of time feeding could represent long-term challenges by reducing energy acquisition. Energetic consequences would depend on whether suitable food is readily available. The energetic consequences of one or more disturbance-induced periods of interrupted feeding have not been evaluated quantitatively. Because of the limited areal extent of impacts and the short duration of the pile-driving activity, no significant impacts on sea turtles are expected.

All six species of sea turtles (possibly present at the STL buoy locations and anywhere along the pipeline route) could be exposed to construction vessel noise. Although sounds created by construction equipment and vessels would be continuous during pipeline installation, activities would progress slowly along the route as the pipeline is laid, buried, and the trench backfilled. Thus, any one area would be subject to the

maximum sound levels for only a day or two each time as the construction activities pass that area. It is likely that sea turtles would be able to hear low-frequency underwater noise from construction vessels and possibly experience some disturbance. The most likely impacts would be short-term behavioral changes such as diving and evasive swimming, disruption of activities, or departure from the area.

The following BMPs were proposed by the Applicant to reduce impacts associated with noise or to meet specific regulatory requirements.

1. Anchors for the unloading buoys would be driven piles. Pile-driving would be confined to an approximately 2-week period. Bubble curtains, mufflers, sound-muffling devices, and engine covers would be used where appropriate to reduce the noise associated with pile driving and vessel noise. Additionally, engines and equipment would be turned off when not in use. To minimize excessive noise, engines on all equipment and vessels would be maintained in accordance with manufacturer's recommendations.
2. All vessel crew members and contractors would be requested to "ramp-up" (also known as "soft start" or "slow build up"), which entails the gradual increase in intensity of a sound source. The intent of ramp-up is to either avoid or reduce the potential for instantaneous hearing damage to an animal (from the sudden initiation of an acoustic source at full power) that might be located in close proximity. Increasing sound levels are designed to warn animals of pending seismic operations, and to allow sufficient time for those animals to leave the immediate area.

With strict adherence to the proposed BMPs, noise is not likely to adversely affect sea turtles. Most construction-related noise (i.e., pile driving) would be temporary and localized.

Entanglement. Entanglement of sea turtles in discarded fishing gear and other marine debris is a serious and growing problem (USFWS and NMFS 1992, 1993, 2008). Once entangled, turtles can be injured by the line itself, become susceptible to predation because of reduced mobility, or drown if they are unable to surface for air. The risk of a sea turtle becoming entangled in buoy anchor lines is very low because the anchor chains would be large, heavy, and taut. In addition, there would be no horizontal link between anchor lines, eliminating this potential for entanglement. The derrick/lay barge could use up to 10 anchor cables, including the anchor, anchor line, and mid-line buoy. The mid-line buoy would be a single buoy and line used to suspend the anchor line to avoid dragging and scouring the seafloor. All lines would be greater than 4 inches in diameter. Anchor lines on the derrick/lay barge would be set and raised once during the installation of each unloading buoy, but they would be set and raised repeatedly during pipeline installation. Other construction vessels could also employ anchors and anchor lines.

The following BMPs were proposed by the Applicant to reduce impacts associated with entanglement or to meet specific regulatory requirements.

1. Siltation barriers shall be made of material in which a sea turtle cannot become entangled (not monofilament net), be properly secured, and be regularly monitored to avoid protected species entrapment.

1. Siltation barriers may not block sea turtle entry to or exit from designated critical habitat without prior agreement from the NOAA Fisheries Protected Resources Division, St. Petersburg, Florida.
2. Any lines or other equipment that have the potential to become a source of entanglement for sea turtles would only be deployed as long as necessary to complete the task and would then be removed from the site.

3. Any lines or other equipment that have the potential to become a source of entanglement for sea turtles would be kept as taut as possible to prevent entanglement; however, a certain amount of slack is necessary to account for currents, tides, and other factors.
4. In the unlikely event that entanglement appears likely, the operator would remove the source as quickly as possible or take in the slack.
5. If temporary buoys need to be placed, materials such as heavy chains or cables would be used to avoid material that could enable entanglement.
6. Lines with mandated modifications, such as knotless and nonfloating material, would be used on construction vessels.
7. Any collision with or injury to a sea turtle would be required to be reported immediately to the NOAA Fisheries Protected Resources Division (727-824-5312), the FWC Law Enforcement (850-488-6251), and the local authorized sea turtle stranding/rescue organization, as appropriate.

With strict adherence to the proposed BMPs, entanglement is not likely to adversely affect sea turtles.

Lighting. The lighting associated with this Project's construction can affect nesting and hatching sea turtles adjacent to the shoreline where the construction will occur. The main issue concerning lighting and sea turtles is disorientation of hatchlings by artificial lighting on or near nesting beaches (Witherington 1997). Under natural conditions, hatching sea turtles typically emerge from nests at night and move toward the brightest, most open horizon which is over the ocean. However, when bright light sources are visible on the beach, they become the brightest spot on the horizon and attract hatchlings in the wrong direction making them more vulnerable to predators, desiccation, entrapment in debris or vegetation, and exhaustion, and often lure them onto roadways and parking lots where they are run over. Artificial lights can also disorient hatchlings once they reach the water. Electroretinography (ERG) data show that green turtles are most sensitive to light in the violet to orange region of the visible spectrum, from 400 to 640 nanometers. Green turtles, hawksbills, and olive ridleys were most strongly attracted to light in the near-ultraviolet to yellow region of the spectrum and were weakly attracted or indifferent to orange and red light. Loggerheads were most strongly attracted to light in the near-ultraviolet to green region. A light source emitting both 525-nanometer (green) and 645-nanometer (red) light, a source highly attractive to hatchlings, appears to a human observer to emit yellow light comparable to a 588-nanometer monochromatic source, which would be only weakly attractive to hatchlings (Witherington and Martin 1996).

Nearly all ocean-facing (Gulf) sandy beaches in the Tampa Bay area are used as nesting habitat by sea turtles, primarily loggerheads. The NMFS notes that attraction to offshore locations is less problematic than attraction to landside locations, as the issue is to ensure that hatchlings head to sea rather than remaining onshore. NMFS concludes that while some adverse effects could occur from brightly lit platforms, "it is unlikely that they would appreciably reduce the reproduction, numbers, or distribution of sea turtles in the wild" (NMFS 2001, 2002).

The following BMPs were proposed by the Applicant to reduce impacts associated with lighting.

1. Lighting used during all activities would be regulated to reduce wattage and quantity of lights to complete the activity.
2. Lighting would be downshielded to prevent unnecessary upward illumination, while directing the light to vessel decks as needed.
3. Lighting would be turned off when not being used.

Strict adherence to these BMPs would decrease light attraction by sea turtles thereby reducing their vulnerability to disorientation, vessel strikes, noise, predation, and entanglement. As such, impacts on sea turtles would be insignificant. Therefore, adverse effects on sea turtles during construction would be unlikely.

4.2.2 Operations Impacts

Seafloor Disturbance and Turbidity. Operations activities would cause long-term disturbances in both soft- and hard-bottom habitat in the offshore portion of the Project area. The placement of buoy system parts, direct placement of the pipelines, and concrete mattresses along the pipeline route, as well as anchor sweep, would result in 36.76 acres of long-term disturbance on soft-bottom habitat and 34.53 acres of long-term disturbance on hard-bottom habitat. Although sea turtles do not directly use such habitat, they might feed on benthic species that could be temporarily displaced or destroyed by operation activities and thus minor, indirect, adverse impacts on sea turtles from seafloor disturbance and turbidity would be expected.

Vessel Traffic. Sea turtles can be injured or killed if struck by a vessel, particularly if struck by an engaged propeller. Increases in vessel traffic (with no mitigation or monitoring) could potentially increase the likelihood for collisions with sea turtles, thereby increasing the occurrence of serious injuries or mortality. While it is known that an increase in vessel traffic increases the risk of collision, the probability of that risk cannot be quantified.

The following BMPs were proposed by the Applicant to reduce impacts associated with vessel traffic or to meet specific regulatory requirements.

1. All personnel associated with the Project shall be advised of the potential presence of sea turtles and the need to avoid collisions.
2. All vessel crew members and contractors would participate in a fisheries training for sea turtle presence and emergency procedures in the unlikely event a sea turtle is struck by a vessel.
3. If a sea turtle is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include the following:
   - Cessation of operation of any moving equipment closer than 50 feet to a sea turtle
   - Operation of any mechanical construction equipment shall cease immediately if a sea turtle is seen within a 50-foot radius of the equipment
   - Activities may not resume until the protected species has departed the Project area of its own volition.
4. Any collision with or injury to a sea turtle would be required to be reported immediately to the NOAA Fisheries Protected Resources Division (1-727-824-5312), the FWC Law Enforcement (1-850-488-6251), and the local authorized sea turtle stranding/rescue organization.

With strict adherence to the proposed BMPs, no significant impacts on sea turtles are expected as the result of increased vessel traffic associated with the Proposed Action.

Noise. Continuous, yet transient noise would be created by SRVs, support vessels, and pilot vessels in transit. The acoustic transponder would emit a 30-kHz signal at 188 to 192 dB re µPa when signaled by an incoming SRV. Therefore, this signal would not be within the hearing range of sea turtles, which generally range from 0.08 to 2 kHz with the best dynamic hearing range between 0.1 and 1 kHz (Ridgway

et al. 1969, Lenhardt 1994, Moein et al. 1994, Moein Bartol et al. 1999). Overall, the amount of noise created by vessel traffic during routine Port operations would be consistent with other man-made underwater noise sources in the area (e.g., commercial shipping). Ambient underwater noise conditions are expected to vary, depending on factors such as wind and waves, precipitation noise, biological noise in the area, and tidally generated noise (JASCO 2008).

Entanglement. The possibility exists that a sea turtle could become entangled in the messenger or recovery line. Although there is evidence that some sea turtles take up residence, at least briefly or seasonally, at platforms or other hard-bottom structures, a statistical study of such associations in the GOM produced mixed results, with positive associations in a few areas but little or no association in others (Lohoefener et al. 1990). The buoy locations are in an area where extensive low-relief hard-bottom habitat already exists, so the subsea buoys would not constitute a unique feature likely to attract large numbers of turtles from surrounding areas. There would be two buoy locations in a small area, and relatively few turtles would be expected to encounter them. The likelihood of entanglement is insignificant because the anchor chains securing the unloading buoys would be large, heavy, and taut. In addition, there would be no horizontal link between anchor lines.

The following BMPs were proposed by the Applicant to reduce impacts associated with entanglement or to meet specific regulatory requirements.

1. Any lines or other equipment that have the potential to become a source of entanglement for sea turtles would be kept as taut as possible to prevent entanglement; however, a certain amount of slack is necessary to account for currents, tides, and other factors.
2. In the unlikely event that entanglement appears likely, the operator would remove the source as quickly as possible or take in the slack.
3. If temporary buoys need to be placed, materials such as heavy chains or cables would be used to avoid material that could enable entanglement.
4. Lines with mandated modifications, such as knotless and nonfloating material, would be used on construction vessels.
5. Any collision with or injury to a sea turtle would be required to be reported immediately to the NOAA Fisheries Protected Resources Division (727-824-5312), the FWC Law Enforcement (850-488-6251), and the local authorized sea turtle stranding/rescue organization, as appropriate.

With strict adherence to the proposed BMPs, no significant impacts on sea turtles are expected as a result of entanglement.

Lighting. Due to the distance offshore, lighting at the STL buoy locations is expected to have no detectable impact (beneficial or adverse) on sea turtle hatchlings. Offshore structures such as drilling rigs or drill ships typically are visible from shore at distances of 5 to 16 km (3 to 10 NM), and on a clear night, lights on top of offshore structures could be visible to humans on shore to a distance of approximately 32 km (20 NM) (MMS 2002b). The buoy locations are 45 km (28 NM) offshore and, therefore, the associated lighting would not be visible to humans or turtle hatchlings. Also, the distribution of hatchlings in offshore waters is likely to be much more diffuse than at the nesting beach, and the chance of numerous turtle hatchlings encountering a particular offshore structure (e.g., a ship moored at the STL buoy) is remote. The average level of lighting at the vessel side (at sea level) would be 50 to 55 Lux, and at the buoy markers would be 900 to 1,000 Candela (Alards method) and a peak of 400 to 500 Candela (Clear lens).

As of 2005, there were more than 4,000 bottom-founded structures (e.g., jacketed platforms, caissons, and well protectors) and 29,500 well-related structures in the northern GOM (MMS 2005). Many of these structures are well-lit, and the MMS (2002b) speculated that if hatchlings were attracted to brightly lit platforms, they could be susceptible to increased predation since large birds and predatory fish also congregate around these structures. The NMFS addressed this issue in biological opinions (BOs) for several oil and gas lease sales in the GOM (NMFS 2001, 2002). The NMFS analysis notes that attraction to offshore locations is less problematic than attraction to landside locations, as the issue is to ensure that hatchlings head to sea rather than remain onshore. NMFS concludes that while some adverse effects might occur from brightly lit platforms, "it is unlikely that they would appreciably reduce the reproduction, numbers, or distribution of sea turtles in the wild" (NMFS 2001, 2002).

The following BMPs were proposed by the Applicant to reduce impacts associated with lighting and or to meet specific regulatory requirements. All lights would be installed and used in accordance with NMFS and USFWS guidelines designed to reduce impacts.

1. Lighting used during all activities would be regulated to reduce wattage and quantity of lights to complete the activity.
2. Lighting would be downshielded to prevent unnecessary upward illumination, while directing the light to vessel decks as needed.
3. Lighting would be turned off when not being used.

Strict adherence to these BMPs would decrease light attraction by sea turtles thereby reducing their vulnerability to disorientation, vessel strikes, noise, predation, and entanglement. As such, adverse impacts on sea turtles would be unlikely.

Seawater Intake and Cooling Water Discharge. Seawater would be taken in through one of two sea chests covered with a lattice screen. The two intakes would be located 4.5 m (14.8 feet) and 7.5 m (24.6 feet) below the water line of a fully loaded vessel. The water intake velocity (through-screen) would be maintained below 0.15 m/s (0.5 feet/s) independent of vessel size. The speeds of several measured sea turtle hatchling species are faster than both the average and maximum intake velocities, so hatchlings would be able to outswim the seawater intake. Average swimming speeds for sea turtle hatchlings are 0.44 m/s (1.43 feet/s) for green turtles, 0.36 m/s (1.17 feet/s) for loggerhead turtles, and 0.25 m/s (0.83 feet/s) for leatherback turtles (Wyneken 2001). In addition, only juvenile and adult sea turtles would be present in the Project area and they would also be capable of outswimming the seawater intake. No measurable direct impacts on sea turtles would be expected to occur as a result of seawater intake associated with the Project.

Indirect, adverse impacts of seawater intake on sea turtles would primarily be associated with the impingement or entrainment of marine organisms. Impingement would occur if organisms became trapped against the seawater intake screens; entrainment would occur if small marine organisms (e.g., ichthyoplankton) were drawn into the seawater intake system. The mortality rate of all entrained organisms is conservatively assumed to be 100 percent. The entrainment and subsequent mortality of eggs, larvae, phytoplankton, and zooplankton would potentially impact the juvenile and hatchling sea turtles that feed on them. However, considering the overall availability of food in this area, these impacts would be insignificant. Therefore, adverse impacts on sea turtles would be unlikely.

Cooling water would be discharged at 10 °C (18 °F) above ambient seawater temperature. Modeling indicates that cooling water temperature would be 1 °C (1.8 °F) above ambient temperature within 100 m (328 feet) of the discharge. In compliance with NPDES permits, the cooling water discharge plume is not expected to reach the seafloor. An increase in temperature could result in adverse behavioral and

physiological impacts. The main difference in comparison between sea turtles and marine mammals is that sea turtles are ectothermic (cold-blooded) animals and, thus, could potentially be more adversely affected by warmed seawater discharges from engine cooling. However, due to the localized nature of the discharges and dilution in the open ocean (MMS 2007c), it is unlikely that a threatened or endangered sea turtle would be within the discharge plume long enough for more than a minor impact to occur.

Most sea turtles would be expected to avoid the cooling water discharge during the summer months and be attracted to the cooling water during the winter months. There would be a marine growth prevention system on the SRV for ballast water treatment, but this system would not be used while at the buoy site. The effects of cooling water discharges would decrease water quality in a localized area but would be expected to dilute rapidly.

Routine Discharges. Testing of the firefighting system associated with operation of the Port would comply with NPDES permit conditions. While SRVs are present at the Port, they would not discharge domestic waste, bilge water, or ballast water. In addition, on the SRVs, gutter bars would be replaced around equipment where oil leaks could occur (e.g., mooring winches, cranes). Rain water from these areas would be drained to a bilge holding tank. No rain water would be discharged overboard, from areas around equipment where oil leaks would occur, while at the buoy. The firewater system discharges consist of uncontaminated seawater from testing the firefighting system on the SRVs. Based on the infrequent nature of the discharge, its short duration, and the lack of contaminants, no impacts on sea turtles are expected.

Marine Debris. Sea turtles could be seriously injured or killed if they became entangled in or ingested construction debris or other materials accidentally released by SRVs moored at the Port, should that occur. Marine debris could also affect a sea turtle's ability to successfully migrate, feed, mate, or nest. The discharge and disposal of garbage and other solid debris from vessels by lessees is prohibited by the MMS (30 CFR 250.300) and the USCG (MARPOL Annex V, Public Law 100-220 [Statute 1458]) (33 CFR Part 151). The discharge of plastics, including ashes from burned plastics, is strictly prohibited and is therefore never authorized. All plastics must be returned to shore, and are tracked. These prohibitions on the discharge and disposal of garbage and other solid debris from vessels would be incorporated as enforceable conditions into the DWPA license. The USCG enforces MARPOL and the Deepwater Port License and fines or penalties could be assessed where laws and regulations are violated.

No food or garbage would be discharged into the sea. All such materials would be placed in proper containers and disposed of in accordance with applicable regulations. No wildlife would be fed or intentionally attracted to the SRVs or support vessels, and no fishing by crewmembers would be allowed. Given the relatively small amount of marine debris associated with the Project, significant increases in sea turtle ingestion of or entanglement in debris would not be expected.

The following BMPs were proposed by the Applicant to reduce impacts associated with marine debris or to meet specific regulatory requirements.

1. All vessel crew members and contractors would be responsible for ensuring that no debris would inadvertently enter the water, thus reducing the chance of entanglement and eliminating pollution to marine habitats.
2. Discharge or disposal of garbage and other solid debris from vessels would be prohibited, consistent with MMS (30 CFR 250.300) and the USCG). Discharge of plastics would be strictly prohibited and would never be authorized; this includes ashes from burned plastics. All plastics would be returned to shore and would be tracked. Marine debris training consistent with MMS NTL 2007-G03 Marine Trash and Debris Awareness and Elimination would be required for all

personnel working on the project. No food or garbage would be discharged; all waste would be offloaded onshore for proper disposal.

3. No wildlife would be fed or attracted to the vessel and no fishing would be allowed.
4. A waste management plan would be developed and implemented as part of the port operations manual.

With strict adherence to the measures that would be implemented to reduce the discharge of marine debris, no significant impacts on sea turtles are expected as the result of marine debris associated with the Proposed Action. Therefore, adverse effects on sea turtles are unlikely.

Planned and Unplanned Maintenance and Emergencies. Planned and unplanned maintenance, emergencies, repair, inspection, and surveys could both directly and indirectly affect sea turtles if they occur in the proposed project vicinity. Impacts would be expected to be similar in nature to some construction impacts (see **Section 4.1.1**). In general, the potential impacts of planned maintenance, repair, inspection, and surveys would be similar or of less magnitude than construction impacts with adherence to the same recommended mitigation measures, monitoring, and BMPs. Unplanned maintenance and emergencies are expected to occur infrequently. Therefore, impacts on sea turtles from planned and unplanned maintenance, emergencies, repair, inspection, and surveys would be expected to be low. In some cases when unplanned maintenance, repairs, or emergencies occur, it might not be possible to follow some of the recommended mitigation measures, monitoring, and BMPs. In these cases of unplanned maintenance and emergencies, resource agencies (NMFS, USFWS, and state agencies, as appropriate) would be informed. ESA consultation could potentially be reinitiated after emergency situations and for cases where mitigation measures and BMPs could not be followed.

Hydrocarbon Spills. A hydrocarbon spill associated with fuel and lubricating oil on the vessels could adversely affect sea turtles. Approximately 3 percent of annual south Florida sea turtle strandings are associated with oil spills. Oil spills in shipping lanes result in surface contamination along ocean tanker lanes and coastal areas. Like any living resource at risk, turtles are susceptible to a number of potential indirect impacts, which would generally be less obvious than short-term direct impacts such as mortality, but might ultimately cause more harm to populations. Dietary differences can potentially increase or decrease risk from hydrocarbon ingestion. Kemp's ridley and loggerhead turtles, for example, feed primarily on crustaceans and mollusks, which bioaccumulate petroleum hydrocarbons because they cannot efficiently clear contaminants from their bodies. Thus Kemp's ridleys and loggerheads might be at greater risk of exposure by ingesting food than leatherback turtles, which feed primarily on coelenterates. Trapped oil in sediments of intertidal beds of turtle grass (*Thalassia testudinum*) kills the seagrass, a significant component of green turtle diets. Decreases in invertebrates and sponge populations also affect hawksbills, loggerheads, and Kemp's ridleys (NOAA 2003).

There would be no ship-to-ship fuel oil transfer and the Port would operate under the provisions of an approved oil spill contingency plan. Vessels would be operated in compliance with all applicable spill prevention requirements and would have spill response plans. Pursuant to the USCG's deepwater port regulations, the USCG will prepare an Independent Risk Assessment to assess the risk and consequences of accidental and intentional events that compromise cargo containment.

LNG spills. The diving behavior of sea turtles puts them at risk in the unlikely event of an LNG spill. They rapidly inhale a large volume of air before diving and continually resurface over time. Adults doing this would experience extended physical exposure to the spill and prolonged exposure to vapors. Compared to hatchlings, however, juveniles and adults spend less time at the sea surface, which potentially reduces their chances of exposure (NOAA 2003). A release of natural gas would rise to the surface and dissipate. The pipeline would be monitored and be capable of being shut down in the event of

a release. Pursuant to the USCG's deepwater port regulations, the USCG will prepare an Independent Risk Assessment to assess the risk and consequences of accidental and intentional events that compromise cargo containment.

4.2.3 Decommissioning

Under decommissioning, it would be expected that the reverse of the Port installation processes would occur. Port components would be removed from the seafloor or reused, as appropriate. Unlike construction, there would be no pile driving at the STL buoy locations, so this source of noise would be absent. The process would probably result in temporary turbidity increases in the immediate vicinity of the proposed decommissioning activities. These increases could indirectly affect sea turtles by impacting their prey species (see section on turbidity). Additionally, the presence of additional vessels during decommissioning and typical debris-removal practices could potentially affect sea turtles (see section on vessel traffic). Decommissioning activities would occur mainly in the STL buoy area and would not involve any activities along the pipeline route or in nearshore waters. Decommissioning involves no use of explosives. Decommissioning is not likely to have adverse effects on sea turtles because decommissioning is a one-time event and monitoring efforts during decommissioning would detect presence of sea turtles and mitigate any impacts.

Given that decommissioning would occur 25 years from now, it seems reasonable to expect that technologies for decommissioning and removal, and the understanding of impacts on the marine ecosystem, might be different from current conditions. This issue will be addressed at the time of decommission (estimated at 2034), at which time the owner would be required to adhere to all applicable and appropriate requirement. The owner would consult with the appropriate Federal agencies at the time and submit a decommissioning plan to the Secretary for approval.

4.3 Coastal and Marine Birds

The federally listed birds that occur in the Project area are Audubon's crested caracara, piping plover, Florida scrub-jay, wood stork, and red-cockaded woodpecker, also identified in **Tables 3-1** and **4-1**. Of these species, only the piping plover (*Charadrius melodus*), listed as threatened, and wood stork (*Mycteria americana*), listed as endangered, are known to inhabit or frequent coastal areas and waters of the inner continental shelf where proposed project activities would take place.

Only three piping plover individuals have been recorded within the St. Petersburg survey area last year; none within the Alafia Banks Sanctuary, the Tampa survey area, or the Bradenton survey area (Audubon Society 2007), which would be in the vicinity of the project area. Critical habitat for wintering piping plovers is designated in the Project area on Egmont Key in Hillsborough County (66 FR 36038-36086). Although foraging wood storks were observed in the Project area during the October to November 2007 field surveys, rookeries are not known within or adjacent to the proposed construction area (Port Dolphin 2007b). However, a wood stork nesting colony exists within 15 miles of suitable foraging habitat within the proposed project area.

4.3.1 Construction Impacts

Vessel Traffic. Traffic increases associated with construction would be short-term and temporary. Approximately 1,800 vessel trips are anticipated during the construction of Port Dolphin (within 11 months). Vessel traffic could result in degraded water quality and disturbance of foraging/reproductive activity. Disturbance often curtails breeding success; excessive disturbance can cause individuals to desert the nest, exposing eggs or chicks to the elements and predation. Interrupted feedings can stress juvenile birds during critical periods in their development (USFWS 2007c). The

Project area is a busy Port with vessel traffic. Foraging wood storks in the Project area are currently exposed to vessel traffic. The Proposed Route is approximately 800 m (2,625 feet) from Passage Key NWR and 1,750 m (5,742 feet) from Egmont Key NWR. Vessels would travel south of Egmont Key, which is designated as critical habitat for wintering piping plovers.

The following BMPs were proposed by the Applicant to reduce impacts associated with vessel traffic or to meet a regulatory requirement.

1. Plan vessel routes to avoid sensitive receptors (e.g., bird colonies) to the extent feasible. This would require consultation with USFWS and FWC to determine locations and seasonal occurrences of protected species' colonies within the Project area.
2. Limit the number of vessel trips by using full-capacity crew boats as much as possible.

These restrictions would be mandated on all vessels, except when USCG regulations or safety precautions supersede them. These BMPs would reduce physical contact, thereby decreasing impacts on threatened and endangered coastal and marine birds. Therefore, temporary impacts associated with construction vessel traffic are expected to be insignificant.

Noise. Localized, short-term increases in noise associated with construction could potentially affect coastal birds. The level of impact would vary depending on the bird species, type of vessel or machinery, vessel speed, relative noise level, distance, frequency, and season (MMS 2002b). During Project installation, increased noise levels could temporarily displace coastal and marine birds from commonly used feeding or resting areas, but displaced birds would be expected to return shortly after construction ceased. During construction, increased noise levels could temporarily displace foraging wood storks and piping plover, but displaced individuals would be expected to return shortly after construction ceased. The lay barge and support vessels move very slowly down the pipeline corridor during installation activities to decrease the level of disturbance from wakes. Any local noise ordinances would also dictate construction work hours in this area. Animals, in general, tend to become less sensitive to those types of noise and disturbance to which they are repeatedly exposed (Richardson et al. 1995). Because the Proposed Action occurs in a busy Port, wood storks and piping plovers would be expected to have adapted to the variety of noise levels associated with Port Manatee and local industry. Therefore, adverse impacts on wood storks and piping plovers from noise would be so low as to be discountable.

Lighting. The use of lights on construction and support vessels would be short-term, temporary, and transient. The construction activities would be performed to the extent practicable to avoid sensitive areas during bird nesting seasons. In North Florida these birds are more numerous in summer than in winter, indicating a fall migration to South Florida (FWC 2003). The Applicant has proposed to construct nearshore and onshore components early in the 11 month construction schedule, which would avoid the fall migration. In addition, the lay barge and support vessels move very slowly down the pipeline corridor during installation activities. The slow movement of steady light is expected to not surprise bird in flight over the water. On land, construction would be limited by local noise ordinances , which would limit on land contraction to normal business hours, which would also reduce nighttime lighting that would affect nesting birds near the onshore construction zone.

The following restrictions would be mandated on all vessels, except when USCG regulations or safety precautions supersede them.

1. Lights would be installed and used in accordance with USFWS guidelines designed to reduce impacts in comparable construction projects (USFWS 2000).

2. Lighting would be downshielded to prevent unnecessary upward illumination, while directing the light to decks as needed.
3. Lighting would be turned off when not being used.
4. Plan vessel routes to avoid sensitive receptors (e.g., bird colonies) to the extent feasible.
5. Limit the number of vessel trips by using full-capacity crew boats as much as possible.
6. During construction of the facility, an Environmental Coordinator would be on site.
7. In the unlikely event a pelagic bird is injured, immediately notify the USFWS Division of Migratory Birds, Southeast Regional Division office (404-679-7189).

With strict adherence to the proposed BMPs, lighting associated with the Proposed Action is not likely to adversely affect threatened and endangered coastal and marine birds.

4.3.2 Operations Impacts

Vessel Traffic. Traffic increases associated with routine Port operations would be minor compared to the total vessel traffic in the Project area. SRVs and support vessels in transit to and from the Port could result in long-term, minor, direct, adverse impacts on threatened and endangered coastal and marine birds. The Applicant has identified BMPs and minimization measures for birds in the Project area to include planning vessel routes to avoid sensitive receptors (e.g., bird colonies) to the extent feasible and limiting the number of vessel trips as much as possible. These restrictions would be mandated on all vessels, except when USCG regulations or safety precautions supersede them. These BMPs would reduce physical contact; therefore, impacts on threatened and endangered coastal and marine birds would be insignificant.

Noise. Noise created by SRVs and support vessels in transit to and from the Port would be continuous, yet transient, for short periods of time. Animals, in general, tend to become less sensitive to those types of noise and disturbance to which they are repeatedly exposed (Richardson et al. 1995). Because the construction activities, associated with the Proposed Action, occur in a busy Port and shipping channel, wood storks and piping plovers would be expected to have adapted to the variety of noise levels associated with Port Manatee and local industry. Therefore, impacts on wood storks and piping plovers would be insignificant.

Lighting. Lighting aboard SRVs would be low, and all lights would be installed and utilized in accordance with USFWS guidelines designed to reduce migratory bird impacts (USFWS 2000). The use of solid or pulsating red lights would be avoided, and all vessel lights would be downshielded to minimize visibility to birds above. Based on the proposed BMPs, the effects of lighting associated with the Proposed Action on wood storks and piping plovers would be insignificant.

Seawater Intake and Cooling Water Discharge. Negligible impacts on wood storks would occur as a result of seawater intake and cooling water discharges associated with the Project. Seawater intakes would be below the sea surface, which would preclude birds from being entrained or impinged. Cooling water would be discharged at 10 °C (18 °F) above ambient seawater temperature. Due to dilution in the open ocean and because the cooling water plumes compose a relatively small localized area, impacts are expected to be negligible.

Routine Discharges. Routine discharges from project-related vessels (i.e., grey water) would have an effect on water quality and therefore an indirect effect on birds. Due to dilution in the open ocean and because the discharges would be localized, impacts on threatened and endangered birds are expected to be negligible.

Marine Debris. Wood storks foraging in the Project area could be seriously injured or killed if they became entangled in or ingested construction debris or other materials accidentally released by SRVs moored at the Port. Marine debris could also affect a bird's ability to successfully migrate, feed, mate, or nest. Short-term, minor, direct, adverse impacts on coastal and marine birds could occur as a result of marine debris associated with the Project. The discharge and disposal of garbage and other solid debris from vessels by lessees is prohibited by the MMS (30 CFR 250.300) and the USCG (MARPOL Annex V, Public Law 100-220 [Statute 1458]) (33 CFR Part 151). The discharge of plastics, including ashes from burned plastics, is strictly prohibited and is therefore never authorized. All plastics must be returned to shore, and are tracked. These prohibitions on the discharge and disposal of garbage and other solid debris from vessels would be incorporated as enforceable conditions into the DWPA license. The USCG enforces MARPOL and the Deepwater Port License and fines or penalties could be assessed where laws and regulations are violated.

In addition, no food or garbage would be discharged into the sea. All such materials would be placed in proper containers and disposed of in accordance with applicable regulations. No wildlife would be fed or intentionally attracted to the SRVs or support vessels, and no fishing by crewmembers would be allowed. Given the relatively small amount of marine debris associated with the Project, major increases in coastal and marine bird ingestion of or entanglement in debris would not be expected. The relatively small amount of marine debris potentially generated at the Port, along with required avoidance measures would result in insignificant impacts on threatened and endangered coastal and marine birds.

Planned and Unplanned Maintenance and Emergencies. Planned and unplanned maintenance, emergencies, repair, inspection, and surveys could both directly and indirectly affect coastal and marine birds if they occur in the proposed project vicinity. Impacts would be expected to be similar in nature to some construction impacts (see **Section 4.1.1**). In general, the potential impacts of planned maintenance, repair, inspection, and surveys would be similar or of less magnitude than construction impacts with adherence to the same recommended mitigation measures, monitoring, and BMPs. Unplanned maintenance and emergencies are expected to occur infrequently. Therefore, impacts on coastal and marine birds from planned and unplanned maintenance, emergencies, repair, inspection, and surveys would be expected to be low. In some cases when unplanned maintenance, repairs, or emergencies occur, it might not be possible to follow some of the recommended mitigation measures, monitoring, and BMPs. In these cases of unplanned maintenance and emergencies, resource agencies (NMFS, USFWS, and state agencies, as appropriate) would be informed. ESA consultation could potentially be reinitiated after emergency situations and for cases where mitigation measures and BMPs could not be followed.

Hydrocarbon Spills. The impacts of hydrocarbons on wood storks and piping plovers are caused by the physical and chemical nature of the spill, by clean-up operations, or indirectly through physical damage to the foraging habitats in the Project area. There would be no ship-to-ship fuel oil transfer and the Port would operate under the provisions of an approved oil spill contingency plan. Vessels would be operated in compliance with all applicable spill prevention requirements and would have spill response plans. Pursuant to the USCG's deepwater port regulations, the USCG will prepare an Independent Risk Assessment to assess the risk and consequences of accidental and intentional events that compromise cargo containment.

LNG Spills. Potential impacts would include exposure to low-temperature LNG at the water surface, possibly resulting in frostbite or death, and asphyxiation by natural gas vapors above the surface of the water. These impacts would likely occur in the immediate vicinity of the spill location; the timeframe of the impact is limited. Since LNG does not dissolve in water, the timeframe for these potential impacts would be limited, and no adverse toxic impacts would be expected after the LNG boiled off and the vapors dispersed. Because of the low temperatures in the vicinity of the spill, coastal and marine birds

would be expected to avoid the area. Because wood storks and piping plovers would be located inshore, LNG spills would not be likely to adversely affect listed coastal and marine bird species.

4.3.3 Decommissioning

Under decommissioning, it would be expected that the reverse of the Port installation processes would occur. Port components would be removed from the seafloor or reused, as appropriate. Unlike construction, there would be no pile driving at the STL buoy locations, so this source of noise would be absent. Decommissioning activities would occur mainly in the STL buoy area and would not involve any activities along the pipeline route or in nearshore waters. Decommissioning involves no use of explosives. Decommissioning is not likely to have adverse effects on ESA-listed coastal and marine bird species, including wood storks and piping plovers.

Given that decommissioning would occur 25 years from now, it seems reasonable to expect that technologies for decommissioning and removal, and the understanding of impacts on the marine ecosystem, might be different from current conditions. This issue will be addressed at the time of decommission (estimated at 2034), at which time the owner would be required to adhere to all applicable and appropriate requirement. The owner would consult with the appropriate Federal agencies at the time and submit a decommissioning plan to the Secretary for approval.

4.4 Fish Species

4.4.1 Construction Impacts

Seafloor Disturbance. Construction machinery and the direct placement of the pipelines and concrete mattresses would result in seafloor disturbance. The redeposition of sediments could cause additional impacts. While impacts could result in the direct mortality, injury, or displacement of fish and their prey, it is expected that fish would avoid the construction zone due to noise, minimizing the potential for direct mortality and injury from construction equipment. Short-term, minor, direct and indirect, adverse impacts on smalltooth sawfish and Gulf sturgeon could occur as a result of seafloor disturbance caused during the installation of the pipeline. Smalltooth sawfish are expected to be rare in the Terminal area and offshore areas of the Pipeline, but will have a greater likelihood for interaction in the shallower, inshore areas of the Pipeline, during construction (see **Section 3.4**). Gulf sturgeon are expected to be rare in both the Terminal and Pipeline areas (see **Section 3.4**). Additionally, critical habitat is greater than 40 NM from the Project area for smalltooth sawfish and 90 NM for Gulf sturgeon. Seafloor disturbance could degrade potential smalltooth sawfish habitat (primarily mud or soft-bottom sediments) during construction in the inshore Pipeline area. However, smalltooth sawfish occurrence in the inshore pipeline installation area is expected to be sporadic. Because impacts on soft-bottom sediments would be temporary and because potential occurrence of smalltooth sawfish and Gulf sturgeon would be rare to sporadic, seafloor disturbance associated with Port construction is not likely to adversely affect Gulf sturgeon or smalltooth sawfish.

Additionally, the following BMPs were proposed by the Applicant to reduce impacts associated with seafloor disturbance and mitigate for unavoidable impacts.

1. Midline buoys would be utilized to the extent practicable on anchor chains to reduce the amount of anchor chain sweep.
2. During detailed design, an anchoring plan would be developed that would provide procedures for anchor deployment to minimize impacts on hard- and live-bottom habitat.

3. A Mitigation Plan to compensate for unavoidable impacts on hard bottom would be developed during the permitting process.

Proper design and implementation of BMPs and mitigation would minimize seafloor disturbance from the construction of the pipeline and, therefore, would reduce impacts on smalltooth sawfish and Gulf sturgeon, if present in the Project area. However, the performance of the BMPs should be monitored during construction to verify their effectiveness. BMPs that reduce impacts on hard bottom and impacts at the Terminal sight would not benefit smalltooth sawfish and Gulf sturgeon because these species are not expected to occur in hard bottom areas.

Turbidity. Direct impacts of turbidity could include clogged fish gills and lower growth rates (Berry et al. 2003). Indirect impacts include the reduction of abundance in part by a reduction in prey and a reduction in light reducing foraging or predation success (SCDNR 1995). However, these potential indirect impacts would be spatially limited and short-term in nature, as the suspended sediment would redeposit soon after the buoy system array and pipeline components were installed.

Turbidity modeling (SSFATE) indicates that turbidity associated with the installation of the proposed Port components would begin to subside within 30 minutes of each turbidity event and would reach acceptable levels in 5 hours. The total areal extent of the turbidity plumes created during pipeline installation would be approximately 4,679 acres (1,894 hectares) (ASA 2008). Turbidity events could occur any time during Port installation, which would take approximately 11 months. Turbidity modeling also indicates that turbidity would remain fairly close to the source of the disturbance (e.g. the plowing for pipeline installation or location of installation of anchor piles) (ASA 2008). The distance from the source would depend on the source (e.g., HDD, dredge), sediment size, and prevailing conditions (e.g., weather and tide). Overall turbidity increases would be temporary in duration and localized in scope. Therefore, short-term, minor, indirect, adverse impacts on phytoplankton would occur as a result of turbidity increases associated with the installation of the Port and Pipeline. Smalltooth sawfish are expected to be rare in the Terminal area and offshore areas of the Pipeline, but will have a greater likelihood for interaction in the shallower, inshore areas of the Pipeline, during construction (see **Section 3.4**). Gulf sturgeon area expected to be rare in both the Terminal and Pipeline areas (see **Section 3.4**). Additionally, critical habitat is approximately 40 NM for smalltooth sawfish and 90 NM for Gulf sturgeon. Turbidity could degrade potential smalltooth sawfish habitat (primarily mud or soft-bottom sediments) during construction in the inshore Pipeline area. However, smalltooth sawfish occurrence in the inshore pipeline installation area is expected to be sporadic. Because turbidity impacts would be temporary and because potential occurrence of smalltooth sawfish and Gulf sturgeon would be rare to sporadic, turbidity associated with construction of the Port and pipeline is not likely to indirectly, adversely affect Gulf sturgeon and smalltooth sawfish.

Additionally, the following BMPs were proposed by the Applicant to reduce impacts associated with turbidity.

1. Trenching and burial of the gas transmission pipeline would be performed using a pipeline plow to the maximum extent practicable. The towed plow trenching and burial technology was selected primarily because it does not fluidize bottom sediments. Therefore, it causes minimal impacts from sediment resuspension in comparison to other more conventional trenching and burial technologies (e.g., clamshell dredging).
2. Minimize the duration of construction in order to minimize impacts on marine resources by using the most efficient and effective construction equipment and methods available.
3. The use of turbidity curtains or other methods to reduce turbidity for pipeline installation under the Skyway Bridge, in Outstanding Florida Waters, and during HDD.

These measures are expected to be effective in reducing the magnitude and extent of impacts resulting from sediment suspension during pipeline construction and therefore, the impact of turbidity on smalltooth sawfish and Gulf sturgeon. However, the performance of the measures should be monitored during construction to verify their effectiveness. The Applicant plans to apply for a variance from turbidity standards which could result in an increase in adverse impacts from turbidity, if granted.

Pipeline Intake and Discharges. Hydrostatic testing would require the use of approximately 24 million gallons of treated and filtered surface seawater. This volume includes flooding the pipeline twice, once for flushing and once for hydrostatic testing. Water would be withdrawn from surface waters at a velocity of 0.15 m/s (0.5 feet/s). Upon completion of the pipeline integrity hydrotest and flushing, the water would be discharged offshore. Because the pipeline dewatering discharges would occur offshore (and only during construction), discharges are not expected to impact smalltooth sawfish or Gulf sturgeon, which, if present, would be more likely to occur in nearshore waters. Therefore, pipeline intake and discharges would have no effect on smalltooth sawfish and Gulf sturgeon.

Additionally, the following BMPs were proposed by the Applicant to reduce impacts associated with hydrostatic testing.

1. Hydrostatic test water would be discharged offshore.
2. Fresh water for the onshore pipe would be discharged on land using industry standard filtering procedures prior to release.

These BMPs are expected to be effective in reducing the magnitude and extent of impacts of hydrostatic testing on smalltooth sawfish and Gulf sturgeon. However, the performance of the measures should be monitored during construction to verify their effectiveness.

Noise. Continuous sound exposure and loud sounds can cause a TTS in fish. The duration of the TTS varies depending on the nature of the stimulus, but by definition, there is generally recovery of full hearing over time (Hastings and Popper 2005). Permanent hearing loss or PTS is caused by acoustic trauma (Hastings and Popper 2005). Other potential impacts of sound exposure on fish include physical damage to the ear region; physiological stress responses; and behavioral responses such as startle response, alarm response, avoidance, and a potential lack of response due to masking of acoustic cues. Although no hearing data are available specifically for smalltooth sawfish (an elasmobranch); however, hearing data are available for a variety of bullhead sharks (also elasmobranchs). Hearing for bullhead sharks ranges from 0.02 kHz through 3.0 kHz. Based on the available data for other elasmobranchs, it is assumed that smalltooth sawfish could hear the broadband noise (noise over a wide range of frequencies) associated with the deepwater Port and Pipeline. Noise modeling indicates that broadband noise (0.001 to 2 kHz) could travel up to 20 km (13 mi) at intensities above 140 dB re 1µPa for pile driving, up to 3.9 km (2 mi) at intensities above 120 dB re 1µPa for buoy installation, up to 7.5 km (5 mi) at intensities above 120 dB re 1µPa for pipe laying offshore, up to 6 km (4 mi) at intensities above 120 dB re 1µPa for pipe laying onshore, and up to 1.6 km (1 mi) at intensities above 120 dB re 1µPa for pipe laying at Passage Key. The most pervasive noise would be pile driving which would occur in the offshore areas. As both species are expected to be rare in the offshore areas of the Project, pile driving would be expected to have no effect on smalltooth sawfish and Gulf sturgeon. Because populations of both species occurring in the Tampa Bay vicinity are accustomed to the noise associated with busy port areas, pipeline construction noise would not likely adversely affect smalltooth sawfish or Gulf sturgeon if present during pipeline construction within Tampa Bay.

Additionally, the following BMPs were proposed by the Applicant to reduce impacts associated with noise.

1. Anchors for the unloading buoys would be driven piles. Pile driving would be confined to an approximately 2-week period. Bubble curtains, mufflers, sound-muffling devices, and engine covers would be used where appropriate to reduce the noise associated with pile driving and vessel noise. Additionally, engines and equipment would be turned off when not in use. To minimize excessive noise, engines on all equipment and vessels would be maintained in accordance with manufacturer's recommendations.
2. All vessel crew members and contractors would be requested to "ramp-up" (also known as "soft start" or "slow build up"), which entails the gradual increase in intensity of a sound source. The intent of ramp-up is to either avoid or reduce the potential for instantaneous hearing damage to an animal (from the sudden initiation of an acoustic source at full power) that might be located in close proximity. Increasing sound levels are designed to warn animals of pending seismic operations, and to allow sufficient time for those animals to leave the immediate area. NMFS has recommended "ramp-up" procedures for pile driving in past projects and believes that it would help to minimize impacts on fish habitat (NMFS 2009b).

These BMPs would be expected to reduce the magnitude and extent of impacts of noise on smalltooth sawfish and Gulf sturgeon, in the event they were present in the Project area. However, the performance of the measures should be monitored during construction to verify their effectiveness.

Entanglement. The entanglement of smalltooth sawfish and Gulf sturgeon in anchors, anchor lines, or deployment of anchor chains/lines for the unloading buoys during installation is unlikely. The derrick/lay barge could use up to 10 anchor cables, including the anchor, anchor line, and mid-line buoy. The mid-line buoy would be a single buoy and line used to suspend the anchor line to avoid dragging and scouring the seafloor. All lines would be greater than 4 inches in diameter. Anchor lines on the derrick/lay barge would be set and raised once during the installation of each unloading buoy, but they would be set and raised repeatedly during pipeline installation. Other construction vessels could also employ anchors and anchor lines.

The size of the anchor chains/lines relative to the size of these two species would interact with the species as a structure rather than a line because of their weight and immobility, preventing fish from getting entangled. Therefore, no adverse impacts on smalltooth sawfish or Gulf sturgeon would be expected as a result of entanglement associated with anchor lines associated with construction.

Lighting. According to the BMPs provided by the Applicant, lights used to identify construction vessels and illuminate working decks would be down shielded but would not illuminate surrounding waters. During installation an environmental coordinator would be on site to ensure no violations would occur. Therefore, no adverse impacts on smalltooth sawfish or Gulf sturgeon would be expected as a result of lighting associated with construction of the Port and pipeline.

4.4.2 Operations Impacts

Smalltooth sawfish and Gulf sturgeon are found in nearshore waters, and are not expected to be found offshore (see **Section 3.4**). As such, smalltooth sawfish and Gulf sturgeon are expected to be rare in the STL buoy area. Therefore, the only potential impact on ESA-listed fish species would be from planned and unplanned maintenance, repair, inspection, and surveys.

Planned and Unplanned Maintenance and Emergencies. Planned and unplanned maintenance, emergencies, repair, inspection, and surveys could both directly and indirectly affect ESA-listed fish species if they occur in the proposed project vicinity. Impacts would be expected to be similar in nature to some construction impacts (see **Section 4.1.1**). In general, the potential impacts of planned

maintenance, repair, inspection, and surveys would be similar or of less magnitude than construction impacts with adherence to the same recommended mitigation measures, monitoring, and BMPs. Unplanned maintenance and emergencies are expected to occur infrequently. Therefore, impacts on ESA-listed fish species from planned and unplanned maintenance, emergencies, repair, inspection, and surveys would be expected to be low. In some cases when unplanned maintenance, repairs, or emergencies occur, it might not be possible to follow some of the recommended mitigation measures, monitoring, and BMPs. In these cases of unplanned maintenance and emergencies, resource agencies (NMFS, USFWS, and state agencies, as appropriate) would be informed. ESA consultation could potentially be reinitiated after emergency situations and for cases where mitigation measures and BMPs could not be followed.

Therefore, adverse impacts on smalltooth sawfish or Gulf sturgeon from operation of the Port would be unlikely.

4.4.3 Decommissioning

Smalltooth sawfish and Gulf sturgeon are found in nearshore waters, and are not expected to be found offshore (see **Section 3.4**). As such, smalltooth sawfish and Gulf sturgeon are expected to be rare in the STL buoy area, which would be the site of most of the decommissioning activities. Impacts associated with decommissioning would occur mostly in the STL buoy area because various Port components (e.g., anchor chains, unloading buoys, and piles) would be removed and retrieved. No explosives would be used for the removal of these components. Impacts along the pipeline route are not expected because the pipeline would be abandoned in place (ends of the pipeline would be capped, filled, and left in place) subject to the terms of negotiated land lease conditions. Minor, temporary increases in turbidity are expected at each end of the pipeline route only. Therefore, adverse impacts on smalltooth sawfish and Gulf sturgeon from decommissioning would be unlikely.

Given that decommissioning would occur 25 years from now, it seems reasonable to expect that technologies for decommissioning and removal, and the understanding of impacts on the marine ecosystem, might be different from current conditions. This issue will be addressed at the time of decommission (estimated at 2034), at which time the owner would be required to adhere to all applicable and appropriate requirements. The owner would consult with the appropriate Federal agencies at the time and submit a decommissioning plan to the Secretary for approval.

4.5 Terrestrial Resources

Section 7 consultation with the USFWS initiated on August 24, 2007 to determine the existence of suitable habitat and listed species within the proposed onshore route. The Applicant conducted a field survey in January 2007 and again in October and November 2007 for the presence of threatened and endangered species.

Federally endangered wood storks were observed foraging in the proposed construction area during the latter surveys. No known rookeries are located in the project area; however, they are known within 15 miles of the project area. The (FERC) Plan would address methods for restoring wetland vegetation and functions and values associated with wood stork foraging habitat; therefore, the Port Dolphin Project is not likely to adversely affect the wood stork in the long term. However, short-term disturbances during onshore pipeline construction have the potential to affect wood stork. The (FERC) Plan would address methods for restoring wetland vegetation and functions and values associated with wood stork foraging habitat; therefore, the proposed project would be expected to have no adverse effects on the wood stork in the long term.

Additional potential federally listed species found in Manatee County include Audubon's crested caracara and the Eastern indigo snake. Neither of these species were observed during the surveys. The proposed onshore pipeline, valve station, and aboveground facilities do not cross suitable habitat for the caracara; therefore, no adverse effects on Audubon's crested caracara are expected as a result of the proposed Project.

Although the Eastern indigo snake was not observed during the survey, potentially suitable habitat exists in the project area. Federal protection measures are presented in the following section should the snake be observed during construction activities. An onsite Environmental Coordinator would be present during construction operations and would follow the required Federal and state guidelines should any listed species be observed. Therefore, the proposed project is not likely to adversely affect the Eastern indigo snake.

4.5.1 Construction

Potential federally listed species in the vicinity of the proposed Project area would be expected to have adapted to the variety of noise levels associated with Port Manatee, local industry, and the maintenance associated with the existing pipeline and would likely move back into the area following the estimated 3 months of construction. Adverse, minor, short-term effects would occur on these species as a result of temporary noise disturbances associated with the pipeline, valve station, and aboveground facilities construction activities.

The following sections describe specific construction impacts on federally listed species.

Audubon's Crested Caracara. The proposed onshore pipeline, valve station, and the aboveground facilities do not cross suitable habitat for the caracara; therefore, no adverse effects on this species are expected from construction of the project.

Florida Scrub Jay. Although no Florida scrub jays were observed during surveys of the onshore project area, suitable habitat, shrub and brushland, does exist within 1.57 acres proposed for construction of the interconnect station. Construction of the interconnect station would last 2 to 3 months, and during this time could cause scrub jays to leave the area. Construction of the proposed project is not expected to have long-term effects on Florida scrub jays.

Red-Cockaded Woodpecker. The proposed onshore pipeline, valve station, and the aboveground facilities do not cross suitable habitat for the red-cockaded woodpecker; therefore, no adverse effects on this species are expected from construction of the project.

Wood Stork. Although wood storks were observed during one of the surveys, rookeries are not known within or adjacent to the proposed construction area, and occasional foraging wood storks in the proposed construction area could leave the active construction ROW with minimal disruption. The FERC Plan and Procedures would address methods for restoring wetland vegetation and functions and values associated with wood stork foraging habitat; thus the Project is not likely to adversely affect the wood stork. Proper design and implementation of the required wetland mitigation measures would ensure the project would not adversely affect the wood stork in the long term; however, short-term disturbances during onshore pipeline construction could occur.

Eastern Indigo Snake. The Applicant would survey for the Eastern indigo snake before construction of the pipeline, valve station, and the aboveground facilities begins**.** Protective measures would be implemented to avoid the potential impacts on the Eastern indigo snake from direct physical effects associated with construction activities should it be observed during construction activities. Incidental

contact with personnel equipment could result in trampling or crushing of the Eastern indigo snake. If issued, the license would require the mitigation and monitoring plan following the USFWS Standard Protection Measures (USFWS 2004b) for the Eastern indigo snake be developed prior to construction. The following protection measures would be incorporated into the plan.

a. Description of the Eastern indigo snake, its habits, and protection under Federal Law
b. Instructions not to injure, harm, harass, or kill this species
c. Directions to cease clearing activities and allow the Eastern indigo snake sufficient time to move away from the site on its own before resuming clearing
d. Telephone numbers of pertinent agencies to be contacted if a dead Eastern indigo snake is encountered. The dead specimen should be thoroughly soaked in water and then frozen.

If not currently authorized through an Individual Take Statement met in association with a BO, only an individual who has been either authorized by a section 10(a)(1)(A) permit issued by the USFWS, or designated as an agent of the State of Florida by the FWC for such activities, is permitted to come in contact with or relocate an Eastern indigo snake.

An Eastern indigo snake monitoring report must be submitted to the appropriate Florida Field Office within 60 days of the conclusion of clearing phases. The report should be submitted whether or not Eastern indigo snakes are observed. The report should contain the following information:

a. Any sightings of Eastern indigo snakes; and
b. Other obligations required by the FWC, as stipulated in the permit.

Proper design and implementation of the Federally required mitigation and monitoring plan and protection measures would ensure the project would not adversely affect the Eastern indigo snake in the long-term; however, short-term disturbances during onshore pipeline construction could occur if a snake had to be relocated.

Any upsets or accidents during construction would be handled by contingency planning and development of a Spill Prevention, Control, and Countermeasure Plan to respond to spills of any size. Such impacts tend to be temporary, and, therefore, potential impacts on federally listed species would be negligible.

4.5.2 Operations

Federally listed species in the vicinity of the proposed Project area would be expected to have adapted to the variety of noise levels associated with Port Manatee, local industry, and the maintenance associated with the existing pipeline. The area within the ROW corridor would be fully restored to pre-construction conditions according to the FERC Plan and Procedures. Federally listed terrestrial species could potentially be affected by planned and unplanned maintenance and emergencies.

Planned and Unplanned Maintenance and Emergencies. Planned and unplanned maintenance, emergencies, repair, inspection, and surveys could both directly and indirectly affect ESA-listed terrestrial species if they occur in the proposed project vicinity. Impacts would be expected to be similar in nature to some construction impacts (see **Section 4.1.1**). In general, the potential impacts of planned maintenance, repair, inspection, and surveys would be similar or of less magnitude than construction impacts with adherence to the same recommended mitigation measures, monitoring, and BMPs. Unplanned maintenance and emergencies are expected to occur infrequently. Therefore, impacts on ESA-listed terrestrial species from planned and unplanned maintenance, emergencies, repair, inspection,

and surveys would be expected to be low. In some cases when unplanned maintenance, repairs, or emergencies occur, it might not be possible to follow some of the recommended mitigation measures, monitoring, and BMPs. In these cases of unplanned maintenance and emergencies, resource agencies (NMFS, USFWS, and state agencies, as appropriate) would be informed. ESA consultation could potentially be reinitiated after emergency situations and for cases where mitigation measures and BMPs could not be followed.

4.5.3 Decommissioning

Aboveground decommissioning of pipeline components would consist of all of the aboveground equipment and the pipe being removed. The underground decommissioning would consist of the removal of any hydrocarbons in the pipe through flushing, filling the pipe with treated freshwater, and capping the ends of the pipe to abandon in place.

Temporary noise disturbances associated with the pipeline decommissioning activities could potentially impact federally listed terrestrial species. Decommissioning activities and procedures related to listed species would be similar to those presented for construction activities. Most potential federally listed species in the vicinity of the proposed Project area would be expected to have adapted to the variety of noise levels associated with Port Manatee, local industry, and the maintenance associated with the existing pipeline and would likely move back into the area following decommissioning of the pipeline. Proper design and implementation of the required FWC procedures and BMPs would ensure decommissioning activities would not adversely affect federally listed species.

Given that decommissioning would occur 25 years from now, it seems reasonable to expect that technologies for decommissioning and removal, and the understanding of impacts on the marine ecosystem, might be different from current conditions. This issue will be addressed at the time of decommission (estimated at 2034), at which time the owner would be required to consult with appropriate Federal agencies, submit a decommissioning plan for review and approval, and adhere to all applicable and appropriate requirements.

5. Cumulative and Other Impacts

5.1 Introduction

The Council on Environmental Quality (CEQ) defines cumulative impacts as the "impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts can also result from individually minor but collectively significant actions taking place over a period of time within a geographic area.

Port Dolphin would include the construction and operation of two natural gas unloading buoys, two 36-inch flow lines to transfer the natural gas to the transmission line, and the transmission line from the flow lines to the onshore connections in Manatee County, Florida. SRVs would transport LNG to the unloading buoys and vaporize LNG into natural gas for distribution. The Port Dolphin Project would result in water quality, geological resources, biological, air quality, and noise quality impacts on the west coast of Florida, 45 km (28 mi) southwest of Tampa Bay. There would also be socioeconomic, recreational, and transportation impacts.

This cumulative impacts analysis summarizes expected environmental effects from the combined impacts of past, current, and reasonably foreseeable future projects within the geographic study area. The geographic study area used for the cumulative impacts analysis of the Port Dolphin project is characterized by three geographical boundaries: Tampa Bay, the west coast of Florida, and the northeastern GOM. Projects and programs considered for this analysis were identified through consultation with local governments, state and Federal agencies, company news releases, and published media reports. Projects with similar impacts were identified and generally include offshore, nearshore, or onshore commercial and resource agency activities. In Tampa Bay, on the west coast of Florida, and in the northeastern GOM, projects with similar impacts generally include nearshore and deepwater port construction, offshore mineral and oil leases on the Outer Continental Shelf (OCS), resource agency operations, and onshore residential and commercial development. **Figure 5-1** shows the current and future projects identified for Tampa Bay, the west coast of Florida, and the northeastern GOM.

5.1.1 Framework for Assessing Cumulative Impacts

The cumulative impacts analysis focuses on the resource rather than the planned action and considers impacts that take place in both space and time. For the purposes of assessing the potential cumulative effects on natural resources and activities in the marine environment for this and other projects, both within and outside the Project area, the timeline for the construction and operation of the Port Dolphin project was taken into consideration. The timeframe for the Port Dolphin project is estimated at 25 years, with construction activities scheduled to start in August 2010 and to be complete in June 2011. Offshore pipeline construction would be scheduled to take 9 or 10 months. Installation of the STL subsea system is scheduled to take 3 to 4 months. Onshore pipeline construction is expected to take 5 months, and interconnections with the existing pipelines would take an additional 2 to 3 months (Port Dolphin 2007a).

The general approach taken for cumulative impacts analysis is as follows:

- Define other past, present, and reasonably foreseeable activities that could impact resources within the ROI of Port Dolphin
- Assess whether impacts from Port Dolphin overlap impacts (in time and space) from other activities, potentially creating cumulative impacts

- Total the impacts from Port Dolphin with other similar impacts, if impacts are additive and if quantitative information is available, or make a qualitative assessment of total impacts
- Estimate Port Dolphin's incremental contribution to total (cumulative) impacts (as a percentage of total, if quantitative)
- Assign an impact duration (short- or long-term) and an impact descriptor (minor, moderate, or major) to Port Dolphin's contributions to cumulative impacts and discuss whether an impact is adverse or beneficial to the resource
- Review mitigation measures identified throughout **Section 6** (BMPs, Mitigation and Minimization Measures, and Monitoring) for their effectiveness in reducing cumulative impacts and identify further mitigation measures designed to specifically reduce cumulative impacts, where possible.

5.2 Past, Present, and Reasonably Foreseeable Cumulative Actions

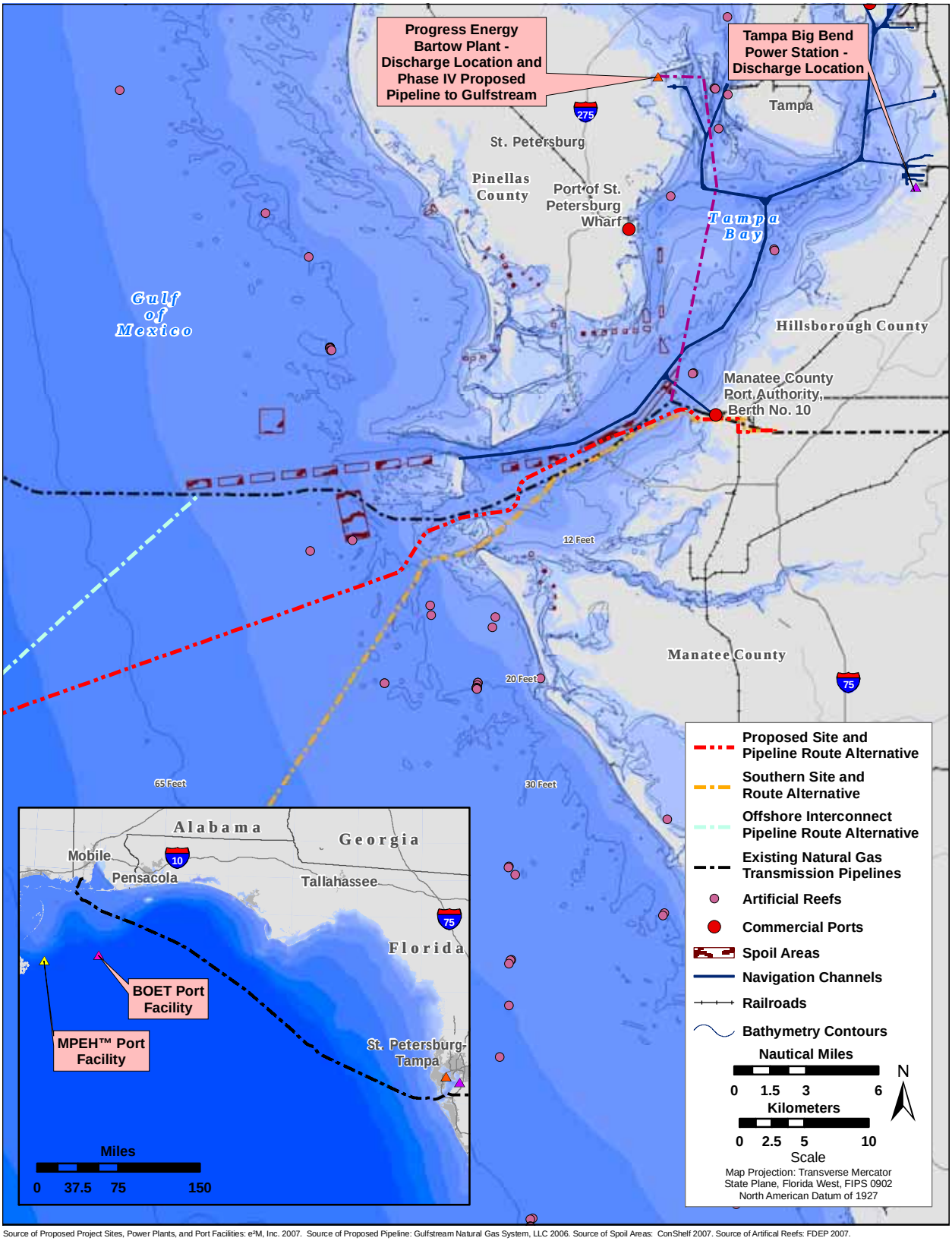
5.2.1 LNG Projects

There are five operational LNG terminals in the United States. Two of these operational terminals are located in the GOM. Lake Charles LNG terminal is in Louisiana and is licensed through FERC. The Gulf Gateway Energy Bridge is an offshore LNG terminal in West Cameron Block 603 of the GOM. In addition to these constructed and operational LNG terminals, licenses have also been approved by the Maritime Administrator for Port Pelican deepwater port, the Gulf Landing deepwater port, and the Main Pass Energy Hub (MPEH™) deepwater port. MPEH™ would be located in Main Pass Block 299, off the coast of Louisiana. Port Pelican and Gulf Landing have been delayed indefinitely by the applicants. Currently, the Maritime Administration and USCG are considering an additional proposal for a deepwater port LNG terminal in the GOM in addition to the Port Dolphin project. If approved and constructed, the Bienville Offshore Energy Terminal (BOET) would be located in Main Pass Block 258 off the shore of Alabama. FERC has also approved two additional onshore LNG terminals in the Pascagoula, Mississippi, area.

The projects that could include impacts cumulative to Port Dolphin are presented in **Figure 5-1** and **Table 5-1**. The USCG and Maritime Administration have also received informal inquiries concerning application procedures for other deepwater ports for natural gas; however, this evaluation would include those deepwater port applications of which the USCG is aware.[1]

Impacts on the GOM and Florida as a whole are also assessed where appropriate. All proposed LNG facilities were considered, but only those relevant to the resource in question were addressed in the cumulative impacts assessment. Facilities west of the Mississippi River were considered outside of the range of influence for assessment of cumulative impacts; therefore, LNG facilities west of the Mississippi are not considered to have cumulative impacts on the proposed Project. Using these criteria and the geographic location of ports east or west of the Mississippi River discharge plume, the assessment of cumulative impacts associated with the Port Dolphin project would include the MPEH™, and BOET projects proposed for the northeastern GOM. Given the location of Port Dolphin, concurrent impacts of air emissions on the same airshed would rarely, if ever, occur, since transport conditions that produce impacts from one facility would carry emissions from the other away from shore. Both the Bayou Cassote Energy and the Gulf Clean Energy terminals are more than 600 km (375 mi) northwest of the

[1] The USCG declines to speculate on where additional deepwater ports for natural gas might be located, what technologies they might employ, or whether inquiries that have been made to date will, in fact, result in license applications.



Source of Proposed Project Sites, Power Plants, and Port Facilities: e²M, Inc. 2007. Source of Proposed Pipeline: Gulfstream Natural Gas System, LLC 2006. Source of Spoil Areas: ConShelf 2007. Source of Artifical Reefs: FDEP 2007.

Figure 5-1. Current and Proposed Deepwater Port Projects in Tampa Bay and the Northeastern Gulf of Mexico

Table 5-1. Existing and Proposed LNG Terminals Within the Geographic Study Area

Project	Project Type	Project Location	Permitting Status	Distance from Port Dolphin (estimated)
Lake Charles, LA	Onshore LNG Terminal 2.1 bcfd	Lake Charles, LA	Operational	637 mi
Bayou Cassotte Energy, LLC, MS	Onshore LNG Terminal 1.3 bcfd	Pascagoula, MS	Approved by FERC	380 mi
Gulf LNG Clean Energy, LLC, MS	Onshore ONG Terminal 1.5 bcfd	Pascagoula, MS	Approved by FERC	380 mi
BOET LNG (TORP)	Deepwater Port 1.4 bcfd submerged turret loading system	GOM, Main Pass Block 258	Application withdrawn on October 9, 2008	319 mi
MPEH™	Deepwater Port 1.0 bcfsd, reuse of existing platforms plus new platforms	GOM, Main Pass Block 299	Application approved January 3, 2007	362 mi

Source: FERC 2008; MARAD 2008a, 2008b; USDOT 2007

Port Dolphin terminal in coastal waters. Due to the distance between the terminals, current movement between coastal and Federal waters, and meteorology, it would be rare that impacts between Port Dolphin and the two Pascagoula terminals would ever overlap. Therefore, the following LNG terminals will be considered when evaluating cumulative impacts.

- MPEH^{TM} would be approximately 25.7 km (16 mi) southeast of the coast of Louisiana in Main Pass Block 299 in a water depth of approximately 64 m (210 feet). MPEH^{TM} would provide a peak capacity of 1.0 billion cubic feet per day (bcfd). MPEH^{TM}'s major components would include four existing platforms, two new platforms, five natural gas takeaway pipelines, and natural gas liquids pipeline. The proposed natural gas pipelines would connect to the interstate pipeline system off- and onshore. The natural gas liquids pipeline fractionating facility is located in Venice, Louisiana.
- BOET would be approximately 101 km (63 mi) south of Fort Morgan, Alabama, in Main Pass Block 258 in a water depth of approximately 130 m (425 feet). BOET would provide a peak capacity of 1.4 bcfd of natural gas. BOET's major components would include a support platform, two HiLoad LNG regasification units to receive and regasify LNG and parking systems for the HiLoad units, and four offshore gas pipelines totaling 39.8 km (22.7 mi) long. The interconnect pipelines would connect with existing natural gas pipelines on the OCS.

To assess whether impacts from Port Dolphin overlap impacts (in time and space) from activities at these LNG terminals, **Table 5-2** shows the time and spatial comparison of the proposed GOM deepwater ports.

5.2.2 Pipeline Projects

In 2001, Gulfstream Natural Gas System LLC completed a 419-mi, 36-inch offshore pipeline between Mobile Bay, Alabama, and Tampa Bay. Gulfstream is currently proposing to construct approximately

Table 5-2. Time and Spatial Comparison of the Proposed GOM Deepwater Ports

Deepwater Port	Construction Period	Operation Period	Distance Direction to Port Dolphin (Miles)	Distance Direction to MPEH™ (Miles)	Distance Direction to BOET (Miles)	Distance Offshore (Miles)	Depth of Water (Feet)
Port Dolphin	11 months	Estimated to begin mid 2011, lasting for 20 years.	---	363 mi SW	319 mi SW	28 [a]	100
MPEH™	48 months	Estimated to begin 2011, lasting for 30 years. [a]	363 mi NE	---	48 mi W	16 [a]	210 [a]
BOET	7 months	Estimated to begin 2010, lasting for 25 years. [b]	319 mi NE	48 mi E	---	63 [b]	425 [b]

Notes:

a. USCG and MARAD 2006

b. USCG and MARAD 2005

18 mi of 20-inch offshore pipeline from a proposed underwater hot tap with the existing Gulfstream pipeline in the Hillsborough County waters of Tampa Bay and connecting to the existing Progress Energy Bartow Power Plant on the eastern shore of St. Petersburg in Pinellas County (USEPA 2006).

There are two proposed onshore pipeline projects that could have an added impact along with the onshore portion of the Proposed Action. The St. Petersburg Relay Replacement Project and the Phase VII Expansion Project are both located in the same geographical area as the onshore portion of the proposed Port Dolphin pipeline and interconnection facilities. These projects, in combination with the Proposed Action, could have a cumulative impact on resources. **Table 5-3** outlines the existing and proposed natural gas pipelines in Florida that could have direct and indirect additive impacts on resources in the geographical area of cumulative impact.

Table 5-3. Proposed Pipeline Projects in Tampa Bay Area

Project Name	Company	Activity Description
Phase VII Expansion Project	Florida Gas Transmission Company	Request for permission and authorization to construct, own, and operate certain pipeline facilities and additional compression to enable Florida Gas Transmission Company to provide firm transportation services
St. Petersburg Relay Replacement Project	Florida Gas Transmission Company	Florida Gas Transmission Company proposes to replace about 6.6 miles of its St. Petersburg 12-inch-diameter lateral pipeline in east-central Pinellas County

Source: USEPA 2006

Several additional operational pipelines are in the Tampa Bay area. Three operating pipelines are in Manatee County. These pipelines are operated by Florida Gas Transmission Company, Florida Power &

Light, and William Pipeline Transco (PHMSA 2007). Six pipelines, operated by Bayside Power Plant, Central Florida Pipeline Corporation, Florida Gas Transmission Company, Tampa Bay Pipeline Company, Tampa Pipeline Limited Partnership, and William Gas Pipeline Transco, are operated in Hillsborough County. Two pipelines, operated by Florida Gas Transmission Company and Florida Power Corporation, are operated in Pinellas County (PHMSA 2007). **Table 5-4** outlines operational pipelines in the Tampa Bay area. Construction of Port Dolphin could be additive to the operation and maintenance of these pipelines.

5.2.3 Electrical Power Transmission Line Projects

There are two electrical power transmission line projects scheduled for completion in 2011 that could have an added impact along with the onshore portion of the Proposed Action. Power transmission lines are linear projects that can have similar impacts as pipeline projects due to the necessity of a corridor ROW and associated disturbances. **Table 5-5** outlines the proposed electric power transmission line projects in the Project vicinity that could have direct and indirect cumulative impacts on resources in the geographical area of cumulative impact. The preferred corridors for the BobWhite-Manatee Line and the Lake Agnes-Gifford Line are approximately 10 miles and 70 miles, respectively, from the onshore portion of the Proposed Action.

5.2.4 Sand Resources

5.2.4.1 Dredging

Dredging operations include sediment and gravel harvesting; pipeline installation; canal installation, maintenance, and modifications; harbor installation and maintenance; and stream channelization. The U.S. Army Corps of Engineers (USACE) dredges millions of cubic meters of material a year. Materials from maintenance dredging are primarily disposed of on existing dredged-material disposal banks and in dredged-material disposal areas in Federal and state waters. Some dredged material can be used in a beneficial manner such as wetland restoration projects, beach nourishment projects, and industrial and commercial development. Dredged material disposal results in temporarily increased turbidity and resuspension and can release sediment contaminants into coastal waters (MMS 2007b). There are several dredged-material disposal areas in the vicinity of the Port Dolphin Project area.

Currently, dredging to maintain the Tampa Bay's channels generates about a million cubic yards of material each year. Much of the sediment dredged during maintenance activities is deposited on two man-made spoil islands in Hillsborough Bay. Eventually these spoils would reach capacity and alternatives would be necessary to accommodate the nearly 30 million cubic yards that would be created through the year 2030. Options for increasing the capacity of these islands are being studied. USACE is also evaluating the need for additional passing and turning lanes, anchorage areas, creation of a loop channel, and several other navigational safety improvements to accommodate increased maritime commerce in Tampa Bay (TBEP 2006). A comprehensive maintenance and expansion-dredging program is under way at Port Manatee. The Port of St. Petersburg has been approved to initiate studies to widen and deepen the Port basin and approach channel. The Port of Tampa has recently completed the widening of a portion of Sparkman Channel to support larger cruise ship traffic (FSTEDC 2007).

5.2.4.2 Beach Nourishment Projects

Beach nourishment projects on the west coast of Florida are currently occurring in Pinellas County (Long Key and Egmont Key), Manatee County, Sarasota County, Charlotte County, and Lee County (TBW 2007).

Table 5-4. Operational Pipelines in the Tampa Bay Area, Florida

Project Name	Company	Activity Description
Gulfstream Pipeline	Gulfstream LLC	Proposal to construct approximately 18 miles of 20-inch offshore pipeline from a proposed underwater hot tap with the existing Gulfstream pipeline in the Hillsborough County waters of Tampa Bay and connecting to the existing Progress Energy Bartow Power Plant on the eastern shore of St. Petersburg, Florida, in Pinellas County.
Cypress Pipeline Project	Southern Natural Gas Company	Proposal to construct about 165 miles of mainline pipeline in Chatham, Effingham, Bryan, Liberty, Long, McIntosh, Glynn, Camden, and Charlton counties, Georgia; and Nassau, Duval, and Clay counties Florida, about 10 miles of pipeline loop in Chatham and Effingham counties, Georgia; and three new compressor stations in Liberty County and Glynn County, Georgia; and Nassau County, Florida.
Florida Natural Gas Storage Project	Floridian Natural Gas Storage Company, LLC	The project would consist of a natural gas storage facility in Martin County, Florida, north of Indiantown, Florida, and two approximately 4-mile-long natural gas pipelines, extending northwest from the facility to interconnect with the existing interstate pipeline systems of Florida Gas Transmission and Gulfstream Natural Gas System, LLC.
Inglis Hydropower Project	Inglis Hydropower, LLC	The project would be located on the Withlacoochee River, in Levy County, Florida.
Martin Connector	Gulfstream Natural Gas System, L.L.C.	Proposal to construct a 4.98-mile-long pipeline in Martin County, Florida.
Phase III Pipeline Project	Gulfstream Natural Gas System, L.L.C.	Gulfstream proposes to construct, own, and operate a 34.3-mile segment of 30-inch gas pipeline extending from its existing Station 712 in Martin County, Florida, to a newly constructed station that would connect to the proposed FPL gas turbine West County Energy Center in Palm Beach County, Florida.
Phase VII Expansion Project	Florida Gas Transmission Company	Application to expand existing pipeline facilities between Jacksonville and Tampa, Florida. The expansion would consist primarily of 32 miles of looping pipeline and modifying compression at two existing compressor stations. This expansion is planned to transport new volumes of gas to be delivered into Florida by the Cypress Pipeline Project (PF05-7-000).
SR 91 Pipeline Relocation Project	Florida Gas Transmission Company	Approval to abandon certain mainline pipeline, and to construct, modify, and operate mainline pipeline, valves, and ancillary facilities to replace a portion of mainline on the FGT East Leg to accommodate a widening project of State Road 91 in Broward County, Florida.
SR 91 Widening Project	Florida Gas Transmission Company	Proposal to replace/relocate about 13 miles of pipeline to resolve possible conflicts resulting from the widening of State Route 91 in Broward County, Florida.
Turkey Point Project	Florida Gas Transmission Company	Application to construct a new compressor station on an existing lateral on the grounds of the Turkey Point Power Plant in Miami-Dade County, Florida.

Source: USEPA 2006

Table 5-5. Proposed Electric Transmission Line Projects in Tampa Bay Area, Florida

Project Name	Company	Activity Description
BobWhite-Manatee 230-kV Line	Florida Power and Light	Proposed 25.5mile-long line to connect the Manatee Energy Center near Parrish in Manatee County to a proposed new substation east of I-75 in Sarasota County. Approved by Florida Department of Environmental Protection in November 2008.
Lake Agnes-Gifford 230kV Line	Progress Energy/Tampa Electric	Proposed 27.5-mile line connecting Tampa Electric's existing Lake Agnes substation in Polk County to Progress Energy's planned Gifford Substation in Orange County. Siting Board hearing scheduled January 2009.

Source: FDEP 2008a

5.2.5 Oil and Gas Leasing/Mineral Leasing

No active oil and gas platforms are near the location proposed for the Port Dolphin project. On December 20, 2006, President Bush signed into law the Gulf of Mexico Energy Security Act (GOMESA) of 2006, which increased acreage to be offered for oil and gas leasing in both the Central Gulf Planning Area and the Eastern Gulf Planning Area. One oil and gas lease sale (Lease Sale 224) offered a portion of the "181 Area" in the newly defined Eastern Planning Area; "181 South" is more than 125 miles from Florida (MMS 2007b). Lease Sale 224 offered all blocks in the proposed lease sale area that could contain economically recoverable oil and gas via one lease sale, as authorized under GOMESA. Lease Sale 224 was held on March 19, 2008, in New Orleans, Louisiana. The MMS received 58 bids from 6 companies on 36 tracts, resulting in $64,713,213 in high bids. This oil and gas lease sale falls within the boundaries of this cumulative impacts assessment.

The MMS prepared the *Gulf of Mexico OCS Oil and Gas Lease Sale 224: Eastern Planning Area, Final Supplemental Environmental Impact Statement (EIS)* for the sale (MMS 2007b). The GOMESA also establishes a moratorium on leasing, preleasing, and other activities in the following areas until June 30, 2022:

- The area within 201.17 km (125 mi) of the State of Florida in the MMS Eastern Planning Area
- The "181 Area" in the MMS Central Planning Area that is within 160.93 km (100 mi) of the State of Florida
- The area east of the Military Mission Line.

In April 2007, the MMS prepared an EIS entitled *Gulf of Mexico OCS Oil and Gas Lease Sales: 2007 - 2012* (MMS 2007c). The EIS evaluated five lease sales in the Western Planning Area and six lease sales in the Central Planning Area that are expected to occur through 2012. Its discussions take into account a wide variety of activities that flow from OCS leases: exploration; pipeline and platform construction; emplacement and removal; oil and gas production operations, including use of the support vessels and helicopters; and ship transit and anchoring. The eastern portion of the Central Planning area falls within the boundary for this cumulative impacts assessment. Additionally, many of the activities associated with the lease sales could result in indirect or direct cumulative impacts with the Proposed Action.

The MMS EIS for oil and gas lease sales includes offshore scenario information related to OCS Program activities in the GOM for the years 2007 to 2046. The MMS estimates that as of September 2006 there were 3,350 active offshore platforms. Presently and over the next 20 years, in comparison to other

structure-based activities in the OCS (and based on known applications for future deepwater ports), there would be a substantially smaller number of LNG terminals in the GOM. In addition, adding these deepwater ports to the inventory of offshore facilities, would not affect the MMS estimates of GOM-wide activities. The Louisiana Offshore Oil Port (LOOP), permitted in 1977, was the first deepwater port and remains the only crude oil deepwater port. The LOOP is approximately 18 miles south of Leeville and Grand Isle, Louisiana, in 110 feet of water. Ultra-large crude carriers and very large crude carriers transport crude oil from around the world to the LOOP, where it is offloaded and piped to Fourchon, Louisiana, then to Clovelly Terminal. The LOOP would operate until 2015. However, because the LOOP facility accounts for 13 percent of oil imports to the United States, it is anticipated that the license would be extended beyond 2015.

5.2.6 Cooling Water Withdrawals and Discharges

Two projects in the Tampa Bay area would impact cooling water withdrawals and discharges. Tampa Electric's Big Bend Power Station withdraws and discharges 1.4 billion gallons per day of seawater from Tampa Bay. The Tampa Bay Seawater Desalination Plant, the largest water desalination plant in North America, works in conjunction with the Big Bend Power Station. It is designed to "catch" approximately 44 million gallons per day (MGD) of that warm seawater and separate it into drinking water and concentrated seawater (TBW 2008). The plant returns the concentrated seawater to Big Bend's cooling water stream. It would be mixed with approximately 1.4 billion gallons of cooling water from Big Bend and would be diluted at a concentration of 70 to 1. The water would be discharged at a salinity that is 1.0 to 1.5 percent higher than ambient Tampa Bay water (within Tampa Bay's normal, seasonal fluctuation). The Tampa Bay Seawater Desalination Plant would be an integral part of the Tampa Bay region's drinking water supply. The plant began producing water in March 2003 and operated intermittently through May 2005, supplying nearly 5 billion gallons of fresh drinking water to the regional system. Remediation construction was completed in spring 2007. The plant is now fully operational, providing 25 MGD of fresh drinking water daily (TBW 2008). Progress Energy's upgrade of the Bartow Plant is now 90 percent complete, and could also result in cooling water withdrawal and discharge from Tampa Bay (Progress Energy 2008). The plant began producing water in March 2003 and operated intermittently through May 2005, supplying nearly 5 billion gallons of fresh drinking water to the regional system. The desalination plant is off-line while deficiencies in the design and construction of the pretreatment and intake processes, and the reverse osmosis and intake processes, are being fixed. No expansion of the generating capacity at the Big Bend Power Station is proposed (MMS 2007b).

Progress Energy's proposal to repower the Bartow Station Power Plant could also result in cooling water withdrawal and discharge from Tampa Bay. The repowering of Bartow Station in Pinellas County entails the addition of a natural gas-fired simple cycle unit and a natural gas-fired combined cycle unit, with total generating capacity of 1,475 megawatts (FDEP 2008b). Water withdrawal numbers are unknown at this time.

5.2.7 Area Fisheries Restrictions

The Gulf of Mexico Fishery Management Council (GMFMC) is one of eight regional fishery management councils established by the Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSFCMA), for the purpose of managing fisheries in the exclusive economic zone (EEZ) of the GOM. The GMFMC has developed seven fishery management plans (FMPs) that manage 55 species of fish and invertebrates plus the coral complex. Overfishing is occurring on four reef fish species: red snapper, greater amberjack, gag, and gray triggerfish. Overfishing occurs when more fish are being taken from a stock than the fish population can replace through reproduction or immigration from other populations. A species is declared overfished when the population size is below a certain level determined by scientists to be healthy (TBEP 2006, GMFMC 2004). The red snapper stock is in the

seventh year of a 31-year rebuilding schedule (NMFS 2008). The greater amberjack stock is projected to be rebuilt in 2010 (GMFMC 2008). The rebuilding schedule for the gag stock is undefined (NMFS 2008). The gray triggerfish stock is projected to be rebuilt in 2017 (GMFMC 2008). In order for these stocks to recover, mortality needs to be reduced (NMFS 2008).

Other activities that could result in impacts on fisheries resources and Essential Fish Habitat (EFH) include overfishing, habitat degradation caused by commercial and recreational fishing, and a general degradation of water quality. Specific activities in Tampa Bay that have an adverse impact on fisheries resources include project installation, cooling water intakes and discharges, other effluent discharge, loss of trash and debris from vessels, vessel traffic, shipping, commercial and recreational fishing, and seawater intake for cooling and warming purposes.

The GMFMC has established two gear-restricted areas to protect species managed under the Reef Fish FMP. The Reef Fish Stressed Area was originally established by the GMFMC to help rebuild overfished reef fish. The Reef Fish Stressed Area is that part of the GOM EEZ shoreward of a rhumb line (a line crossing all meridians at the same angle, i.e., a path of constant bearing) (50 CFR 622.34). The use of fish traps, roller trawls (e.g., rock hopper trawl), and powerheads (e.g., a spear gun shaft with a fire arm ammunition replacing the spearhead) is prohibited in this part of the EEZ to reduce fishing pressure on snapper and grouper species. The Reef Fish Longline/Buoy Gear area was established by the GMFMC to protect the larger red snapper spawning population. The use of long lines and buoy gear are prohibited inshore of 20 fathoms in Florida and inshore of 50 fathoms for the remainder of the GOM (GMFMC 2004).

The FWC, Division of Marine Fisheries (DMF) is the state agency for managing commercial and recreational marine fisheries in Florida. The DMF's Bureau of Marine Fisheries Management administers a state artificial reef program to provide financial and technical assistance to coastal local governments, nonprofit corporations, and state universities to develop artificial reefs and to monitor and evaluate these reefs. Under the program, reefs have been constructed with one or more of the following intended objectives: (1) enhance private recreational and charter fishing and diving opportunities; (2) provide a socioeconomic benefit to local coastal communities; (3) increase reef fish habitat; (4) reduce user conflicts; (5) facilitate reef-related research; and, (6) while accomplishing objectives 1 to 5, do no harm to fishery resources, EFH, or human health. Other reef-building objectives undertaken in Florida but outside this agency include mitigation or restoration reefs to replace hard-bottom habitat lost through such activities as beach renourishment (MMS 2007b).

5.2.8 Onshore Residential and Commercial Construction

The Taylor Woodrow Community of Artisan Lakes, LLC has plans to develop the Artisan Lakes Community in Manatee County, Florida. This area would be adjacent to the FPL and Gulfstream easements. Construction of the community could overlap with construction of the onshore pipeline causing additional impacts on transportation and community infrastructure**.**

The population in Tampa Bay is expected to grow approximately 19 percent by the year 2015 (TBEP 2006). Population increases and development in the Tampa Bay region are related to the major shipping centers and the associated commercial and recreational activities (USEPA 2006). The effects of the population growth, development, and other commercial and recreational activities (such as commercial and recreational fishing) could result in direct and indirect coastal and offshore cumulative impacts with the Proposed Action.

5.3 Impacts on Federally Listed Species

Cumulative impacts on federally listed species from past and ongoing actions in Tampa Bay and the offshore Project area would be expected from vessel operations, onshore cooling water and industrial discharges, dredging and channelization, and offshore vessel discharges which continue to impact biological resources and wildlife habitat. Foreseeable future actions that could contribute to cumulative biological impacts include oil and gas production; vessels; onshore cooling water intake and discharges; dredging; the MPEH™ and BOET projects in the northeastern GOM; and the potential for additional LNG Terminals, future offshore pipelines, and population growth and coastal development in the Tampa Bay area.

5.3.1 Marine Mammals

This cumulative analysis considers the effects related to the Proposed Action along with impacts of other commercial, military, recreational, offshore, and coastal activities that might occur and adversely affect populations of marine mammals in the same general area of the Proposed Action. The analysis of cumulative effects can go beyond the scope of project-specific direct and indirect effects to include expanded geographic and time boundaries and a focus on broad resource sustainability. The contribution of a proposed action to the overall impacts in a region is of particular concern. While a single project can have individually minor impacts, when it is considered together with other projects on a regional scale, the effect can be collectively significant.

ESA-listed marine mammals occurring in the Proposed Action area face threats from a multitude of man-made and natural sources including recreational and commercial fisheries, oil and gas exploration/development activities, military operations, vessel traffic, ecotourism, habitat degradation, ensonification, pollution, toxic algal blooms, disease, predators, and climate change. Threats to threatened and endangered marine mammals are outlined in recovery plans and status reviews drafted by NMFS and USWFS.

Harassment, injury to, or death of any ESA-listed marine mammal species would be considered a "take" under the ESA. Biological significance of any mortality would depend, in part, on the size and reproductive rates of affected stocks, as well as the number, age, and size of animals affected. For ESA-listed species, "takes" are of particular concern, because of depleted status of those species. For example, the USFWS has consistently concluded in Section 7 Biological Opinion, pursuant to the ESA, that the "take" of a single manatee would "jeopardize the continued existence" of the species (USFWS 2000). As noted earlier, the only other ESA-listed marine mammals that might occur rarely in Florida coastal waters of the GOM are the North Atlantic right whale and humpback whale. NOAA Stock Assessment Reports list PBRs (maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population) of 1 individual for the North Atlantic right whale and 1.1 individuals for the humpback whale (Waring et al. 2008). With the proposed mitigation measures, potential for serious injury or mortality of ESA-listed marine mammals from the Port Dolphin project would be minimized.

The incremental contribution of impacts from Port Dolphin, in conjunction with other similar activities in the GOM, would result from an increase in noise, increased risk of collisions with vessels, increase in marine debris, and impacts on water quality. OCS activities in the GOM that could impact ESA-listed marine mammal species include degrading water quality via routine discharges; increasing vessel strikes due to increased vessel traffic; generating noise from platforms, drill ships, helicopters and vessels, seismic surveys, and removal of structures by vessels; inadvertent spills during construction and decommissioning; sodium hypochlorite spills during operation; spill emergency response activities; and discharging debris from offshore service and support vessels and OCS structures. Activities that might

occur or are proposed in the GOM that could contribute to cumulative impacts include installation and operation of LNG regasificiation facilities.

The increase in ambient noise is a concern for ESA-listed marine mammal species. Increased vessel traffic and operations associated with Port Dolphin would overlap with noise generated by other vessels, thus contributing to this concern. Noise produced by service vessels and the construction, operation, and removal of drill rigs might cause physiological stress and make animals more susceptible to disease or predation, as well as disrupt their normal activities.

There were 120,915 recreational vessels and 2,677 commercial vessels registered in Manatee, Hillsborough, and Pinellas counties in 2007 (FHSMV 2008). Total service vessel trips for OCS activities are expected to be between 6 to 9 million trips in the GOM for the years 2007 to 2046 (MMS 2007b). This would equate to an average of 150,000 to 225,000 service vessel trips per year. No comparable numbers specifically for the northeastern GOM are available. In comparison, 938 service vessel trips per year are expected during operation of the Port Dolphin project. Construction and decommissioning would require approximately 1,600 and 154 total trips, respectively.

The increase in vessel activity in inshore and offshore GOM waters due to LNG operations could increase the occurrence of collisions between marine mammals and vessels, potentially resulting in increased injury or death. Manatees are most often found in shallow coastal waters, including bays with seagrass beds. Rare occurrences farther from shore are documented for the GOM. Major threats to the manatee, right whale, and humpback whale include vessel strikes related to recreational and commercial boating activities that occur in both nearshore and offshore waters. Indirect effects from increased vessel traffic include increased wave action due to vessel wakes and scarring of seagrass beds by propellers (EPC 2007). Seagrasses are important foraging areas for the manatee. Wakes affect seagrass beds by the increase of wave action which could play a role in the decline of longshore sandbars that help protect seagrasses (Lewis 2002), as well as increased turbidity that, as noted earlier, reduces light availability and, therefore, seagrass production.

Cumulative impacts associated with additional LNG facilities and other activities could result in an increase in marine debris. Ingestion of or entanglement in marine debris, particularly plastic items lost from SRVs and service vessels, could result in marine mammal injury or death. However, the prohibition of discharge or disposal of garbage and other solid debris from vessels by lessees and operators by the MMS (30 CFR 250.300) and the USCG (MARPOL, Annex V, P.L. 100-220 [101 Statute 1458]) (33 CFR Part 151) is expected to minimize cumulative impacts of marine debris.

Cumulative impacts associated with additional LNG facilities and other activities would result in an increased risk of an oil spill. Although unlikely, oil spills and oil-spill response activities are potential threats that might cause marine mammal deaths. Contact with or consumption of oil and oil-contaminated prey (including seagrasses) might seriously affect marine mammals. The Port Operations Manuals from all approved deepwater ports include detailed engineering and procedural conditions necessary to minimize the potential occurrence of spills and minimize potential impacts from spills that might occur.

Overall, construction and operation of the offshore components of Port Dolphin combined with two other operating or proposed LNG deepwater ports in northeastern GOM and other OCS activities could result in minor, adverse cumulative impacts on marine mammals for the Preferred Alternative and the other alternatives analyzed. It is anticipated that the contribution to cumulative impacts of the other alternatives analyzed would be similar to those of the Preferred Alternative discussed above. The mitigation measures discussed in **Section 6** for marine mammal vessel strike, noise disturbance, and entanglement, and similar mitigation measures proposed at the other LNG facilities, are expected to minimize cumulative impacts on marine mammals. The incremental contribution of Port Dolphin to these cumulative impacts would be

minor compared to the existing levels of commercial, recreational, fishing, military, and oil and gas exploration/development activities in the GOM.

5.3.2 Sea Turtles

Construction and operation of the offshore components of Port Dolphin combined with two other operating or proposed LNG deepwater ports in the northeastern GOM and other OCS activities could result in minor, adverse cumulative impacts on sea turtles. Cumulative impacts on federally listed sea turtles would primarily result from increased vessel traffic, noise, marine debris, and accidental spills and would be the same for all Port Dolphin alternatives analyzed. These impacts could create chronic sublethal effects (e.g., stress) that could cause persistent physiological or behavioral changes, such as the avoidance of impacted areas. This could cause declines in survival or productivity and result in either acute or gradual population reduction. Any harassment of, injury to, or mortality of a sea turtle would be considered a "take" under the ESA.

ESA-listed sea turtles occurring in the Proposed Action area face threats from a multitude of man-made and natural sources. Sources include recreational and commercial fisheries, military operations, vessel traffic, ecotourism, habitat degradation, ensonification, pollution, beach lighting, disease, predators, and climate change. Threats to threatened and endangered sea turtles are outlined in recovery plans and status reviews drafted by NMFS and USWFS as described below.

The increase in vessel activity in inshore and offshore GOM waters could increase the occurrence of collisions between sea turtles and vessels, potentially resulting in increased injury or death. Major threats to sea turtles include vessel strikes related to recreational and commercial boating activities that occur in both nearshore and offshore waters. Indirect effects from increased vessel traffic include increased wave action due to vessel wakes and scarring of seagrass beds by propellers (EPC 2007). Seagrasses are important foraging areas for the green turtle. Wakes affect seagrass beds by the increase of wave action which could play a role in the decline of longshore sandbars that help protect seagrasses (Lewis 2002), as well as increased turbidity that, as noted earlier, reduces light availability and, therefore, seagrass production.

Cumulative impacts associated with additional LNG facilities and other activities could result in an increase in noise. Noise produced by construction vessels; service vessels; SRVs; and the construction, operation, and removal of drill rigs might cause physiological stress and make animals more susceptible to disease or predation, as well as disrupt their normal activities. Adverse effects resulting from construction of the three proposed ports in the northeastern GOM are expected to be temporary. Therefore, cumulative effects would be minor.

Cumulative impacts associated with additional LNG facilities and other activities could result in an increase in marine debris. Ingestion of or entanglement in marine debris, particularly plastic items lost from SRVs and service vessels, could result in sea turtle injury or death. However, the prohibition of discharge or disposal of garbage and other solid debris from vessels by lessees and operators by the MMS (30 CFR 250.300) and the USCG (MARPOL, Annex V, P.L. 100-220 [101 Statute 1458]) (33 CFR Part 151) is expected to minimize cumulative impacts of marine debris. Discharge of plastics is strictly prohibited and is therefore never authorized; this includes ashes from burned plastics. All plastics must be tracked and returned to shore.

Cumulative impacts associated with additional LNG facilities and other activities would result in an increased risk of an oil spill. Although unlikely, oil spills and oil-spill response activities are potential threats that might cause sea turtle deaths. Contact with or consumption of oil and oil-contaminated prey might seriously affect sea turtles, and sea turtles have been seriously harmed by oil spills in the past. The

Port Operations Manuals from all approved deepwater ports include detailed engineering and procedural conditions necessary to minimize the potential occurrence of spills and minimize potential impacts from spills that might occur.

Overall, the mitigation measures discussed in **Section 6** for sea turtle vessel strike and entanglement, and similar mitigation measures proposed at the other LNG facilities, are expected to minimize cumulative impacts on sea turtles. The incremental contribution of Port Dolphin to these cumulative impacts would be minor adverse compared to the existing levels of commercial, recreational, fishing, oil and gas exploration/development, and military activities in the GOM.

5.3.3 Coastal and Marine Birds

Construction and operation of the offshore components of Port Dolphin combined with two other operating or proposed LNG deepwater ports in the northeastern GOM and other OCS activities could result in minor, adverse cumulative impacts on coastal and marine birds. Cumulative effects would result from a minor increase in vessel traffic, noise, marine debris, and offshore lighting and would be the same for all Port Dolphin alternatives analyzed. Considering the narrow coastal ranges of the federally listed piping plover and wood stork, these species are not likely to appear in the vicinity of the proposed LNG facilities. Additionally, mitigation measures proposed in **Section 6**, and similar mitigation measures proposed at the other deepwater ports, are expected to minimize cumulative impacts on coastal and marine birds.

5.3.4 Fish Species

Construction of the deepwater port when combined with other proposed LNG deepwater ports in the northeastern GOM and other OCS activities could result in minor adverse cumulative impacts on the smalltooth sawfish and Gulf sturgeon. Short-term, minor, direct, adverse impacts on smalltooth sawfish and Gulf sturgeon would result from the seafloor disturbance, turbidity, and noise associated with the proposed construction of Port Dolphin and would be the same for all Port Dolphin alternatives analyzed. Reasons for the decline of smalltooth sawfish include bycatch in commercial and recreational fisheries, habitat loss and degradation, entanglement in marine debris, injury from saw removal, pollution, and disturbance of natural behavior by divers and other marine activities (NMFS 2009a). Threats to Gulf sturgeon include exploitation, incidental catch in shrimp and gillnet harvest, and habitat reduction and degradation (e.g., dams, contamination, and navigation activities such as dam construction, and dredging) (USFWS and GSMFC 1995).

The mitigation measures discussed in **Section 6** for smalltooth sawfish strike and entanglement, and similar mitigation measures proposed at the other LNG facilities, are expected to minimize cumulative impacts on threatened and endangered fish species. Overall, Port Dolphin would have an incremental contribution on cumulative impacts of these two fish species.

5.3.5 Terrestrial Resources

There is a potential for short-term minor adverse cumulative impacts on wildlife and threatened and endangered species as a result of temporary noise disturbances associated with pipeline construction activities. As indicated above, land use in the area of the onshore pipeline route is primarily industrial. The incremental contribution of the Proposed Action to noise in the area would be negligible compared to the noise that already occurs there. Any displaced wildlife should recolonize the area after the Project area is revegetated. Additionally, mitigation measures proposed in **Section 6** (e.g., terrestrial pipeline and facilities BMPs), and similar mitigation measures proposed at the other deepwater ports, are expected to minimize cumulative impacts on coastal and marine birds.

5.4 Unavoidable Impacts

Unavoidable impacts are those that would result from the Proposed Action or any alternatives that cannot be mitigated. These impacts might be beneficial or adverse in nature, and have short- and long-term impacts.

Unavoidable effects on threatened and endangered marine mammals, sea turtles, fish, and birds could result from construction and operation of the proposed Port and pipeline, as well as vessel traffic. Marine animals would be affected by noise and disturbances associated with offshore activities. Losses to fishing resources could occur from placement of the proposed pipelines. These impacts would be minor and would not jeopardize the population. Localized populations of fish species would be expected to be impacted; however, these impacts are not expected to result in population-level effects. Construction of the onshore pipeline would have short-term, adverse impacts on vegetation. However, vegetation would be expected to quickly become reestablished. Modification of vegetation type would displace any wildlife species inhabiting the area, and would be considered a long-term, adverse impact. However, none of the species that would be impacted are protected.

5.5 Irreversible and Irretrievable Commitment of Resources

An irreversible or irretrievable commitment of resources refers to impacts on or losses to resources that cannot be reversed or recovered, even after an activity has ended and facilities have been decommissioned. This differs from unavoidable impacts which might be short-term or long-term in nature. A commitment of resources is related to use or destruction of nonrenewable resources, and effects that loss would have on future generations. For example, if a species becomes extinct as a result of a Proposed Action, the loss is permanent. If prime farmland is converted to a residential or commercial development, there is permanent loss of agricultural productivity. Chronic, low-level pollution can injure and kill organisms at virtually all trophic levels. Mortality of individual organisms can be expected to occur, and possibly a reduction or even elimination of a few small or isolated populations. Construction and operation of the Port involves the irreversible and irretrievable commitment of material resources and energy, land and wetland resources, and biological resources. The impacts on these resources would be permanent.

Material resources used for the proposed Port include building materials for new structures and other equipment. Steel might be recyclable after Port decommissioning. No supplies are considered scarce, and would not limit other unrelated construction activities in the region. Construction of the proposed Port would also require use of fossil fuels, a nonrenewable natural resource.

Construction and operation of the proposed Port would result in an irreversible or irretrievable loss of some biological resources. Irreversible losses might also include the loss of various terrestrial organisms during pipeline construction, loss of marine animals in the unlikely event of an LNG spill, and loss of sea turtles or marine mammals due to ship strikes. Some normal and required operations, such as structure removal done in accordance with applicable laws and regulations, can result in the destruction of viable marine life. With the proposed mitigation measures, potential for serious injury or mortality to marine mammals, sea turtles, birds, and fish would be minimized.

5.6 Relationship between Short-Term Uses and Long-Term Productivity

Short-term and long-term characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term impacts are those that would occur only with respect to a

particular activity or for a finite period, or only during the time required for installation activities. Long-term impacts are those that are more likely to be persistent and chronic. For instance, air emissions associated with vessels at the deepwater port would occur for 20 years, the estimated useful life of the proposed facilities. Other types of long-term impacts might persist even beyond the Port's authorized operational period. According to the MMS, the short-term uses of the environment, and the cumulative development of OCS oil and gas resources in the GOM are compatible with the maintenance of long-term productivity of the OCS. Unavoidable adverse impacts are anticipated to be primarily short-term and localized in nature (MMS 2002a).

Short-term project operational activities might result in chronic impacts over a longer period. Installation and eventual removal of new structures would cause minor, localized impacts in the short-term; impacts of site clearance and decommissioning might last longer because of minor elements that would be left in place. Short-term use might have long-term impacts on biologically sensitive offshore areas or archaeological resources. Upon completion of DWPA licensed activities, the marine environment would generally be expected to remain at or return to its normal long-term productivity levels.

No long-term productivity or environmental gains are expected as a result of the DWPA development of the OCS. Benefits of the Proposed Action are expected to be principally those associated with an increase in supplies of natural gas for domestic consumption. While no reliable data exist to indicate long-term productivity losses as a result of use of the OCS, such losses are possible.

6. Best Management Practices

The design of the proposed Port, and the construction methods to be employed, are intended to avoid or minimize the impact that construction activities would have on the environment. The potential impacts from the operation of the proposed Port have been minimized by selecting the preferred location and route, and through the design of the SRVs and use of equipment and systems onboard the SRVs. The following BMPs would be implemented to avoid or minimize impacts on environmental resources during installation and operation of the proposed Port.

6.1 BMPs, Mitigation and Minimization Measures, and Monitoring

CEQ specifically defines mitigation as follows:

1. Avoiding the impact altogether by not taking a certain action or parts of an action
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

In an EIS, mitigation measures must be considered for impacts that would not by themselves be considered significant but would contribute to lessen the environmental impact of the project overall.

6.1.1 Applicant-Proposed BMPs and Minimization Measures

The Applicant has identified BMPs to avoid and minimize the impacts of the construction and operation of the proposed Port, to meet specific regulatory requirements, or to mitigate unavoidable impacts. These are contained within the *Port Dolphin Energy LLC Deepwater Port License Application, Volume II, Appendix F,* as revised (Port Dolphin 2007c). The Applicant has committed to implementing these BMPs to comply with state and local requirements for permits, and to avoid or reduce potentially adverse environmental impacts if a license is issued for the proposed deepwater port. The Applicant would also comply with all applicable mitigation requirements for unavoidable impacts.

Water Quality BMPs

1. Trenching and burial of the gas transmission pipeline would be performed using a pipeline plow to the maximum extent practicable. The towed plow trenching and burial technology was selected primarily because it does not fluidize bottom sediments. Therefore, it causes minimal impacts from sediment resuspension in comparison to other more conventional trenching and burial technologies (e.g., clamshell dredging).
2. Minimize the duration of construction to minimize impacts on marine resources by using the most efficient and effective construction equipment and methods available.
3. The use of turbidity curtains or other methods to reduce turbidity for pipeline installation under the Skyway Bridge, in Outstanding Florida Waters, and during HDD.
4. Filtered seawater would be used for the hydrotesting. An environmentally benign dye would be added to the flooding and test water. A biocide, oxygen scavengers, and a corrosion inhibitor would be added to the water; however, the water would be treated prior to discharge.
5. Hydrostatic test water for the offshore pipe would be discharged in offshore waters

6. Fresh water for the onshore pipe would be discharged on land using industry-standard filtering procedures prior to release.
7. The gasification system on the SRVs is a closed system, requiring no intake of water for vaporizing LNG. To cool generators, 9.5 MGD of intake water would be required. Discharge would be no greater than 50 °F (10 °C) above ambient temperature.
8. Thermal discharge of SRV cooling water meets USEPA criterion of less than or equal to 1.8 °F (1 °C) above ambient at edge of 100-m mixing zone.
9. No discharges would be made from the SRVs (i.e., bilge water, sanitary wastes, grey water).
10. Desalination freshwater-generation systems would be turned off while vessels are moored; therefore no chlorine or hypersaline wastewater would be discharged.
11. On the SRVs, gutter bars shall be placed around equipment where oil leaks could occur, (e.g., mooring winches, cranes). Rain water from these utility areas shall be drained to a bilge holding tank. No rain water from the utility areas would be discharged overboard while at the buoy.
12. During the regasification operation, the SRVs would not discharge any ballast water.
13. Spill response plan and emergency response plans would be implemented.
14. Vessels would be in compliance with MARPOL Annex I and Annex IV and USCG regulations.

Marine Mammal Vessel Strike BMPs

Manatee Vessel Strike Mitigation Measures for active installation/decommissioning vessel operations:

1. Vessel operators and crews must maintain a vigilant watch for marine mammals and slow down or stop their vessels to avoid striking sighted protected species.
2. If a manatee is within 50 yards of a construction or support vessel underway, all operations would discontinue until it has left the vicinity of its own volition.
3. If a manatee is within 300 feet of an active construction or support vessel underway, it would be observed and the vessel would proceed with caution, following the guidelines below:
   - Resume vessel at slow speeds.
   - Stay on parallel course with manatee; follow behind, or next to, at an equal or lesser speed.
   - Do not cross path of manatee.
   - Do not attempt to steer or direct manatees away.
   - Do not allow the vessel to come between a mother and her calf.
4. Practical speeds would be maintained to the extent possible when applicable. Guidelines for speeds include the following:
   - No wake/idle speeds when the draft of the vessel is less than 4 feet from seafloor. All vessels would follow routes of deep water whenever possible.
   - All construction vessels transiting to and from the Port from shore would not exceed 10 knots, during regular operations.
   - Avoid sudden changes in speed and direction.

- Speeds during installation would be well under 10 knots; vessel might be stationary during certain phases of installation.
- Higher speeds would only be used if safety reasons warrant.
- Reduce vessel speed to 10 knots or less when mother/calf pairs or large assemblages of manatees are observed near an underway vessel, when safety permits.

5. Members of the vessel crew would be required to undergo training for observing marine mammals. Topics covered in the training course might include reporting procedures, collision emergency procedures, and marine mammal presence detection using a reference guide specific to GOM marine mammal species.
6. During installation and decommissioning, lookouts are required to scan for surfacing mammals and report sightings to the captain, who would notify the Environmental Coordinator.
7. Offshore construction activities would be temporarily terminated if manatees were observed in the area and there is the potential for harm of an individual. The Environmental Coordinator would be called in to determine the appropriate course of action.
8. During construction of the facility, an Environmental Coordinator would be on site and would be responsible for communicating with NOAA Fisheries Service and USFWS/FWC personnel, as appropriate.
9. If a collision seems likely, emergency collision procedures would be followed.
10. Vessel crews would be required to report sightings of any injured or dead protected species immediately, regardless of whether the injury or death is caused by their vessel. Report marine mammals to the Southeast U.S. Stranding Hotline: 877-433-8299, FWC Law Enforcement (850-488-6251), and the USFWS in Tampa, Florida (813-348-1523).

Whale Vessel Strike BMPs for Active Installation/Decommissioning Vessel Operations

1. Vessel operators and crews must maintain a vigilant watch for marine mammals and slow down or stop their vessels to avoid striking sighted protected species.
2. When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel.
3. When small cetaceans are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible.
4. When cetaceans are sighted while a vessel is underway, attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.
5. Reduce vessel speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface can indicate the presence of submerged animals in the vicinity of the vessel; therefore, prudent precautionary measures should always be exercised.
6. Whales can surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.
7. If a whale is within 100 yards of a construction or support vessel underway, all operations would cease until it is greater than 300 feet from vessel. If the whale is within 300 feet of an active

construction or support vessel underway, it would be observed and the vessel would proceed with caution, following the guidelines below:

- Resume vessel at slow speeds.
- Stay on parallel course with whale, following behind, or next to, at an equal or lesser speed.
- Do not cross path of whale.
- Do not attempt to steer or direct whale away.
- If a whale exhibits evasive or defensive behavior, stop the vessel until the whale has left the immediate area.
- Do not allow the vessel to come between a mother and her calf.

8. Practical speeds would be maintained to the extent possible. Guidelines for speeds include the following:
   - No wake/idle speeds where the draft of the vessel provides less than a 4-foot clearance from the bottom. All vessels would follow routes of deep water whenever possible.
   - All construction vessels transiting to and from the port from shore would not exceed 10 knots, during regular operations as most collisions causing lethal or severe injuries involve vessels moving at 10 knots or faster.
   - Avoid sudden changes in speed and direction.
   - Speeds during installation would be well under 10 knots; vessel might be stationary during certain phases of installation.
   - Higher speeds would only be used if safety reasons warrant.
9. Members of the vessel crew would be required to undergo fisheries training prior to activity. Topics in the training course include reporting procedures, collision emergency procedures, and marine mammal presence detection (surfacing near wake).
10. During installation and decommissioning, lookouts are required to scan for surfacing mammals and report sightings to the captain, who would notify the Environmental Coordinator.
11. Offshore construction activities would be temporarily terminated if whales or dolphins were observed in the area and there is the potential for harm of an individual. The Environmental Coordinator would be called in to determine the appropriate course of action.
12. During construction of the facility, an Environmental Coordinator would be on site and be responsible for communicating with NOAA Fisheries Service and USFWS/FWC personnel, as appropriate.
13. If a collision seems likely, emergency collision procedures would be followed.
14. Vessel crews would be required to report sightings of any injured or dead protected species immediately, regardless of whether the injury or death is caused by your vessel. Notify the Southeast U.S. Stranding Hotline: 877-433-8299, FWC Law Enforcement (850-488-6251), and the USFWS in Tampa, Florida (813-348-1523).

Marine Mammal Acoustic Disturbance BMPs

Marine Mammal Acoustic Disturbance BMPs

1. Anchors for the unloading buoys would be driven piles. Pile-driving would be confined to an approximately 2-week period. Bubble curtains, mufflers, sound-muffling devices, and engine covers would be used where appropriate to reduce the noise associated with pile driving and vessel noise. Additionally, engines and equipment would be turned off when not in use. To minimize excessive noise, engines on all equipment and vessels would be maintained in accordance with manufacturer's recommendations.
2. All vessel crew members and contractors would be requested to "ramp-up" (also known as "soft start" or "slow build up"), which entails the gradual increase in intensity of a sound source. "Soft start" is a practiced mitigation measure used during pile driving (see recent National Environmental Policy Act documents and marine mammal take permit authorizations) (e.g., documents for download, particularly bridge construction projects that utilize pile driving, can be found at the NMFS LOA/IHA Applications for Public Review Web site: http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications) and seismic surveys (MMS 2007a, Weir and Dolman 2007, Abgrall et al. 2008). The intent of ramp-up is to either avoid or reduce the potential for instantaneous hearing damage to an animal (from the sudden initiation of an acoustic source at full power) that might be located in close proximity. Increasing sound levels are designed to warn animals of pending operations, and to allow sufficient time for those animals to leave the immediate area.

Marine Mammal Entanglement BMPs

Marine Mammal Entanglement BMPs to Prevent Entanglement in Anchor Lines or other Lines used in Project Area

1. Any lines or other equipment that have the potential to become a source of entanglement for marine mammals would only be deployed as long as necessary to complete the construction or decommissioning task and would then be removed from the site.
2. Any lines or other equipment that have the potential to become a source of entanglement for marine mammals would be kept as taut as possible to prevent entanglement; however, a certain amount of slack is necessary to account for currents, tides, and other factors.
3. In the unlikely event that entanglement appears likely, the operator would remove the source as quickly as possible or take in the slack.
4. If temporary buoys need to be placed, materials such as heavy chains or cables would be used instead of material that could enable entanglement.
5. In the unlikely event a mammal becomes entangled, vessel crews would be required to notify the FWC Law Enforcement (850-488-6251) or the Marine Mammal Hotline of NOAA Fisheries (877-433-8299). Immediately notify the Disentanglement Hotline (800-900-3622).

Marine Mammal Entanglement BMPs to Prevent Entanglement in or Ingestion of Marine Debris

1. All vessel crew members and contractors would be responsible for ensuring that no debris would inadvertently enter the water, thus reducing the chance of entanglement and eliminating pollution to marine habitats.
2. Discharge or disposal of garbage and other solid debris from vessels would be prohibited, consistent with MMS (30 CFR 250.300) and the USCG. Discharge of plastics would be strictly

prohibited and would never be authorized; this includes ashes from burned plastics. All plastics would be returned to shore and would be tracked. Marine debris training consistent with MMS NTL 2007-G03 *Marine Trash and Debris Awareness and Elimination* would be required for all personnel working on the project. No food or garbage would be discharged; all waste would be offloaded onshore for proper disposal.

3. No wildlife would be fed or attracted to the vessel and no fishing would be allowed.

4. A waste management plan would be developed and implemented as part of the port operations manual.

Sea Turtle and Smalltooth Sawfish Vessel Strike BMPs

Sea Turtle and Smalltooth Sawfish Vessel Strike BMPs for Active Installation/Decommissioning Vessel Operations:

1. All personnel associated with the Project shall be advised of the potential presence of sea turtles and smalltooth sawfish and the need to avoid collisions.
2. All vessel crew members and contractors would participate in a fisheries training for sea turtle and smalltooth sawfish presence and emergency procedures in the unlikely event a sea turtle or smalltooth sawfish is struck by a vessel.
3. All construction personnel are responsible for observing water-related activities for the presence of these species.
4. All construction personnel shall be advised that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the ESA.
5. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include the following:
   - Operation of any moving equipment closer than 50 feet to a sea turtle or smalltooth sawfish shall cease.
   - Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-foot radius of the equipment.
   - Activities may not resume until the protected species has departed the Project area of its own volition.
6. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a 4-foot clearance from the bottom. All vessels would preferentially follow deepwater routes (e.g., marked channels) whenever possible.
7. Lighting would be downshielded to prevent unnecessary upward illumination while illuminating the vessel decks only. Lights would not illuminate surrounding waters.
8. Lighting used during all operational activities would be regulated according to USCG requirements, without using excessive wattage or quality of lights.
9. Once an operational activity is completed, all lights used only for that activity would be extinguished.

10. During installation and decommissioning, lookouts are required to scan for surfacing turtles and report sightings to the captain, who would notify the Environmental Coordinator.
11. During construction of the facility, an Environmental Coordinator would be on site.
12. Any collision with or injury to a sea turtle or smalltooth sawfish would be required to be reported immediately to the NMFS's Protected Resources Division (727-824-5312), the FWC Law Enforcement (850-488-6251), and the local authorized sea turtle stranding/rescue organization.

Sea Turtle and Smalltooth Sawfish Entanglement BMPs

Sea Turtle and Smalltooth Sawfish Entanglement BMPs to Prevent Entanglement in Anchor Lines, Other Lines Used, or Siltation Barriers in Project Area

1. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled (not monofilament), be properly secured, and be regularly monitored to avoid protected species entrapment.
2. Siltation barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the NMFS's Protected Resources Division, St. Petersburg, Florida.
3. Any lines or other equipment that have the potential to become a source of entanglement for sea turtles or smalltooth sawfish would only be deployed as long as necessary to complete the task and would then be removed from the site.
4. Any lines or other equipment that have the potential to become a source of entanglement for sea turtles or smalltooth sawfish would be kept as taut as possible to prevent entanglement; however, a certain amount of slack is necessary to account for currents, tides, and other factors.
5. If entanglement appears likely, the operator would remove the source as quickly as possible or take in the slack.
6. If temporary buoys need to be placed, materials such as heavy chains or cables would be used instead of void material that could enable entanglement.
7. Lines with mandated modifications, such as knotless and nonfloating material, would be used on construction vessels.
8. Any collision with or injury to a sea turtle or smalltooth sawfish would be required to be reported immediately to the NMFS's Protected Resources Division (727-824-5312), the FWC Law Enforcement (850-488-6251), and the local authorized sea turtle or smalltooth sawfish stranding/rescue organization, as appropriate.

Sea Turtle Entanglement BMPs to Prevent Entanglement in or Ingestion of Marine Debris

1. All vessel crew members and contractors would be responsible for ensuring that no debris would inadvertently enter the water, thus reducing the chance of entanglement and eliminating pollution to marine habitats.
2. Discharge or disposal of garbage and other solid debris from vessels would be prohibited, consistent with MMS (30 CFR 250.300) and the USCG. Discharge of plastics would be strictly prohibited and would never be authorized; this includes ashes from burned plastics. All plastics would be returned to shore and would be tracked. Marine debris training consistent with MMS NTL 2007-G03 *Marine Trash and Debris Awareness and Elimination* would be required for all

personnel working on the project. No food or garbage would be discharged; all waste would be offloaded onshore for proper disposal.

3. No wildlife would be fed or attracted to the vessel and no fishing would be allowed.

4. A waste management plan would be developed and implemented as part of the port operations manual.

Pelagic Bird BMPs

Pelagic Bird Impact BMPs: The following restrictions would be mandated on all vessels, except when USCG regulations or safety precautions supersede them.

1. Lighting used during all activities would be regulated according to USCG requirements, without using excessive wattage or quantity of lights to complete the activity.
2. Lighting would be downshielded to prevent unnecessary upward illumination, while directing the light to decks as needed.
3. Lighting would be turned off when not being used.
4. Plan vessel routes to avoid sensitive receptors (e.g., bird colonies) to the extent feasible.
5. Limit the number of vessel trips by using full-capacity crew boats as much as possible.
6. If a pelagic bird is injured, immediately notify the USFWS Division of Migratory Birds, Southeast Regional Division office (404-679-7189).

Benthic Habitat Impact BMPs

1. Geohazards and benthic video survey that were conducted provided a fine-scale delineation of seafloor structure, substrate, and habitat within the proposed Port Dolphin project area.
2. The footprint of the terminals has been minimized.
3. Anchor locations were optimized to minimize impacts on benthic habitat.
4. Performed additional geophysical surveys in water depths of 45 to 65 feet to look for reef gap. Unable to locate any for 3 NM north or 3 NM south of surveyed corridor.
5. Minimize duration of construction by using BMPs for installation.
6. Identify avoidance zones of critical habitat areas for placement of installation barge anchors.
7. Midline buoys would be utilized to the extent practicable on anchor chains to reduce the amount of anchor chain sweep.
8. During installation operations, vessel sizes would be selected to provide vessels adequate to perform the work, but minimized to reduce the number and type of anchors, where possible.
9. During detailed design, an anchoring plan would be developed that would provide procedures for anchor deployment to minimize impacts on hard- and live-bottom habitat.
10. A Mitigation Plan to compensate for unavoidable impacts on hard bottom would be developed during the permitting process.

Pelagic Habitat Impact BMPs

1. The SRVs are closed systems, requiring no intake of water for heating LNG. However, a minimal amount of intake water would be required to cool generators. Discharge would be no greater than 10 °C above ambient temperature.
2. Thermal discharge of SRV cooling water meets USEPA criterion of less than or equal to 1 °C (1.8 °F) above ambient at edge of 100-m mixing zone.
3. No discharges would be made from the SRVs (i.e., bilge water, sanitary wastes, grey water).
4. Desalination freshwater-generation systems would be turned off while vessels are moored, therefore no chlorine or hypersaline wastewater would be discharged.
5. Spill response plan and emergency response plans would be implemented.
6. The SRVs would include secondary containment around hydrocarbon-containing equipment and systems.
7. Utilization of best technology available, a closed-loop system, would significantly reduce the loss of marine organisms. The innovative engineering design has resulted in operational aspects of the terminal that would provide for significant reductions of daily intake volumes compared to other conventional regasification processes presently proposed throughout the United States.
8. An intake rate of 9.5 MGD of seawater for engine-cooling purposes would substantially reduce the potential for entrainment of plankton individuals compared to open-loop vaporization systems, which can use five times more volume.
9. Limit seawater intake velocity to less than 0.15 m/s (0.5 feet/s) to ensure that older larval stages and juveniles would be able to avoid impingement or entrainment.
10. Use of pipeline plow to bury the pipeline to the extent practicable to reduce turbidity.
11. Vessels would have secondary containment around hydrocarbon-containing equipment and systems as practicable.
12. During the regasification operations, the vessel would not discharge any ballast water.
13. Spill response plan and emergency response plans would be developed and implemented, as required.
14. Vessels would be in compliance with MARPOL Annex I and Annex IV and USCG regulations.

Terrestrial Pipeline and Facilities Mitigation

1. Use of HDD method under mangroves to avoid impacts.
2. Development of contingency plan for potential loss of drilling fluids.
3. Use of Environmental Coordinator onsite during installation of pipeline.
4. Implementation of project-specific Wetland and Waterbody Construction and Mitigation Plan.
5. Restoration of wetlands after construction.
6. Utilize BMPs and FERC's Upland Erosion Control, Revegetation and Maintenance Plan.
7. Use of existing ROWs and minimize size of ROWs.
8. Use of areas at Port Manatee previously used for similar activities.
9. Regrade areas and revegetate.

Eastern Indigo Snake BMPs

- The development of an Eastern indigo snake protection/education plan for all construction personnel to follow. The plan would be provided to the USFWS for review and approval at least 30 days prior to any clearing activities. Informational signs should be posted throughout the construction site to contain the following information:
  a. Description of the Eastern indigo snake, its habits, and protection under Federal Law
  b. Instructions not to injure, harm, harass, or kill this species
  c. Directions to cease clearing activities and allow the Eastern indigo snake sufficient time to move away from the site on its own before resuming clearing
  d. Telephone numbers of pertinent agencies to be contacted if a dead Eastern indigo snake is encountered. The dead specimen should be thoroughly soaked in water, and then frozen.
- If not currently authorized through an Individual Take Statement met in association with a Biological Opinion, only an individual who has been either authorized by a section 10(a)(1)(A) permit issued by the USFWS, or designated as an agent of the State of Florida by the FWC for such activities, is permitted to come in contact with or relocate an Eastern indigo snake.
- An Eastern indigo snake monitoring report must be submitted to the appropriate Florida Field Office within 60 days of the conclusion of clearing phases. The report should be submitted whether or not Eastern indigo snakes are observed. The report should contain the following information:
  a. Any sightings of Eastern indigo snakes
  b. Other obligations required by the FWC, as stipulated in the permit.

Other obligations required by the FWC, as stipulated in the permit.

6.1.2 The Maritime Administration/USCG-Recommended Mitigation Measures

If issued, the Deepwater Port License would contain conditions requiring development and implementation of appropriate mitigation and monitoring measures. USCG would recommend the following measures for inclusion in the mitigation and monitoring plans, should a license be granted:

- Aboveground facilities adjacent to the ROW would be fenced and screened by existing and planted shrubs and trees to improve aesthetics.
- Fuel combustion sources would result in emissions of nitrous oxide (NO_x) and carbon monoxide (CO), and, to a lesser extent, emissions of volatile organic compounds (VOCs), sulfur dioxide (SO_2), and particulate matter. During the vaporization process, the boilers would be fired by natural gas only. The boilers would be equipped with low NO_x burners and selective catalytic reduction (SCR) to minimize emissions of NO_x, CO, and VOCs. Emissions of SO_2 and particulate matter from natural gas combustion would be minimal compared to the combustion of other fossil fuels because of the negligible sulfur and noncombustible content in natural gas. Potential annual emissions would be limited by a fuel use restriction.
- The power generation engines would supply electrical power for the vaporization process. Potential emissions are based on use of natural gas (greater than 99 percent) with a small amount (less than 1 percent) of diesel pilot fuel and an SCR and oxidation catalyst to control NO_x and CO/VOC emissions. SO_2 emissions would be limited by fuel use restrictions.

- Monitoring of the operation phase of the Port Dolphin Project would focus on measuring the noise source levels of the LNG carriers (LNGCs) and the regasification process and on verifying the acoustic propagation models used to predict the sound fields generated by the project. This program would be conducted during the first year of project operation.
- The Maritime Administration agrees that mitigation and monitoring of egg and fish mortality should be required to demonstrate impacts consistent with those analyzed in the EIS. Further details of this effort, including the duration of monitoring, would be developed in coordination with NOAA and USEPA as part of a detailed monitoring and mitigation plan being developed by the Maritime Administration and USCG.
- The entire pipeline corridor and stations within the proposed Terminal area would be evaluated for the presence and relative densities of lobsters prior to and post construction using video survey technologies.
- If any roadways are damaged during onshore construction activities, such as using the slick bore method for installing pipeline under roadways, then the damaged roadway would be repaired to the preconstruction state.

6.1.3 FERC Recommendations

If the FERC Commission authorizes the onshore pipeline portion of the Port Dolphin Project, the FERC staff recommends that the following measures be included as specific conditions in the Commission's Order (Order). The FERC staff believes that these measures would further mitigate the environmental impacts associated with the construction and operation of the proposed Project. Mitigation measures 1 through 9 are standard conditions typically recommended by the FERC staff for pipeline projects. FERC staff recommendations 10 through 13 are Project-specific.

1. Port Dolphin shall follow the construction procedures and mitigation measures described in its application and supplements (including responses to data requests) and as identified in the EIS, unless modified by the Order. Port Dolphin must:
    a. Request any modification to these procedures, measures, or conditions in a filing with the Secretary of the Commission (Secretary)
    b. Justify each modification relative to site-specific conditions
    c. Explain how that modification provides an equal or greater level of environmental protection than the original measure
    d. Receive approval in writing from the FERC Director of the Office of Energy Projects(OEP) before using that modification.
2. The Director of OEP has delegated authority to take whatever steps are necessary to ensure the protection of all environmental resources during construction and operation of the Project. This authority shall allow:
    a. The modification of conditions of the Order
    b. The design and implementation of any additional measures deemed necessary (including stop work authority) to ensure continued compliance with the intent of the environmental conditions, as well as the avoidance or mitigation of adverse environmental impacts resulting from project construction and operation.
3. Prior to any construction, Port Dolphin shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, environmental inspectors

(EIs), and contractor personnel will be informed of the EI's authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs before becoming involved with construction and restoration activities.

4. The authorized facility locations shall be as shown in the EIS and as supplemented by filed alignment sheets. **As soon as they are available, and before the start of construction**, Port Dolphin shall file with the Secretary any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

   Port Dolphin's exercise of eminent domain authority granted under Natural Gas Act (NGA) section 7(h) in any condemnation proceedings related to the Order must be consistent with these authorized facilities and locations. Port Dolphin's right of eminent domain granted under NGA section 7(h) does not authorize it to increase the size of its natural gas pipeline to accommodate future needs or to acquire a ROW for a pipeline to transport a commodity other than natural gas.

5. Port Dolphin shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, pipe storage yards, and other areas that would be used or disturbed and have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, and documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps, sheets, and aerial photographs. Each area must be approved in writing by the Director of OEP **before construction in or near that area**.

   This requirement does not apply to extra workspace allowed by the *Upland Erosion Control, Revegetation, and Maintenance Plan,* minor field realignments per landowner needs, and requirements which do not affect other landowners or sensitive environmental areas such as wetlands. Examples of alterations requiring approval include all route realignments and facility location changes resulting from:

   a. Implementation of cultural resources mitigation measures

   b. Implementation of endangered, threatened, or special concern species mitigation measures

   c. Recommendations by state regulatory authorities

   d. Agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

6. **Within 60 days of the acceptance of this certificate and before the start of construction**, Port Dolphin shall file an initial Implementation Plan with the Secretary for review and written approval by the Director of OEP describing how Port Dolphin will implement the mitigation measures required by the Order. Port Dolphin must file revisions to the plan as schedules change. The plan shall identify:

   a. How Port Dolphin will implement the construction procedures and mitigation measures described in its application and supplements (including responses to data requests), those identified in the EIS, and those required by the Order

   b. How Port Dolphin will incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to onsite construction and inspection personnel

c. The number of EIs assigned per spread, and how the company will ensure that sufficient personnel are available to implement the environmental mitigation

d. Company personnel, including EIs and contractors, who will receive copies of the appropriate material

e. The training and instructions Port Dolphin will give to all personnel involved with construction and restoration (initial and refresher training as the project progresses and personnel change), with the opportunity for OEP staff to participate in the training sessions

f. The company personnel (if known) and specific portion of Port Dolphin's organization having responsibility for compliance

g. The procedures (including use of contract penalties) Port Dolphin will follow if noncompliance occurs

h. For each discrete facility, a Gantt or PERT chart (or similar project-scheduling diagram), and dates for:

i. the completion of all required surveys and reports

ii. the mitigation training of onsite personnel

iii. the start of construction

iv. the start and completion of restoration.

7. Port Dolphin shall employ at least one EI per construction spread. The EI shall be:

a. Responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or other authorizing documents

b. Responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 5 above) and any other authorizing document

c. Empowered to order correction of acts that violate the environmental conditions of the Order, and any other authorizing document

d. A full-time position, separate from all other activity inspectors

e. Responsible for documenting compliance with the environmental conditions of the Order, as well as any environmental conditions/permit requirements imposed by other Federal, state, or local agencies

f. Responsible for maintaining status reports.

8. Port Dolphin shall file updated status reports with the Secretary, prepared by the EI on a biweekly basis until all construction and restoration activities are complete. On request, these status reports will also be provided to other Federal and state agencies with permitting responsibilities. Status reports shall include:

a. The current construction status of the project, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally sensitive areas

b. A listing of all problems encountered and each instance of noncompliance observed by the EIs during the reporting period (both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other Federal, state, or local agencies)

c. Corrective actions implemented in response to all instances of noncompliance, and their cost

d. The effectiveness of all corrective actions implemented

e. A description of any landowner/resident complaints which might relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns

f. Copies of any correspondence received by Port Dolphin from other Federal, state, or local permitting agencies concerning instances of noncompliance.

9. Port Dolphin must receive written authorization from the Director of OEP **before commencing service of the project**. Such authorization will only be granted following a determination that rehabilitation and restoration of the ROW and other areas affected by the project are proceeding satisfactorily.

10. Port Dolphin shall file any proposed changes or project-specific revisions to the FERC Plan and Procedures. This information must be included with Port Dolphin's comments on the draft EIS or in a separate document submitted at the same time. Port Dolphin shall clearly identify any items that differ from the requirements of the FERC Plan and Procedures and explain how such Project-specific measures would result in an equal or greater protection of resources. Any outstanding information (e.g., from pending surveys or ongoing agency consultation) must be identified, along with an estimate of when such will be completed.

11. Port Dolphin shall not begin construction of the onshore portion of the Project until it has filed documentation that all Section 7 consultations with the USFWS regarding the onshore portion of the project has been completed and Port Dolphin has received written notification from the Director of OEP that construction or use of mitigation may begin.

12. Prior to the start of construction, Port Dolphin shall file for each HDD location the following: (a) the estimated number of days of drilling required for each location, and whether drilling would be done 24 hours per day; and (b) a description of any noise mitigation which would be implemented during drilling activity to reduce noise impacts at the noise sensitive areas below 55 dBA L_{dn}, or 10 dBA over background if ambient levels are above 55 dBA L_{dn}.

13. Port Dolphin shall defer construction and use of the onshore facilities and staging, storage, and temporary work areas until Port Dolphin consults the Florida State Historic Preservation Office (SHPO) regarding the need for survey of any newly identified pullouts, staging areas, extra work spaces, the concrete coating batch plant and storage area, and pipe and contractor yards; and files the SHPO's comments, any required survey report(s), and the SHPO's comments on the reports. All material filed with the Commission containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: **"CONTAINS PRIVILEGED INFORMATION--DO NOT RELEASE."**

6.1.4 NOAA/NMFS Recommendations

In a scoping letter dated August 9, 2007, NMFS expressed concerns that the entrainment of marine organisms could affect the sustainability of marine and estuarine fisheries (see **Appendix C**). NMFS recommended that mitigative measures be developed and proposed to ensure that unavoided entrainment impacts are fully offset. The mitigation plan should be linked to a plan for adaptive management of the deepwater Port to identify and require operational or mechanical modifications to minimize adverse fishery impacts.

The NOAA/NMFS Southeast Region Habitat Conservation Division has developed the *Southeast Regional LNG Monitoring Plan Considerations* (Plan Considerations) (see **Appendix C**) for LNG terminal construction and operation in the GOM. Although the Plan Considerations were developed for open-loop regasification systems, two of the considerations (Questions 6 and 7 are represented as A and B) are applicable to the proposed Project.

A. LNG facilities must transport the regasified product to market through pipelines. These pipelines begin at the Terminal and can tie-in with other natural gas pipelines located either offshore or onshore. Often, these pipelines are proposed to be considered on productive water bottoms or through wetlands, both of which could be designated as EFH supportive of marine fishery resources. If a pipeline impacts EFH, the NMFS recommends the habitat be restored after the pipeline has been constructed. Alternatively, NMFS might recommend a different pipeline route that would avoid or minimize impacts on EFH.

   Monitoring of the pipeline ROW is necessary to document pre-construction conditions as well as the level of successful restoration and the need for remedial actions. The following constitutes typical monitoring recommendations associated with the installation of pipelines in areas classified as EFH.

   1. The licensee should conduct a pre-construction survey of the pipeline ROW and all work areas to document pre-Project conditions. The survey should include a Geographic Information System (GIS) analysis using recent aerial photographs of the Project area with the pipeline ROW superimposed on the photograph and identify all habitat types using Cowardin codes (Cowardin et al. 1979) or other accepted measures. The survey also should identify elevations of all wetland areas crossed and include a description of major wetland vegetative communities. Where shell reefs could be impacted, the survey should document the geographic extent and productivity of those shell reefs.
   2. Ground photographs of those portions of the pipeline ROW which cross marsh should be taken prior to construction and immediately after construction. The photographs should be taken at 500-foot intervals from the center of the ROW with two photographs being taken at each location, one in each direction. Global Positioning System (GPS) should be used during photography such that pre-and post-construction could be taken from the same locations.
   3. Following one growing season after construction, the licensee should undertake a post-construction survey similar to that taken prior to construction. The intent of the post-construction survey is to identify areas where pre-construction contours were not successfully restored or where vegetative or shell reef communities did not become reestablished.
   4. All monitoring information should be provided to the NMFS within 3 months of its development.

B. Reporting the Monitoring Result

   1. Monitoring methodologies, sample locations, monitoring results and analysis, and any resulting recommendations for change of facility operations or monitoring protocols are to be prepared and submitted to the Federal licensing agency and the NMFS annually.
   2. Annual reports are to be submitted by March 30 and would encompass the previous calendar year (or portion of a year if monitoring was not conducted for an entire 12-month period).

In a letter dated May 29, 2008, the Southeast Regional Office requested that the measures such as press in piles or pile sleeves be considered to reduce the noise impacts associated with pile driving. Additionally, NMFS recommends the Applicant utilize the study of David Mann at the University of South Florida to do the following:

1. Monitor noise levels as part of the ESA consultation with NMFS to address uncertainties in the noise estimates
2. Monitor the effectiveness of any noise-reduction methodologies proposed.

During the Section 7 Endangered Species Act consultation process, NMFS submitted the following BMPs or harm avoidance measures for protected species to the USCG and MARAD. The following BMPs were considered for their effectiveness at reducing the potential for adverse effects on protected species (threatened and endangered species, and marine mammals). These measures are required to be implemented by Port Dolphin to avoid harm to ESA-listed species, as well as marine mammals protected under the MMPA, associated with the construction, operation, and decommissioning of the Port Dolphin Deepwater Port.

A. Pile-Driving Conditions

The following measures shall be required during any pile-driving activity associated with Port Dolphin.

1. All project personnel and contractor personnel shall be advised that there are civil and criminal penalties for harming or harassing protected species. Informational materials regarding protected species identification shall be provided to project personnel.
2. For impact hammers, the power of the hammer shall be reduced to minimum energy levels required to drive a pile; thus, reducing the amount of noise produced in the marine environment. Additional measures shall be considered, when feasible, such as bubble curtains, Micarta© pile caps, and pile-driving sleeves.
3. A 250-m zone of influence (ZOI) shall be established around a pile to be monitored (a 200-m radius to the 160-dB isopleths and an additional 50-m watch zone). The Environmental Coordinator (EC) or at least one person designated as a Protected Species Observer (PSO) by the EC shall monitor the 250-m ZOI to prevent or minimize potential adverse impacts on protected species.
4. Each PSO used shall be instructed in surveying for protected species, data recording, and be familiar with species that might occur in the area. A viewing platform, such as the highest point on a barge that has an unobstructed view in all directions, should be used to conduct effective observations. Each PSO shall be provided with the equipment necessary to conduct effective observations (e.g., a two-way radio dedicated to protected species communication, ear protection, polarized sunglasses, binoculars, and any necessary data-recording equipment that might be required).
5. The 250-m ZOI around a pile shall be observed for protected species prior to beginning any pile driving. PSOs to protected species observations shall be used to visually monitor the impact zone for at least 45 minutes prior to beginning all pile-driving activities (each time a hammer is started).
6. Each time a pile driving hammer is started, "dry firing" or "ramping up" of the hammer shall be conducted for at least 15 minutes to allow animals the opportunity to leave the area. Dry firing of a pile-driving hammer is a method of raising and dropping the hammer with no compression of the pistons, producing a lower-intensity sound than the full power of the hammer. Ramping up involves slowly increasing the power of the hammer and noise produced over the ramp-up period (and bubble curtains turned on if used).
7. The 45-minute observation period may occur during dry firing and ramping up of the pile-driving hammer (i.e., observations may begin 30 minutes prior to dry firing or ramp-up). Pile driving shall be stopped if any protected species are sighted within the 250-m impact zone, or a

protected species is observed moving toward the ZOI. Pile driving shall not restart until the animal is confirmed to be outside of the impact zone. If at any time a protected species is observed in the safety zone during dry firing or ramp-up, the hammer shall be shut down until the animal has left the safety zone of its own volition; ramp-up procedures shall then be repeated.

8. Pile driving is expected to last at least 2 weeks. For pile-driving activities, the designated PSO shall intermittently scan the ZOI to watch for animals in the area (and to ensure bubble curtains are functioning properly if they are used). Any time an animal is observed in the impact zone during pile driving, all activities shall stop and the animal continually observed until it has left the area of its own volition.

9. Pile driving may continue into nighttime hours only if ramp-up/dry-firing protocols and visual clearing of the impact are conducted during daylight hours and bubble curtains are utilized.

10. Records shall be maintained of all protected species sightings in the area, including date and time, weather conditions, species identification, approximate distance from the pile, direction and heading in relation to the pile driving, and behavioral observations. When animals are observed in the impact zone, additional information and corrective actions taken such as a shutdown of the pile driver, duration of the shutdown, behavior of the animal, and time spent in the safety zone will be recorded. The PSOs shall also identify and record large schools of fish, marine mammals, *Sargassum*, jellyfish aggregations, or other indicators of biologically productive areas. Data shall be recorded on the types of piles driven (material construction, diameter and length of pile, wall thickness), the type and power of the hammer used, the number of cold starts, strikes per minute, and the duration of the pile-driving activities.

11. If a take of a listed species occurs, reinitiation of consultation is required. If a take of a listed species occurs from pile-driving activities, a report of the incident must be submitted by email to NMFS' Protected Resources Division at takereport.nmfsser@noaa.gov.

    Please report all other dead or injured protected species to your local stranding network contacts. A list of sea turtle stranding responders is available at http://www.sefsc.noaa.gov/seaturtleSTSSN.jsp. A list of marine mammal stranding network responders for each state is available at http://www.nmfs.noaa.gov/pr/health/networks.htm or sightings can be reported to the marine mammal stranding hotline at 877-433-8299.

    All other dead or injured protected species incidents shall be reported to NMFS' Southeast Regional Office by telephone at 727-824-5312, or by fax at 727-824-5309.

B. Noise-Monitoring Study

Port Dolphin shall monitor noise levels during construction and operation of the LNG terminal to address uncertainties in the estimated noise levels, document propagation characteristics, and verify the impact zones estimated in the EIS. A noise-monitoring plan shall be submitted for review to NMFS, USCG, and MARAD for review prior to the start of pile-driving activities. A noise-monitoring report shall be submitted to NMFS, USCG, and MARAD detailing methods, noise levels measured during construction and operation of the terminal, verification of the noise levels predicted from construction and operation activities, and effectiveness of the noise-reduction methodologies utilized during construction. NMFS is available to assist with the development of the noise-monitoring plan and data collection protocols.

C. Construction Conditions

1. During construction of the facility, the EC must be on site.

2. Port Dolphin shall instruct all personnel associated with the project of the potential presence of protected species. Personnel associated with the project shall undergo a briefing of the potential presence of protected species in the project area and harm avoidance and any other mitigation requirements. All construction personnel are responsible for observing water-related activities for the presence of these species.
3. Personnel shall be informed that there are civil and criminal penalties for harming, harassing, or killing sea turtles and smalltooth sawfish protected under the ESA. The responsible party shall be held accountable for any protected species harmed, harassed, or killed as a result of construction activities.
4. During construction, lookouts are required to scan for protected species and report sightings to the EC.
5. If a protected species is seen within 100 yards of marine construction activities, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment within 100 yards of a protected species. Activities may not resume until the animal has departed the project area of its own volition.
6. In order to avoid causing injury or disturbance to protected species during activities associated with construction of the Port Dolphin, construction and support vessels shall follow the NMFS Vessel Strike Avoidance Measures and Reporting for Mariners (see below) during construction activities and when in transit between the terminal location and shore.
7. Use of HDD shall be used under mangroves to avoid impacts.
8. All vessel crew members and contractors shall participate in a fisheries training for protected species presence and emergency procedures in the unlikely event a protected species is struck by a vessel.
9. All construction personnel are responsible for observing water-related activities for the presence of protected species.
10. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a 4-foot clearance from the bottom. All vessels would preferentially follow deepwater routes (e.g., marked channels) whenever possible.
11. Lighting will be downshielded to prevent unnecessary upward illumination, while only illuminating the vessel decks. Lights will not illuminate surrounding waters. Lighting used during all operational activities would be regulated according to USCG requirements, without using excessive wattage or quantity of lights. Once an operational activity is completed, all lights used only for that activity would be extinguished.
12. If a dead or injured protected species is observed and is unrelated to the project, it will be reported, as requested, to the local stranding network contacts. The appropriate contact will be selected from either the current list of sea turtle stranding responders available at http://www.sefsc.noaa.gov/seaturtleSTSSN.jsp or the list of marine mammal stranding network responders available at http://www.nmfs.noaa.gov/pr/health/networks.htm. All other observed dead or injured protected species must be reported to the NMFS Southeast Regional Office by telephone at 727-824-5312 or by fax at 727-824-5309, or by email at takereport.nmfsser@noaa.gov if the death or injury was the result of Port Dolphin activities.

D. Vessel Strike Avoidance Measures and Reporting for Mariners

The National Marine Fisheries Service (NMFS) has determined that collisions with vessels can injure or kill protected species (e.g., endangered and threatened species, and marine mammals). The following standard measures should be implemented to reduce to discountable levels the risk associated with vessel strikes or disturbance of these protected species. NMFS should be contacted to identify any additional conservation and recovery issues of concern, and to assist in the development of measures that might be necessary.

Protected Species Identification Training. Vessel crews should use an Atlantic and Gulf of Mexico reference guide that helps identify protected species that might be encountered in U.S. waters of the Atlantic Ocean, including the Caribbean Sea, and Gulf of Mexico. Additional training should be provided regarding information and resources available regarding Federal laws and regulations for protected species, ship strike information, critical habitat, migratory routes and seasonal abundance, and recent sightings of protected species.

Vessel Strike Avoidance. In order to avoid causing injury or death to marine mammals and sea turtles the following measures should be taken when consistent with safe navigation:

1. Vessel operators and crews shall maintain a vigilant watch for marine mammals and sea turtles to avoid striking sighted protected species.
2. When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel.
3. When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible.
4. When small cetaceans are sighted while a vessel is underway (e.g., bow-riding), attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.
5. Reduce vessel speed to 10 knots or less when mother/calf pairs, groups, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface could indicate the presence of submerged animals in the vicinity; therefore, prudent precautionary measures should always be exercised. The vessel shall attempt to route around the animals, maintaining a minimum distance of 100 yards whenever possible.
6. Whales can surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel and when safety permits, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.

E. Additional Requirements for the North Atlantic Right Whale

1. If a sighted whale is believed to be a North Atlantic right whale, Federal regulation requires a minimum distance of 500 yards be maintained from the animal (50 CFR 224.103 (c)).
2. Vessels entering North Atlantic right whale critical habitat are required to report into the Mandatory Ship Reporting System.
3. Mariners shall check with various communication media for general information regarding avoiding ship strikes and specific information regarding North Atlantic right whale sighting locations. These include NOAA weather radio, U.S. Coast Guard NAVTEX broadcasts, and Notices to Mariners. Commercial mariners calling on United States ports should view the most

recent version of the NOAA/USCG produced training CD titled "A Prudent Mariner's Guide to Right Whale Protection" (contact the NMFS Southeast Region, Protected Resources Division for more information regarding the CD).

4. Injured, dead, or entangled right whales should be immediately reported to the U.S. Coast Guard via VHF Channel 16.

F. Injured or Dead Protected Species Reporting

Vessel crews shall report sightings of any injured or dead protected species immediately, regardless of whether the injury or death is caused by your vessel.

Report marine mammals to the Southeast U.S. Stranding Hotline: 877-433-8299

Report sea turtles to the NMFS Southeast Regional Office: 727-824-5312

If the injury or death of a marine mammal was caused by a collision with your vessel, responsible parties shall remain available to assist the respective salvage and stranding network as needed. NMFS' Southeast Regional Office shall be immediately notified of the strike by email (takereport.nmfsser@noaa.gov) using the attached vessel strike reporting form.

For additional information, please contact the Protected Resources Division at:

NOAA Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701-5505
Tel: 727-824-5312
http://sero.nmfs.noaa.gov

G. Line and Cable Conditions

The following BMPs will be required to prevent entanglement in any lines or cables used, or siltation barriers used in any construction area to avoid the potential for entanglement of protected species.

1. Siltation barriers shall not be made of any materials in which a protected species can become entangled (e.g., monofilament), shall be properly secured, and shall be regularly monitored to avoid protected species entrapment.
2. Siltation barriers may not block protected species entry or exit points from habitat without prior agreement from NMFS' Protected Resources Division, St. Petersburg, Florida.
3. Any lines or other equipment that have the potential to become a source of entanglement for sea turtles or smalltooth sawfish shall only be deployed as long as necessary to complete the task and then shall be removed from the site.
4. Any lines or other equipment that have the potential to become a source of entanglement for protected species shall be kept as taut as possible to prevent entanglement; however, a certain amount of slack is necessary to account for currents, tides, and other factors.
5. If entanglement appears likely, the operator shall remove the source as quickly as possible or take in the slack.
6. If temporary buoys need to be placed, materials such as heavy chains or cables shall be used instead of void material that could enable entanglement.

7. Lines with mandated modifications, such as knotless and nonfloating material, shall be used on construction vessels.
8. Any collision with or injury to a protected species must be reported immediately to NMFS' Protected Resources Division (727-824-5312), FWC Law Enforcement (850-488-6251), and the local authorized sea turtle or marine mammal stranding/rescue organization, as appropriate.

H. Marine Debris Reduction and Elimination Conditions

1. Marine debris training consistent with MMS NTL 2007-G03 Marine Trash and Debris Awareness and Elimination (http://www.gomr.mms.gov/homepg/regulate/regs/ntls/2007NTLs/07-g03.pdf) is required for all personnel working on the project.
2. All vessel crew members and contractors are responsible for ensuring that no debris inadvertently enters the water, thus reducing the chances of entanglement and eliminating pollution to marine habitats.
3. Discharge or disposal of garbage and other solid debris from vessels shall be prohibited, consistent with MMS (30 CFR 250.300) and the USCG. Discharge of plastics shall be strictly prohibited and shall never be authorized; this includes ashes from burned plastics. All plastics shall be returned to shore and shall be tracked. No food or garbage shall be discharged; all waste shall be offloaded onshore for proper disposal.
4. No wildlife shall be fed or purposely attracted to the vessel and no fishing is allowed.
5. A waste management plan shall be developed and implemented as part of the port operations manual.

I. Water Quality Conditions

1. Trenching and burial of the gas transmission pipeline shall be performed using a pipeline plow, to the maximum extent practicable. The towed plow trenching and burial technology was selected primarily because it does not fluidize bottom sediments. Therefore, it causes minimal impacts from sediment resuspension in comparison to other more conventional trenching and burial technologies (e.g., clamshell dredging).
2. The duration of construction shall be minimized to minimize impacts on marine resources by using the most efficient and effective construction equipment and methods available.
3. Turbidity curtains or other methods to reduce turbidity shall be used for pipeline installation under the Skyway Bridge, in Outstanding Florida Waters, and during HDD.
4. Filtered seawater shall be used for the hydrotesting. An environmentally benign dye would be added to the flooding and test water. A biocide, oxygen scavengers, and a corrosion inhibitor would be added to the water; however, the water would be treated prior to discharge.
5. Hydrostatic test water for the offshore pipe will be discharged in offshore waters.
6. Fresh water for the onshore pipe will be discharged on land using industry-standard filtering procedures prior to release.
7. The gasification system on the SRVs is a closed system, requiring no intake of water for vaporizing LNG. To cool generators, 9.5 MGD of intake water will be required. Discharge will be no greater than 50 °F (10 °C) above ambient temperature.
8. Thermal discharge of SRV cooling water shall meet USEPA's criterion of less than or equal to 1.8 °F (1 °C) above ambient at the edge of the 100-m mixing zone.

9. No discharges shall be made from the SRVs (i.e., bilge water, sanitary wastes, grey water).
10. Desalination freshwater-generation systems shall be turned off while vessels are moored; therefore, no chlorine or hypersaline wastewater would be discharged.
11. On the SRVs, gutter bars shall be placed around equipment where oil leaks could occur, (e.g., mooring winches, cranes). Rain water from these utility areas shall be drained to a bilge holding tank. No rain water from the utility areas shall be discharged overboard while at the buoy.
12. During the regasification operation, the SRVs shall not discharge any ballast water.
13. Spill response plan and emergency response plans shall be implemented.
14. Vessels shall be in compliance with MARPOL Annex I, Annex IV, and USCG regulations.

6.1.5 USFWS Recommendations

1. The service recommends that a light management plan be implemented during the construction phase of the Port Dolphin LLC liquefied natural gas deepwater port. The service requests to review this plan prior to the commencement of this project.
2. The development of an Eastern indigo snake protection/education plan for all construction personnel to follow. The plan would be provided to the USFWS for review and approval at least 30 days prior to any clearing activities. Informational signs should be posted throughout the construction site to contain the following information:
   - Description of the Eastern indigo snake, its habits, and protection under Federal Law
   - Instructions not to injure, harm, harass, or kill this species
   - Directions to cease clearing activities and allow the Eastern indigo snake sufficient time to move away from the site on its own before resuming clearing
   - Telephone numbers of pertinent agencies to be contacted if a dead Eastern indigo snake is encountered. The dead specimen should be thoroughly soaked in water, and then frozen.
3. If not currently authorized through an Individual Take Statement met in association with a Biological Opinion, only an individual who has been either authorized by a section 10(a)(1)(A) permit issued by the USFWS, or designated as an agent of the State of Florida by the FWC for such activities, is permitted to come in contact with or relocate an Eastern indigo snake.
4. An Eastern indigo snake monitoring report must be submitted to the appropriate Florida Field Office within 60 days of the conclusion of clearing phases. The report should be submitted whether or not Eastern indigo snakes are observed. The report should contain the following information:
   - Any sightings of Eastern indigo snakes
   - Other obligations required by the FWC, as stipulated in the permit.
5. The Service recommends the Applicant use as a minimum the *Standard Manatee Conditions for in-Water Work (2005 revision)*.

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Appendix F
Detailed Maps

- Appendix F1: Detailed Criteria Maps for Landfall Locations
- Appendix F2: Detailed Maps of the Project Area

Appendix F1
Detailed Criteria Maps for Landfall Locations

Selection of Location for Onshore Pipeline Transition And Construction Support Area

As described in **Section 2.1.4** of this FEIS, a number of factors were considered in the siting analysis for the onshore location of the LNG port. Phase I screening identified five areas for more detailed evaluation. In the Phase 2 screening, three of these areas were eliminated as discussed in **Section 2.1.4**. As stated in **Section 2.1.4**, the Sarasota area was eliminated because of the proximity of highly developed residential areas along the coastline. There were no industrial areas along the coast that would be able to support a potential LNG port. A barrier island and environmental constraints, including several sand resource areas, also would have made it difficult to build and support a pipeline port. There was one nonresidential area close to the coast. However, it was not suitable for construction because it is a State Recreational Area, and as such, not acceptable for construction. The remaining two areas, Tampa Bay and Fort Myers, were further evaluated to identify acceptable locations that would support construction of the pipeline and interconnection with at least one interstate pipeline system. This included the transition from offshore to a suitable onshore location.

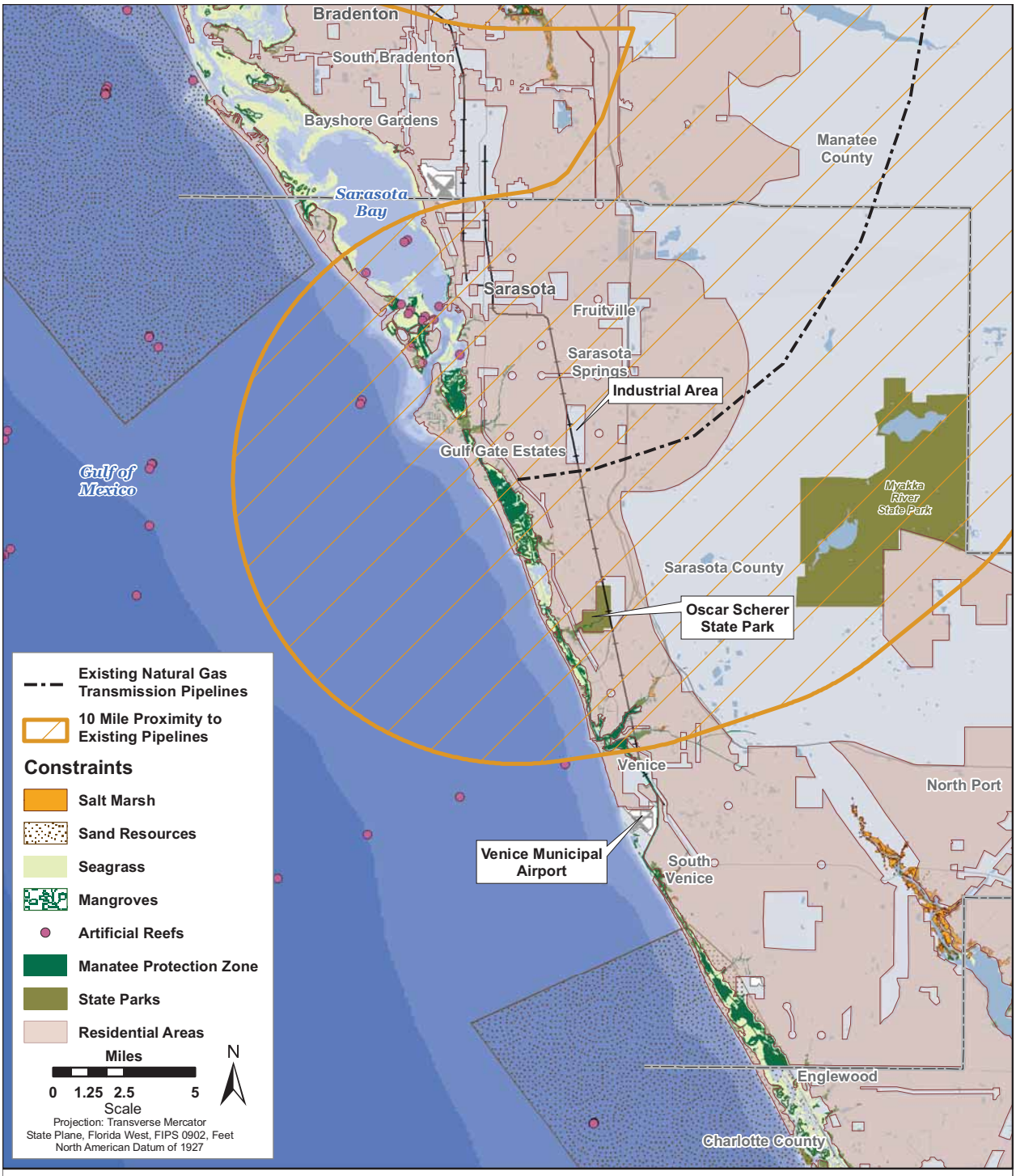
Using the USGS Land Use data, industrial areas located within the two areas were selected for further site screening. These selected areas were confirmed with aerial photography as potential locations for bringing the pipeline ashore and providing pipeline construction support areas. There were six areas identified as potential port locations, five potential locations in the Tampa Bay area and one location in Fort Myers.

The selection criteria for Phase II include avoiding coastal environmental resources to the maximum degree possible and identifying appropriate land use. The environmental constraints including, aquatic preserves, mangroves, manatee protected areas, seagrasses, and salt marshes were collected and overlaid in the potential port locations. This mapping helped to identify potential areas and eliminated unsuitable areas based on the provided criterion.

The Sarasota area, as shown in **Figure F-1**, is densely developed with residential properties for at least 8 km (5 mi) from the coast, making it unsuitable for pipeline construction. Coastal resources also include seagrass beds, turtle habitat, mangrove resources, and protected waters. The most suitable area is south of the FGT pipeline. This area has nonresidential property closer to shore, but that property is a State Recreational Area and was therefore, determined not suitable for pipeline construction (see **Figure F-1**).

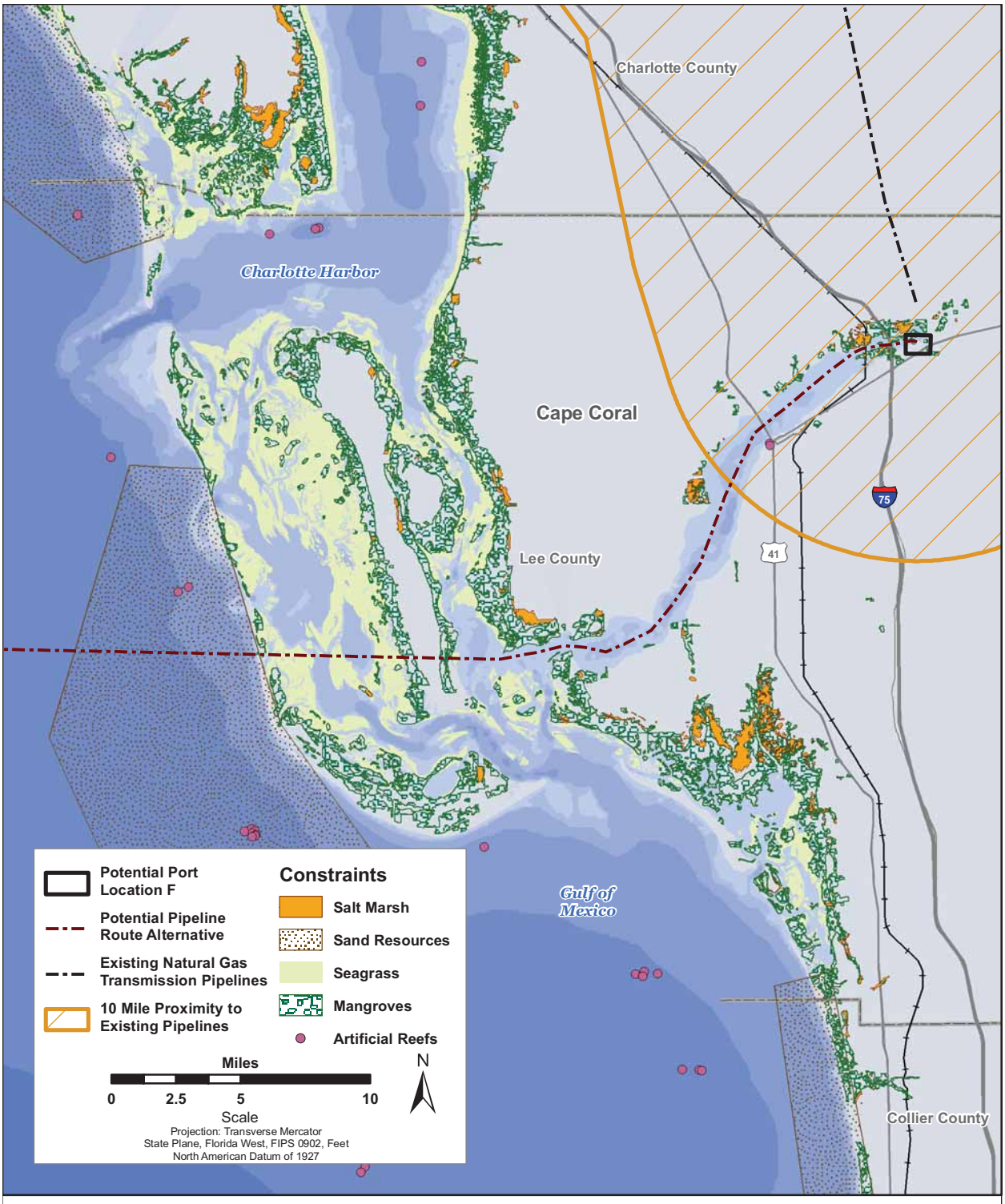
The potential onshore location in Fort Myers that could provide a landing point for the offshore to onshore pipeline would be 1.5 miles away from the existing interstate pipeline. However, the onshore site and interconnection location are located inland within the Caloosahatchee River. This would require a long pipeline through barrier islands and through inland waters over twenty miles to open water. (See **Figure F-2**) Therefore, the Ft. Myers area was eliminated from further consideration.

Several potential locations were identified in Tampa Bay that appeared to be suitable sites for bringing the pipeline ashore and supporting pipeline construction. **Figure F-3** shows the locations of each of these. Details of each potential site are shown on **Figures F-4** through **F-8**. Each of these figures includes a description of the screening process for the potential site depicted.



South of Tampa Bay in the Sarasota area, the coastal area is densely developed with residential properties for at least 8 km (5 mi) from the coast, making it unsuitable for pipeline construction. Coastal resources also include seagrass beds, turtle habitat, mangrove resources, and protected waters. There is one industrial area adjacent to the interstate pipeline. However, the area is over 4 miles from the coast. This distance is greater than available directional drilling techniques are able to span. The area between the coast and the industrial area are densely developed with residential properties, so there would be no appropriate location for staging a directional drill under the coastal resources. One area south of the FGT pipeline has nonresidential property closer to shore, but that property is a State Recreational Area and therefore not suitable for pipeline construction.

Figure F-1. Area showing potential landfall site for pipeline around Sarasota, Florida



The potential onshore location in Fort Myers would provide an interconnection point to the existing onshore pipeline and would be 1.5 miles away from the existing interstate pipeline. However, onshore site and interconnection location are located inland within the Caloosahatchee River. This would require a long pipeline through barrier islands and through inland waters over twenty miles to open water. Therefore, the Ft. Myers area was eliminated from further consideration.

Figure F-2. Area showing potential landfall site for pipeline around Fort Meyers, Florida

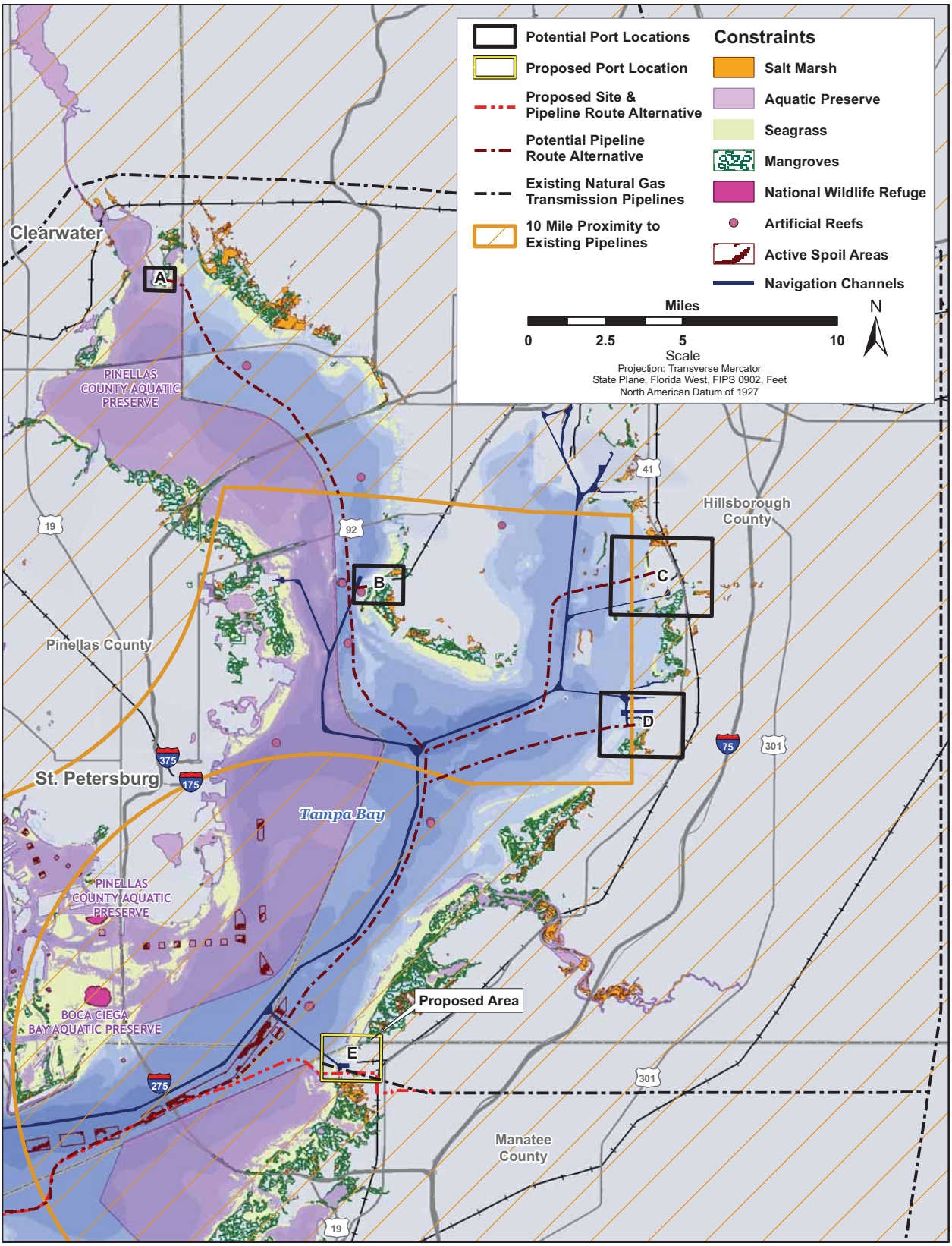
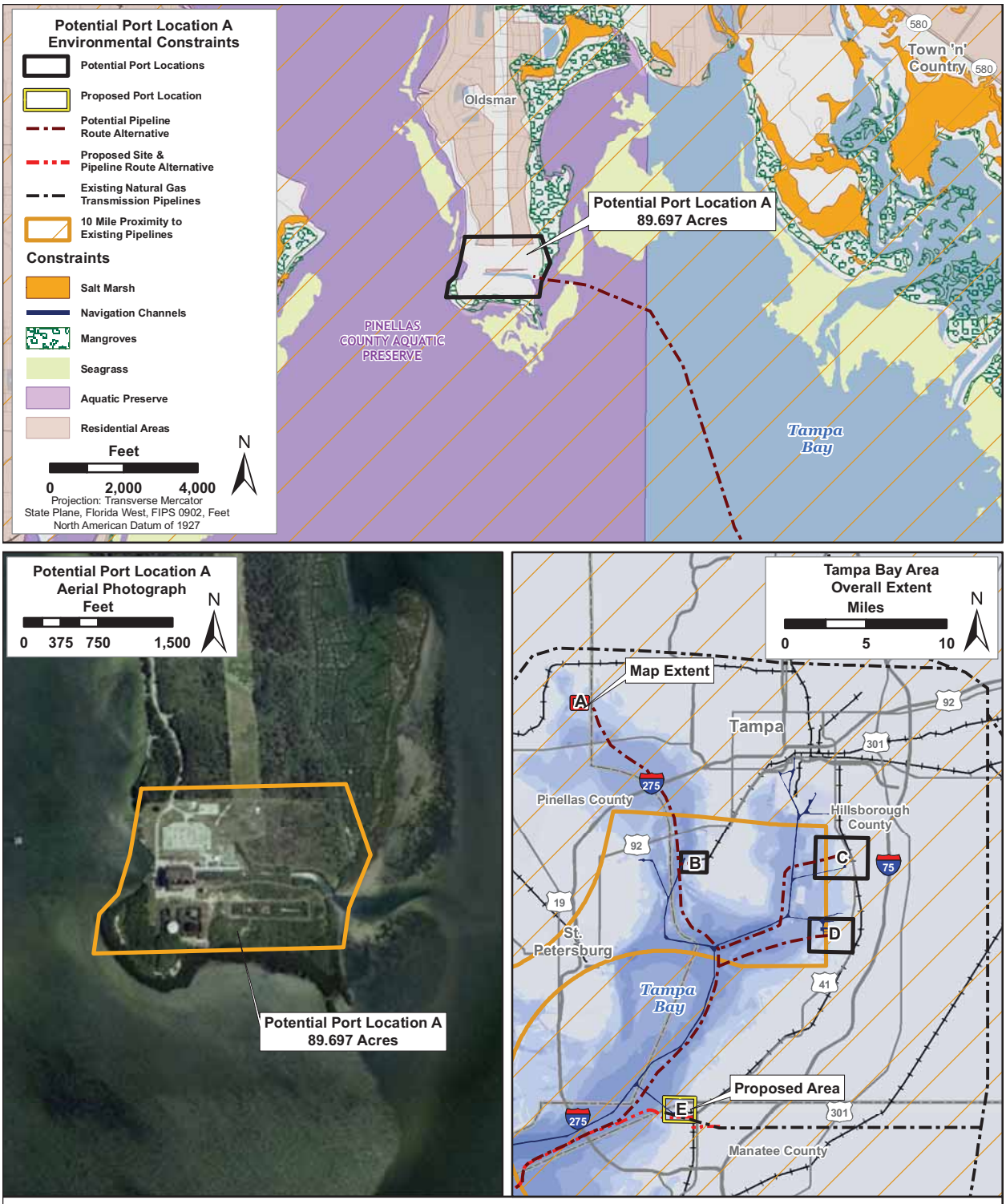
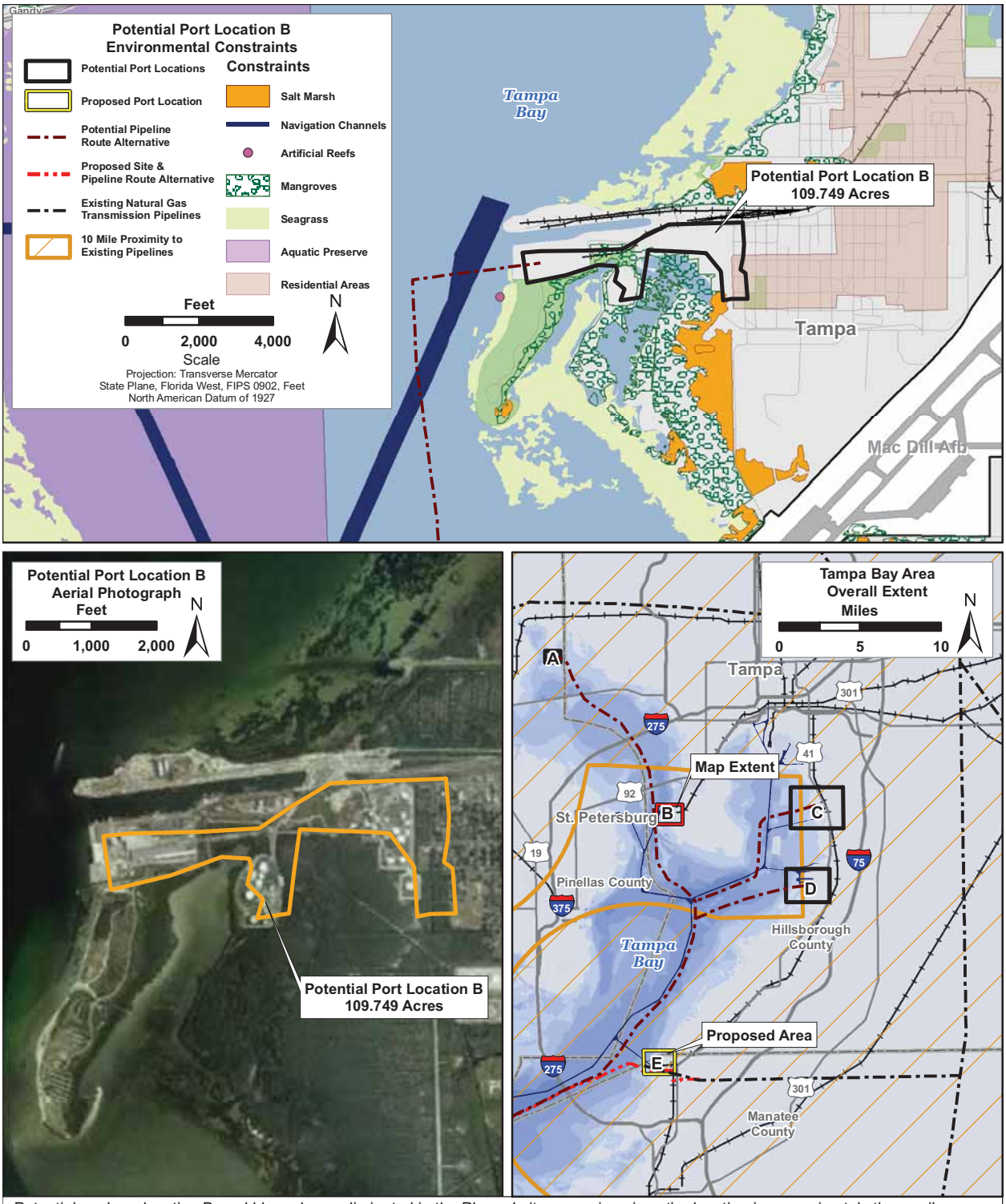


Figure F-3. Area showing potential landfall sites for pipeline around Tampa Bay, Florida



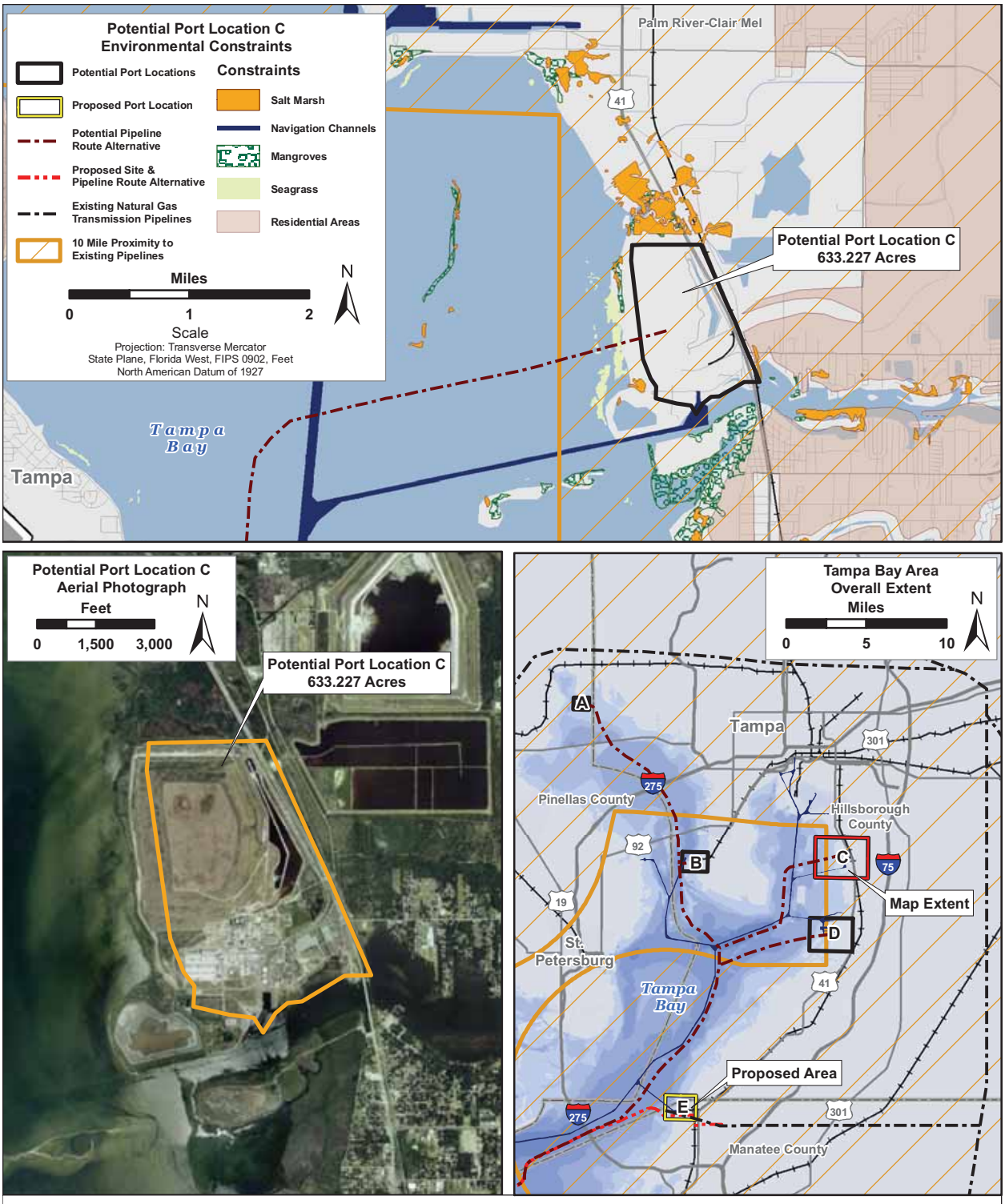
The potential onshore location A was the northernmost location considered. The site is located 3.2 miles south of an existing onshore interstate pipeline. However, its location would have required at least 33 miles of pipeline construction through Tampa Bay. The route would have crossed through several navigation channels which are routinely dredged for channel maintenance. There also are several environmental constraints such as seagrasses, mangroves, and aquatic preserves that would have increased environmental impacts or made construction more difficult to complete.

Figure F-4. Location A: Potential landfall site for pipeline in Tampa Bay, Florida



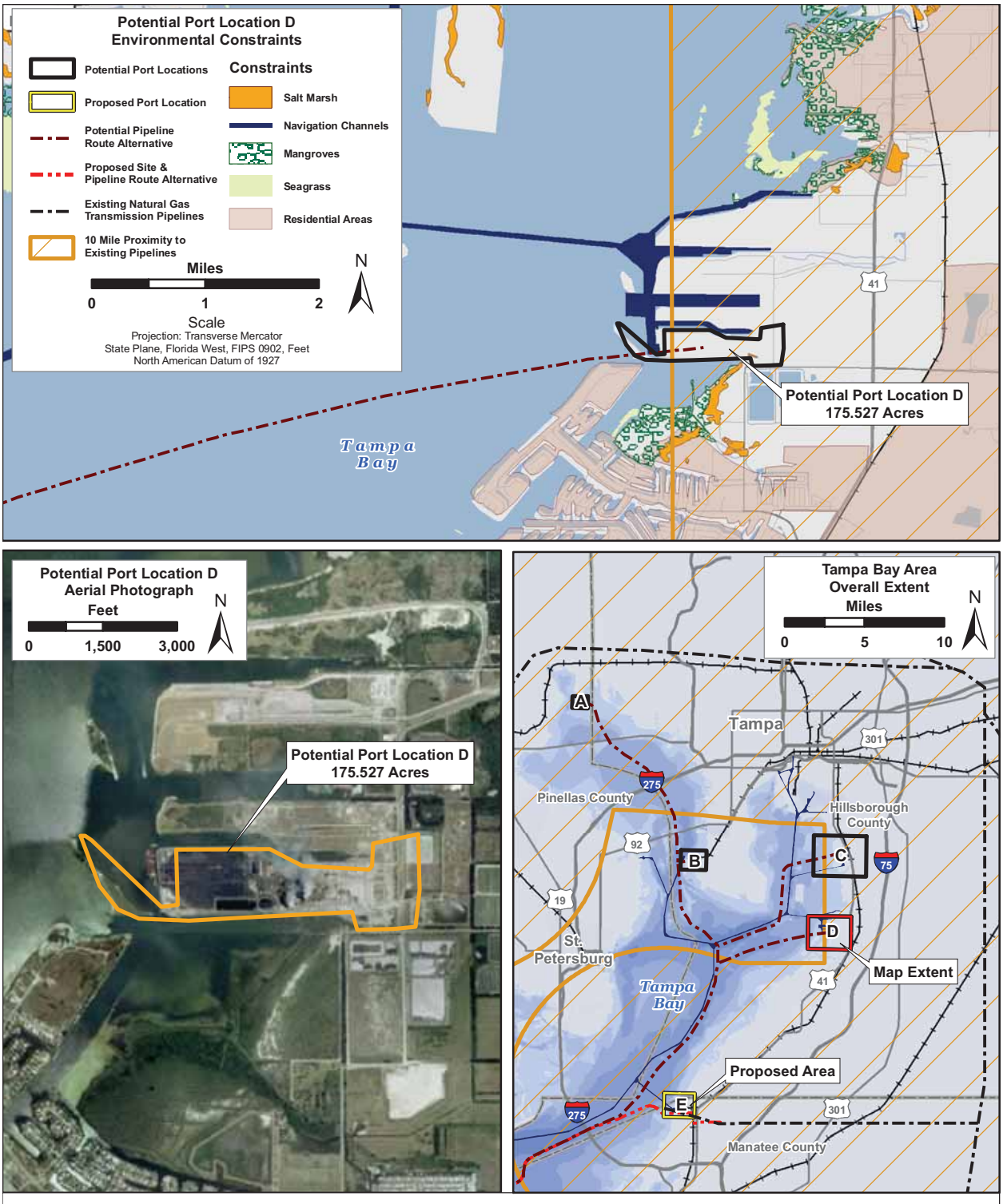
Potential onshore location B could have been eliminated in the Phase I site screening since the location is approximately three miles outside the original ten mile corridor for the existing interstate pipeline. However it was considered in this phase of the site screening because of its proximity to the coast and suitability of land use designation. Location B is approximately one mile from MacDill AFB in Tampa and 12.8 miles south of an existing interstate pipeline. Environmental constraints are not as severe as location A, but other environmental factors included mangroves, seagrasses, and artificial reefs. Selection of this location would require at least twenty miles of pipeline construction in Tampa Bay that crisscross navigation channels. Therefore, Site B was eliminated from further selection.

Figure F-5. Location B: Potential landfall site for pipeline in Tampa Bay, Florida



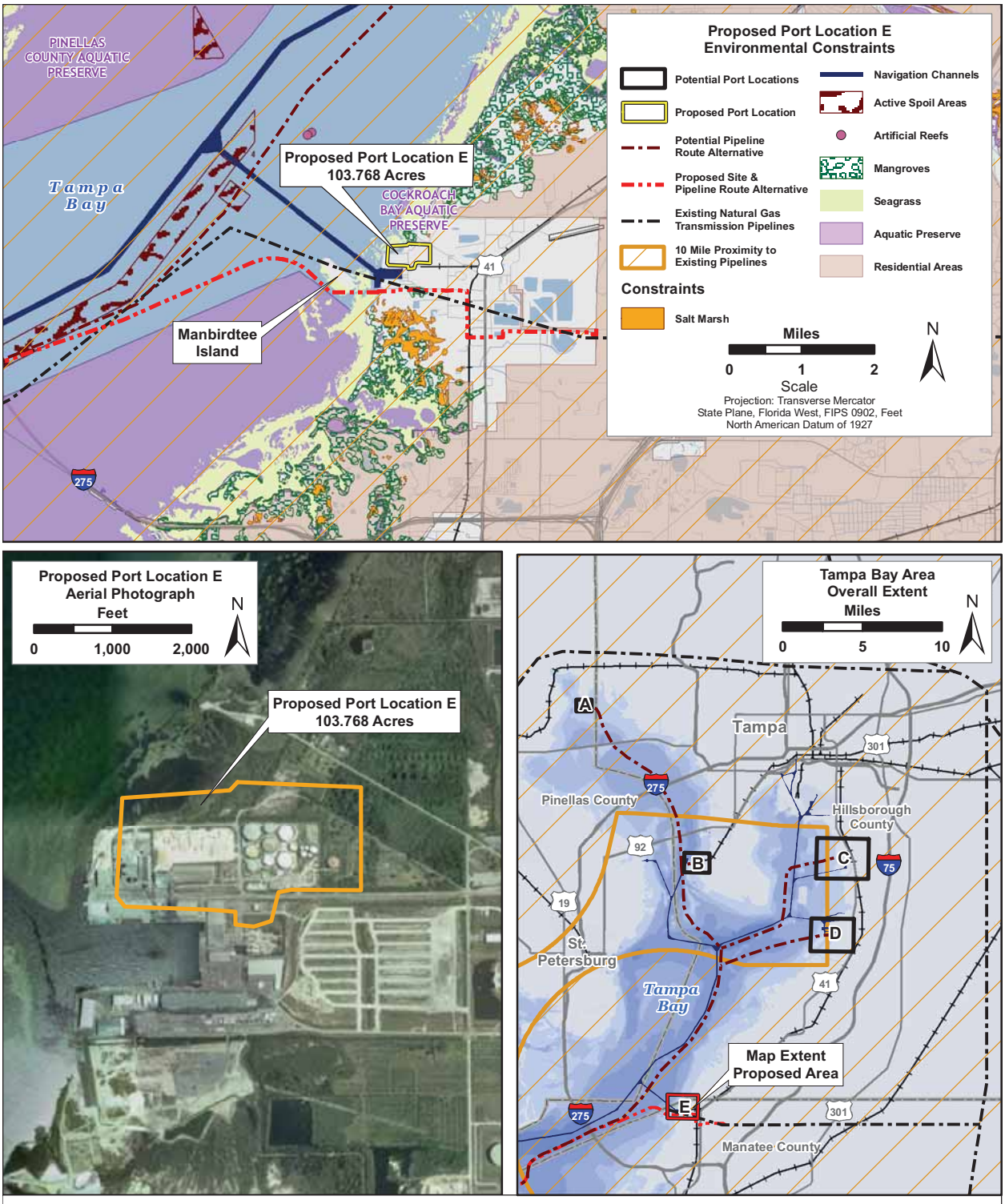
Potential onshore location C is on the eastern side of Tampa Bay. The nearest interconnection point to an existing onshore pipeline is 8.5 miles to the east. Environmental constraints are minimal in this location. There are seagrasses and mangroves nearby, but they are not disturbed due to channel dredging. However, the site is located over 22 miles from the entrance to Tampa Bay, requiring the constructed pipeline to cross navigation channels which are routinely dredged.

Figure F-6. Location C: Potential landfall site for pipeline in Tampa Bay, Florida



The next site considered was potential port location D. It is located on the eastern side of Tampa Bay and is four miles south of location C. The nearest interconnection point to an existing onshore pipeline is 9.2 miles to the east. Environmental constraints are almost nonexistent except for salt marshes and mangroves to the south of the site that could be avoided. This site is 21 miles away from the mouth of Tampa Bay, and like the previous potential sites, this requires multiple crossings of navigation channels.

Figure F-7. Location D: Potential landfall site for pipeline in Tampa Bay, Florida



Potential port location E exhibits benefits that surpass the other potential locations. This site is located eight miles from the mouth of Tampa Bay. The environmental constraints consist mainly of an area of seagrass between Manbirdtee Island and landfall. The primary advantage of this site is the proximity to the existing interstate pipeline, which is approximately four miles from the proposed port location. This site was the most advantageous potential site because environmental impacts could be minimized and no navigational channels have to be crossed.

Figure F-8. Location E: Potential landfall site for pipeline in Tampa Bay, Florida

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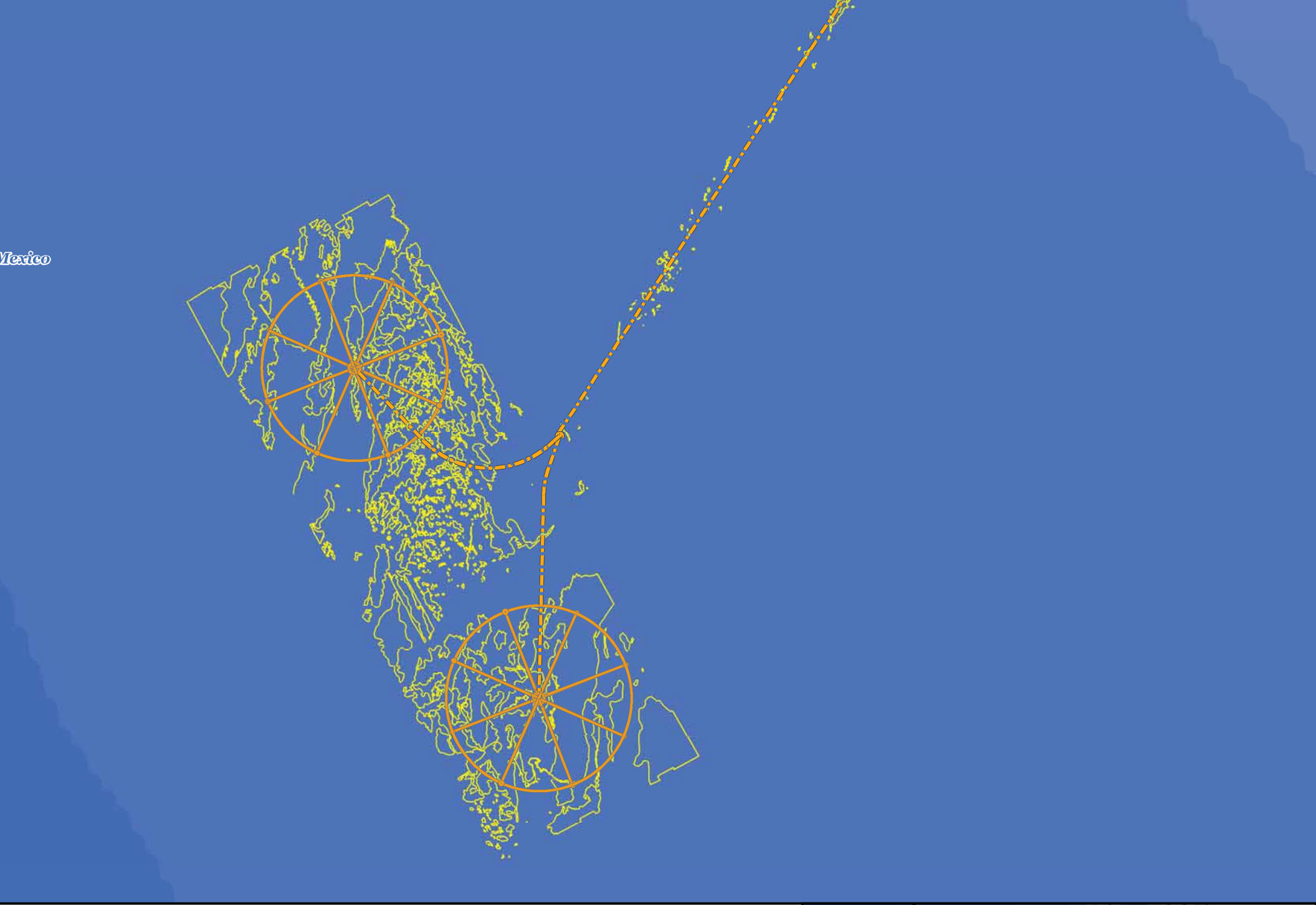
Appendix F2
Detailed Maps of the Project Area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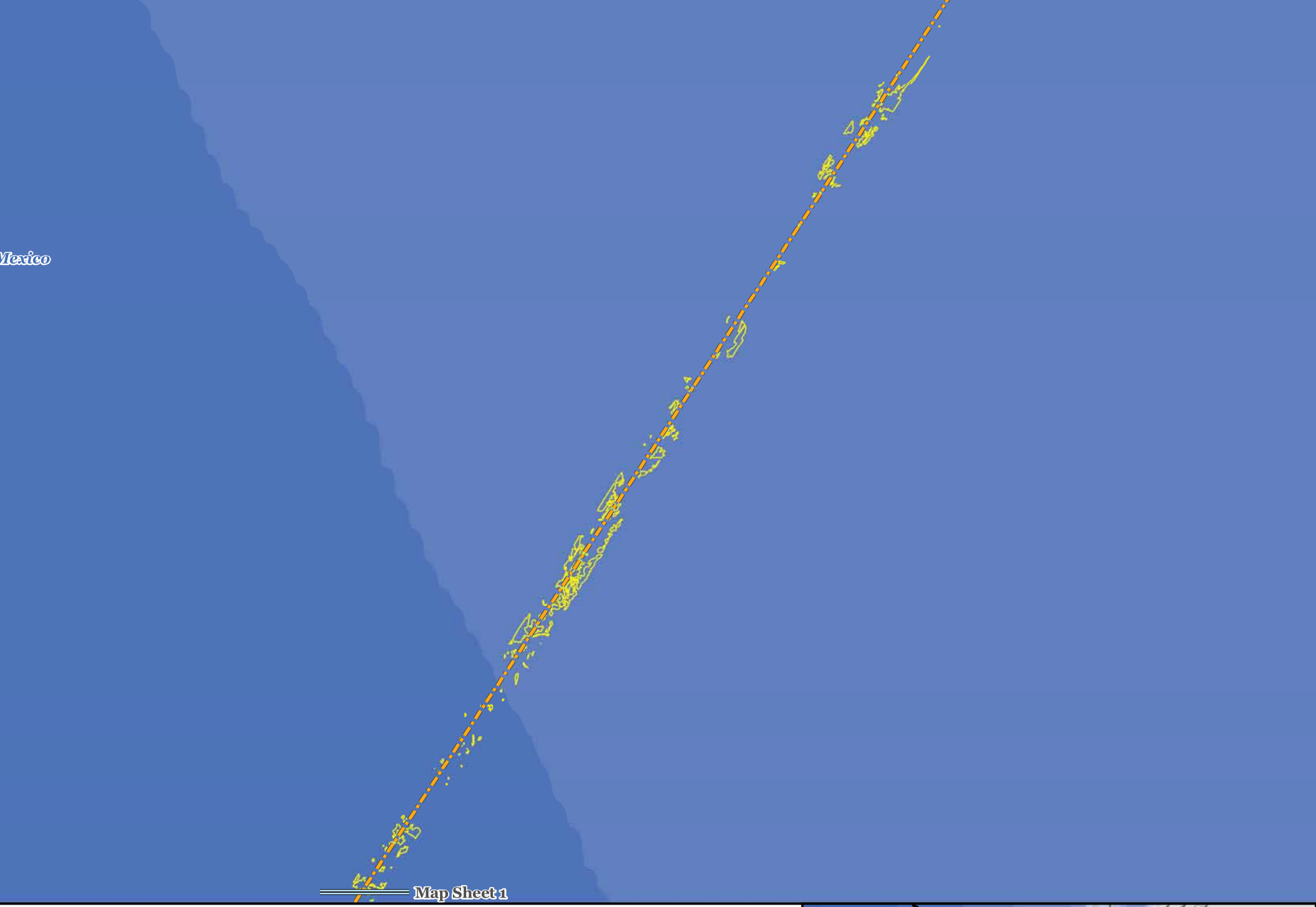

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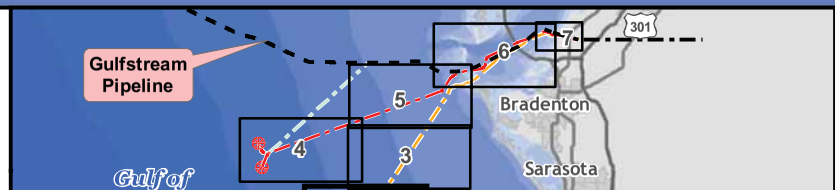



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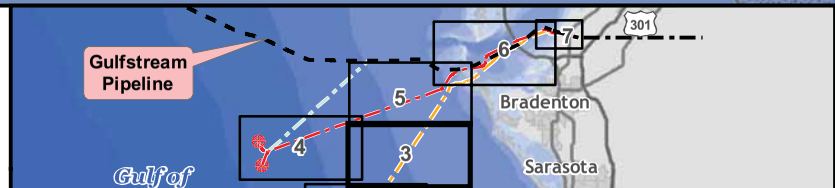



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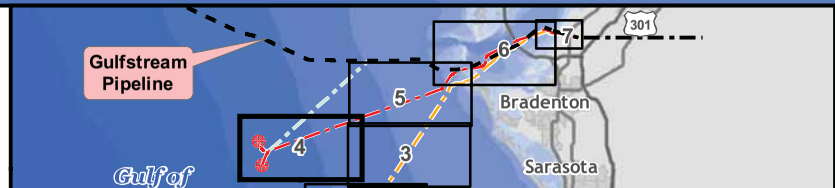

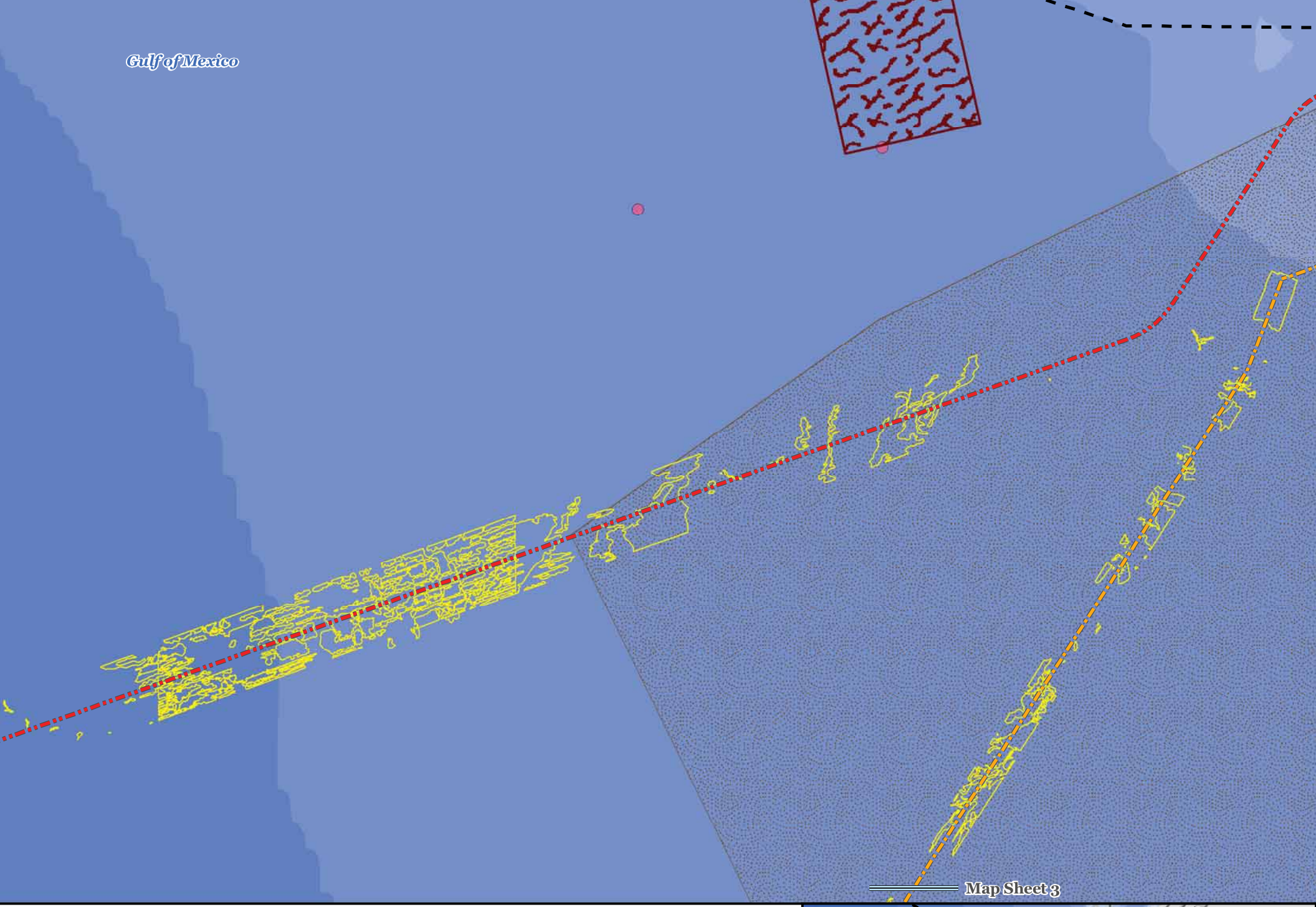
Gulf of Mexico
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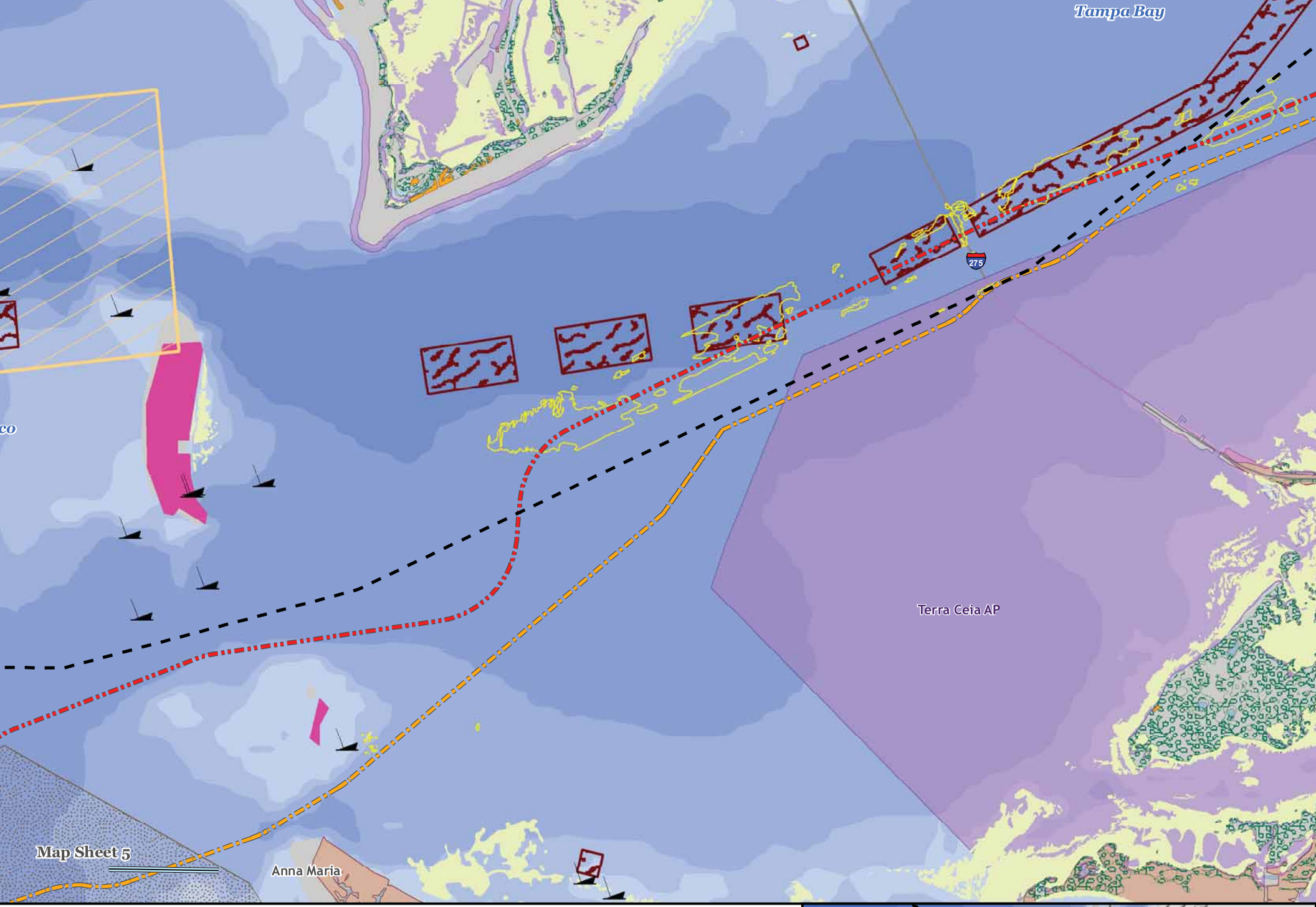
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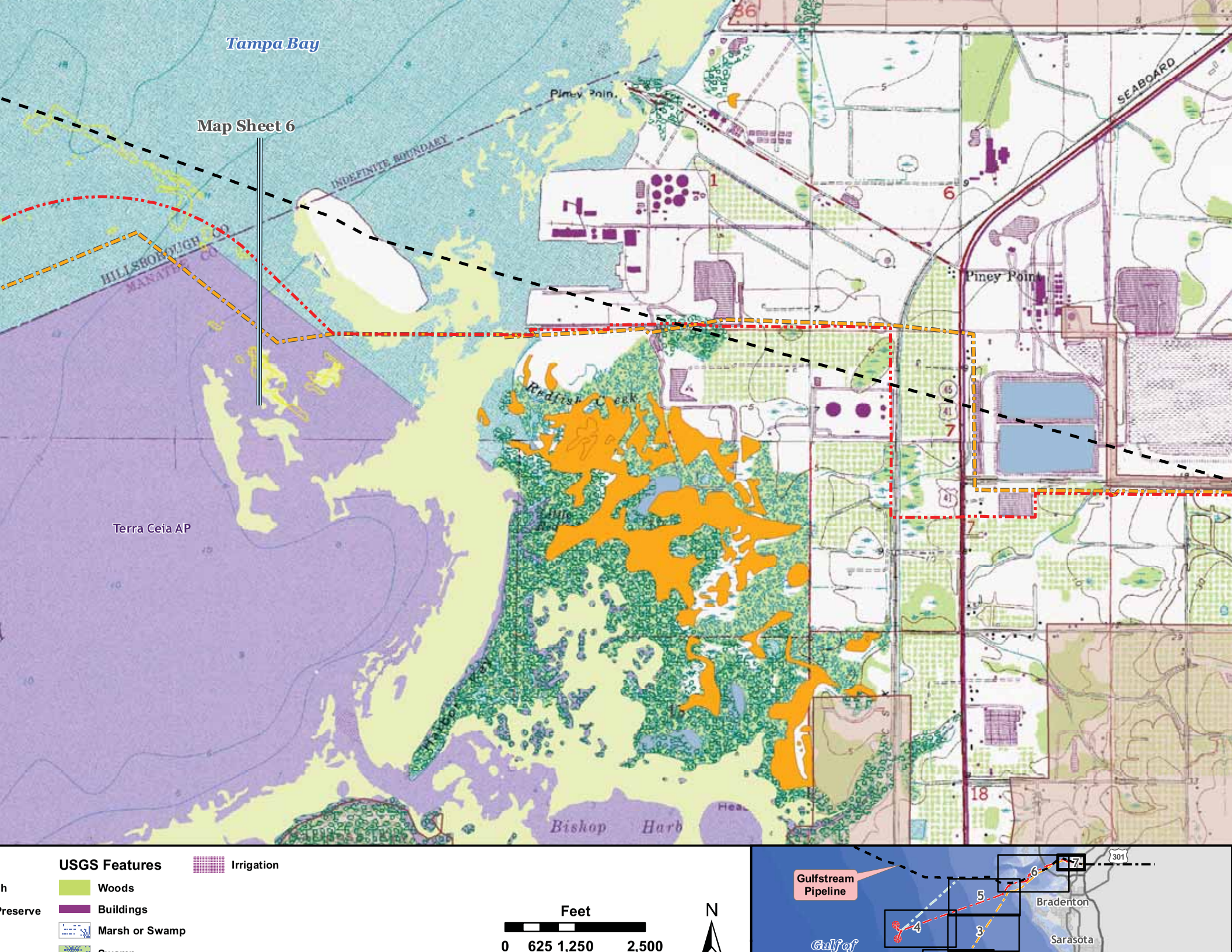

Tampa Bay
Map Sheet 6
Piney Point
INDEFINITE BOUNDARY
HILLSBOROUGH CO
MANATEE CO
SEABOARD
Piney Point
Redfish Creek
Terra Ceia AP
Bishop Harb
USGS Features
Woods
Buildings
Marsh or Swamp
Irrigation
Feet
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N
Gulfstream Pipeline
Bradenton
Sarasota
Gulf of

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Appendix G
Ichthyoplankton Assessment

ICHTHYOPLANKTON ASSESSMENT MODEL METHODOLOGY: DEVELOPMENT OF THE STUDY AREA AND SPECIES OF CONCERN

SUPPORTING THE

ENVIRONMENTAL IMPACT STATEMENT FOR THE PORT DOLPHIN LLC DEEPWATER PORT LICENSE APPLICATION

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Prepared for

Commandant
United States Coast Guard
Deepwater Ports Standards Division (CG-5225)
2100 Second Street, SW
Washington, DC 20593-0001

MARCH 2009

ICHTHYOPLANKTON ASSESSMENT MODEL METHODOLOGY: DEVELOPMENT OF THE STUDY AREA AND SPECIES OF CONCERN SUPPORTING THE PORT DOLPHIN LLC DEEPWATER PORT LICENSE APPLICATION ENVIRONMENTAL IMPACT STATEMENT

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1. Overview

The purpose of this document is to present the criteria that engineering-environmental Management, Inc. (e^2M) used to develop a study area for the Port Dolphin LLC Deepwater Port Environmental Impact Statement (EIS) and present the data used for the ichthyoplankton impact assessment. The methodology to evaluate impacts of seawater intakes associated with deepwater ports in the Gulf of Mexico was developed previously for the Gulf Landing Deepwater Port License Application EIS (USCG and MARAD 2004a) and was used to evaluate the impacts of the seawater intake alternatives associated with the proposed Port Dolphin Deepwater Port.

The following evaluation provides an overall description of abundance and density within the project area and assesses potential impacts based on calculated age-1 equivalents and equivalent yields for six finfish species. Based on the species represented in the Southeast Area Monitoring and Assessment Program (SEAMAP) data and other considerations, such as the availability of data to construct life histories and whether or not a species had Essential Fish Habitat (EFH) in the area, four species were selected to represent broad categories of the species represented in the data when the methodology was developed. The four finfish species that were selected are red drum (*Sciaenops ocellatus*), red snapper (*Lutjanus campechanus*), and bay anchovy (*Anchoa* spp.). These species were selected to represent a commercially and recreationally important species with significant impacts from over fishing and extensive restrictions on landings through a Federal Fishery Management Plan (FMP) (red drum), another important commercial and recreational species that is managed under a Federal FMP (red snapper), and an important prey species with some commercial importance (bay anchovy). Typically Gulf menhaden are assessed; however, a quantitative assessment of Gulf menhaden were omitted from this assessment because of data limitations, described in **Section 4**.

Based on discussions with the National Marine Fishery Service (NMFS) and the Florida Fish and Wildlife Commission (FFWC), three additional species were identified for analysis. Gag grouper (*Myctoperca microlepis*) was selected as a commercially and recreationally important species in the project area that is managed under a Federal FMP. Sheepshead (*Archosargus probatocephalus*) was selected as a species of concern to Florida that is not managed under a Federal FMP. Spanish sardine (*Sardinella aurita*) was selected as a forage fish common to the west coast of Florida that is also commercially fished. Other species might have EFH in the project area or occur in the project area, but these representative species were selected (in cooperation with NMFS) based on economic and ecological importance, availability of life history data, and the similarity to other population types. It is assumed that impacts on other species in the Project area would be similar to impacts on these representative species.

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2. Study Area

To maximize the number of samples from habitat similar to that of the proposed Port Dolphin Deepwater Port, e²M chose the study area based on depth and location (see **Figure 2-1**).

The proposed location of the Port Dolphin Deepwater Port is approximately 27.41 degrees (°) latitude and -83.20° longitude. The study area for this analysis incorporates depths greater than 65 feet, and encompasses 6,938 square miles around the proposed location with corners positioned as follows (see **Figure 2-1**):

- Northwest corner: 28.167° latitude/-84.019° longitude
- Northeast corner: 28.169° latitude/-83.245° longitude
- Southwest corner: 26.661° latitude/-84.019° longitude
- Southeast corner: 26.661° latitude/-83.552° longitude.

The proposed location is west of Tampa Bay and centered on the proposed Port Dolphin Deepwater Port. To capture all the SEAMAP sample locations within the designated study area, e²M queried the "statcard" table for samples classified as follows: "SLATDEC" (decimal latitude) greater than or equal to "26.595" and less than or equal to "28.225"; "SLONDEC" (decimal longitude) greater than or equal to "-84.015" and less than or equal to "-82.385"; and "ST_DEPTH" (sample depth) greater than or equal to "10.83" (note that this variable is reported in fathoms, so that a depth of greater than or equal to 65 feet was queried).

Between 1984 and 2002, 143 samples were taken in the study area, and eggs and larvae were collected in all 143 samples. There were no trips reported with egg samples in 1995. There were no trips with larval samples in 2000. A summary of the trips that caught eggs and larvae is presented in **Table 2-1**. These samples will be referred to as the Port Dolphin samples throughout the remainder of the document.

Sampling trips occurred from May to November (excluding July); the frequency of samples that caught larvae and eggs is presented in **Figure 2-2**. Because the trips occurred from May through November, the density estimates (i.e., average, upper, and lower estimates of larvae per 1 million gallons) are initially considered estimates for that 7-month period. The 7-month density estimates for the species of concern were used to derive yearly entrainment estimates, as described in the Gulf Landing EIS (USCG and MARAD 2004b) and below.

Estimates of the average density of eggs and larvae in 1 million gallons of seawater are presented in **Table 2-2**. Samples from within the study area indicate that an average of 3,398 eggs and 12,084 larvae occur per 1 million gallons of seawater in the area of the proposed Port Dolphin Deepwater Port.

Formulas designed within Microsoft Excel were used to calculate descriptive statistics for larval and egg densities per 1 million gallons of seawater. **Table 2-3** shows these statistics. The formula confidence limit equals the mean, plus or minus, the "t value" multiplied by the standard error. The "t value" is dependent on the degrees of freedom (n-1) and the desired confidence limits (95 percent in this case), and can be found in any standard t-distribution table.

The descriptive statistics were used to judge the normality of the data distribution and to estimate larval and egg densities in the study area. Based on the large values of kurtosis (flatness) and skewness, the distribution of the data was determined not to be a normal distribution. However, a non-normal distribution was expected, based on the inherent patchy distribution associated with ichthyoplankton.

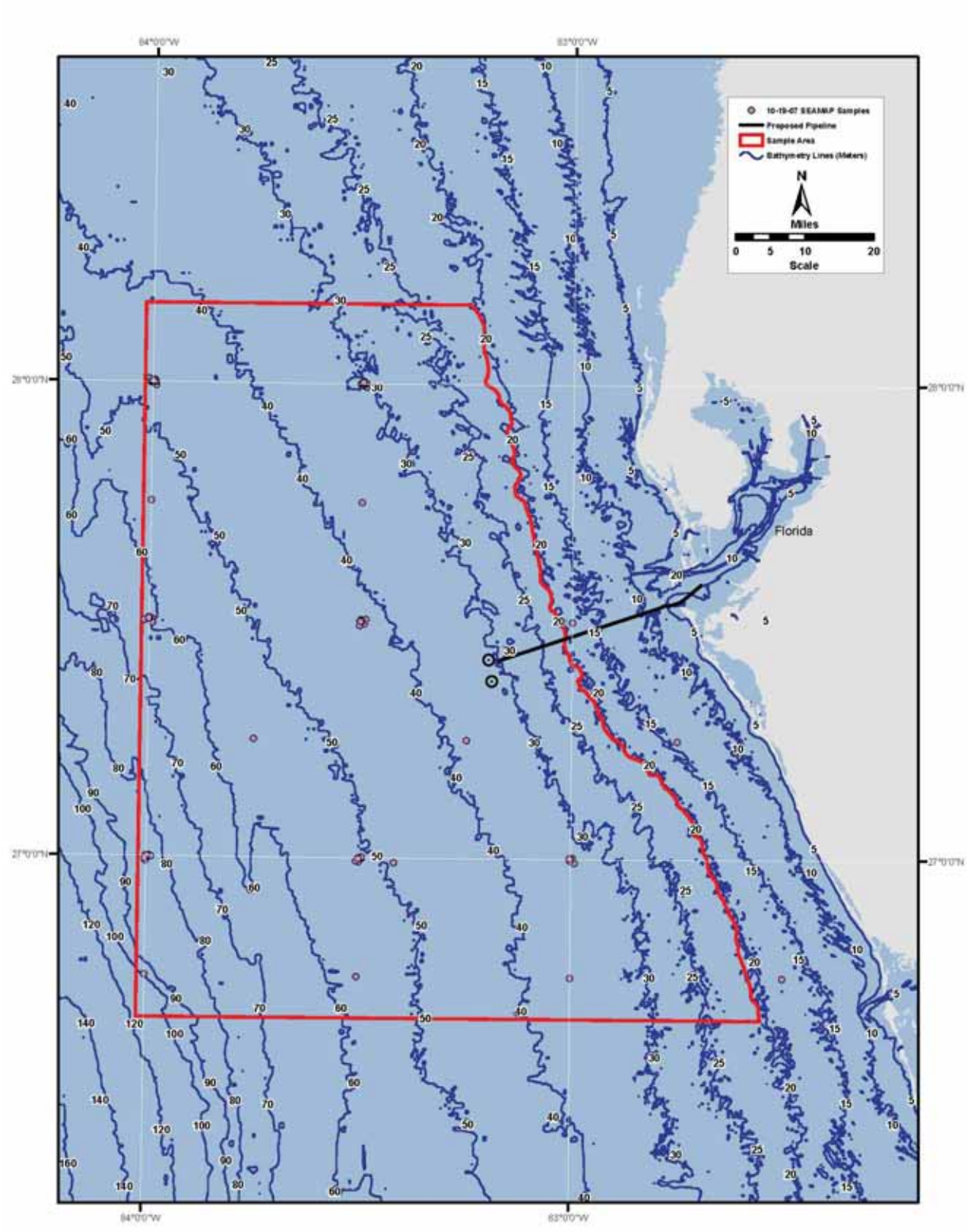


Figure 2-1. Study Area Surrounding the Proposed Port Dolphin Deepwater Port, for the Ichthyoplankton Analysis

Table 2-1. Density of Eggs and Larvae in the Samples within the Study Area Surrounding the Proposed Port Dolphin Deepwater Port

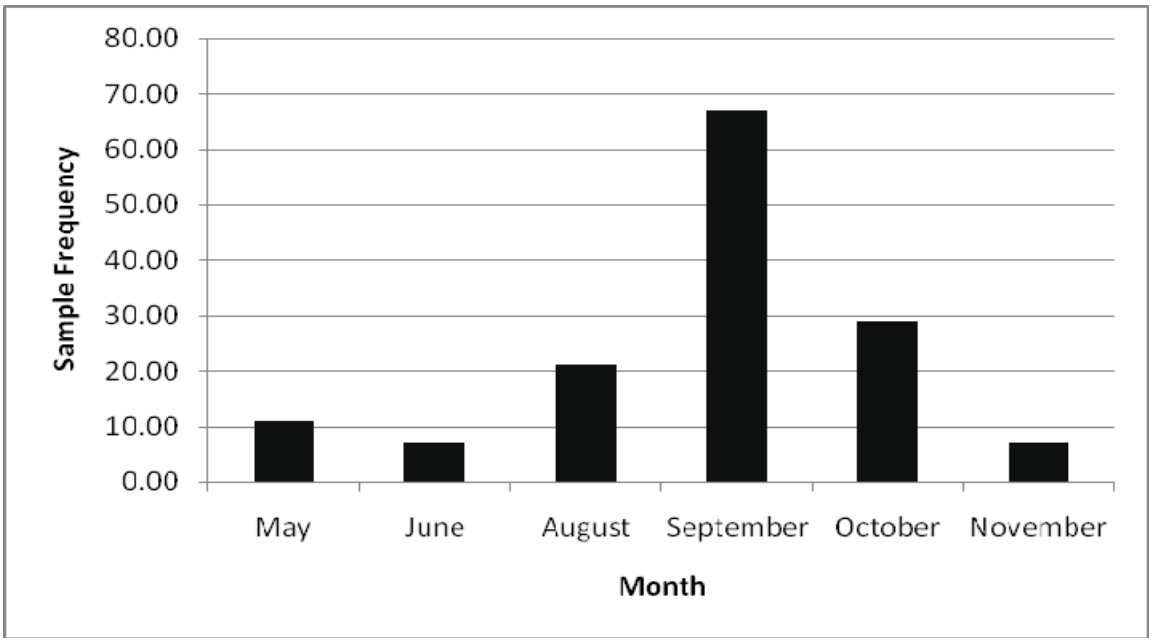
Sample Number	Latitude	Longitude	Depth (meters)	Date (Year-Mo-Day)	Eggs/ 1 million gallons	Larvae/ 1 million gallons
041343913701287	28.00	-84.00	27	19830509	3,785.40	19,183.63729
041464147003009	27.75	-84.00	31	19840824	3,250.09	15,371.01818
041464147103012	27.75	-83.50	17	19840825	56,846.27	20,428.1069
041614435505752	28.00	-84.00	25	19860908	0.00	16,032.28235
041614435605755	27.50	-84.00	32	19860908	0.00	412.9527273
041614435905764	27.00	-84.00	45	19860909	0.00	4,150.886897
041614436005767	27.00	-83.50	27	19860909	0.00	10,148.09362
041694619307403	28.00	-84.00	25	19870912	2,939.25	36,696.11294
041694619407406	28.00	-83.50	17	19870912	5,428.12	31,640.23019
041764849708738	28.00	-84.00	26	19880907	6,056.64	14,445.0864
041905177611925	28.00	-84.00	24	19900902	2,748.30	19,238.12877
042015427315049	28.00	-84.00	26	19920925	9,778.95	7,570.8
042015427415052	28.00	-83.50	17	19920925	17,435.78	11,929.74545
042420410627062	28.01	-83.50	16	20000930	9,383.53	8,743.740845
042420410727065	27.50	-83.50	22	20000930	7,527.29	7,788.351724
042420410827068	27.50	-84.00	32	20000930	2,598.63	7,141.105946
042420410927071	28.00	-84.00	24	20000930	1,461.03	6,342.205263
260012600327082	27.00	-83.99	46	20000927	1,550.21	3,713.297143
260012600327083	27.00	-83.99	46	20000927	1,619.71	3,257.627885
260012600427118	27.00	-83.50	29	20000927	4,106.20	2,021.018644
260012600427119	27.00	-83.50	29	20000927	3,850.67	2,480.089655
260012600527086	27.00	-83.00	18	20000927	9,365.94	4,917.117526
260012600527087	27.00	-83.00	18	20000927	7,886.25	4,100.85
269220002315199	27.49	-83.50	23	19921012	3,344.38	13,083.51845
269220002415202	27.50	-84.00	34	19921013	398.46	4,892.242105
269220002615208	27.00	-83.00	19	19921017	2,566.37	4,747.789831
269220002715211	26.99	-83.42	28	19921017	4,136.90	2,866.088571
269220002815214	26.99	-84.00	47	19921017	555.19	1,085.148
269320003516873	28.00	-84.00	27	19931013	888.19	15,289.6324
269320003616876	28.00	-83.50	17	19931014	8,755.35	19,828.28571
269320003716879	27.50	-83.50	23	19931014	2,429.82	7,698.685135
269320003816882	27.50	-84.00	34	19931014	2,869.98	13,632.38824
269320004116891	27.00	-84.00	47	19931014	456.86	4,059.515172
269320004216894	27.00	-83.50	29	19931015	4,857.37	5,376.607965
269320004316897	27.00	-83.00	18	19931015	1,289.23	76,558.34348
269522601620151	27.50	-83.00	11	19950924	3,269.21	1,686.223636

Sample Number	Latitude	Longitude	Depth (meters)	Date (Year-Mo-Day)	Eggs/ 1 million gallons	Larvae/ 1 million gallons
269522601720154	27.50	-83.50	24	19950924	3,854.23	12,801.53455
269522601820157	27.50	-84.00	33	19950924	1,688.87	15,549.25846
269522602220169	27.00	-84.00	29	19950925	2,185.21	7,295.498182
269522602320172	27.00	-83.50	29	19950925	2,026.53	11,929.74545
269522602420175	27.00	-83.00	18	19950925	1,032.38	8,450.236364
269622602021470	27.50	-83.50	23	19960911	5,693.00	88,196.83937
269622602121473	27.50	-84.00	34	19960912	4,222.18	9,629.891209
269622602421482	27.00	-84.00	46	19960912	2,018.88	1,170.032727
269622602521485	27.00	-83.50	29	19960912	3,573.63	7,464.914685
269622602621488	27.00	-83.00	19	19960912	10,320.57	49,424.46792
269722601923460	27.00	-83.00	17	19971002	10,028.49	4,830.622388
269722602023463	27.00	-83.50	28	19971002	2,183.88	14,209.80923
269722602123466	27.00	-84.00	45	19971002	792.29	2,024.748837
269912600525518	27.00	-83.00	19	19990926	7,802.56	9,270.367347
289552809420542	28.00	-84.00	25	19950924	5,089.26	22,880.64
289552809520545	28.00	-83.51	15	19950924	10,815.43	9,625.731429
289652808921750	28.00	-84.00	25	19960922	0.00	7,689.09375
289652809021753	28.00	-83.50	17	19960922	0.00	9,361.191892
289752810123380	27.50	-84.00	33	19970924	4,371.24	7,322.946429
289752810223383	27.50	-83.50	22	19970924	3,067.00	7,239.232117
289752810523392	28.00	-83.50	17	19970925	13,446.64	21,751.92537
289752810623395	28.00	-84.00	25	19970925	16,216.47	15,328.53333
308410000103771	27.25	-82.75	13	19840825	0.00	1,1924.01
308410000203774	27.25	-83.25	40	19840826	0.00	15,215.82353
308410000303777	27.25	-83.75	52	19840826	0.00	30,328.80723
308410000603786	26.75	-84.00	99	19840826	0.00	6,962.925547
308410000703789	26.75	-83.50	54	19840827	0.00	8,895.69
308410000803792	26.75	-83.00	36	19840827	0.00	27,689.5
308410000903795	26.75	-82.50	14	19840827	0.00	47,196.68936
308510002703999	28.00	-84.00	24	19850613	0.00	10,058.34857
308510002804002	28.00	-83.50	15	19850612	0.00	8,850.371831
308510003004008	27.50	-84.00	33	19850613	0.00	2,001.475862
308510003104011	27.50	-83.50	20	19850614	0.00	12,269.91724
308510003304014	27.00	-84.00	44	19850614	0.00	2,931.829412
308510003404017	27.00	-83.50	28	19850614	0.00	9,818.38125
308510003504020	27.00	-83.00	20	19850614	0.00	6,309
368620002505623	28.00	-83.50	15	19860909	0.00	56.49850746
368620002805632	27.50	-83.50	21	19860910	0.00	10,094.4
368620002905635	27.00	-83.00	17	19860910	0.00	18,746.74286

Sample Number	Latitude	Longitude	Depth (meters)	Date (Year-Mo-Day)	Eggs/ 1 million gallons	Larvae/ 1 million gallons
368640005306439	28.00	-83.99	24	19861118	0.00	5,158.127473
368640005406442	28.00	-83.49	14	19861118	0.00	4,568.586207
368640005506445	27.49	-83.99	20	19861118	0.00	3,137.897368
368640005606448	27.50	-84.00	29	19861119	0.00	6,632.824779
368640005906457	27.00	-83.99	43	19861119	0.00	1,470.58705
368640006006460	27.00	-83.00	26	19861119	0.00	21,736.78144
368640006106463	26.99	-82.99	17	19861120	0.00	5,455.429412
368730000306649	27.00	-83.49	26	19870501	4,247.034146	14,249.10732
368730001806675	27.00	-83.99	43	19870507	2,790.69635	10,720.69489
368730002006677	28.00	-83.99	24	19870507	8,906.823529	8,550.550588
368730002906696	28.00	-83.49	14	19870509	8,054.042553	7,852.691489
368750003107056	27.50	-83.50	20	19870901	7,010	4,486.4
368750003207059	27.49	-83.99	29	19870901	3,264.473394	31,151.41101
368750003507068	27.00	-83.99	41	19870902	3,843.045685	10,606.80609
368750003607071	27.00	-83.49	25	19870902	5,034.582	21,879.612
368750003707074	27.00	-83.00	16	19870902	3,785.4	12,132.69231
368810001607857	26.99	-84.00	44	19880507	5,649.850746	7,288.307463
368810001707860	27.50	-84.00	30	19880507	4,416.3	1,484.470588
368820001908460	27.50	-83.50	20	19880827	8,803.255814	7,966.946512
368820002008463	27.50	-83.99	26	19880827	3,711.897087	13,083.51845
368820002208469	27.00	-83.99	41	19880827	1,946.777143	2,460.51
368820002308472	27.00	-83.49	27	19880827	9,346.666667	18,412.93333
368820002408475	27.00	-83.00	16	19880828	10,983.86557	11,852.6459
368920002711556	27.50	-83.50	20.9	19891004	1,026.549153	7,442.481356
368920002811559	27.50	-83.99	31	19891005	1,261.8	11,999.97551
368920003111568	27.00	-84.00	41.9	19891005	1,100.856122	4,731.75
368920003211571	27.00	-83.50	26	19891005	1,354.409174	5,139.809174
368920003311574	27.00	-83.00	16.8	19891005	8,645.035135	3,529.62973
368920003311575	27.00	-83.00	16.8	19891005	0	5,444.753425
369010000311719	27.99	-83.49	15.4	19900524	1,0094.4	9,337.32
369010000411722	27.50	-83.50	21	19900525	9,226.9125	19,731.3975
369010000511725	27.49	-83.99	31.4	19900525	4,183.863158	3,486.552632
369010000611728	27.99	-83.99	24.2	19900525	3,127.069565	7,044.135652
369020002313928	27.49	-83.49	20.9	19901013	2,654.696104	14,109.21818
369020002413931	27.49	-83.99	31.9	19901013	378.54	8,290.026
369020002713940	27.00	-84.00	43.5	19901014	1,603.983051	1,924.779661
369020002813943	26.99	-83.50	27	19901014	462.66	7,739.04
369020002913946	27.00	-83.00	17.1	19901014	66.41052632	4,051.042105
369120001913121	27.00	-83.00	16.5	19910822	0	11,752.34651

Sample Number	Latitude	Longitude	Depth (meters)	Date (Year-Mo-Day)	Eggs/ 1 million gallons	Larvae/ 1 million gallons
369120002613142	26.99	-83.51	27.5	19910824	0	13,002.02609
369120002713145	27.00	-84.00	44.6	19910824	0	5,811.100541
369120003113157	28.00	-84.00	24.2	19910824	0	11,801.54118
369120003213160	27.50	-84.00	32.4	19910825	0	13,889.07794
369120003313163	27.50	-83.50	21.4	19910825	0	10,124.80482
369120003413166	28.00	-83.50	16	19910825	0	5,249.088
369420001718825	28.00	-83.50	15.6	19940928	5,106.718868	4,499.626415
369420001818828	28.00	-84.01	25.6	19940929	2,831.228926	10,855.65124
369420002218840	27.50	-84.00	32.8	19940929	2,487.548571	9,842.04
369420002318843	27.50	-83.50	22.2	19940930	12,026.53125	15,634.49063
369420002518849	27.00	-83.00	17.2	19941005	4,670.873684	6,087.631579
369420002618852	27.00	-83.50	28.3	19941005	5,536.355947	6,553.577974
369420002718855	27.00	-84.00	45.6	19941006	3,021.040385	11,926.43654
630156311728361	28.00	-83.50	15.7	20010921	0	12,714.00652
630156312328379	27.50	-84.00	32.8	20010922	0	7,397.611765
630156312428382	27.50	-83.50	22.7	20010922	0	30,417.19646
630156312728391	27.00	-83.00	18.3	20010923	0	10,465.51765
630156312828394	27.00	-83.50	28.3	20010923	0	10,372.97922
630156312928397	27.00	-84.00	44.7	20010923	0	4,500.932927
630250004729522	27.00	-84.00	45.2	20020909	0	3,523.333846
630250004829525	27.00	-83.50	28.3	20020909	0	8,221.415625
630250004929528	27.00	-83.00	18	20020909	0	25,801.63448
630250005229537	27.50	-83.50	22	20020910	0	24990.65
630250005329540	27.50	-84.00	33	20020910	0	4,441.827746
630250005629549	28.00	-84.00	24.8	20020910	0	5,467.8
630250005729552	28.00	-83.50	15.7	20020911	0	45,715.98462
639926310625854	28.01	-84.01	21	19990926	2,246.281319	9,692.287912
639926311025866	27.50	-84.01	30	19990927	1,892.7	9,201.433846
639926311125869	27.50	-83.49	19.1	19990927	5,320.021622	30,436.66216
				Mean=	**3,398.50**	**12,084.52**
				Standard Deviation=	**5,814.18**	**12,298.04**
				Standard Error=	**486.21**	**1,028.41**
				Upper=	**4,359.64**	**14,117.5**
				Lower=	**2,437.36**	**10,051.54**
				n=	**143**	**143**

Source: SEAMAP data provided by NOAA, NMFS



Source: e²M

Figure 2-2. Frequency of Egg and Larval Samples within the Study Area by Month

Table 2-2. Estimate of Egg and Larval Abundance at the Proposed Site for the Port Dolphin Deepwater Port, Based on Port Dolphin Samples

Life Stage	Number of Samples	Number of Eggs or Larvae/1 million gallons of Seawater	
		Mean	Standard Error
Egg	143	3,398	486
Larvae	143	12,084	1,028

Source: e2M

Based on the measures of central tendency, median, mode, mean, and skewness, it was determined that the best values to use as estimates for the larval and egg density in the study area were the standard mean and the upper and lower 95 percent confidence limits.

The mean densities of eggs and larvae within the study were previously adjusted because of the potential for undersampling by bongo nets used to collect the ichthyoplankton data for the SEAMAP survey. These bongo nets have a mesh size of 0.333 millimeters (mm). A comparison of ichthyoplankton samples taken with 0.333- and 0.202-mm mesh nets indicates that the smallest red drum larvae sampled were 5 to 8 times more numerous when collected with the finer mesh net. These results are expected to be applicable to larvae of other species (Thompson 2004). Additionally, in order to account for the patchiness and variability of the ichthyoplankton data (described above), 95 percent confidence limits were constructed around the adjusted mean.

Table 2-3. Descriptive Statistics for Egg and Larval Samples within the Study Area, Based on SEAMAP Data

Statistics	Eggs/1 million gallons	Larvae/1 million gallons
Mean	3,398.50	12,084.52
Standard Error	486.21	1,028.41
Median	1,947	8,896
Mode	0	11,929.74545
Standard Deviation	5,814.18	12,298.04
Sample Variance	33,804,719	151,241,832
Kurtosis	50.13	15.25
Skewness	5.85	3.35
Range	56,846	88,197
Minimum	0	0
Maximum	56,846	88,197
Sum	485,985.51	1,728,086.8
Count	143	143
Confidence Limit (95%)	4,359.64	14,117.5

Source: e2M

3. Species of Concern

The larvae in the Port Dolphin Deepwater Port samples represent 217 taxa (i.e., larvae identified to the lowest taxon possible). These taxa are presented in **Table 3-1**. The 10 most abundant taxa, in order of decreasing abundance, are gobies (Family Gobiidae), Spanish sardine (*Sardinella aurita*), round scad (*Decapterus punctatus*), Atlantic thread herring (*Opisthonema oglinum*), lizardfish (Family Synodontidae), scorpionfish (Family Scorpaenidae), unidentified fish, cusk eels (Family Ophidiidae), codfish (*Bregmaceros sp.*), and perches (Order Perciformes).

Ms. Patience Whitten consulted NMFS and FFWC via email to determine if the study area chosen was sufficient and if any additional species of concern need to be addressed (Whitten 2007)**.**

Table 3-1. Density of Larvae (Number of Larvae Per 1 Million Gallons) by Taxon in the Samples Within the Study Area Surrounding the Proposed Port Dolphin Deepwater Port

Scientific Name	Common Name	Larval Density (Larvae per 1 Million Gallons)		
		Lower Estimate	Average Estimate	Upper Estimate
Acanthuridae	Surgeonfish	0.00	0.26	0.77
Acanthurus sp. (Acanthuridae)	Surgeonfish	0.00	0.69	1.49
Acropomatidae	Lanternbellies	0.00	0.08	0.25
Aluterus heudelotii (Monacanthidae)	Dotterel Filefish	0.00	0.31	0.93
Aluterus sp. (Monocanthidae)	Filefish	0.00	1.34	2.87
Aluterus schoepfii (Monocanthidae)	Orange Filefish	0.00	1.03	2.58
Anchoa sp. (Engraulidae)	Anchovies	0.00	0.21	0.62
Anchoa hepsetus (Engraulidae)	Broad-Striped Anchovy	0.00	0.08	0.25
Anguilliformes	Eels	7.14	13.31	19.49
Anthias sp. (Serranidae)	Groupers	0.00	0.72	1.97
Anthias nicholsi (Serranidae)	Yellowfin Bass	0.00	0.51	1.52
Anthiinae (Serranidae)	Groupers	0.00	0.99	2.94
Antigonia sp. (Caproidae)	Red Boarfish	0.00	0.81	1.74
Apogon sp.(Apogonidae)	Cardinalfish	53.11	78.03	102.95
Apogonidae	Cardinalfish	60.01	84.29	108.57
Argentinidae	Argentines	0.00	0.30	0.88
Ariomma sp. (Ariommatidae)	Ariommatids	0.00	0.33	0.80
Auxis sp. (Scombridae)	Tunas, Mackerels	2.44	4.97	7.49
Bairdiella chrysoura (Sciaenidae)	Silver Perch	0.00	0.46	1.36
Balistidae	Triggerfish	31.38	54.03	76.67
Benthosema (Myctophidae)	Lanternfish	0.00	0.72	1.54

Scientific Name	Common Name	Larval Density (Larvae per 1 Million Gallons)		
		Lower Estimate	Average Estimate	Upper Estimate
Benthosema suborbitale (Myctophidae)	Smallfin Lanternfish	0.00	0.22	0.67
Beryciformes	Squirrelfish	0.00	0.18	0.53
Blenniidae	Blennies	11.95	20.88	29.80
Blennioidei	Blennies	1.07	3.66	6.26
Bothidae	Lefteye Flounders	124.46	183.89	243.31
Bothus sp. (Bothidae)	Lefteye Flounders	101.62	144.62	187.63
Bregmaceros sp. (Bregmacerotidae)	Codfish	183.86	294.80	405.74
Bregmacerotidae	Codfish	0.00	0.38	1.14
Brevoortia gunteri (Clupeidae)	Finescale Menhaden	0.00	0.27	0.81
Brotula sp. (Ophidiidae)	Cusk Eels	0.00	0.20	0.61
Callecheyls muraena (Ophichthidae)	Blotched Snake Eel	0.00	0.59	1.31
Callionymidae	Dragonets	98.68	166.77	243.86
Callyonymus sp. (Callionymidae)	Dragonets	14.98	67.95	120.91
Caproidae	Boarfish	0.00	1.22	3.13
Carangidae	Jacks	13.54	24.80	36.06
Caranx crysos (Carangidae)	Blue Runner	0.00	0.26	0.77
Carapidae	Pearlfish	0.00	3.05	8.01
Carapus sp. (Carapidae)	Pearlfish	4.21	9.72	15.22
Carapus bermudensis(Carapidae)	Atlantic Pearlfish	1.01	4.49	7.96
Centrobranchus nigroocellatus (Myctophidae)	Lanternfish	0.00	0.08	0.25
Centropristis sp. (Serranidae)	Sea Basses	11.43	28.63	45.82
Centropristis striata (Serranidae)	Black Sea Bass	0.00	14.25	42.43
Ceratioidea	Anglerfish	1.77	11.67	21.58
Ceratioidei	Anglerfish	63.50	91.07	118.63
Ceratoscopelus sp. (Myctophidae)	Lanternfish	0.30	1.29	2.28
Ceratoscopelus maderensis (Myctophidae)	Horned Lanternfish	0.00	0.55	1.38
Chaetodontidae	Butterflyfish	0.00	0.32	0.78
Chiasmodontidae	Swallowers	0.00	0.25	0.73
Chloroscombrus chrysurus (Carangidae)	Atlantic Bumper	9.16	31.57	53.97

Scientific Name	Common Name	Larval Density (Larvae per 1 Million Gallons)		
		Lower Estimate	Average Estimate	Upper Estimate
Chloroscombrus sp. (Carangidae)	Jacks	0.00	0.11	0.32
Citharichthys sp. (Paralichthyidae)	Whiffs	18.44	37.30	56.15
Citharichthys cornutus (Paralichthyidae)	Horned Whiff	0.00	1.54	3.94
Citharichthys gymnorhinus (Paralichthyidae)	Anglefin Whiff	7.65	16.57	25.49
Citharichthys spilopterus (Paralichthyidae)	Bay Whiff	0.00	0.42	1.25
Clinidae	Kelpfish	0.00	0.46	1.12
Clupeidae	Herrings	46.27	228.88	411.50
Clupeiformes	Herrings	0.00	194.14	524.71
Congridae	Conger Eels	5.45	15.42	25.40
Coryphaena sp. (Coryphaenidae)	Dolphinfish	0.02	1.20	2.37
Cubiceps sp. (Nomeidae)	Driftfish	0.00	0.57	1.39
Cyclopsetta sp. (Paralichthyidae)	Flounders	1.47	4.16	0.00
Cyclopsetta fimbriata (Paralichthyidae)	Spotfin Flounder	0.00	1.36	2.92
Cyclothone sp. (Gonostomatidae)	Lightfish	2.25	4.53	6.80
Cynoglossidae	Tongue Soles	0.00	3.08	7.71
Cynoscion arenarius (Sciaenidae)	Sand Seatrout	0.00	0.37	1.11
Decapterus punctatus (Carangidae)	Round Scad	551.40	731.82	912.24
Decapterus sp. (Carangidae)	Jacks	0.00	1.47	4.38
Diaphus sp. (Myctophidae)	Lanternfish	5.39	76.16	146.93
Diogenichthys atlanticus (Myctophidae)	Lanterfish	0.00	0.53	1.34
Diplectrum sp. (Serranidae)	Groupers	44.69	84.64	124.60
Diplospinus multistriatus (Gempylidae)	Snake Mackerels	0.00	0.26	0.77
Echiodon dawsoni (Carapidae)	Chain Pearlfish	0.00	0.38	0.93
Engraulidae	Anchovies	11.32	25.91	40.50
Engyophrys senta (Bothidae)	Spiny Flounder	0.00	1.03	2.28
Epinephelinae	Groupers	0.10	1.84	3.59
Etropus sp. (Paralichthyidae)	Flounders	6.99	29.82	52.65

Scientific Name	Common Name	Larval Density (Larvae per 1 Million Gallons)		
		Lower Estimate	Average Estimate	Upper Estimate
Etropus crossotus (Paralichthyidae)	Fringed Flounder	4.43	24.62	44.80
Etrumeus teres (Clupeidae)	Atlantic Red Herring	0.84	7.93	15.02
Euthynnus alletteratus (Scombridae)	Little Tunny	13.02	21.89	30.77
Exocoetidae	Flyingfish	0.00	2.50	5.54
Fistularia sp. (Fistulariidae)	Cornetfish	0.00	0.33	0.99
Gadiformes	Codfish	0.00	0.41	1.21
Gerreidae	Mojarras	66.16	143.93	221.70
Gobiidae	Gobies	2571.22	3201.81	3832.40
Gonichthys cocco (Myctophidae)	Lanterfish	0.00	0.18	0.54
Gonostoma sp. (Gonostomatidae)	Bristlemouths	0.00	0.41	1.21
Gonostomatidae	Lightfish	0.46	2.38	4.29
Grammistidae	Groupers	8.13	13.52	18.91
Grammistinae	Groupers	2.49	6.12	9.74
Haemulidae	Grunts	0.00	31.51	80.77
Harengula jaguana(Clupeidae)	Scaled Herring	1.21	3.78	6.34
Holocentridae	Squirrelfish	0.10	0.99	1.88
Holocentrus sp. (Holocentridae)	Squirrelfish	0.00	1.89	3.85
Howella sp. (Howellidae)	Perches	0.00	0.72	1.64
Hygophum sp. (Myctophidae)	Lanternfish	0.00	3.15	7.11
Hygophum reinhardtii (Myctophidae)	Lanternfish	0.00	0.88	1.78
Hypleurochilus geminatus (Blenniidae)	Crested Blenny	0.00	1.12	2.44
Hypsoblennius hentzi (Blenniidae)	Feather Blenny	0.00	0.37	1.11
Istiophoridae	Billfish	0.00	0.36	1.06
Katsuwonas pelamis (Scombridae)	Artic Bonito	0.00	0.58	1.73
Labridae	Wrasses	93.03	144.75	196.48
Lagodon rhomboides (Sparidae)	Pinfish	0.00	4.13	8.42
Lampanyctus sp. (Myctophidae)	Lanternfish	0.00	0.35	0.84
Leiostomus xanthrus (Sciaenidae)	Spot	0.00	0.33	0.97

Scientific Name	Common Name	Larval Density (Larvae per 1 Million Gallons)		
		Lower Estimate	Average Estimate	Upper Estimate
Letharchus aliculatus (Ophichthidae)	Snake Eel	0.00	0.18	0.53
Letharchus velifer (Ophichthidae)	Sailfin Eel	0.00	0.32	0.94
Liopropoma sp. (Serranidae)	Groupers	0.00	0.14	0.43
Lophiformes	Anglerfish	0.00	0.19	0.58
Lutjanidae	Snappers	172.78	219.28	265.78
Lutjanus campechanus (Lutjanidae)	Red Snapper	0.00	0.57	1.28
Lutjanus griseus (Lutjanidae)	Grey Snapper	0.54	3.31	6.09
Lutjanus sp. (Lutjanidae)	Snapper	16.42	31.11	45.81
Macroramphosus sp. (Macroramphosidae)	Snipefish	0.00	0.83	2.48
Malacanthidae	Tilefish	0.00	0.60	1.64
Maurolicus muelleri (Sternoptychidae)	Pearlside	0.00	1.35	4.01
Melamphaidae	Ridgeheads	0.49	2.33	4.18
Melanostomiinae	Scaleless Dragonfish	0.00	0.14	0.40
Menticirrhus sp. (Sciaenidae)	Weakfish	0.00	0.47	1.13
Microdesmidae	Dartfish	0.49	2.48	4.48
Monacanthus ciliatus (Monacanthidae)	Fringed Filefish	0.00	0.23	0.69
Stephanolepis hispida (Monacanthidae)	Planehead Filefish	0.00	1.35	4.01
Monacanthidae	Filefish	17.28	29.80	42.33
Monacanthus sp. (Monacanthidae)	Filefish	0.00	1.48	3.17
Monolene sp. (Bothidae)	Lefteye Flounders	0.00	0.14	0.43
Mugil sp. (Mullidae)	Mullet	0.00	0.58	1.30
Mugilidae	Mullet	0.00	0.13	0.38
Mullidae	Mullet	0.00	2.91	5.87
Muraenidae	Morey Eels	0.49	1.76	3.02
Myctophidae	Lanternfish	3.81	9.08	14.35
Myctophiformes	Lanternfish	0.00	1.05	2.62
Myctophum sp. (Myctophidae)	Lanternfish	0.37	2.37	4.37
Myrophinae	Worm Eels	0.00	0.37	1.11
Myrophis punctatus (Ophichthidae)	Speckled Worm Eel	0.00	0.09	0.27
Nesiarchus nasutus (Gempylidae)	Black Gemfish	0.00	0.18	0.53

Scientific Name	Common Name	Larval Density (Larvae per 1 Million Gallons)		
		Lower Estimate	Average Estimate	Upper Estimate
Nettastomatidae	Duckbill Eels	0.00	0.99	2.17
Notolychnus valdiviae (Myctophidae)	Lanternfish	0.00	0.61	1.31
Ogcocephalidae	Batfish	0.00	0.23	0.69
Ophichthus gomesii (Ophichthidae)	Shrimp Eel	0.13	3.47	6.82
Ophichthidae	Snake Eels	13.25	21.12	28.99
Ophichthus sp. (Ophichthidae)	Snake Eels	0.00	0.73	2.16
Ophichthus rex (Ophichthidae)	King Snake Eel	0.16	2.19	4.23
Ophidiidae	Cusk Eels	248.53	304.80	361.07
Opisthonema oglinum (Clupeidae)	Atlantic Thread Herring	0.00	422.49	980.09
Opistognathidae	Jawfish	2.00	4.61	7.21
Opistognatus sp. (Opistognathidae)	Jawfish	0.00	0.69	1.49
Ostraciidae	Boxfish	0.00	0.63	1.52
Paralepididae	Barracudinas	0.45	6.23	12.01
Perprilus alepidotus (Stromateidae)	Harvestfish	0.00	0.25	0.74
Perprilus burti (Stromateidae)	Gulf Butterfish	0.00	2.60	5.75
Perprilus paru (Stromateidae)	Harvestfish	0.00	8.72	21.41
Peprilus sp. (Stromateidae)	Harvestfish	0.00	3.23	6.59
Perciformes	Perches	196.18	271.57	346.96
Peristedion sp. (Triglidae)	Searobins	0.00	0.14	0.43
Phaenomonas longissima (Ophichthidae)	Short-Maned Sand Eel	0.00	0.22	0.67
Pleuronectiformes	Flatfish	1.79	5.60	9.41
Pomacanthidae	Angelfish	0.00	0.36	0.89
Pomacentridae	Damselfish	11.32	22.10	32.88
Pomatomus saltatrix (Pomatomidae)	Bluefish	0.00	0.27	0.80
Priacanthidae	Bigeyes	24.57	41.42	58.28
Prionotus sp. (Triglidae)	Searobins	30.01	47.20	64.38
Pristipomoides aquilonaris(Lutjanidae)	Wenchman	1.68	3.96	6.25
Psenes sp. (Nomeidae)	Driftfis	0.00	1.16	2.47
Pseudogramma sp. (Serranidae)	Grouper	0.00	0.21	0.62
Pseudomyrophis fugesae (Ophichthidae)	Diminutive Worm Eel	0.07	1.07	2.06

Scientific Name	Common Name	Larval Density (Larvae per 1 Million Gallons)		
		Lower Estimate	Average Estimate	Upper Estimate
Pseudomyrophis sp. (Opichthidae)	Worm Eels	0.00	0.63	1.52
Rhomboplities aurorubens (Lutjanidae)	Vermillion Snapper	55.06	74.04	93.03
Rypticus sp. (Serranidae)	Soapfish	0.00	0.52	1.27
Salmoniformes	Salmons	0.00	0.22	0.64
Sardinella aurita (Clupeidae)	Spanish Sardine	735.86	1834.14	2932.42
Sardinella sp. (Clupeidae)	Sardines	0.00	0.99	2.94
Scaridae	Parrotfish	31.01	55.36	79.71
Sciaenidae	Croakers	0.00	2.13	4.56
Sciaenops ocellatus (Sciaenidae)	Red Drum	0.00	0.12	0.35
Scomberomorus cavalla(Scombridae)	King Mackerel	5.94	9.71	13.47
Scomberomorus maculatus (Scombridae)	Spanish Mackerel	0.00	0.55	1.33
Scomberomorus sp. (Scombridae)	Tunas, Mackerels	0.00	0.30	0.71
Scombridae	Tunas, Mackerels	3.76	13.09	22.41
Scombroidei	Billfish	0.00	0.19	0.58
Scorpaenidae	Scorpionfish	270.19	361.48	452.76
Scorpaeniformes	Scorpionfish	0.65	2.88	5.11
Selar crumenopthalmus (Carangidae)	Bigeye Scad	3.74	8.33	12.91
Selen vomer (Carangidae)	Lookdown	0.00	0.24	0.72
Seriola sp. (Carangidae)	Amberjacks	0.00	0.76	1.71
Serranidae	Groupers	103.84	159.62	215.39
Serraniculus pumilio (Serranidae)	Pygmy Sea Bass	44.19	103.79	164.40
Serranus sp. (Serranidae)	Sea Basses	0.00	0.96	2.32
Soleiidae	Soles	0.00	0.80	1.62
Sparidae	Porgies	20.87	35.57	50.27
Sparisoma sp. (Scaridae)	Parrotfish	8.82	21.34	33.86
Sphoeroides sp. (Tetraodontidae)	Puffers	29.94	41.98	54.02
Sphyraena sp. (Sphyraenidae)	Barracudas	2.70	6.78	10.86
Stellifer lanceolatus (Sciaenidae)	Star Drum	0.00	0.17	0.51
Stephanolepis hispida (Monacanthidae)	Planehead Filefish	0.00	0.53	1.32

Scientific Name	Common Name	Larval Density (Larvae per 1 Million Gallons)		
		Lower Estimate	Average Estimate	Upper Estimate
Stephanolepis sp. (Monacanthidae)	Filefish	0.43	9.23	18.04
Sternoptychidae	Hatchetfish	0.00	0.31	0.93
Stromateidae	Butterfish	0.00	3.76	7.91
Sudis sp. (Paralepididae)	Lussions	0.00	0.32	0.95
Syacium sp. (Paralichthyidae)	Flounders	163.54	238.21	312.88
Syacium papillosum (Paralichthyidae)	Dusky Flounder	135.68	198.00	260.32
Symphurus plagiusa (Cynoglossidae)	Blackcheek Tonguefish	0.00	0.45	1.34
Symphurus sp. (Cynoglossidae)	Straightmouth Tonguefish	70.86	99.17	127.47
Syngnathidae	Pipefish	0.00	0.57	1.42
Syngnathus sp. (Syngnathidae)	Pipefish	0.12	1.54	2.96
Synodontidae	Lizardfish	322.10	411.21	500.33
Synodus foetens (Synodontidae)	Inshore Lizardfish	0.00	2.92	7.10
Tetraodontidae	Trunkfish	13.90	23.93	33.95
Tetraodontiformes	Trunkfish	27.02	42.50	57.95
Thunnus sp. (Scombridae)	Tunas	3.21	10.33	17.44
Thunnus thynnus (Scombridae)	Atlantic Bluefin Tuna	0.00	0.80	2..0930
Trachipteridae	Ribbonfish	0.00	0.48	1.15
Triglidae	Searobins	14.29	36.14	57.98
Unidentified Fish	Unidentified Fish	258.73	335.28	411.84
Uranoscopidae	Stargazers	0.00	0.19	0.55
Vinciguerria attenuata (Phosichthyidae)	Slender Lightfish	0.00	0.39	0.92
Vinciguerria sp. (Phosichthyidae)	Lightfish	0.00	0.17	0.51
Vinciguerria nimbaria (Phosichthyidae)	Oceanic Lightfish	0.00	1.74	3.50

Source: SEAMAP Data

4. Evaluation of Potential Impacts of the Proposed Port Dolphin Deepwater Port

To evaluate the impacts of the seawater intake of the Port Dolphin Deepwater Port on fisheries resources and EFH, e^2M used the ichthyoplankton assessment model developed for the Gulf Landing EIS (USCG and MARAD 2004a) to estimate density of larvae and eggs for each species of concern that could be entrained by the Proposed Port Dolphin Deepwater Port and to estimate potential impacts on fish stocks by calculating the age-1 (one-year-old) equivalents and equivalent yield for the potentially entrained fish.

e^2M assumed that 100 percent of larvae and eggs in 1 million gallons of seawater taken in by Port Dolphin would be entrained. We also assumed a mortality rate of 100 percent. It is unlikely that 100 percent would be entrained; however, because only the larvae and eggs that come into contact with the intake screen would be entrained.

Because SEAMAP data are collected with oblique tows throughout the water column, the true distribution and entrainment of larvae and eggs are unknown. We have found no studies that would allow a reliable estimate of whether or how much this would reduce impingement or entrainment. Therefore, we allowed no exclusion credits for screen mesh size, intake depth, or intake velocity, but the entrainment rates are expected to be reduced based on the proposed locations of the intake screens.

Table 4-1 summarizes adjustments that we used to compensate for data limitations. In order to address variability and uncertainty, we performed a sensitivity analysis to examine potential ranges of age-1 and equivalent yield estimates.

Table 4-1. Summary of Data Limitations, Corresponding Assumptions, and Data Adjustments

Data Limitation	Assumption or Data Adjustment
Low number of samples based on frequency of sampling and distance between sampling station.	Sample size was increased by increasing the study area to habitat representative of the study area based on depth and distance from shore.
No data on distribution of ichthyoplankton throughout the water column.	Assumed a homogenous distribution of ichthyoplankton throughout the water column.
Efficiency of sampling equipment—because of mesh size and regurgitation from net not all eggs and larvae are sampled.	Density of ichthyoplankton in samples is multiplied by three.
Samples only occur from May through November (excluding July).	Data are adjusted for seasonality by weighting it using values in literature.
Invertebrate data are not included.	The Project will not be located within brown or white shrimp EFH.
Eggs are not identified.	(1) Eggs were analyzed separately using four life history tables. (2) There were 24.2% fewer eggs than larvae for key species.
Not all larvae can be identified to species level.	Unidentified larvae within taxon for key species were weighted by proportion of key species for that taxon and added to the number of larvae of key species.
Data are highly variable.	Used 95% confidence limits of ichthyoplankton densities.

Additionally, Gulf menhaden were not represented in the SEAMAP data because this species spawns from October through March, a time when the SEAMAP data were not consistently collected. It is likely that Gulf menhaden would be entrained by seawater intake associated with the Deepwater Port. Egg and larval entrainment is likely to be less than entrainment of Spanish sardines. Data collected by Houde (1979) indicate that *Brevoortia* spp. (the genus that includes Gulf menhaden) occurred at depths of less than 30 meters and that *Brevoortia* spp. were less common than any of the other clupeids (e.g., Spanish sardines); suggesting that concentrations of menhaden are relatively low in the eastern Gulf of Mexico.

4.1 Calculation of Larval Entrainment Estimation

Calculating annual larval entrainment involves the following steps, which are described in greater detail in the revised Appendix G of the Gulf Landing EIS (USCG and MARAD 2004a).

1. An adjustment for larvae that were not identified to species but were identified to Order, Family, Subfamily, or Genus and are associated with a species of concern. Note that this adjustment assumed that the larvae under the taxa Perciformes were Lutjanidae, Sciaenidae, Serranidae, and Sparidae and larvae under the taxa Clupeiformes were Engraulidae and Clupeidae.
2. A seasonal adjustment using data from Ditty 1986 because the SEAMAP data were only collected from June through November. The entrainment estimates larval abundance of SEAMAP data was considered the larval abundance for the 213 days from June through November. The monthly larval abundance presented from Ditty 1986 was used to develop a weighting factor for the June through November and December through May time periods. A ratio of the average abundance in these two time periods was used as a weighting factor. Larval abundance data were not available for red snapper, grouper, sheepshead, and Spanish sardines in Ditty 1986. For these species, the average for each time period was based on presence and absence for each time period.
3. An adjustment for the number of larvae entrained each day based on the volume of seawater intake.
4. An adjustment for the number of larvae entrained annually, based on the 213 days in the 7-month period of May through November and the 152 days in the 5-month period of December through April.
5. An adjustment for net extrusion and sampling inefficiency by multiplying by three.

Table 4-2 summarizes the mean, upper, and lower larval entrainment estimates for the species of concern.

Table 4-2. Summary of Average Larval Entrainment Estimates

Species of Concern	Lower Estimate	Average	Upper Estimate
Red Drum	454	4,384	10,281
Red Snapper	51,857	97,516	145,291
Bay Anchovy	154,724	358,388	566,099
Gag Grouper	62,552	169,073	276,046
Sheepshead	2,258,554	3,631,060	5,002,810
Spanish Sardines	14,892,446	42,000,246	78,762,655

4.2 Calculation of Egg Entrainment Estimates

Egg entrainment estimates for a particular target species are calculated by taking the proportion of total eggs to total larvae in the entire data set and applying that proportion to the entrainment estimate for each species, after all adjustments are made.

In the case of the Port Dolphin samples, the average total number of eggs in the entire data set is 0.297 of the average total number of larvae in the entire data set. Based on this proportion, the larval entrainment estimate for each key species is multiplied by 0.28 to estimate the number of potentially entrained eggs of the target species. **Table 4-3** presents the mean, lower, and upper annual entrainment estimates for eggs in the Port Dolphin samples.

Table 4-3. Summary of Average Egg Entrainment Estimates

Species of Concern	Lower Estimate	Average	Upper Estimate
Red Drum	127	1,228	2,879
Red Snapper	14,520	27,304	40,682
Bay Anchovy	43,323	100,349	158,508
Gag Grouper	17,515	47,340	77,293
Sheepshead	632,395	1,016,697	1,400,787
Spanish Sardines	4,169,884	11,760,069	22,053,543

4.3 Life History Values

The evaluation uses age-specific mortality to compare the estimated total number of eggs and larvae that could be entrained in the proposed warming system to the number that would have been expected to survive to age-1 or that would have been caught in a commercial or recreational fishery (equivalent yield). Life history values that are used for age-specific mortality include stage duration (e.g., it takes 1-2 days for an egg to hatch) and daily instantaneous mortality rates. These two values are multiplied to determine an age- or stage-specific mortality rate. In some cases, if an age-specific mortality rate was not available, a mortality rate, or a range of mortality rates, for comparable species was multiplied by the stage duration for the species in question. **Tables 4-4** through **4-9** present the available life history data for the species of concern.

4.4 Age-1 Equivalent Yield Calculations

The equivalent adult forward projection approach was used to estimate age-1 equivalent losses (EPRI 2004). Of the total estimated number of eggs and larvae entrained, age-1 equivalents represent the number of individuals of each species that would have been expected to survive to age-1 (1 year) had they not been entrained. The calculation of the age-1 equivalents is described in detail in revised Appendix G of the Gulf Landing EIS (USCG and MARAD 2004a). The entrainment estimates and critical life history values were used to estimate age-1 equivalents for red drum, red snapper, bay anchovy, Spanish sardines, gag grouper, and sheepshead in **Tables 4-10** through **4-15**.

Table 4-4. Critical Values of the Red Drum Life History Table

Stage	Daily Instantaneous Mortality (Z)			Resource Information	Stage Duration (Days)			Reference
	Base	High	Low		Base	High	Low	
Egg	0.4984	0.4984	0.4984	Mortality rate of 0.4984 was for Atlantic croaker (Diamond et al. 1999). Red drum hatch rate was 94–99 percent at 22–23C, egg size was 0.95 mm, and newly hatched fish were 1.74 mm TL (Holt et al. 1981a); 24-h lab mortality for red drum ranged from 2–35 percent (Holt et al. 1981b).	1	1	1	Reported as 28–29 hrs at 22–23C (Holt et al. 1981a); 18 and 25 hours (Davis 1990)
Larvae	0.25	0.33	0.17	Comyns (1997) reported a best mortality estimate of 0.33 (SE=0.04) for the early part of this life stage; this value is derived from a composite estimate of 0.27 corrected for net extrusion. The base estimate of 0.25 uses 0.33 for the first 10 d of the stage and 0.17 (Comyn's lowest mortality recorded in his Table 3.1) for the second 10 d. The high mortality estimate uses 0.33 for the entire stage; the low estimate uses 0.17 for the entire stage.	20	20	20	Reported as 20 d if settlement occurs at 8 mm SL (Rooker et al. 1999, Stunz et al. 2002). Herzka et al. (2002) found peak settlement at 6–8 mm SL. In the lab, 13-d old larvae ranged from 4.3–6.3 mm SL (Holt et al. 1981b)
Juvenile 1	0.1365	0.139	0.134	Midpoint of 0.134-0.139 (Rooker et al. 1999)	12	20	12	Rooker et al. (1999) indicate that this mortality applies to a 12-d period, but Fig. 6 in their paper extends to 40-d old fish.
Juvenile 2	0.0054	0.00609	0.0047	Mean of reported conditional daily mortalities for 20 years and 9 estuaries (Scharf 2000). High and low values are upper and lower 95 percent confidence levels.	166	162	166	Remainder age 0 year split with the juvenile 3 stage
Juvenile 3	0.0018	0.0018	0.0009	Porch (2000) estimated a mortality of 0.6 for entire post settlement period (332 days). Low mortality estimate assumes that most of this mortality occurs in juvenile 2 stage.	166	162	166	Remainder age 0 year split with the juvenile 2 stage

Table 4-5. Critical Values of the Red Snapper Life History Table

Stage	Daily Instantaneous Mortality (Z)			Resource Information	Stage Duration (Days)			Reference
	Base	High	Low		Base	High	Low	
Egg	0.4984	0.4984	0.4984	Mortality rate of 0.4984 was for Atlantic croaker (Diamond et al. 1999).	1	1	1	Rabalais et al. 1980
Larvae	0.205	0.255	0.155	Comyns reported a range in mortalities from 0.19-0.29 for vermillion snapper ranging in age from 4-16 days (Comyns et al. 2003); A used the midpoint of 0.24 for these larvae. Mortality for day 17 to settlement (28 days) should be lower and was estimated (Minello 2004).	28	30	26	Larval settlement of red snapper at 17.4 mm SL (26 d) (Szledmeyer and Conti 1999) and 16–19 mm SL; 27–30 d (Rooker et al. 2004). Vermillion snapper are gone from plankton at 5–6 mm SL (Comyns et al. 2003)
Juvenile 1	0.1	0.12	0.045	Daily mortality from day 47 to 57 was 0.129 but estimates varied among habitats from 0.045 to 0.120 (Rooker et al. 2004).	24	10	31	Rooker cites that the dominant size class is between 31 and 54 d, but he reports that the M for early post-settlement is for 47–57 days (a 10-day period). When added to larval duration the base estimate is the midpoint of 47–57, the high estimate accounts for his 10- day duration and the fact that the dominant size class was between 31 and 54, the low estimate accounts for the high end of his range (Rooker et al. 2004) extends only to day 57.
Juvenile 2	0.00160	0.00154	0.00163	Age 0+ M=0.5/stage duration (SEDAR 7 2004)	312	324	307	365 minus the sum of the other stage durations.

Table 4-6. Critical Values of the Bay Anchovy Life History Table

Stage	Daily Instantaneous Mortality (Z)			Resource Information	Stage Duration (Days)			Reference
	Base	High	Low		Base	High	Low	
Egg	1.044	1.94	0.69	Base (EPRI 2004, PSEG 1999). High (CEFAS Lowestoft 2000). Low (Houde 1987).	1	1	1	(Robinette 1983, Houde 1987)
Larvae	2.059	0.231	0.184	For the base life history table, it assumes 2 days yolk sac larvae stage duration at M=0.4915 (midpoint of 0.783 and 0.2) and 32 days at M=0.188 (midpoint of 0.196 and 0.18) for post yolk sac larvae (EPRI 2004 and Houde 1987). For the low natural mortality life history table it assumes 0.625 days for yolk sac larvae at M=0.2 and 30 days for post yolk sac larvae at M=0.18 (Houde 1987). High natural mortality life history table assumes at total of 2 days at M=0.783 and for yolk sac larvae and 32 days at 0.196 for post yolk sac larvae.	34	34	30.63	For the base life history table, it assumes 2 days yolk sac larvae stage duration at M=0.4915 (midpoint of 0.783 and 0.2) and 32 days at M=0.188 (midpoint of 0.196 and 0.18) for post yolk sac larvae (EPRI 2004 and Houde 1987). For the low natural mortality life history table it assumes 0.625 days for yolk sac larvae at M=0.2 and 30 days for post yolk sac larvae at M=0.18 (Houde 1987). High natural mortality life history table assumes at total of 2 days at M=0.783 and for yolk sac larvae and 32 days at 0.196 for post yolk sac larvae.
Juvenile	0.004	0.01	0.004	Base and low life history table adapted from EPRI (2004) and PSEG (1999). High life history table from Houde (1987).	330	330	333.4	365 days minus the sum of the other early life history durations.

Table 4-7. Critical Values of the Gag Grouper Life History Table

Stage	Daily Instantaneous Mortality (Z)			Resource Information	Stage Duration (Days)			Reference
	Base	High	Low		Base	High	Low	
Egg	1.31	2.70	0.64	Egg mortality based on temperatures of 21 °C (base), 25 °C (high), and 17 °C (low) (Pepin 1991).	2.182	3.242	1.468	Egg mortality based on temperatures of 21 °C (base), 17 °C (high), and 25 °C (low) (Pepin 1991).
Larvae	0.11	0.13	0.09	Larval mortality based apparent mortality per mm for lengths 2.6 to 8.5 mm for Serranidae (Houde 1979, p. 265).	45	50	40	Larval stage duration is based on the midpoint of 40-50 (Hill 2004).
Juvenile	0.00295	0.0032	0.0027	Range of juvenile mortality 0.0027 – 0.0032(SEDAR 10 2006).	317.82	311.76	323.53	365 days minus the sum of the egg and larval stage durations.

Table 4-8. Critical Vales of the Sheepshead Life History Table

Stage	Daily Instantaneous Mortality (Z)			Resource Information	Stage Duration (Days)			Reference
	Base	High	Low		Base	High	Low	
Egg	1.6197	2.053	1.3772	Total mortality of 2.3 (USEPA 2002) divided by stage duration.	1.42	1.67	1.12	Low is from Tucker and Kennedy (2008). High is from Fishbase (2005). Base is the midpoint.
Larvae	0.2111	0.246	0.1848	Total mortality of 7.39 (USEPA 2002) divided by stage duration.	35	40	30	Sheepshead larval stage duration (Hill 2005).
Juvenile	0.0058	0.005	0.0059	Total mortality of 1.91 (USEPA 2002) divided by stage duration.	328.6	323.3	333.9	365 days minus the sum of the egg and larval stage durations.

Table 4-9. Critical Vales of the Spanish Sardines Life History Table

Stage	Daily Instantaneous Mortality (Z)			Reference	Stage Duration (Days)			Reference
	Base	High	Low		Base	High	Low	
Egg	3.716	5.5480255	1.8841	The high and low are based on equation 9 (M=0.030e^0.18T) in Pepin (1991). Assumed a high temperature of 29 °C and a low temperature of 23 °C, based on Ditty et al. (1994).	1.3	1.6	1	Midpoint of 24 hours at 29 °C and 38 hours at 23 °C (Ditty et al. 1994)
Larvae	0.45	0.54	0.36	The base is based on Houde and Zastrow (1993). The high and low are plus and minus 20% of the base.	34.8	41.4	28.1	Base is based on midpoint of 28.1 and 41.4 days. High is 41.4 days [based on assumed growth rate of 0.8 mm per day (Ditty et al. 1994), hatching at 3.7 mm and transformation at 36.8 mm (Johnson and Vaught 1986)]. Low is 28.1 days [based on assumed growth rate of 0.8 mm per day, hatching at 3 mm and transformation at 25 mm] .
Juvenile 1	0.02	0.0218395	0.0159	Base is based on stage mortality of 6.53 for scaled sardines (USEPA 2002). The high and low are plus and minus 20% of the base.	328.9	322	335.9	365 days minus the sum of the other early life history durations.

Table 4-10. Base Age-1 Equivalent Estimates for Red Drum Using the Base Life History Table and the Average Larval Entrainment Estimate

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.50	1.00	0.4984	0.607501886	0.755833497	1228	0.000299578	0
Larvae	0.25	20.00	5	0.006737947	0.013385702	4384	0.000787405	3
Juvenile 1	0.14	12.00	1.638	0.194368391	.	.	.	.
Juvenile 2	0.01	166.00	0.8964	0.408035948	.	.	.	.
Juvenile 3	0.00	166.00	0.2988	0.741707736	.	.	.	.
Total Egg To Age-1 Mortality =			**8.3316**			**Total Age-1 Equivalents =**		**3**

Table 4-11. Base Age-1 Equivalent Estimates for Red Snapper Using the Base Life History Table and the Average Larval Entrainment Estimate

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.50	1.00	0.4984	0.607501886	0.755833497	27304	0.000133804	4
Larvae	0.21	28.00	5.74	0.003214768	0.006408933	97516	0.000352922	34
Juvenile 1	0.10	24.00	2.4	0.090717953	.	.	.	.
Juvenile 2	0.00	312.00	0.4992	0.607016078	.	.	.	.
Total Egg to Age-1 Mortality =			**9.1376**			**Total Age-1 Equivalents =**		**38**

Table 4-12. Base Age-1 Equivalent Estimates for Bay Anchovy Using the Base Life History Table and the Average Larval Entrainment Estimate

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	1.0440	1.00	1.044	0.352043687	0.520757858	100349	0.000126778	13
Larvae	0.2059	34.00	7.0006	0.000911335	0.00182101	358388	0.000486456	174
Juvenile	0.0040	330.00	1.32	0.267135302	.	.	.	.
Total Egg to Age-1 Mortality =			**9.3646**			**Total Age-1 Equivalents =**		**187**

Table 4-13. Base Age-1 Equivalent Estimates for Gag Grouper Using the Base Life History Table and the Average Larval Entrainment Estimate

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age1+	Age-1 Equivalents
Egg	1.3140	2.18	2.867148	0.056860863	0.107603309	47340.38356	0.000272774	13
Larvae	0.1120	45.00	5.04	0.006473748	0.012864217	169072.7984	0.005037382	852
Juvenile	0.0030	317.82	0.9375631	0.391580917	.	.		
	Total Egg to Age-1 Mortality =		**8.8447111**			**Total Age-1 Equivalents =**		**865**

Table 4-14. Base Age-1 Equivalent Estimates for Sheepshead Using the Base Life History Table and the Average Larval Entrainment Estimate

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age1+	Age-1 Equivalents
Egg	1.62	1.42	2.3	0.100258844	0.182245922	1016696.675	1.66617E-05	16.94
Larvae	0.21	35.00	7.39	0.000617396	0.00123403	3631059.552	0.000182736	663.52
Juvenile	0.01	328.58	1.91	0.148080387	.	.		
	Total Egg to Age-1 Mortality =		**11.6**			**Total Age-1 Equivalents =**		**680**

Table 4-15. Base Age-1 Equivalent Estimates for Spanish Sardines Using the Base Life History Table and the Average Larval Entrainment Estimate

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age 1+	Age-1 Equivalents (Number)
Egg	3.716055083	1.3	4.8309	0.0080	0.0158	11,760,069	0.0000000	0
Larvae	0.4500	34.8	15.6600	0.0000	0.0000	42,000,246	0.0000000	0
Juvenile 1	0.019854059	328.9	6.5300	0.0015	-	-	-	
	Total Egg to Age-1 Mortality=		**27.0208716**			**Total Age-1 Equivalents=**		**0**

4.5 Equivalent Yield Calculations

The equivalent yield model calculates an estimated recreational or commercial fish yield (harvest) in pounds that might be lost due to entrainment in the Port Dolphin Deepwater Port (EPRI 2004). The calculation adjusts the estimated larval impacts of the deepwater port forward in time to resemble a fishery yield or harvest. The equivalent yield estimate is used as a base for reasonable comparison to other fisheries to help assess potential stress on the population. Equivalent yield is not intended to predict direct losses to fish landings or harvest. For example, an equivalent yield that represents 2 percent of some fishing harvest is equivalent to an additional 2 percent fishing stress on the population when compared to that harvest, not a 2 percent loss to that harvest. Equivalent yield is calculated using the age-equivalent equation, Baranov's catch equation, age-specific natural and fishing mortality, and weight (EPRI 2004). The calculation of the equivalent yield is described in detail in revised Appendix G of the Gulf Landing EIS (USCG and MARAD 2004a). **Tables 4-16** through **4-20** present the age-specific mortality and weight used to calculate equivalent yield for red drum, red snapper, gag grouper, and sheepshead. Because bay anchovy is a forage fish, there is no equivalent yield analysis for bay anchovies. Rather, the biomass of the bay anchovies potentially entrained by the proposed Port Dolphin Deepwater Port was estimated by multiplying the age-1 equivalents by the average weight of an anchovy. The results can be compared to an estimate of biomass of bay anchovies in the Gulf of Mexico and Northeast Gulf of Mexico. **Tables 4-21** through **4-25** present the results of the equivalent yield analysis for red drum.

Table 4-16. Critical Values Used in the Red Drum Equivalent Yield Life History Table

Age	Natural Mortality	Fishing Mortality	Midpoint Weight at Death (lbs)
1	0.27	0.621	2.59
2	0.19	1.149	6.88
3	0.16	0.324	10.23
4	0.16	0.19	11.45
5	0.15	0.036	12.62
6	0.14	0.117	13.73
7	0.14	0.117	14.77
8	0.14	0.117	15.74
9	0.14	0.117	16.64
10	0.14	0.117	17.48
11	0.14	0.117	18.25
12	0.14	0.117	18.95
13	0.14	0.117	19.59
14	0.14	0.117	20.18
15	0.14	0.117	20.71
16	0.14	0.117	21.20
17	0.14	0.117	21.64
18	0.14	0.117	22.03
19	0.14	0.117	22.39
20	0.14	0.117	22.71

Source: Porch 2000

Table 4-17. Critical Values Used in the Red Snapper Equivalent Yield Life History Table

Age	Natural Mortality	Fishing Mortality	Fork Length (Inches)	Weight (lbs)	Median Weight at Death (lbs)
1	0.1	1.009	6.310582	0.1125624	0.312203291
2	0.1	0.073	11.10842	0.6337157	1.078177702
3	0.1	0.288	15.15618	1.6378115	2.29954469
4	0.1	0.537	18.57114	3.0475583	3.86505456
5	0.1	0.434	21.45222	4.7354416	5.643088548
6	0.1	0.289	23.8829	6.573771	7.51489678
7	0.1	0.199	25.93355	8.4555839	9.386632383
8	0.1	0.147	27.66363	10.300436	11.19085368
9	0.1	0.116	29.12323	12.053062	12.88340238
10	0.1	0.084	30.35465	13.679225	14.43874938
11	0.1	0.084	31.39355	15.160924	15.84530904
12	0.1	0.084	32.27003	16.491966	17.10136025
13	0.1	0.084	33.00949	17.674281	18.21176751
14	0.1	0.084	33.63335	18.715046	19.18548284
15	0.1	0.084	34.15968	19.624536	20.03372138

Source: Nelson and Manooch 1982, FMRI 2003, SEDAR 7 2004

Table 4-18. Critical Values Used in the Gag Grouper Equivalent Yield Life History Table

Age	Natural Mortality	Fishing Mortality	Midpoint Weight at Death (lbs)
1	1	0.432	0
2	2	0.311	0
3	3	0.251	0.396
4	4	0.216	0.396
5	5	0.193	0.396
6	6	0.176	0.396
7	7	0.164	0.396
8	8	0.155	0.396
9	9	0.148	0.396
10	10	0.143	0.396
11	11	0.138	0.396
12	12	0.125	0.396
13	13	0.125	0.396
14	14	0.125	0.396
15	15	0.125	0.396
16	16	0.125	0.396
17	17	0.125	0.396
18	18	0.125	0.396
19	19	0.125	0.396
20	20	0.125	0.396
21	21	0.125	0.396
22	22	0.125	0.396
23	23	0.125	0.396
24	24	0.125	0.396
25	25	0.125	0.396
26	26	0.125	0.396
27	27	0.125	0.396
28	28	0.125	0.396
29	29	0.125	0.396
30	30	0.125	0.396

Source: SEDAR 10 2006

Table 4-19. Critical Values Used in the Sheepshead Equivalent Yield Life History Table

Age	Natural Mortality	Fishing Mortality	Midpoint Weight at Death (lbs)
1	1.98	0	0.981
2	1.98	0	1.22
3	1.98	0.225	1.56
4	1.98	0.45	2.33
5	1.98	0.45	2.43
6	1.98	0.45	2.45
7	1.98	0.45	2.47
8	1.98	0.45	2.49
9	1.98	0.45	2.51
10	1.98	0.45	2.53
11	1.98	0.45	2.55
12	1.98	0.45	2.57
13	1.98	0.45	2.59
14	1.98	0.45	2.61
15	1.98	0.45	2.63
16	1.98	0.45	2.65

Source: USEPA 2002

Table 4-20. Critical Values Used in the Spanish Sardines Equivalent Yield Life History Table

Age	Natural Mortality[a]	Fishing Mortality[b]	Mid-Point Weight at Death (lbs)[c]
1	0.78315	0.00726	0.032725
2	0.78315	0.00726	0.067804
3	0.78315	0.00726	0.099578
4	0.78315	0.00726	0.123926

Notes:

[a] Based on mid-point of 0.5769 and 0.9894 in Johnson and Vaught (1986).

[b] Based on mid-point of 1.5 and 3.8 in Johnson and Vaught (1986). It was assumed these values were a daily fishing mortality rate.

[c] Based on the average weight for male and females at ages 1.5, 2.5, 3.5, and 4.5, based on Grall (1984) growth equations in Johnson and Vaught (1986) and FWRI (2006).

Table 4-21. Equivalent Yield Estimate for Red Drum Using the Base Life History Table and the Average Entrainment Estimate

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	0.4984	0.00	0.50	1228	0.37	.	.	.	.	.	.	.	.
Larvae	5	0.00	5.00	4384.43	3.45	.	.	.	.	.	.	.	.
Juvenile 1	1.638	0.00	1.64	.	.	.	.	.	.	.	.	.	.
Juvenile 2	0.8964	0.00	0.90	.	.	.	.	.	.	.	.	.	.
Juvenile 3	0.2988	0.00	0.30	.	.	.	.	.	.	.	.	.	.
1	0.27	0.621	0.89	.	.	2.59	1.57	0.68	1.57	3.82	4.07	1.77	4.07
2	0.19	1.149	1.34	.	.	6.88	0.99	0.16	0.41	1.57	6.83	1.13	2.83
3	0.16	0.324	0.48	.	.	10.23	0.11	0.05	0.25	0.41	1.08	0.53	2.59
4	0.16	0.19	0.35	.	.	11.45	0.04	0.03	0.18	0.25	0.46	0.39	2.04
5	0.15	0.036	0.19	.	.	12.62	0.01	0.02	0.15	0.18	0.07	0.31	1.87
6	0.14	0.117	0.26	.	.	13.73	0.02	0.02	0.11	0.15	0.21	0.25	1.57
7	0.14	0.117	0.26	.	.	14.77	0.01	0.01	0.09	0.11	0.17	0.21	1.31
8	0.14	0.117	0.26	.	.	15.74	0.01	0.01	0.07	0.09	0.14	0.17	1.08
9	0.14	0.117	0.26	.	.	16.64	0.01	0.01	0.05	0.07	0.12	0.14	0.88
10	0.14	0.117	0.26	.	.	17.48	0.01	0.01	0.04	0.05	0.10	0.11	0.72
11	0.14	0.117	0.26	.	.	18.25	0.00	0.01	0.03	0.04	0.08	0.09	0.58
12	0.14	0.117	0.26	.	.	18.95	0.00	0.00	0.02	0.03	0.06	0.07	0.46
13	0.14	0.117	0.26	.	.	19.59	0.00	0.00	0.02	0.02	0.05	0.06	0.37
14	0.14	0.117	0.26	.	.	20.18	0.00	0.00	0.01	0.02	0.04	0.05	0.30
15	0.14	0.117	0.26	.	.	20.71	0.00	0.00	0.01	0.01	0.03	0.04	0.23
16	0.14	0.117	0.26	.	.	21.20	0.00	0.00	0.01	0.01	0.02	0.03	0.19
17	0.14	0.117	0.26	.	.	21.64	0.00	0.00	0.01	0.01	0.02	0.02	0.15
18	0.14	0.117	0.26	.	.	22.03	0.00	0.00	0.01	0.01	0.02	0.02	0.12
19	0.14	0.117	0.26	.	.	22.39	0.00	0.00	0.00	0.01	0.01	0.01	0.09
20	0.14	0.117	0.26	.	.	22.71	0.00	0.00	0.00	0.00	0.01	0.01	0.07
				Total =	**4**		**3**	**1**	**3**	**7**	**14**	**5**	**22**
							Numbers				**Pounds**		

Table 4-22. Equivalent Yield Estimate for Red Snapper Using the Base Life History Table and the Average Entrainment Estimate

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	0.4984	0.00	0.50	27304.44	3.65	.	.	.	.	.	.	.	.
Larvae	5.74	0.00	5.74	97515.87	34.42	.	.	.	.	.	.	.	.
Juvenile 1	2.4	0.00	2.40	.	.	.	.	.	.	.	.	.	.
Juvenile 2	0.4992	0.00	0.50	.	.	.	.	.	.	.	.	.	.
1	0.1	1.009	1.11	.	.	0.31	23.21	2.30	12.56	38.07	7.24	0.72	3.92
2	0.1	0.073	0.17	.	.	1.08	0.84	1.15	10.56	12.56	0.91	1.24	11.39
3	0.1	0.288	0.39	.	.	2.30	2.52	0.88	7.17	10.56	5.80	2.01	16.48
4	0.1	0.537	0.64	.	.	3.86	2.85	0.53	3.79	7.17	10.99	2.05	14.63
5	0.1	0.434	0.53	.	.	5.64	1.27	0.29	2.22	3.79	7.19	1.66	12.54
6	0.1	0.289	0.39	.	.	7.52	0.53	0.18	1.51	2.22	4.00	1.38	11.32
7	0.1	0.199	0.30	.	.	9.39	0.26	0.13	1.12	1.51	2.43	1.22	10.48
8	0.1	0.147	0.25	.	.	11.19	0.15	0.10	0.87	1.12	1.63	1.11	9.76
9	0.1	0.116	0.22	.	.	12.88	0.09	0.08	0.70	0.87	1.17	1.01	9.05
10	0.1	0.084	0.18	.	.	14.44	0.05	0.06	0.58	0.70	0.78	0.93	8.44
11	0.1	0.084	0.18	.	.	15.85	0.04	0.05	0.49	0.58	0.71	0.85	7.71
12	0.1	0.084	0.18	.	.	17.10	0.04	0.04	0.40	0.49	0.64	0.76	6.92
13	0.1	0.084	0.18	.	.	18.21	0.03	0.04	0.34	0.40	0.57	0.67	6.13
14	0.1	0.084	0.18	.	.	19.19	0.03	0.03	0.28	0.34	0.50	0.59	5.37
15	0.1	0.084	0.18	.	.	20.03	0.02	0.03	0.23	0.28	0.43	0.51	4.67
				Total =	**38**		**32**	**6**	**43**	**81**	**45**	**17**	**139**
							Numbers				**Pounds**		

Table 4-23. Equivalent Yield Estimate for Gag Grouper Using the Base Life History Table and the Average Entrainment Estimate

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	2.867148	0.00	2.87	47340.38356	12.91								
Larvae	5.04	0.00	5.04	169072.7984	851.68								
Juvenile	0.937563	0.00	0.94										
1	0.432	0	0.43			0.815	0.00	303.29	561.30	864.60	0.00	247.18	457.46
2	0.311	0	0.31			1.974	0.00	150.03	411.28	561.30	0.00	296.16	811.86
3	0.251	0.396	0.65			3.411	119.92	76.01	215.35	411.28	409.04	259.26	734.56
4	0.216	0.396	0.61			4.931	63.78	34.79	116.78	215.35	314.51	171.55	575.83
5	0.193	0.396	0.59			6.4	34.95	17.03	64.80	116.78	223.66	109.01	414.70
6	0.176	0.396	0.57			7.738	19.54	8.68	36.57	64.80	151.21	67.20	282.99
7	0.164	0.396	0.56			8.912	11.09	4.59	20.89	36.57	98.83	40.93	186.17
8	0.155	0.396	0.55			9.914	6.36	2.49	12.04	20.89	63.05	24.68	119.37
9	0.148	0.396	0.54			10.752	3.68	1.37	6.99	12.04	39.54	14.78	75.14
10	0.143	0.396	0.54			11.444	2.14	0.77	4.08	6.99	24.48	8.84	46.65
11	0.138	0.396	0.53			12.008	1.25	0.44	2.39	4.08	15.02	5.23	28.70
12	0.125	0.396	0.52			12.464	0.74	0.23	1.42	2.39	9.19	2.90	17.69
13	0.125	0.396	0.52			12.831	0.44	0.14	0.84	1.42	5.62	1.77	10.82
14	0.125	0.396	0.52			13.125	0.26	0.08	0.50	0.84	3.42	1.08	6.57
15	0.125	0.396	0.52			13.359	0.15	0.05	0.30	0.50	2.06	0.65	3.97
16	0.125	0.396	0.52			13.545	0.09	0.03	0.18	0.30	1.24	0.39	2.39
17	0.125	0.396	0.52			13.692	0.05	0.02	0.10	0.18	0.75	0.24	1.44
18	0.125	0.396	0.52			13.809	0.03	0.01	0.06	0.10	0.45	0.14	0.86

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been lost to Natural Causes	Weight of Fish that Would have Remained in Population
19	0.125	0.396	0.52			13.901	0.02	0.01	0.04	0.06	0.27	0.08	0.51
20	0.125	0.396	0.52			13.974	0.01	0.00	0.02	0.04	0.16	0.05	0.31
21	0.125	0.396	0.52			14.032	0.01	0.00	0.01	0.02	0.10	0.03	0.18
22	0.125	0.396	0.52			14.077	0.00	0.00	0.01	0.01	0.06	0.02	0.11
23	0.125	0.396	0.52			14.113	0.00	0.00	0.00	0.01	0.03	0.01	0.06
24	0.125	0.396	0.52			14.141	0.00	0.00	0.00	0.00	0.02	0.01	0.04
25	0.125	0.396	0.52			14.163	0.00	0.00	0.00	0.00	0.01	0.00	0.02
26	0.125	0.396	0.52			14.181	0.00	0.00	0.00	0.00	0.01	0.00	0.01
27	0.125	0.396	0.52			14.194	0.00	0.00	0.00	0.00	0.00	0.00	0.01
28	0.125	0.396	0.52			14.205	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.125	0.396	0.52			14.214	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.125	0.396	0.52			14.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Total =	**865**		**265**	**600**	**1,456**	**2,321**	**1,363**	**1,252**	**3,778**
							Numbers				**Pounds**		

Table 4-24. Equivalent Yield Estimate for Sheepshead Using the Base Life History Table and the Average Entrainment Estimate

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	2.3	0	2.3	1016696.67	16.94								
Larvae	7.39	0	7.39	3631059.55	663.52								
Juvenile	1.91	0	1.91										
1	1.98	0	1.98			0.981	0.00	586.51	93.95	680.46	0.00	575.37	92.17
2	1.98	0	1.98			1.22	0.00	80.98	12.97	93.95	0.00	98.79	15.83
3	1.98	0.225	2.205			1.56	1.18	10.36	1.43	12.97	1.84	16.17	2.23
4	1.98	0.45	2.43			2.33	0.24	1.06	0.13	1.43	0.56	2.48	0.29
5	1.98	0.45	2.43			2.43	0.02	0.09	0.01	0.13	0.05	0.23	0.03
6	1.98	0.45	2.43			2.45	0.00	0.01	0.00	0.01	0.00	0.02	0.00
7	1.98	0.45	2.43			2.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	1.98	0.45	2.43			2.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.98	0.45	2.43			2.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	1.98	0.45	2.43			2.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	1.98	0.45	2.43			2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	1.98	0.45	2.43			2.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	1.98	0.45	2.43			2.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	1.98	0.45	2.43			2.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	1.98	0.45	2.43			2.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	1.98	0.45	2.43			2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Total =	**680**		**1**	**679**	**108**	**789**	**2**	**693**	**111**
							Numbers				**Pounds**		

Table 4-25. Equivalent Yield Estimate for Spanish Sardines Using the Base Life History Table and the Average Entrainment Estimate

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Number Potentially Entrained at Stage or Age	Projected Mortality of Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would Have Been Lost to Natural Causes	Weight of Fish That Would Have Remained in the Population
Egg	4.83	0	11,760,069	0	-	-	-	-	-	-	-	-
Larvae	15.66	0	42,000,246	0	-	-	-	-	-	-	-	-
Juvenile 1	6.53	0	-	-	-	-	-	-	-	-	-	-
1	0.78315	0.00726	-	-	0.033	0	0	0	0	0	0	0
2	0.78315	0.00726	-	-	0.068	0	0	0	0	0	0	0
3	0.78315	0.00726	-	-	0.100	0	0	0	0	0	0	0
4	0.78315	0.00726	-	-	0.124	0	0	0	0	0	0	0
			Total =	**0**		**0**	**0**	**0**	**0**	**0**	**0**	**0**
						Numbers				**Pounds**		

4.6 Sensitivity Analysis

In addition to estimating age-1 equivalents and equivalent yield using the base life history table and average entrainment estimates, three variations of the life history tables were used to examine the sensitivity of age-1 equivalents and equivalent yield related to changes in natural mortality and entrainment estimates. **Tables 4-26** through **4-31** present the results of the sensitivity analyses for age-1 equivalents and equivalent yield potentially entrained for the proposed Port Dolphin Deepwater Port.

Table 4-26. Sensitivity Analysis for Age-1 Equivalent Losses of Red Drum and Corresponding Projected Losses to the Fishery

Estimate	Likelihood	Number of Age-1 Fish Lost	Equivalent Yield Loss to Fishery (pounds)	Percent of 1990–2006 Gulf Harvest	Percent of 1990–2006 NE Gulf Harvest	Percent of 1990–2006 Florida West Coast Harvest
Base Life History Table and Average Entrainment Estimate	Average	4	14	0.00%	0.00%	0.00%
Low Larval Mortality and Average Entrainment Estimate	Likely	18	66	0.00%	0.00%	0.01%
High Larval Mortality and Average Entrainment Estimate	Likely	1	3	0.00%	0.00%	0.00%
Base Life History Table and Upper 95 Percent Confidence Limits	Likely	3	11	0.00%	0.00%	0.00%
Base Life History Table and Lower 95 Percent Confidence Limits	Likely	0	1	0.00%	0.00%	0.00%
Extreme High Estimate Using Low Natural Mortality and Upper 95 Percent Confidence Limits	Unlikely	58	207	0.00%	0.01%	0.02%
Extreme Low Estimate Using High Natural Mortality and Lower 95 Percent Confidence Limits	Unlikely	0	0	0.00%	0.00%	0.00%

Note: Fishery Losses Are Compared with the 1990–2006 Harvest in the Gulf of Mexico (10,530,135 pounds), Northeast Gulf of Mexico (Mississippi, Alabama, West Coast of Florida) (2,281,436 pounds), and the West Coast of Florida (1,296,070 pounds)

Table 4-27. Sensitivity Analysis for Age-1 Equivalent Losses of Red Snapper and Corresponding Projected Losses to the Fishery

Estimate	Likelihood	Number of Age-1 Fish Lost	Equivalent Yield Loss to Fishery (pounds)	Percent of 1990–2006 Gulf Harvest	Percent of 1990–2006 NE Gulf Harvest	Percent of 1990–2006 Florida West Coast Harvest
Base Life History Table and Average Entrainment Estimate	Average	38	45	0.00%	0.00%	0.00%
Low Larval Mortality and Average Entrainment Estimate	Likely	153	181	0.00%	0.01%	0.01%
High Larval Mortality and Average Entrainment Estimate	Likely	9	11	0.00%	0.00%	0.00%
Base Life History Table and Upper 95 Percent Confidence Limits	Likely	57	67	0.00%	0.00%	0.00%
Base Life History Table and Lower 95 Percent Confidence Limits	Likely	20	24	0.00%	0.00%	0.00%
Extreme High Estimate Using Low Natural Mortality and Upper 95 Percent Confidence Limits	Unlikely	845	998	0.01%	0.03%	0.06%
Extreme Low Estimate Using High Natural Mortality and Lower 95 Percent Confidence Limits	Unlikely	10	12	0.00%	0.00%	0.00%

Note: Fishery Losses Are Compared with the 1990–2006 Harvest in the Gulf of Mexico (7,411,312 pounds), Northeast Gulf of Mexico (Mississippi, Alabama, West Coast of Florida) (3,552,975 pounds), and the West Coast of Florida (1,802,225 pounds)

Table 4-28. Sensitivity Analysis for Age-1 Equivalent Losses of Bay Anchovy and Corresponding Projected Losses to the Fishery

Estimate	Likelihood	Number of Age-1 Fish Lost	Total Biomass of Age-1 Fish Lost (pounds)	Percent of Estimated Gulf of Mexico Harvest	Percent of Estimated NE Gulf of Mexico Harvest
Base Life History Table and Average Entrainment Estimate	Average	187	1	0.00%	0.00%
Low Larval Mortality and Base Entrainment Estimate	Likely	445	3	0.00%	0.00%
High Larval Mortality and Base Entrainment Estimate	Likely	80	1	0.00%	0.00%
Base Life History Table and Upper 95 Percent Confidence Limits	Likely	295	2	0.00%	0.00%
Base Life History Table and Lower 95 Percent Confidence Limits	Likely	81	1	0.00%	0.00%
Extreme High Estimate Using Low Natural Mortality and Upper 95 Percent Confidence Limits	Unlikely	1,295	8	0.00%	0.00%
Extreme Low Estimate Using High Natural Mortality and Lower 95 Percent Confidence Limits	Unlikely	5	0	0.00%	0.00%

Note: Biomass Losses are Compared with an Estimate of Bay Anchovy Biomass in the Gulf of Mexico (396,832,072 pounds).

Table 4-29. Sensitivity Analysis for Age-1 Equivalent Losses of Gag Grouper and Corresponding Projected Losses to the Fishery

Estimate	Likelihood	Number of Age-1 Fish Lost	Equivalent Yield Loss to Fishery (pounds)	Percent of 1990–2006 Gulf Harvest	Percent of 1990–2006 NE Gulf Harvest	Percent of 1990–2006 Florida West Coast Harvest
Base Life History Table and Average Entrainment Estimate	Average	865	1,363	0.03%	0.03%	0.03%
Low Larval Mortality and Average Entrainment Estimate	Likely	2,302	3,629	0.07%	0.07%	0.07%
High Larval Mortality and Average Entrainment Estimate	Likely	337	532	0.01%	0.01%	0.01%
Base Life History Table and Upper 95 Percent Confidence Limits	Likely	1,412	2,225	0.04%	0.04%	0.05%
Base Life History Table and Lower 95 Percent Confidence Limits	Likely	320	504	0.01%	0.01%	0.01%
Extreme High Estimate Using Low Natural Mortality and Upper 95 Percent Confidence Limits	Unlikely	6,626	10,443	0.21%	0.21%	0.21%
Extreme Low Estimate Using High Natural Mortality and Lower 95 Percent Confidence Limits	Unlikely	60	94	0.00%	0.00%	0.00%

Note: Fishery Losses Are Compared with the 1990–2006 Harvest in the Gulf of Mexico (7,411,312 pounds), Northeast Gulf of Mexico (Mississippi, Alabama, West Coast of Florida) (3,552,975 pounds), and the West Coast of Florida (1,802,225 pounds)

Table 4-30. Sensitivity Analysis for Age-1 Equivalent Losses of Sheepshead and Corresponding Projected Losses to the Fishery

Estimate	Likelihood	Number of Age-1 Fish Lost	Equivalent Yield Loss to Fishery (pounds)	Percent of 1990–2006 Gulf Harvest	Percent of 1990–2006 NE Gulf Harvest	Percent of 1990–2006 Florida West Coast Harvest
Base Life History Table and Average Entrainment Estimate	Average	680	2	0.00%	0.00%	0.00%
Low Larval Mortality and Average Entrainment Estimate	Likely	1,712	6	0.00%	0.00%	0.00%
High Larval Mortality and Average Entrainment Estimate	Likely	199	1	0.00%	0.00%	0.00%
Base Life History Table and Upper 95 Percent Confidence Limits	Likely	938	3	0.00%	0.00%	0.00%
Base Life History Table and Lower 95 Percent Confidence Limits	Likely	423	2	0.00%	0.00%	0.00%
Extreme High Estimate Using Low Natural Mortality and Upper 95 Percent Confidence Limits	Unlikely	2,454	9	0.00%	0.00%	0.00%
Extreme Low Estimate Using High Natural Mortality and Lower 95 Percent Confidence Limits	Unlikely	118	0	0.00%	0.00%	0.00%

Note: Fishery Losses Are Compared with the 1990–2006 Harvest in the Gulf of Mexico (7,411,312 pounds), Northeast Gulf of Mexico (Mississippi, Alabama, West Coast of Florida) (3,552,975 pounds), and the West Coast of Florida (1,802,225 pounds)

Table 4-31. Sensitivity Analysis for Age-1 Equivalent Losses of Spanish Sardines and Corresponding Projected Losses to the Fishery

Estimate	Likelihood	Number of Age-1 Fish Lost	Equivalent Yield Loss to Fishery (pounds)	Percent of 1990–2006 Gulf Harvest	Percent of 1990–2006 NE Gulf Harvest	Percent of 1990–2006 Florida West Coast Harvest
Base Life History Table and Average Entrainment Estimate	Average	0	0	0.000%	0.000%	0.000%
Low Larval Mortality and Average Entrainment Estimate	Likely	5	0	0.000%	0.000%	0.000%
High Larval Mortality and Average Entrainment Estimate	Likely	0	0	0.000%	0.000%	0.000%
Base Life History Table and Upper 95 Percent Confidence Limits	Likely	0	0	0.000%	0.000%	0.000%
Base Life History Table and Lower 95 Percent Confidence Limits	Likely	0	0	0.000%	0.000%	0.000%
Extreme High Estimate Using Low Natural Mortality and Upper 95 Percent Confidence Limits	Unlikely	32	2	0.000%	0.000%	0.000%
Extreme Low Estimate Using High Natural Mortality and Lower 95 Percent Confidence Limits	Unlikely	0	0	0.000%	0.000%	0.000%

Note: Fishery Losses Are Compared with the 1990–2006 Harvest in the Gulf of Mexico, Northeast Gulf of Mexico, and the West Coast of Florida. Landings of Spanish sardines only occur on the West coast of Florida; therefore this value is the same (1,433,773 pounds) for all three sets of landings.

4.6.1 Variability in Recruitment

Variability in recruitment is demonstrated in the low and high ranges of mortality rates and stage durations in the sensitivity analysis. The first variation on the life history tables uses the average entrainment estimate with high and low natural mortality values (scenarios accepted by NMFS as likely).

Relatively few measurements are available for mortality and growth in the early life history stages of fishes (Houde 1987). Available data, however, indicate that these rates can be highly variable. Larval mortality is thought to vary in relation to water temperature, food availability, and predation. Mortality of early life history is also difficult to measure. To capture this variability and uncertainty, age-1 equivalents were calculated using life history values based on the literature. Literature values for upper and lower larval instantaneous natural mortality rates were used to calculate estimates of high and low age-1 equivalents and equivalent yield. **Tables 4-32** through **4-53** present those results.

Although multiple life stages are used in calculating age-1 equivalents and equivalent yield, and there are multiple opportunities to compound the range of impacts using low and high mortality estimates for each life stage, only larval mortality was changed. Larval mortality is one of the most difficult to measure, and it is one of the life stages with the most variable mortality.

4.6.2 Variability in Ichthyoplankton Densities

Distribution of ichthyoplankton varies both temporally and spatially and often occurs in patches. Ichthyoplankton densities can also be variable. The distribution and abundance of fish eggs and larvae depend on spawning behavior of adults, hydrographic structure and transport on a variety of scales (e.g., vertical stratification and coastal currents), duration of the pelagic period, and behavior of larvae (e.g., vertical migration). The use of 95 percent confidence levels in the sensitivity analysis helps to capture this variability.

Variability in ichthyoplankton densities is demonstrated by the upper and lower confidence limits calculated for each species of concern. These values were used as low and high entrainment to calculate age-1 equivalent estimates and equivalent yield estimates (scenarios that NMFS accepts as likely). Those results are presented in **Tables 4-54** through **4-75**.

4.6.3 Compounded Variability and Uncertainty

The third variation used the low natural mortality estimates and stage durations for each early life history stage with the upper 95 percent confidence limit entrainment estimate to yield the highest possible age-1 and equivalent yield estimates, and the high natural mortality estimates and stage durations for each life history stage with the lower 95 percent confidence limit entrainment estimate to yield the lowest age-1 and equivalent yield estimates (scenarios that NMFS considers unlikely). **Tables 4-76** through **4-97** present the results of these estimates.

These estimates use the most extreme values at each life stage. Although each estimated value can be supported by scientific literature and expert opinion, it is difficult to determine the probability of all of the conditions aligning that would be required to produce the worst-case (highest) or best-case (lowest) impact numbers. It is extremely unlikely that all of these factors would align in a single year, and it is even more unlikely that they would persist for the 30-year projected lifetime of the proposed project. Over the years, it is more likely that the natural variability of conditions would tend toward the mean.

Table 4-32. Age-1 Equivalent Estimates for Red Drum Based on Low Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.50	1.00	0.4984	0.607501886	0.755833497	1228	0.001483822	2
Larvae	0.17	20.00	3.4	0.03337327	0.064590929	4384	0.003799517	17
Juvenile 1	0.14	12.00	1.638	0.194368391	.	.	.	.
Juvenile 2	0.01	166.00	0.8964	0.408035948	.	.	.	.
Juvenile 3	0.00	166.00	0.2988	0.741707736	.	.	.	.
Total Egg To Age-1 Mortality =			**6.7316**		**Total Age-1 Equivalents =**			**19**

Table 4-33. Age-1 Equivalent Estimates for Red Snapper Based on Low Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.50	1.00	0.4984	0.607501886	0.755833497	27304	0.000542602	15
Larvae	0.16	28.00	4.34	0.013036528	0.025737528	97516	0.001417295	138
Juvenile 1	0.10	24.00	2.4	0.090717953	.	.	.	.
Juvenile 2	0.00	312.00	0.4992	0.607016078	.	.	.	.
Total Egg to Age-1 Mortality =			**7.7376**		**Total Age-1 Equivalents =**			**153**

Table 4-34. Age-1 Equivalent Estimates for Bay Anchovy Based on Low Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	1.04	1.00	1.044	0.352043687	0.520757858	100349	0.000301702	30
Larvae	0.18	34.00	6.1336	0.002168759	0.004328132	358388	0.001156197	414
Juvenile	0.00	330.00	1.32	0.267135302	.	.	.	.
Total Egg to Age-1 Mortality =			**8.4976**		**Total Age-1 Equivalents =**			**444**

Table 4-35. Age-1 Equivalent Estimates for Gag Grouper Based on Low Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age 1 Equivalents
Egg	1.31	2.18	2.867148	0.056860863	0.107603309	47340.38356	0.000734099	34.75
Larvae	0.09	45.00	4.05	0.017422375	0.034248067	169072.7984	0.013410889	2267.42
Juvenile	0.00	317.82	0.9375631	0.391580917	.	.		
Total Egg to Age-1 Mortality =			**7.8547111**		**Total Age-1 Equivalents =**			**2,302**

Table 4-36. Age-1 Equivalent Estimates for Sheepshead Based on Low Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age 1 Equivalents
Egg	1.62	1.42	2.3	0.100258844	0.182245922	1016696.675	4.19661E-05	42.67
Larvae	0.18	35.00	6.46625	0.001555046	0.003105264	3631059.552	0.000459829	1669.67
Juvenile	0.01	328.58	1.91	0.148080387	.	.		
Total Egg to Age-1 Mortality =			**10.67625**		**Total Age-1 Equivalents =**			**1,712**

Table 4-37. Age-1 Equivalent Estimates for Spanish Sardines Based on Low Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age 1+	Age-1 Equivalents (Number)
Egg	3.716055083	1.3	4.8309	0.0080	0.0158	**11,760,069**	0.0000000	**0**
Larvae	0.3600	28.1	10.1160	0.0000	0.0001	**42,000,246**	0.0000001	**5**
Juvenile 1	0.019854059	328.9	6.5300	0.0015	-	-	-	
Total Egg to Age-1 Mortality=			**21.4768716**		**Total Age-1 Equivalents=**			**5**

Table 4-38. Equivalent Yield Estimates for Red Drum Based on Low Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	0.4984	0.00	0.50	1227.64	1.82	.	.	.	.	.	.	.	.
Larvae	3.4	0.00	3.40	4384.43	16.66	.	.	.	.	.	.	.	.
Juvenile 1	1.638	0.00	1.64	.	.	.	.	.	.	.	.	.	.
Juvenile 2	0.8964	0.00	0.90	.	.	.	.	.	.	.	.	.	.
Juvenile 3	0.2988	0.00	0.30	.	.	.	.	.	.	.	.	.	.
1	0.27	0.62	0.89	.	.	2.59	7.60	3.30	7.58	18.48	19.71	8.57	19.67
2	0.19	1.15	1.34	.	.	6.88	4.80	0.79	1.99	7.58	33.05	5.46	13.68
3	0.16	0.32	0.48	.	.	10.23	0.51	0.25	1.22	1.99	5.22	2.58	12.53
4	0.16	0.19	0.35	.	.	11.45	0.20	0.17	0.86	1.22	2.25	1.89	9.88
5	0.15	0.04	0.19	.	.	12.62	0.03	0.12	0.72	0.86	0.36	1.49	9.04
6	0.14	0.12	0.26	.	.	13.73	0.07	0.09	0.55	0.72	1.01	1.21	7.61
7	0.14	0.12	0.26	.	.	14.77	0.06	0.07	0.43	0.55	0.84	1.01	6.33
8	0.14	0.12	0.26	.	.	15.74	0.04	0.05	0.33	0.43	0.70	0.83	5.22
9	0.14	0.12	0.26	.	.	16.64	0.03	0.04	0.26	0.33	0.57	0.68	4.27
10	0.14	0.12	0.26	.	.	17.48	0.03	0.03	0.20	0.26	0.46	0.55	3.46
11	0.14	0.12	0.26	.	.	18.25	0.02	0.02	0.15	0.20	0.37	0.45	2.80
12	0.14	0.12	0.26	.	.	18.95	0.02	0.02	0.12	0.15	0.30	0.36	2.25
13	0.14	0.12	0.26	.	.	19.59	0.01	0.01	0.09	0.12	0.24	0.29	1.80
14	0.14	0.12	0.26	.	.	20.18	0.01	0.01	0.07	0.09	0.19	0.23	1.43
15	0.14	0.12	0.26	.	.	20.71	0.01	0.01	0.05	0.07	0.15	0.18	1.14
16	0.14	0.12	0.26	.	.	21.20	0.01	0.01	0.04	0.05	0.12	0.14	0.90
17	0.14	0.12	0.26	.	.	21.64	0.00	0.01	0.03	0.04	0.09	0.11	0.71
18	0.14	0.12	0.26	.	.	22.03	0.00	0.00	0.03	0.03	0.07	0.09	0.56
19	0.14	0.12	0.26	.	.	22.39	0.00	0.00	0.02	0.03	0.06	0.07	0.44
20	0.14	0.12	0.26	.	.	22.71	0.00	0.00	0.02	0.02	0.05	0.06	0.34
				Total =	**18**		**13**	**5**	**15**	**33**	**66**	**26**	**104**
							Numbers				**Pounds**		

Table 4-39. Equivalent Yield Estimates for Red Snapper Based on Low Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	0.50	0.00	0.50	27304.44	14.82	.	.	.	.	.	.	.	.
Larvae	4.34	0.00	4.34	97515.87	138.21	.	.	.	.	.	.	.	.
Juvenile 1	2.40	0.00	2.40	.	.	.	.	.	.	.	.	.	.
Juvenile 2	0.50	0.00	0.50	.	.	.	.	.	.	.	.	.	.
1	0.10	1.01	1.11	.	.	0.31	93.30	9.25	50.48	153.02	29.11	2.88	15.75
2	0.10	0.07	0.17	.	.	1.08	3.38	4.64	42.46	50.48	3.65	5.00	45.77
3	0.10	0.29	0.39	.	.	2.30	10.14	3.52	28.81	42.46	23.31	8.09	66.25
4	0.10	0.54	0.64	.	.	3.86	11.44	2.13	15.24	28.81	44.16	8.22	58.81
5	0.10	0.43	0.53	.	.	5.64	5.12	1.18	8.93	15.24	28.91	6.66	50.40
6	0.10	0.29	0.39	.	.	7.52	2.14	0.74	6.05	8.93	16.07	5.56	45.49
7	0.10	0.20	0.30	.	.	9.39	1.04	0.52	4.49	6.05	9.77	4.91	42.14
8	0.10	0.15	0.25	.	.	11.19	0.58	0.40	3.51	4.49	6.54	4.45	39.24
9	0.10	0.12	0.22	.	.	12.88	0.37	0.32	2.83	3.51	4.71	4.06	36.40
10	0.10	0.08	0.18	.	.	14.44	0.22	0.26	2.35	2.83	3.13	3.73	33.94
11	0.10	0.08	0.18	.	.	15.85	0.18	0.21	1.96	2.35	2.86	3.40	30.98
12	0.10	0.08	0.18	.	.	17.10	0.15	0.18	1.63	1.96	2.57	3.05	27.82
13	0.10	0.08	0.18	.	.	18.21	0.12	0.15	1.35	1.63	2.27	2.71	24.65
14	0.10	0.08	0.18	.	.	19.19	0.10	0.12	1.13	1.35	1.99	2.37	21.60
15	0.10	0.08	0.18	.	.	20.03	0.09	0.10	0.94	1.13	1.73	2.06	18.77
				Total =	**153**		**128**	**24**	**172**	**324**	**181**	**67**	**558**
							Numbers				**Pounds**		

Table 4-40. Equivalent Yield Estimates for Gag Grouper Based on Low Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	2.867148	0.00	2.87	47340.38356	34.75								
Larvae	4.05	0.00	4.05	169072.7984	2267.42								
Juvenile	0.9375631	0.00	0.94										
1	0.432	0	0.43			0.815	0.00	807.58	1494.59	2302.17	0.00	658.18	1218.09
2	0.311	0	0.31			1.974	0.00	399.48	1095.11	1494.59	0.00	788.58	2161.74
3	0.251	0.396	0.65			3.411	319.31	202.39	573.41	1095.11	1089.15	690.35	1955.91
4	0.216	0.396	0.61			4.931	169.83	92.64	310.94	573.41	837.45	456.79	1533.26
5	0.193	0.396	0.59			6.4	93.05	45.35	172.54	310.94	595.55	290.25	1104.23
6	0.176	0.396	0.57			7.738	52.03	23.13	97.38	172.54	402.62	178.94	753.52
7	0.164	0.396	0.56			8.912	29.53	12.23	55.62	97.38	263.14	108.98	495.72
8	0.155	0.396	0.55			9.914	16.94	6.63	32.06	55.62	167.89	65.72	317.84
9	0.148	0.396	0.54			10.752	9.79	3.66	18.61	32.06	105.28	39.35	200.08
10	0.143	0.396	0.54			11.444	5.70	2.06	10.85	18.61	65.19	23.54	124.22
11	0.138	0.396	0.53			12.008	3.33	1.16	6.36	10.85	39.99	13.94	76.42
12	0.125	0.396	0.52			12.464	1.96	0.62	3.78	6.36	24.48	7.73	47.11
13	0.125	0.396	0.52			12.831	1.17	0.37	2.24	3.78	14.97	4.72	28.80
14	0.125	0.396	0.52			13.125	0.69	0.22	1.33	2.24	9.09	2.87	17.50
15	0.125	0.396	0.52			13.359	0.41	0.13	0.79	1.33	5.50	1.74	10.58
16	0.125	0.396	0.52			13.545	0.24	0.08	0.47	0.79	3.31	1.04	6.37
17	0.125	0.396	0.52			13.692	0.15	0.05	0.28	0.47	1.99	0.63	3.82
18	0.125	0.396	0.52			13.809	0.09	0.03	0.17	0.28	1.19	0.38	2.29
19	0.125	0.396	0.52			13.901	0.05	0.02	0.10	0.17	0.71	0.22	1.37
20	0.125	0.396	0.52			13.974	0.03	0.01	0.06	0.10	0.42	0.13	0.82

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
21	0.125	0.396	0.52			14.032	0.02	0.01	0.03	0.06	0.25	0.08	0.49
22	0.125	0.396	0.52			14.077	0.01	0.00	0.02	0.03	0.15	0.05	0.29
23	0.125	0.396	0.52			14.113	0.01	0.00	0.01	0.02	0.09	0.03	0.17
24	0.125	0.396	0.52			14.141	0.00	0.00	0.01	0.01	0.05	0.02	0.10
25	0.125	0.396	0.52			14.163	0.00	0.00	0.00	0.01	0.03	0.01	0.06
26	0.125	0.396	0.52			14.181	0.00	0.00	0.00	0.00	0.02	0.01	0.04
27	0.125	0.396	0.52			14.194	0.00	0.00	0.00	0.00	0.01	0.00	0.02
28	0.125	0.396	0.52			14.205	0.00	0.00	0.00	0.00	0.01	0.00	0.01
29	0.125	0.396	0.52			14.214	0.00	0.00	0.00	0.00	0.00	0.00	0.01
30	0.125	0.396	0.52			14.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Total =	**2302**		**704**	**1,598**	**3,877**	**6,179**	**3,629**	**3,334**	**10,061**
							Numbers				**Pounds**		

Table 4-41. Equivalent Yield Estimates for Sheepshead Based on Low Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	2.3	0	2.3	1016696.675	42.67								
Larvae	6.46625	0	6.46625	3631059.552	1669.67								
Juvenile	1.91	0	1.91										
1	1.98	0	1.98			0.981	0.00	1475.91	236.42	1712.33	0.00	1447.87	231.93
2	1.98	0	1.98			1.22	0.00	203.78	32.64	236.42	0.00	248.61	39.82
3	1.98	0.225	2.205			1.56	2.96	26.08	3.60	32.64	4.62	40.68	5.61
4	1.98	0.45	2.43			2.33	0.61	2.67	0.32	3.60	1.42	6.23	0.74
5	1.98	0.45	2.43			2.43	0.05	0.24	0.03	0.32	0.13	0.57	0.07
6	1.98	0.45	2.43			2.45	0.00	0.02	0.00	0.03	0.01	0.05	0.01
7	1.98	0.45	2.43			2.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	1.98	0.45	2.43			2.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.98	0.45	2.43			2.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	1.98	0.45	2.43			2.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	1.98	0.45	2.43			2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	1.98	0.45	2.43			2.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	1.98	0.45	2.43			2.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	1.98	0.45	2.43			2.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	1.98	0.45	2.43			2.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	1.98	0.45	2.43			2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Total =	**1712**		**4**	**1,709**	**273**	**1,985**	**6**	**1,744**	**278**
							Numbers				**Pounds**		

Table 4-42. Equivalent Yield Estimates for Spanish Sardines Based on Low Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Number Potentially Entrained at Stage or Age	Projected Mortality of Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would Have Been Lost to Natural Causes	Weight of Fish That Would Have Remained in the Population
Egg	4.83	0	11,760,069	0	-	-	-	-	-	-	-	-
Larvae	10.12	0	42,000,246	5	-	-	-	-	-	-	-	-
Juvenile 1	6.53	0	-	-	-	-	-	-	-	-	-	-
1	0.78315	0.00726	-	-	0.033	0	3	2	5	0	0	0
2	0.78315	0.00726	-	-	0.068	0	1	1	2	0	0	0
3	0.78315	0.00726	-	-	0.100	0	1	0	1	0	0	0
4	0.78315	0.00726	-	-	0.124	0	0	0	0	0	0	0
			Total =	**5**		**0**	**5**	**4**	**0**	**0**	**0**	**0**
						Numbers				**Pounds**		

Table 4-43. Age-1 Equivalent Estimates for Red Drum Based on High Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.50	1.00	0.4984	0.607501886	0.755833497	1,228	6.04839E-05	0
Larvae	0.33	20.00	6.6	0.001360368	0.00271704	4,384	0.000159828	1
Juvenile 1	0.14	12.00	1.638	0.194368391	.	.	.	.
Juvenile 2	0.01	166.00	0.8964	0.408035948	.	.	.	.
Juvenile 3	0.00	166.00	0.2988	0.741707736	.	.	.	.
Total Egg To Age-1 Mortality =			**9.9316**				**Total Age-1 Equivalents =**	1

Table 4-44. Age-1 Equivalent Estimates for Red Snapper Based on High Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.50	1.00	0.4984	0.607501886	0.755833497	27304	3.29957E-05	1
Larvae	0.26	28.00	7.14	0.000792752	0.001584248	97516	8.72402E-05	9
Juvenile 1	0.10	24.00	2.4	0.090717953	.	.	.	.
Juvenile 2	0.00	312.00	0.4992	0.607016078	.	.	.	.
Total Egg to Age-1 Mortality =			**10.5376**				**Total Age-1 Equivalents =**	**10**

Table 4-45. Age-1 Equivalent Estimates for Bay Anchovy Based on High Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	1.04	1.00	1.044	0.35204368	0.520757858	100349	5.4003E-05	5
Larvae	0.23	34.00	7.854	0.00038819	0.000776091	358388	0.000207321	74
Juvenile	0.00	330.00	1.32	0.26713530	.	.	.	.
Total Egg to Age-1 Mortality =			**10.218**				**Total Age-1 Equivalents =**	**79**

Table 4-46. Age-1 Equivalent Estimates for Gag Grouper Based on High Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age 1 Equivalents
Egg	1.31	2.18	2.867148	0.05686086	0.107603309	47340.38356	0.000106022	5.02
Larvae	0.13	45.00	5.985	0.00251621	0.005019797	169072.7984	0.001965657	332.34
Juvenile	0.00	317.82	0.9375631	0.39158091	.	.		
Total Egg to Age-1 Mortality =			**9.7897111**				**Total Age-1 Equivalents =**	**337**

Table 4-47. Age-1 Equivalent Estimates for Sheepshead Based on High Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age 1 Equivalents
Egg	1.62	1.42	2.3	0.10025884	0.182245922	1016696.675	4.86198E-06	4.94
Larvae	0.25	35.00	8.621666667	0.00018016	0.000360255	3631059.552	5.33466E-05	193.70
Juvenile	0.01	328.58	1.91	0.14808038	.	.		
Total Egg to Age-1 Mortality =			**12.83166667**				**Total Age-1 Equivalents =**	**199**

Table 4-48. Age-1 Equivalent Estimates for Spanish Sardines Based on High Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age 1+	Age-1 Equivalents (Number)
Egg	3.716055083	1.3	4.8309	0.0080	0.0158	**11,760,069**	0.0000000	**0**
Larvae	0.5400	41.4	22.3560	0.0000	0.0000	**42,000,246**	0.0000000	**0**
Juvenile 1	0.019854059	328.9	6.5300	0.0015	-	-	-	
Total Egg to Age-1 Mortality=			33.7168716				**Total Age-1 Equivalents=**	**0**

Table 4-49. Equivalent Yield Estimates for Red Drum Based on High Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	0.50	0.00	0.50	1228	0.07	.	.	.	.	.	.	.	.
Larvae	6.60	0.00	6.60	4384	0.70	.	.	.	.	.	.	.	.
Juvenile 1	1.64	0.00	1.64	.	.	.	.	.	.	.	.	.	.
Juvenile 2	0.90	0.00	0.90	.	.	.	.	.	.	.	.	.	.
Juvenile 3	0.30	0.00	0.30	.	.	.	.	.	.	.	.	.	.
1	0.27	0.62	0.89	.	.	2.59	0.32	0.14	0.32	0.78	0.83	0.36	0.82
2	0.19	1.15	1.34	.	.	6.88	0.20	0.03	0.08	0.32	1.39	0.23	0.57
3	0.16	0.32	0.48	.	.	10.23	0.02	0.01	0.05	0.08	0.22	0.11	0.53
4	0.16	0.19	0.35	.	.	11.45	0.01	0.01	0.04	0.05	0.09	0.08	0.41
5	0.15	0.04	0.19	.	.	12.62	0.00	0.00	0.03	0.04	0.02	0.06	0.38
6	0.14	0.12	0.26	.	.	13.73	0.00	0.00	0.02	0.03	0.04	0.05	0.32
7	0.14	0.12	0.26	.	.	14.77	0.00	0.00	0.02	0.02	0.04	0.04	0.27
8	0.14	0.12	0.26	.	.	15.74	0.00	0.00	0.01	0.02	0.03	0.03	0.22
9	0.14	0.12	0.26	.	.	16.64	0.00	0.00	0.01	0.01	0.02	0.03	0.18
10	0.14	0.12	0.26	.	.	17.48	0.00	0.00	0.01	0.01	0.02	0.02	0.15
11	0.14	0.12	0.26	.	.	18.25	0.00	0.00	0.01	0.01	0.02	0.02	0.12
12	0.14	0.12	0.26	.	.	18.95	0.00	0.00	0.00	0.01	0.01	0.02	0.09
13	0.14	0.12	0.26	.	.	19.59	0.00	0.00	0.00	0.00	0.01	0.01	0.08
14	0.14	0.12	0.26	.	.	20.18	0.00	0.00	0.00	0.00	0.01	0.01	0.06
15	0.14	0.12	0.26	.	.	20.71	0.00	0.00	0.00	0.00	0.01	0.01	0.05
16	0.14	0.12	0.26	.	.	21.20	0.00	0.00	0.00	0.00	0.01	0.01	0.04
17	0.14	0.12	0.26	.	.	21.64	0.00	0.00	0.00	0.00	0.00	0.00	0.03
18	0.14	0.12	0.26	.	.	22.03	0.00	0.00	0.00	0.00	0.00	0.00	0.02
19	0.14	0.12	0.26	.	.	22.39	0.00	0.00	0.00	0.00	0.00	0.00	0.02
20	0.14	0.12	0.26	.	.	22.71	0.00	0.00	0.00	0.00	0.00	0.00	0.01
				Total =	**1**		**1**	**0**	**1**	**1**	**3**	**1**	**4**
							Numbers				**Pounds**		

Table 4-50. Equivalent Yield Estimates for Red Snapper Based on High Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	0.50	0.00	0.50	27304.44	0.90	.	.	.	.	.	.	.	.
Larvae	7.14	0.00	7.14	97515.87	8.51	.	.	.	.	.	.	.	.
Juvenile 1	2.40	0.00	2.40	.	.	.	.	.	.	.	.	.	.
Juvenile 2	0.50	0.00	0.50	.	.	.	.	.	.	.	.	.	.
1	0.10	1.01	1.11	.	.	0.31	5.74	0.57	3.10	9.41	1.79	0.18	0.97
2	0.10	0.07	0.17	.	.	1.08	0.21	0.29	2.61	3.10	0.22	0.31	2.81
3	0.10	0.29	0.39	.	.	2.30	0.62	0.22	1.77	2.61	1.43	0.50	4.07
4	0.10	0.54	0.64	.	.	3.86	0.70	0.13	0.94	1.77	2.72	0.51	3.62
5	0.10	0.43	0.53	.	.	5.64	0.31	0.07	0.55	0.94	1.78	0.41	3.10
6	0.10	0.29	0.39	.	.	7.52	0.13	0.05	0.37	0.55	0.99	0.34	2.80
7	0.10	0.20	0.30	.	.	9.39	0.06	0.03	0.28	0.37	0.60	0.30	2.59
8	0.10	0.15	0.25	.	.	11.19	0.04	0.02	0.22	0.28	0.40	0.27	2.41
9	0.10	0.12	0.22	.	.	12.88	0.02	0.02	0.17	0.22	0.29	0.25	2.24
10	0.10	0.08	0.18	.	.	14.44	0.01	0.02	0.14	0.17	0.19	0.23	2.09
11	0.10	0.08	0.18	.	.	15.85	0.01	0.01	0.12	0.14	0.18	0.21	1.90
12	0.10	0.08	0.18	.	.	17.10	0.01	0.01	0.10	0.12	0.16	0.19	1.71
13	0.10	0.08	0.18	.	.	18.21	0.01	0.01	0.08	0.10	0.14	0.17	1.52
14	0.10	0.08	0.18	.	.	19.19	0.01	0.01	0.07	0.08	0.12	0.15	1.33
15	0.10	0.08	0.18	.	.	20.03	0.01	0.01	0.06	0.07	0.11	0.13	1.15
				Total =	**9**		**8**	**1**	**11**	**20**	**11**	**4**	**34**
							Numbers				**Pounds**		

Table 4-51. Equivalent Yield Estimates for Gag Grouper Based on High Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	2.867148	0.00	2.87	47340.38356	5.02								
Larvae	5.985	0.00	5.99	169072.7984	332.34								
Juvenile	0.9375631	0.00	0.94										
1	0.432	0	0.43			0.815	0.00	118.34	219.02	337.36	0.00	96.45	178.50
2	0.311	0	0.31			1.974	0.00	58.54	160.48	219.02	0.00	115.56	316.78
3	0.251	0.396	0.65			3.411	46.79	29.66	84.03	160.48	159.60	101.16	286.62
4	0.216	0.396	0.61			4.931	24.89	13.57	45.57	84.03	122.72	66.94	224.68
5	0.193	0.396	0.59			6.4	13.64	6.65	25.28	45.57	87.27	42.53	161.81
6	0.176	0.396	0.57			7.738	7.62	3.39	14.27	25.28	59.00	26.22	110.42
7	0.164	0.396	0.56			8.912	4.33	1.79	8.15	14.27	38.56	15.97	72.64
8	0.155	0.396	0.55			9.914	2.48	0.97	4.70	8.15	24.60	9.63	46.58
9	0.148	0.396	0.54			10.752	1.43	0.54	2.73	4.70	15.43	5.77	29.32
10	0.143	0.396	0.54			11.444	0.83	0.30	1.59	2.73	9.55	3.45	18.20
11	0.138	0.396	0.53			12.008	0.49	0.17	0.93	1.59	5.86	2.04	11.20
12	0.125	0.396	0.52			12.464	0.29	0.09	0.55	0.93	3.59	1.13	6.90
13	0.125	0.396	0.52			12.831	0.17	0.05	0.33	0.55	2.19	0.69	4.22
14	0.125	0.396	0.52			13.125	0.10	0.03	0.20	0.33	1.33	0.42	2.56
15	0.125	0.396	0.52			13.359	0.06	0.02	0.12	0.20	0.81	0.25	1.55
16	0.125	0.396	0.52			13.545	0.04	0.01	0.07	0.12	0.49	0.15	0.93
17	0.125	0.396	0.52			13.692	0.02	0.01	0.04	0.07	0.29	0.09	0.56
18	0.125	0.396	0.52			13.809	0.01	0.00	0.02	0.04	0.17	0.06	0.34
19	0.125	0.396	0.52			13.901	0.01	0.00	0.01	0.02	0.10	0.03	0.20
20	0.125	0.396	0.52			13.974	0.00	0.00	0.01	0.01	0.06	0.02	0.12

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
21	0.125	0.396	0.52			14.032	0.00	0.00	0.01	0.01	0.04	0.01	0.07
22	0.125	0.396	0.52			14.077	0.00	0.00	0.00	0.01	0.02	0.01	0.04
23	0.125	0.396	0.52			14.113	0.00	0.00	0.00	0.00	0.01	0.00	0.03
24	0.125	0.396	0.52			14.141	0.00	0.00	0.00	0.00	0.01	0.00	0.02
25	0.125	0.396	0.52			14.163	0.00	0.00	0.00	0.00	0.00	0.00	0.01
26	0.125	0.396	0.52			14.181	0.00	0.00	0.00	0.00	0.00	0.00	0.01
27	0.125	0.396	0.52			14.194	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.125	0.396	0.52			14.205	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.125	0.396	0.52			14.214	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.125	0.396	0.52			14.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Total =	**337**		**103**	**234**	**568**	**905**	**532**	**489**	**1,474**
							Numbers				**Pounds**		

Table 4-52. Equivalent Yield Estimates for Sheepshead Based on High Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	2.3	0	2.3	1016696.675	4.94								
Larvae	8.621666667	0	8.621666667	3631059.552	193.70								
Juvenile	1.91	0	1.91										
1	1.98	0	1.98			0.981	0.00	171.22	27.43	198.65	0.00	167.97	26.91
2	1.98	0	1.98			1.22	0.00	23.64	3.79	27.43	0.00	28.84	4.62
3	1.98	0.225	2.205			1.56	0.34	3.03	0.42	3.79	0.54	4.72	0.65
4	1.98	0.45	2.43			2.33	0.07	0.31	0.04	0.42	0.16	0.72	0.09
5	1.98	0.45	2.43			2.43	0.01	0.03	0.00	0.04	0.02	0.07	0.01
6	1.98	0.45	2.43			2.45	0.00	0.00	0.00	0.00	0.00	0.01	0.00
7	1.98	0.45	2.43			2.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	1.98	0.45	2.43			2.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.98	0.45	2.43			2.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	1.98	0.45	2.43			2.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	1.98	0.45	2.43			2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	1.98	0.45	2.43			2.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	1.98	0.45	2.43			2.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	1.98	0.45	2.43			2.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	1.98	0.45	2.43			2.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	1.98	0.45	2.43			2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Total =	**199**		**0**	**198**	**32**	**230**	**1**	**202**	**32**
							Numbers				**Pounds**		

Table 4-53. Equivalent Yield Estimates for Spanish Sardines Based on High Larval Natural Mortality and an Average Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Number Potentially Entrained at Stage or Age	Projected Mortality of Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would Have Been Lost to Natural Causes	Weight of Fish That Would Have Remained in the Population
Egg	4.83	0	11,760,069	0	-	-	-	-	-	-	-	-
Larvae	22.36	0	42,000,246	0	-	-	-	-	-	-	-	-
Juvenile 1	6.53	0	-	-	-	-	-	-	-	-	-	-
1	0.78315	0.007260274	-	-	0.033	0	0	0	0	0	0	0
2	0.78315	0.007260274	-	-	0.068	0	0	0	0	0	0	0
3	0.78315	0.007260274	-	-	0.100	0	0	0	0	0	0	0
4	0.78315	0.007260274	-	-	0.124	0	0	0	0	0	0	0
			Total =	**0**		**0**	**0**	**0**	**0**	**0**	**0**	**0**
						Numbers				**Pounds**		

Table 4-54. Age-1 Equivalent Estimates for Red Drum Based on the Base Life History Table and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.50	1.0000	0.4984	0.607501886	0.755833497	2879	0.000103459	0
Larvae	0.25	20.0000	5	0.006737947	0.013385702	10281	0.000271929	3
Juvenile 1	0.14	20.0000	2.73	0.06521929	.	.	.	.
Juvenile 2	0.01	162.0000	0.8748	0.4169454	.	.	.	.
Juvenile 3	0.00	162.0000	0.2916	0.747067303	.	.	.	.
Total Egg To Age-1 Mortality =			**9.3948**				**Total Age-1 Equivalents =**	**3**

Table 4-55. Age-1 Equivalent Estimates for Red Snapper Based on the Base Life History Table and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.50	1.00	0.4984	0.607501886	0.755833497	40682	0.000133804	5
Larvae	0.21	28.00	5.74	0.003214768	0.006408933	145291	0.000352922	51
Juvenile 1	0.10	24.00	2.4	0.090717953	.	.	.	.
Juvenile 2	0.00	312.00	0.4992	0.607016078	.	.	.	.
Total Egg to Age-1 Mortality =			**9.1376**				**Total Age-1 Equivalents =**	**56**

Table 4-56. Age-1 Equivalent Estimates for Bay Anchovy Based on the Base Life History Table and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age 1 Equivalents
Egg	1.0440	1.00	1.044	0.352043687	0.520757858	158508	0.000126778	20
Larvae	0.2059	34.00	7.0006	0.000911335	0.00182101	566099	0.000486456	275
Juvenile	0.0040	330.00	1.32	0.267135302	.	.	.	.
Total Egg to Age-1 Mortality =			**9.3646**				**Total Age-1 Equivalents =**	**295**

Table 4-57. Age-1 Equivalent Estimates for Gag Grouper Based on the Base Life History Table and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	1.3140	2.18	2.867148	0.056860863	0.107603309	77293.01231	0.000272774	21.08
Larvae	0.1120	45.00	5.04	0.006473748	0.012864217	276046.4725	0.005037382	1390.55
Juvenile	0.0030	317.82	0.9375631	0.391580917	.	.		
Total Egg to Age-1 Mortality =			**8.8447111**				**Total Age-1 Equivalents =**	**1,412**

Table 4-58. Age-1 Equivalent Estimates for Sheepshead Based on the Base Life History Table and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	1.62	1.42	2.3	0.100258844	0.182245922	1400786.785	1.66617E-05	23.34
Larvae	0.21	35.00	7.39	0.000617396	0.00123403	5002809.947	0.000182736	914.19
Juvenile	0.01	328.58	1.91	0.148080387	.	.		
Total Egg to Age-1 Mortality =			**11.6**				**Total Age-1 Equivalents =**	**938**

Table 4-59. Age-1 Equivalent Estimates for Spanish Sardines Based on the Base Life History Table and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age 1+	Age-1 Equivalents (Number)
Egg	3.716055083	1.3	4.8309	0.0080	0.0158	**22,053,543**	0.0000000	**0**
Larvae	0.45	34.8	15.6600	0.0000	0.0000	**78,762,655**	0.0000000	**0**
Juvenile 1	0.019854059	328.9	6.5300	0.0015	-	-	-	
Total Egg to Age-1 Mortality=			**27.0208716**				**Total Age-1 Equivalents=**	**0**

Table 4-60. Equivalent Yield Estimates for Red Drum Based on the Base Life History Table and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	0.50	0.00	0.50	2879	0.30	.	.	.	.	.	.	.	.
Larvae	5.00	0.00	5.00	10280.74	2.80	.	.	.	.	.	.	.	.
Juvenile 1	1.64	0.00	1.64	.	.	.	.	.	.	.	.	.	.
Juvenile 2	0.90	0.00	0.90	.	.	.	.	.	.	.	.	.	.
Juvenile 3	0.30	0.00	0.30	.	.	.	.	.	.	.	.	.	.
1	0.27	0.62	0.89	.	.	2.59	1.27	0.55	1.27	3.09	3.30	1.43	3.29
2	0.19	1.15	1.34	.	.	6.88	0.80	0.13	0.33	1.27	5.53	0.91	2.29
3	0.16	0.32	0.48	.	.	10.23	0.09	0.04	0.21	0.33	0.87	0.43	2.10
4	0.16	0.19	0.35	.	.	11.45	0.03	0.03	0.14	0.21	0.38	0.32	1.65
5	0.15	0.04	0.19	.	.	12.62	0.00	0.02	0.12	0.14	0.06	0.25	1.51
6	0.14	0.12	0.26	.	.	13.73	0.01	0.01	0.09	0.12	0.17	0.20	1.27
7	0.14	0.12	0.26	.	.	14.77	0.01	0.01	0.07	0.09	0.14	0.17	1.06
8	0.14	0.12	0.26	.	.	15.74	0.01	0.01	0.06	0.07	0.12	0.14	0.87
9	0.14	0.12	0.26	.	.	16.64	0.01	0.01	0.04	0.06	0.10	0.11	0.71
10	0.14	0.12	0.26	.	.	17.48	0.00	0.01	0.03	0.04	0.08	0.09	0.58
11	0.14	0.12	0.26	.	.	18.25	0.00	0.00	0.03	0.03	0.06	0.07	0.47
12	0.14	0.12	0.26	.	.	18.95	0.00	0.00	0.02	0.03	0.05	0.06	0.38
13	0.14	0.12	0.26	.	.	19.59	0.00	0.00	0.02	0.02	0.04	0.05	0.30
14	0.14	0.12	0.26	.	.	20.18	0.00	0.00	0.01	0.02	0.03	0.04	0.24
15	0.14	0.12	0.26	.	.	20.71	0.00	0.00	0.01	0.01	0.03	0.03	0.19
16	0.14	0.12	0.26	.	.	21.20	0.00	0.00	0.01	0.01	0.02	0.02	0.15
17	0.14	0.12	0.26	.	.	21.64	0.00	0.00	0.01	0.01	0.02	0.02	0.12
18	0.14	0.12	0.26	.	.	22.03	0.00	0.00	0.00	0.01	0.01	0.01	0.09
19	0.14	0.12	0.26	.	.	22.39	0.00	0.00	0.00	0.00	0.01	0.01	0.07
20	0.14	0.12	0.26	.	.	22.71	0.00	0.00	0.00	0.00	0.01	0.01	0.06
				Total =	**3**		**2**	**1**	**2**	**6**	**11**	**4**	**17**
							Numbers				**Pounds**		

Table 4-61. Equivalent Yield Estimates for Red Snapper Based on the Base Life History Table and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	0.50	0.00	0.50	40681.51	5.44	.	.	.	.	.	.	.	.
Larvae	5.74	0.00	5.74	145291.09	51.28	.	.	.	.	.	.	.	.
Juvenile 1	2.40	0.00	2.40	.	.	.	.	.	.	.	.	.	.
Juvenile 2	0.50	0.00	0.50	.	.	.	.	.	.	.	.	.	.
1	0.10	1.01	1.11	.	.	0.31	34.58	3.43	18.71	56.72	10.79	1.07	5.84
2	0.10	0.07	0.17	.	.	1.08	1.25	1.72	15.74	18.71	1.35	1.85	16.97
3	0.10	0.29	0.39	.	.	2.30	3.76	1.30	10.68	15.74	8.64	3.00	24.56
4	0.10	0.54	0.64	.	.	3.86	4.24	0.79	5.65	10.68	16.37	3.05	21.80
5	0.10	0.43	0.53	.	.	5.64	1.90	0.44	3.31	5.65	10.72	2.47	18.68
6	0.10	0.29	0.39	.	.	7.52	0.79	0.27	2.24	3.31	5.96	2.06	16.86
7	0.10	0.20	0.30	.	.	9.39	0.39	0.19	1.66	2.24	3.62	1.82	15.62
8	0.10	0.15	0.25	.	.	11.19	0.22	0.15	1.30	1.66	2.43	1.65	14.54
9	0.10	0.12	0.22	.	.	12.88	0.14	0.12	1.05	1.30	1.75	1.51	13.49
10	0.10	0.08	0.18	.	.	14.44	0.08	0.10	0.87	1.05	1.16	1.38	12.58
11	0.10	0.08	0.18	.	.	15.85	0.07	0.08	0.72	0.87	1.06	1.26	11.48
12	0.10	0.08	0.18	.	.	17.10	0.06	0.07	0.60	0.72	0.95	1.13	10.31
13	0.10	0.08	0.18	.	.	18.21	0.05	0.06	0.50	0.60	0.84	1.00	9.14
14	0.10	0.08	0.18	.	.	19.19	0.04	0.05	0.42	0.50	0.74	0.88	8.01
15	0.10	0.08	0.18	.	.	20.03	0.03	0.04	0.35	0.42	0.64	0.76	6.96
				Total =	**57**		**48**	**9**	**64**	**120**	**67**	**25**	**207**
							Numbers				**Pounds**		

Table 4-62. Equivalent Yield Estimates for Gag Grouper Based on the Base Life History Table and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	2.867148	0.00	2.87	77293.01231	21.08								
Larvae	5.04	0.00	5.04	276046.4725	1390.55								
Juvenile	0.9375631	0.00	0.94										
1	0.432	0	0.43			0.815	0.00	495.19	916.45	1411.64	0.00	403.58	746.90
2	0.311	0	0.31			1.974	0.00	244.95	671.49	916.45	0.00	483.54	1325.53
3	0.251	0.396	0.65			3.411	195.79	124.10	351.60	671.49	667.84	423.30	1199.32
4	0.216	0.396	0.61			4.931	104.14	56.80	190.66	351.60	513.51	280.09	940.16
5	0.193	0.396	0.59			6.4	57.06	27.81	105.80	190.66	365.17	177.98	677.09
6	0.176	0.396	0.57			7.738	31.90	14.18	59.71	105.80	246.88	109.72	462.04
7	0.164	0.396	0.56			8.912	18.11	7.50	34.11	59.71	161.35	66.82	303.96
8	0.155	0.396	0.55			9.914	10.38	4.06	19.66	34.11	102.95	40.30	194.89
9	0.148	0.396	0.54			10.752	6.00	2.24	11.41	19.66	64.56	24.13	122.68
10	0.143	0.396	0.54			11.444	3.49	1.26	6.66	11.41	39.97	14.43	76.17
11	0.138	0.396	0.53			12.008	2.04	0.71	3.90	6.66	24.52	8.55	46.86
12	0.125	0.396	0.52			12.464	1.20	0.38	2.32	3.90	15.01	4.74	28.89
13	0.125	0.396	0.52			12.831	0.72	0.23	1.38	2.32	9.18	2.90	17.66
14	0.125	0.396	0.52			13.125	0.42	0.13	0.82	1.38	5.58	1.76	10.73
15	0.125	0.396	0.52			13.359	0.25	0.08	0.49	0.82	3.37	1.06	6.49
16	0.125	0.396	0.52			13.545	0.15	0.05	0.29	0.49	2.03	0.64	3.91
17	0.125	0.396	0.52			13.692	0.09	0.03	0.17	0.29	1.22	0.38	2.35
18	0.125	0.396	0.52			13.809	0.05	0.02	0.10	0.17	0.73	0.23	1.40

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
19	0.125	0.396	0.52			13.901	0.03	0.01	0.06	0.10	0.44	0.14	0.84
20	0.125	0.396	0.52			13.974	0.02	0.01	0.04	0.06	0.26	0.08	0.50
21	0.125	0.396	0.52			14.032	0.01	0.00	0.02	0.04	0.16	0.05	0.30
22	0.125	0.396	0.52			14.077	0.01	0.00	0.01	0.02	0.09	0.03	0.18
23	0.125	0.396	0.52			14.113	0.00	0.00	0.01	0.01	0.06	0.02	0.11
24	0.125	0.396	0.52			14.141	0.00	0.00	0.00	0.01	0.03	0.01	0.06
25	0.125	0.396	0.52			14.163	0.00	0.00	0.00	0.00	0.02	0.01	0.04
26	0.125	0.396	0.52			14.181	0.00	0.00	0.00	0.00	0.01	0.00	0.02
27	0.125	0.396	0.52			14.194	0.00	0.00	0.00	0.00	0.01	0.00	0.01
28	0.125	0.396	0.52			14.205	0.00	0.00	0.00	0.00	0.00	0.00	0.01
29	0.125	0.396	0.52			14.214	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.125	0.396	0.52			14.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Total =	**1412**		**432**	**980**	**2,377**	**3,789**	**2,225**	**2,044**	**6,169**
							Numbers				**Pounds**		

Table 4-63. Equivalent Yield Estimates for Sheepshead Based on the Base Life History Table and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	2.3	0	2.3	1400786.785	23.34								
Larvae	7.39	0	7.39	5002809.947	914.19								
Juvenile	1.91	0	1.91										
1	1.98	0	1.98			0.981	0.00	808.09	129.44	937.53	0.00	792.73	126.98
2	1.98	0	1.98			1.22	0.00	111.57	17.87	129.44	0.00	136.12	21.80
3	1.98	0.225	2.205			1.56	1.62	14.28	1.97	17.87	2.53	22.28	3.07
4	1.98	0.45	2.43			2.33	0.33	1.46	0.17	1.97	0.78	3.41	0.40
5	1.98	0.45	2.43			2.43	0.03	0.13	0.02	0.17	0.07	0.31	0.04
6	1.98	0.45	2.43			2.45	0.00	0.01	0.00	0.02	0.01	0.03	0.00
7	1.98	0.45	2.43			2.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	1.98	0.45	2.43			2.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.98	0.45	2.43			2.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	1.98	0.45	2.43			2.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	1.98	0.45	2.43			2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	1.98	0.45	2.43			2.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	1.98	0.45	2.43			2.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	1.98	0.45	2.43			2.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	1.98	0.45	2.43			2.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	1.98	0.45	2.43			2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Total =	**938**		**2**	**936**	**149**	**1,087**	**3**	**955**	**152**
							Numbers				**Pounds**		

Table 4-64. Equivalent Yield Estimates for Spanish Sardines Based on the Base Life History Table and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Number Potentially Entrained at Stage or Age	Projected Mortality of Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would Have Been Lost to Natural Causes	Weight of Fish That Would Have Remained in the Population
Egg	4.83	0	22,053,543	0	-	-	-	-	-	-	-	-
Larvae	15.66	0	78,762,655	0	-	-	-	-	-	-	-	-
Juvenile 1	6.53	0	-	-	-	-	-	-	-	-	-	-
1	0.78315	0.00726	-	-	0.033	0	0	0	0	0	0	0
2	0.78315	0.00726	-	-	0.068	0	0	0	0	0	0	0
3	0.78315	0.00726	-	-	0.100	0	0	0	0	0	0	0
4	0.78315	0.00726	-	-	0.124	0	0	0	0	0	0	0
			Total =	**0**		**0**	**0**	**0**	**0**	**0**	**0**	**0**
						Numbers				**Pounds**		

Table 4-65. Age-1 Equivalent Estimates for Red Drum Based on the Base Life History Table and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.50	1.00	0.4984	0.607501886	0.755833497	127	0.000299578	0
Larvae	0.25	20.00	5	0.006737947	0.013385702	454	0.000787405	0
Juvenile 1	0.14	12.00	1.638	0.194368391	.	.	.	.
Juvenile 2	0.01	166.00	0.8964	0.408035948	.	.	.	.
Juvenile 3	0.00	166.00	0.2988	0.741707736	.	.	.	.
Total Egg To Age-1 Mortality =			**8.3316**			**Total Age-1 Equivalents =**		**0**

Table 4-66. Age-1 Equivalent Estimates for Red Snapper Based on the Base Life History Table and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.50	1.00	0.4984	0.607501886	0.755833497	14520	0.000133804	2
Larvae	0.21	28.00	5.74	0.003214768	0.006408933	51857	0.000352922	18
Juvenile 1	0.10	24.00	2.4	0.090717953	.	.	.	.
Juvenile 2	0.00	312.00	0.4992	0.607016078	.	.	.	.
Total Egg to Age-1 Mortality =			**9.1376**			**Total Age-1 Equivalents =**		**20**

Table 4-67. Age-1 Equivalent Estimates for Bay Anchovy Based on the Base Life History Table and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	1.0440	1.00	1.044	0.352043687	0.520757858	43323	0.000126778	5
Larvae	0.2059	34.00	7.0006	0.000911335	0.00182101	154724	0.000486456	75
Juvenile	0.0040	330.00	1.32	0.267135302	.	.	.	.
Total Egg to Age-1 Mortality =			**9.3646**			**Total Age-1 Equivalents =**		**80**

Table 4-68. Age-1 Equivalent Estimates for Gag Grouper Based on the Base Life History Table and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	1.3140	2.18	2.867148	0.056860863	0.107603309	17514.67274	0.000272774	4.78
Larvae	0.1120	45.00	5.04	0.006473748	0.012864217	62552.40264	0.005037382	315.10
Juvenile	0.0030	317.82	0.9375631	0.391580917	.	.		
Total Egg to Age-1 Mortality =			**8.8447111**		**Total Age-1 Equivalents =**			**320**

Table 4-69. Age-1 Equivalent Estimates for Sheepshead Based on the Base Life History Table and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age 1 Equivalents
Egg	1.62	1.42	2.3	0.100258844	0.182245922	632395.0608	1.66617E-05	10.54
Larvae	0.21	35.00	7.39	0.000617396	0.00123403	2258553.788	0.000182736	412.72
Juvenile	0.01	328.58	1.91	0.148080387	.	.		
Total Egg to Age-1 Mortality =			**11.6**		**Total Age-1 Equivalents =**			**423**

Table 4-70. Age-1 Equivalent Estimates for Spanish Sardines Based on the Base Life History Table and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age 1+	Age-1 Equivalents (Number)
Egg	3.716055083	1.3	4.8309	0.0080	0.0158	**4,169,885**	0	**0**
Larvae	0.45	34.8	15.6600	0.0000	0.0000	**14,892,446**	0	**0**
Juvenile 1	0.019854059	328.9	6.5300	0.0015	-	-	-	
Total Egg to Age-1 Mortality=			**27.0208716**		**Total Age-1 Equivalents=**			**0**

Table 4-71. Equivalent Yield Estimates for Red Drum Based on the Base Life History Table and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	0.50	0.00	0.50	127.00	0.04	.	.	.	.	.	.	.	.
Larvae	5.00	0.00	5.00	453.56	0.36	.	.	.	.	.	.	.	.
Juvenile 1	1.64	0.00	1.64	.	.	.	.	.	.	.	.	.	.
Juvenile 2	0.90	0.00	0.90	.	.	.	.	.	.	.	.	.	.
Juvenile 3	0.30	0.00	0.30	.	.	.	.	.	.	.	.	.	.
1	0.27	0.62	0.89	.	.	2.59	0.16	0.07	0.16	0.40	0.42	0.18	0.42
2	0.19	1.15	1.34	.	.	6.88	0.10	0.02	0.04	0.16	0.71	0.12	0.29
3	0.16	0.32	0.48	.	.	10.23	0.01	0.01	0.03	0.04	0.11	0.06	0.27
4	0.16	0.19	0.35	.	.	11.45	0.00	0.00	0.02	0.03	0.05	0.04	0.21
5	0.15	0.04	0.19	.	.	12.62	0.00	0.00	0.02	0.02	0.01	0.03	0.19
6	0.14	0.12	0.26	.	.	13.73	0.00	0.00	0.01	0.02	0.02	0.03	0.16
7	0.14	0.12	0.26	.	.	14.77	0.00	0.00	0.01	0.01	0.02	0.02	0.14
8	0.14	0.12	0.26	.	.	15.74	0.00	0.00	0.01	0.01	0.01	0.02	0.11
9	0.14	0.12	0.26	.	.	16.64	0.00	0.00	0.01	0.01	0.01	0.01	0.09
10	0.14	0.12	0.26	.	.	17.48	0.00	0.00	0.00	0.01	0.01	0.01	0.07
11	0.14	0.12	0.26	.	.	18.25	0.00	0.00	0.00	0.00	0.01	0.01	0.06
12	0.14	0.12	0.26	.	.	18.95	0.00	0.00	0.00	0.00	0.01	0.01	0.05
13	0.14	0.12	0.26	.	.	19.59	0.00	0.00	0.00	0.00	0.01	0.01	0.04
14	0.14	0.12	0.26	.	.	20.18	0.00	0.00	0.00	0.00	0.00	0.00	0.03
15	0.14	0.12	0.26	.	.	20.71	0.00	0.00	0.00	0.00	0.00	0.00	0.02
16	0.14	0.12	0.26	.	.	21.20	0.00	0.00	0.00	0.00	0.00	0.00	0.02
17	0.14	0.12	0.26	.	.	21.64	0.00	0.00	0.00	0.00	0.00	0.00	0.02
18	0.14	0.12	0.26	.	.	22.03	0.00	0.00	0.00	0.00	0.00	0.00	0.01
19	0.14	0.12	0.26	.	.	22.39	0.00	0.00	0.00	0.00	0.00	0.00	0.01
20	0.14	0.12	0.26	.	.	22.71	0.00	0.00	0.00	0.00	0.00	0.00	0.01
				Total =	**0**		**0**	**0**	**0**	**1**	**1**	**1**	**2**
							Numbers				**Pounds**		

Table 4-72. Equivalent Yield Estimates for Red Snapper Based on the Base Life History Table and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	0.50	0.00	0.50	14520.04	1.94	.	.	.	.	.	.	.	.
Larvae	5.74	0.00	5.74	51857.28	18.30	.	.	.	.	.	.	.	.
Juvenile 1	2.40	0.00	2.40	.	.	.	.	.	.	.	.	.	.
Juvenile 2	0.50	0.00	0.50	.	.	.	.	.	.	.	.	.	.
1	0.10	1.01	1.11	.	.	0.31	12.34	1.22	6.68	20.24	3.85	0.38	2.08
2	0.10	0.07	0.17	.	.	1.08	0.45	0.61	5.62	6.68	0.48	0.66	6.06
3	0.10	0.29	0.39	.	.	2.30	1.34	0.47	3.81	5.62	3.08	1.07	8.77
4	0.10	0.54	0.64	.	.	3.86	1.51	0.28	2.02	3.81	5.84	1.09	7.78
5	0.10	0.43	0.53	.	.	5.64	0.68	0.16	1.18	2.02	3.82	0.88	6.67
6	0.10	0.29	0.39	.	.	7.52	0.28	0.10	0.80	1.18	2.13	0.74	6.02
7	0.10	0.20	0.30	.	.	9.39	0.14	0.07	0.59	0.80	1.29	0.65	5.57
8	0.10	0.15	0.25	.	.	11.19	0.08	0.05	0.46	0.59	0.87	0.59	5.19
9	0.10	0.12	0.22	.	.	12.88	0.05	0.04	0.37	0.46	0.62	0.54	4.82
10	0.10	0.08	0.18	.	.	14.44	0.03	0.03	0.31	0.37	0.41	0.49	4.49
11	0.10	0.08	0.18	.	.	15.85	0.02	0.03	0.26	0.31	0.38	0.45	4.10
12	0.10	0.08	0.18	.	.	17.10	0.02	0.02	0.22	0.26	0.34	0.40	3.68
13	0.10	0.08	0.18	.	.	18.21	0.02	0.02	0.18	0.22	0.30	0.36	3.26
14	0.10	0.08	0.18	.	.	19.19	0.01	0.02	0.15	0.18	0.26	0.31	2.86
15	0.10	0.08	0.18	.	.	20.03	0.01	0.01	0.12	0.15	0.23	0.27	2.48
				Total =	**20**		**17**	**3**	**23**	**43**	**24**	**9**	**74**
							Numbers				**Pounds**		

Table 4-73. Equivalent Yield Estimates for Gag Grouper Based on the Base Life History Table and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	2.867148	0.00	2.87	17514.67274	4.78								
Larvae	5.04	0.00	5.04	62552.40264	315.10								
Juvenile	0.9375631	0.00	0.94										
1	0.432	0	0.43			0.815	0.00	112.21	207.67	319.88	0.00	91.45	169.25
2	0.311	0	0.31			1.974	0.00	55.51	152.16	207.67	0.00	109.57	300.37
3	0.251	0.396	0.65			3.411	44.37	28.12	79.67	152.16	151.33	95.92	271.77
4	0.216	0.396	0.61			4.931	23.60	12.87	43.20	79.67	116.36	63.47	213.04
5	0.193	0.396	0.59			6.4	12.93	6.30	23.97	43.20	82.75	40.33	153.43
6	0.176	0.396	0.57			7.738	7.23	3.21	13.53	23.97	55.94	24.86	104.70
7	0.164	0.396	0.56			8.912	4.10	1.70	7.73	13.53	36.56	15.14	68.88
8	0.155	0.396	0.55			9.914	2.35	0.92	4.45	7.73	23.33	9.13	44.16
9	0.148	0.396	0.54			10.752	1.36	0.51	2.59	4.45	14.63	5.47	27.80
10	0.143	0.396	0.54			11.444	0.79	0.29	1.51	2.59	9.06	3.27	17.26
11	0.138	0.396	0.53			12.008	0.46	0.16	0.88	1.51	5.56	1.94	10.62
12	0.125	0.396	0.52			12.464	0.27	0.09	0.53	0.88	3.40	1.07	6.55
13	0.125	0.396	0.52			12.831	0.16	0.05	0.31	0.53	2.08	0.66	4.00
14	0.125	0.396	0.52			13.125	0.10	0.03	0.19	0.31	1.26	0.40	2.43
15	0.125	0.396	0.52			13.359	0.06	0.02	0.11	0.19	0.76	0.24	1.47
16	0.125	0.396	0.52			13.545	0.03	0.01	0.07	0.11	0.46	0.15	0.89
17	0.125	0.396	0.52			13.692	0.02	0.01	0.04	0.07	0.28	0.09	0.53
18	0.125	0.396	0.52			13.809	0.01	0.00	0.02	0.04	0.17	0.05	0.32

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
19	0.125	0.396	0.52			13.901	0.01	0.00	0.01	0.02	0.10	0.03	0.19
20	0.125	0.396	0.52			13.974	0.00	0.00	0.01	0.01	0.06	0.02	0.11
21	0.125	0.396	0.52			14.032	0.00	0.00	0.00	0.01	0.04	0.01	0.07
22	0.125	0.396	0.52			14.077	0.00	0.00	0.00	0.00	0.02	0.01	0.04
23	0.125	0.396	0.52			14.113	0.00	0.00	0.00	0.00	0.01	0.00	0.02
24	0.125	0.396	0.52			14.141	0.00	0.00	0.00	0.00	0.01	0.00	0.01
25	0.125	0.396	0.52			14.163	0.00	0.00	0.00	0.00	0.00	0.00	0.01
26	0.125	0.396	0.52			14.181	0.00	0.00	0.00	0.00	0.00	0.00	0.01
27	0.125	0.396	0.52			14.194	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.125	0.396	0.52			14.205	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.125	0.396	0.52			14.214	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.125	0.396	0.52			14.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Total =	**320**		**98**	**222**	**539**	**859**	**504**	**463**	**1,398**
							Numbers				**Pounds**		

Table 4-74. Equivalent Yield Estimates for Sheepshead Based on the Base Life History Table and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	2.3	0	2.3	632395.0608	10.54								
Larvae	7.39	0	7.39	2258553.788	412.72								
Juvenile	1.91	0	1.91										
1	1.98	0	1.98			0.981	0.00	364.82	58.44	423.26	0.00	357.89	57.33
2	1.98	0	1.98			1.22	0.00	50.37	8.07	58.44	0.00	61.45	9.84
3	1.98	0.225	2.205			1.56	0.73	6.45	0.89	8.07	1.14	10.06	1.39
4	1.98	0.45	2.43			2.33	0.15	0.66	0.08	0.89	0.35	1.54	0.18
5	1.98	0.45	2.43			2.43	0.01	0.06	0.01	0.08	0.03	0.14	0.02
6	1.98	0.45	2.43			2.45	0.00	0.01	0.00	0.01	0.00	0.01	0.00
7	1.98	0.45	2.43			2.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	1.98	0.45	2.43			2.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.98	0.45	2.43			2.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	1.98	0.45	2.43			2.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	1.98	0.45	2.43			2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	1.98	0.45	2.43			2.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	1.98	0.45	2.43			2.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	1.98	0.45	2.43			2.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	1.98	0.45	2.43			2.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	1.98	0.45	2.43			2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Total =	**423**		**1**	**422**	**67**	**491**	**2**	**431**	**69**
							Numbers				**Pounds**		

Table 4-75. Equivalent Yield Estimates for Spanish Sardines Based on the Base Life History Table and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Accepts As Likely

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Number Potentially Entrained at Stage or Age	Projected Mortality of Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would Have Been Lost to Natural Causes	Weight of Fish That Would Have Remained in the Population
Egg	4.83	0	**4,169,885**	**0**	-	-	-	-	-	-	-	-
Larvae	15.66	0	**14,892,446**	**0**	-	-	-	-	-	-	-	-
Juvenile 1	6.53	0	-	-	-	-	-	-	-	-	-	-
1	0.78315	0.0072603	-	-	0.033	0	0	0	0	0	0	0
2	0.78315	0.0072603	-	-	0.068	0	0	0	0	0	0	0
3	0.78315	0.0072603	-	-	0.100	0	0	0	0	0	0	0
4	0.78315	0.0072603	-	-	0.124	0	0	0	0	0	0	0
			Total =	**0**		**0**	**0**	**0**	**0**	**0**	**0**	**0**
						Numbers				**Pounds**		

Table 4-76. Age-1 Equivalent Estimates for Red Drum Based on High Larval Natural Mortality and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.4984	1.00	0.4984	0.607501886	0.755833497	127	1.7768E-05	0
Larvae	0.3300	20.00	6.6	0.001360368	0.00271704	454	4.69516E-05	0
Juvenile 1	0.1390	20.00	2.78	0.062038507	.	.	.	.
Juvenile 2	0.0061	162.00	0.98658	0.372849659	.	.	.	.
Juvenile 3	0.0018	162.00	0.2916	0.747067303	.	.	.	.
Total Egg To Age-1 Mortality =			**11.15658**			**Total Age-1 Equivalents =**		**0**

Table 4-77. Age-1 Equivalent Estimates for Red Snapper Based on High Larval Natural Mortality and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.4984	1.0000	0.4984	0.607501886	0.755833497	14520	6.57998E-05	1
Larvae	0.2550	30.0000	7.65	0.000476044	0.000951635	51857	0.000174029	9
Juvenile 1	0.1200	10.0000	1.2	0.301194212	.	.	.	.
Juvenile 2	0.0015	324.0000	0.49896	0.60716178	.	.	.	.
Total Egg to Age-1 Mortality =			**9.84736**			**Total Age-1 Equivalents =**		**10**

Table 4-78. Age-1 Equivalent Estimates for Bay Anchovy Based on High Larval Natural Mortality and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	1.9400	1.0000	1.94	0.14370395	0.251295713	43323	3.59803E-06	0
Larvae	0.2310	34.0000	7.854	0.000388196	0.000776091	154724	2.86247E-05	4
Juvenile	0.0100	330.0000	3.3	0.036883167	.	.	.	.
Total Egg to Age-1 Mortality =			**13.094**			**Total Age-1 Equivalents =**		**4**

Table 4-79. Age-1 Equivalent Estimates for Gag Grouper Based on High Larval Natural Mortality and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	2.7010	3.2420	8.756642	0.000157412	0.000314775	17514.67274	1.50203E-07	0.00
Larvae	0.1330	50.0000	6.65	0.001294022	0.0025847	62552.40264	0.000953118	59.62
Juvenile	0.0032	311.7580	0.9976256	0.368753972	.	.		
Total Egg to Age-1 Mortality =			**16.4042676**		**Total Age-1 Equivalents =**			**60**

Table 4-80. Age-1 Equivalent Estimates for Sheepshead Based on High Larval Natural Mortality and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	2.0536	1.4200	2.916071429	0.054145986	0.102729578	632395.0608	2.65694E-06	1.68
Larvae	0.2463	35.0000	8.621666667	0.00018016	0.000360255	2258553.788	5.17176E-05	116.81
Juvenile	0.0059	328.5800	1.941013206	0.143558422	.	.		
Total Egg to Age-1 Mortality =			**13.4787513**		**Total Age-1 Equivalents =**			**118**

Table 4-81. Age-1 Equivalent Estimates for Spanish Sardines Based on High Larval Natural Mortality and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age 1+	Age-1 Equivalents (Number)
Egg	1.884084643	1.0	1.8841	0.1520	0.2638	**22,053,543**	0.0000001	**1**
Larvae	0.36	28.1	10.1160	0.0000	0.0001	**78,762,655**	0.0000004	**31**
Juvenile 1	0.015883247	335.9	5.3352	0.0048	`	-	-	
Total Egg to Age-1 Mortality =			**17.3352674**			**Total Age-1 Equivalents=**		**32**

Table 4-82 Equivalent Yield Estimates for Red Drum Based on High Larval Natural Mortality and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	0.50	0.00	0.50	127.00	0.00	.	.	.	.	.	.	.	.
Larvae	6.60	0.00	6.60	453.56	0.02	.	.	.	.	.	.	.	.
Juvenile 1	2.78	0.00	2.78	.	.	.	.	.	.	.	.	.	.
Juvenile 2	0.99	0.00	0.99	.	.	.	.	.	.	.	.	.	.
Juvenile 3	0.29	0.00	0.29	.	.	.	.	.	.	.	.	.	.
1	0.27	0.62	0.89	.	.	2.59	0.01	0.00	0.01	0.02	0.03	0.01	0.03
2	0.19	1.15	1.34	.	.	6.88	0.01	0.00	0.00	0.01	0.04	0.01	0.02
3	0.16	0.32	0.48	.	.	10.23	0.00	0.00	0.00	0.00	0.01	0.00	0.02
4	0.16	0.19	0.35	.	.	11.45	0.00	0.00	0.00	0.00	0.00	0.00	0.01
5	0.15	0.04	0.19	.	.	12.62	0.00	0.00	0.00	0.00	0.00	0.00	0.01
6	0.14	0.12	0.26	.	.	13.73	0.00	0.00	0.00	0.00	0.00	0.00	0.01
7	0.14	0.12	0.26	.	.	14.77	0.00	0.00	0.00	0.00	0.00	0.00	0.01
8	0.14	0.12	0.26	.	.	15.74	0.00	0.00	0.00	0.00	0.00	0.00	0.01
9	0.14	0.12	0.26	.	.	16.64	0.00	0.00	0.00	0.00	0.00	0.00	0.01
10	0.14	0.12	0.26	.	.	17.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.14	0.12	0.26	.	.	18.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.14	0.12	0.26	.	.	18.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.14	0.12	0.26	.	.	19.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.14	0.12	0.26	.	.	20.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.14	0.12	0.26	.	.	20.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.14	0.12	0.26	.	.	21.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.14	0.12	0.26	.	.	21.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.14	0.12	0.26	.	.	22.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.14	0.12	0.26	.	.	22.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.14	0.12	0.26	.	.	22.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Total =	**0**		**0**	**0**	**0**	**0**	**0**	**0**	**0**
							Numbers				**Pounds**		

Table 4-83. Equivalent Yield Estimates for Red Snapper Based on High Larval Natural Mortality and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	0.50	0.00	0.50	14520.04	0.96	.	.	.	.	.	.	.	.
Larvae	7.65	0.00	7.65	51857.28	9.02	.	.	.	.	.	.	.	.
Juvenile 1	1.20	0.00	1.20	.	.	.	.	.	.	.	.	.	.
Juvenile 2	0.50	0.00	0.50	.	.	.	.	.	.	.	.	.	.
1	0.10	1.01	1.11	.	.	0.31	6.08	0.60	3.29	9.98	1.90	0.19	1.03
2	0.10	0.07	0.17	.	.	1.08	0.22	0.30	2.77	3.29	0.24	0.33	2.99
3	0.10	0.29	0.39	.	.	2.30	0.66	0.23	1.88	2.77	1.52	0.53	4.32
4	0.10	0.54	0.64	.	.	3.86	0.75	0.14	0.99	1.88	2.88	0.54	3.84
5	0.10	0.43	0.53	.	.	5.64	0.33	0.08	0.58	0.99	1.89	0.43	3.29
6	0.10	0.29	0.39	.	.	7.52	0.14	0.05	0.39	0.58	1.05	0.36	2.97
7	0.10	0.20	0.30	.	.	9.39	0.07	0.03	0.29	0.39	0.64	0.32	2.75
8	0.10	0.15	0.25	.	.	11.19	0.04	0.03	0.23	0.29	0.43	0.29	2.56
9	0.10	0.12	0.22	.	.	12.88	0.02	0.02	0.18	0.23	0.31	0.26	2.37
10	0.10	0.08	0.18	.	.	14.44	0.01	0.02	0.15	0.18	0.20	0.24	2.21
11	0.10	0.08	0.18	.	.	15.85	0.01	0.01	0.13	0.15	0.19	0.22	2.02
12	0.10	0.08	0.18	.	.	17.10	0.01	0.01	0.11	0.13	0.17	0.20	1.81
13	0.10	0.08	0.18	.	.	18.21	0.01	0.01	0.09	0.11	0.15	0.18	1.61
14	0.10	0.08	0.18	.	.	19.19	0.01	0.01	0.07	0.09	0.13	0.15	1.41
15	0.10	0.08	0.18	.	.	20.03	0.01	0.01	0.06	0.07	0.11	0.13	1.22
				Total =	**10**		**8**	**2**	**11**	**21**	**12**	**4**	**36**
							Numbers				**Pounds**		

Table 4-84. Equivalent Yield Estimates for Gag Grouper Based on High Larval Natural Mortality and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	8.756642	0.00	8.76	17514.67274	0.00								
Larvae	6.65	0.00	6.65	62552.40264	59.62								
Juvenile	3.3	0.00	3.30										
1	0.432	0	0.43			0.815	0.00	20.92	38.71	59.62	0.00	17.05	31.55
2	0.311	0	0.31			1.974	0.00	10.35	28.36	38.71	0.00	20.42	55.99
3	0.251	0.396	0.65			3.411	8.27	5.24	14.85	28.36	28.21	17.88	50.66
4	0.216	0.396	0.61			4.931	4.40	2.40	8.05	14.85	21.69	11.83	39.71
5	0.193	0.396	0.59			6.4	2.41	1.17	4.47	8.05	15.42	7.52	28.60
6	0.176	0.396	0.57			7.738	1.35	0.60	2.52	4.47	10.43	4.63	19.51
7	0.164	0.396	0.56			8.912	0.76	0.32	1.44	2.52	6.81	2.82	12.84
8	0.155	0.396	0.55			9.914	0.44	0.17	0.83	1.44	4.35	1.70	8.23
9	0.148	0.396	0.54			10.752	0.25	0.09	0.48	0.83	2.73	1.02	5.18
10	0.143	0.396	0.54			11.444	0.15	0.05	0.28	0.48	1.69	0.61	3.22
11	0.138	0.396	0.53			12.008	0.09	0.03	0.16	0.28	1.04	0.36	1.98
12	0.125	0.396	0.52			12.464	0.05	0.02	0.10	0.16	0.63	0.20	1.22
13	0.125	0.396	0.52			12.831	0.03	0.01	0.06	0.10	0.39	0.12	0.75
14	0.125	0.396	0.52			13.125	0.02	0.01	0.03	0.06	0.24	0.07	0.45
15	0.125	0.396	0.52			13.359	0.01	0.00	0.02	0.03	0.14	0.04	0.27
16	0.125	0.396	0.52			13.545	0.01	0.00	0.01	0.02	0.09	0.03	0.16
17	0.125	0.396	0.52			13.692	0.00	0.00	0.01	0.01	0.05	0.02	0.10
18	0.125	0.396	0.52			13.809	0.00	0.00	0.00	0.01	0.03	0.01	0.06

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
19	0.125	0.396	0.52			13.901	0.00	0.00	0.00	0.00	0.02	0.01	0.04
20	0.125	0.396	0.52			13.974	0.00	0.00	0.00	0.00	0.01	0.00	0.02
21	0.125	0.396	0.52			14.032	0.00	0.00	0.00	0.00	0.01	0.00	0.01
22	0.125	0.396	0.52			14.077	0.00	0.00	0.00	0.00	0.00	0.00	0.01
23	0.125	0.396	0.52			14.113	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.125	0.396	0.52			14.141	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.125	0.396	0.52			14.163	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.125	0.396	0.52			14.181	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.125	0.396	0.52			14.194	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.125	0.396	0.52			14.205	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.125	0.396	0.52			14.214	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.125	0.396	0.52			14.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Total =	**60**		**18**	**41**	**100**	**160**	**94**	**86**	**261**
							Numbers				**Pounds**		

Table 4-85. Equivalent Yield Estimates for Sheepshead Based on High Larval Natural Mortality and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	2.9160714	0	2.91607142	632395.06	1.68								
Larvae	8.6216666	0	8.62166666	2258553.7	116.81								
Juvenile	1.9410132	0	1.94101320										
1	1.98	0	1.98			0.981	0.00	102.13	16.36	118.49	0.00	100.19	16.05
2	1.98	0	1.98			1.22	0.00	14.10	2.26	16.36	0.00	17.20	2.76
3	1.98	0.225	2.205			1.56	0.21	1.80	0.25	2.26	0.32	2.82	0.39
4	1.98	0.45	2.43			2.33	0.04	0.19	0.02	0.25	0.10	0.43	0.05
5	1.98	0.45	2.43			2.43	0.00	0.02	0.00	0.02	0.01	0.04	0.00
6	1.98	0.45	2.43			2.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	1.98	0.45	2.43			2.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	1.98	0.45	2.43			2.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.98	0.45	2.43			2.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	1.98	0.45	2.43			2.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	1.98	0.45	2.43			2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	1.98	0.45	2.43			2.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	1.98	0.45	2.43			2.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	1.98	0.45	2.43			2.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	1.98	0.45	2.43			2.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	1.98	0.45	2.43			2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Total =	**118**		**0**	**118**	**19**	**137**	**0**	**121**	**19**
							Numbers				**Pounds**		

Table 4-86. Equivalent Yield Estimates for Spanish Sardines Based on High Larval Natural Mortality and the Lower 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Number Potentially Entrained at Stage or Age	Projected Mortality of Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would Have Been Lost to Natural Causes	Weight of Fish That Would Have Remained in the Population
Egg	1.88	0	22,053,543	1	-	-	-	-	-	-	-	-
Larvae	10.12	0	78,762,655	31	-	-	-	-	-	-	-	-
Juvenile 1	5.34	0	-	-	-	-	-	-	-	-	-	-
1	0.78315	0.007260274	-	-	0.033	0	17	14	32	0	1	0
2	0.78315	0.007260274	-	-	0.068	0	8	7	14	0	1	0
3	0.78315	0.007260274	-	-	0.100	0	4	3	7	0	0	0
4	0.78315	0.007260274	-	-	0.124	0	2	1	3	0	0	0
			Total =	**32**		**0**	**30**	**25**	**3**	**0**	**2**	**0**
						Numbers				**Pounds**		

Table 4-87. Age-1 Equivalent Estimates for Red Drum Based on Low Larval Natural Mortality and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.4984	1.0000	0.4984	0.607501886	0.755833497	2879	0.001994156	6
Larvae	0.1700	20.0000	3.4	0.03337327	0.064590929	10281	0.005106294	52
Juvenile 1	0.1340	12.0000	1.608	0.200287789	.	.	.	.
Juvenile 2	0.0047	166.0000	0.7802	0.458314339	.	.	.	.
Juvenile 3	0.0009	166.0000	0.1494	0.861224556	.	.	.	.
Total Egg To Age-1 Mortality =			**6.436**				**Total Age-1 Equivalents =**	**58**

Table 4-88. Age-1 Equivalent Estimates for Red Snapper Based on Low Larval Natural Mortality and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.4984	1.0000	0.4984	0.607501886	0.755833497	40682	0.002018614	82
Larvae	0.1550	26.0000	4.03	0.01777433	0.034927841	145291	0.005248143	763
Juvenile 1	0.0450	31.0000	1.395	0.247833036	.	.	.	.
Juvenile 2	0.0016	307.0000	0.50041	0.606282033	.	.	.	.
Total Egg to Age-1 Mortality =			**6.42381**				**Total Age-1 Equivalents =**	**845**

Table 4-89. Age-1 Equivalent Estimates for Bay Anchovy Based on Low Larval Natural Mortality and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.6900	1.0000	0.69	0.501576069	0.668066146	158508	0.000701268	111
Larvae	0.1804	30.6300	5.525652	0.003983271	0.007934935	566099	0.002091068	1184
Juvenile	0.0040	333.4000	1.3336	0.263526855	.	.	.	.
Total Egg to Age-1 Mortality =			**7.549252**				**Total Age-1 Equivalents =**	**1,295**

Table 4-90. Age-1 Equivalent Estimates for Gag Grouper Based on Low Larval Natural Mortality and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	0.6400	1.4680	0.93952	0.390815382	0.561994621	77293.01231	0.006410619	495.50
Larvae	0.0900	40.0000	3.6	0.027323722	0.053193987	276046.4725	0.022207031	6130.17
Juvenile	0.0027	323.5320	0.8735364	0.417472586	.	.		
Total Egg to Age-1 Mortality =			**5.4130564**		**Total Age-1 Equivalents =**			**6,626**

Table 4-91. Age-1 Equivalent Estimates for Sheepshead Based on Low Larval Natural Mortality and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age-1+	Age-1 Equivalents
Egg	1.3772	1.4200	1.955688623	0.141467026	0.247868791	1400786.785	5.88342E-05	82.41
Larvae	0.1848	35.0000	6.46625	0.001555046	0.003105264	5002809.947	0.000473984	2371.25
Juvenile	0.0057	328.5800	1.879680724	0.152638832	.	.		
Total Egg to Age-1 Mortality =			**10.30161935**		**Total Age-1 Equivalents =**			**2,454**

Table 4-92. Age-1 Equivalent Estimates for Spanish Sardines Based on Low Larval Natural Mortality and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Stage	Instantaneous Natural Mortality	Duration (Days)	Natural Mortality per Stage	Survival Fraction	Corrected Survival Fraction	Number Potentially Entrained	Fraction Surviving to Age 1+	Age-1 Equivalents (Number)
Egg	5.548025522	1.6	8.8768	0.0001	0.0003	**4,169,885**	0.0000000	**0**
Larvae	0.54	41.4	22.3560	0.0000	0.0000	**14,892,446**	0.0000000	**0**
Juvenile 1	0.021839465	322.0	7.0323	0.0009	-	-	-	
Total Egg to Age-1 Mortality=			**38.2651485**		**Total Age-1 Equivalents=**			**0**

Table 4-93. Equivalent Yield Estimates for Red Drum Based on Low Larval Natural Mortality and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	0.50	0.00	0.50	2878.61	5.74	.	.	.	.	.	.	.	.
Larvae	3.40	0.00	3.40	10280.74	52.50	.	.	.	.	.	.	.	.
Juvenile 1	1.61	0.00	1.61	.	.	.	.	.	.	.	.	.	.
Juvenile 2	0.78	0.00	0.78	.	.	.	.	.	.	.	.	.	.
Juvenile 3	0.15	0.00	0.15	.	.	.	.	.	.	.	.	.	.
1	0.27	0.62	0.89	.	.	2.59	23.94	10.41	23.89	58.24	62.11	27.00	61.99
2	0.19	1.15	1.34	.	.	6.88	15.13	2.50	6.26	23.89	104.14	17.22	43.11
3	0.16	0.32	0.48	.	.	10.23	1.61	0.79	3.86	6.26	16.46	8.13	39.50
4	0.16	0.19	0.35	.	.	11.45	0.62	0.52	2.72	3.86	7.09	5.97	31.15
5	0.15	0.04	0.19	.	.	12.62	0.09	0.37	2.26	2.72	1.13	4.70	28.50
6	0.14	0.12	0.26	.	.	13.73	0.23	0.28	1.75	2.26	3.20	3.83	23.97
7	0.14	0.12	0.26	.	.	14.77	0.18	0.22	1.35	1.75	2.66	3.18	19.94
8	0.14	0.12	0.26	.	.	15.74	0.14	0.17	1.04	1.35	2.19	2.62	16.44
9	0.14	0.12	0.26	.	.	16.64	0.11	0.13	0.81	1.04	1.79	2.15	13.44
10	0.14	0.12	0.26	.	.	17.48	0.08	0.10	0.62	0.81	1.46	1.74	10.92
11	0.14	0.12	0.26	.	.	18.25	0.06	0.08	0.48	0.62	1.18	1.41	8.82
12	0.14	0.12	0.26	.	.	18.95	0.05	0.06	0.37	0.48	0.94	1.13	7.08
13	0.14	0.12	0.26	.	.	19.59	0.04	0.05	0.29	0.37	0.76	0.90	5.66
14	0.14	0.12	0.26	.	.	20.18	0.03	0.04	0.22	0.29	0.60	0.72	4.51
15	0.14	0.12	0.26	.	.	20.71	0.02	0.03	0.17	0.22	0.48	0.57	3.58
16	0.14	0.12	0.26	.	.	21.20	0.02	0.02	0.13	0.17	0.38	0.45	2.83
17	0.14	0.12	0.26	.	.	21.64	0.01	0.02	0.10	0.13	0.30	0.36	2.24
18	0.14	0.12	0.26	.	.	22.03	0.01	0.01	0.08	0.10	0.23	0.28	1.76
19	0.14	0.12	0.26	.	.	22.39	0.01	0.01	0.06	0.08	0.18	0.22	1.38
20	0.14	0.12	0.26	.	.	22.71	0.01	0.01	0.05	0.06	0.14	0.17	1.09
				Total =	**58**		**42**	**16**	**47**	**105**	**207**	**83**	**328**
							Numbers				**Pounds**		

Table 4-94. Equivalent Yield Estimates for Red Snapper Based on Low Larval Natural Mortality and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	0.50	0.00	0.50	40682	82.12	.	.	.	.	.	.	.	.
Larvae	4.03	0.00	4.03	145291	762.51	.	.	.	.	.	.	.	.
Juvenile 1	1.40	0.00	1.40	.	.	.	.	.	.	.	.	.	.
Juvenile 2	0.50	0.00	0.50	.	.	.	.	.	.	.	.	.	.
1	0.10	1.01	1.11	.	.	0.31	514.96	51.04	278.63	844.63	160.67	15.92	86.93
2	0.10	0.07	0.17	.	.	1.08	18.68	25.59	234.37	278.63	20.13	27.58	252.65
3	0.10	0.29	0.39	.	.	2.30	55.94	19.43	159.00	234.37	128.67	44.68	365.70
4	0.10	0.54	0.64	.	.	3.86	63.15	11.76	84.09	159.00	243.75	45.39	324.59
5	0.10	0.43	0.53	.	.	5.64	28.28	6.52	49.30	84.09	159.57	36.77	278.19
6	0.10	0.29	0.39	.	.	7.52	11.80	4.08	33.41	49.30	88.70	30.69	251.09
7	0.10	0.20	0.30	.	.	9.39	5.75	2.89	24.78	33.41	53.95	27.11	232.58
8	0.10	0.15	0.25	.	.	11.19	3.23	2.20	19.35	24.78	36.12	24.57	216.59
9	0.10	0.12	0.22	.	.	12.88	2.02	1.74	15.59	19.35	26.01	22.42	200.90
10	0.10	0.08	0.18	.	.	14.44	1.20	1.42	12.97	15.59	17.28	20.57	187.32
11	0.10	0.08	0.18	.	.	15.85	1.00	1.18	10.79	12.97	15.77	18.78	171.01
12	0.10	0.08	0.18	.	.	17.10	0.83	0.99	8.98	10.79	14.16	16.86	153.55
13	0.10	0.08	0.18	.	.	18.21	0.69	0.82	7.47	8.98	12.55	14.94	136.04
14	0.10	0.08	0.18	.	.	19.19	0.57	0.68	6.21	7.47	11.00	13.09	119.23
15	0.10	0.08	0.18	.	.	20.03	0.48	0.57	5.17	6.21	9.55	11.37	103.58
				Total =	**845**		**709**	**131**	**950**	**1,790**	**998**	**371**	**3,080**
							Numbers				**Pounds**		

Table 4-95. Equivalent Yield Estimates for Gag Grouper Based on Low Larval Natural Mortality and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	0.93952	0.00	0.94	77293.01231	495.50								
Larvae	3.6	0.00	3.60	276046.4725	6130.17								
Juvenile	0.8735364	0.00	0.87										
1	0.432	0	0.43			0.815	0.00	2324.22	4301.45	6625.67	0.00	1894.24	3505.68
2	0.311	0	0.31			1.974	0.00	1149.72	3151.73	4301.45	0.00	2269.54	6221.51
3	0.251	0.396	0.65			3.411	918.96	582.47	1650.29	3151.73	3134.59	1986.82	5629.14
4	0.216	0.396	0.61			4.931	488.79	266.61	894.90	1650.29	2410.20	1314.65	4412.73
5	0.193	0.396	0.59			6.4	267.81	130.52	496.56	894.90	1713.99	835.35	3177.99
6	0.176	0.396	0.57			7.738	149.75	66.56	280.26	496.56	1158.76	515.00	2168.63
7	0.164	0.396	0.56			8.912	84.98	35.19	160.09	280.26	757.33	313.64	1426.68
8	0.155	0.396	0.55			9.914	48.74	19.08	92.27	160.09	483.20	189.13	914.75
9	0.148	0.396	0.54			10.752	28.18	10.53	53.55	92.27	303.01	113.25	575.82
10	0.143	0.396	0.54			11.444	16.39	5.92	31.24	53.55	187.62	67.75	357.51
11	0.138	0.396	0.53			12.008	9.59	3.34	18.31	31.24	115.10	40.11	219.92
12	0.125	0.396	0.52			12.464	5.65	1.78	10.88	18.31	70.46	22.24	135.58
13	0.125	0.396	0.52			12.831	3.36	1.06	6.46	10.88	43.08	13.60	82.89
14	0.125	0.396	0.52			13.125	1.99	0.63	3.84	6.46	26.17	8.26	50.36
15	0.125	0.396	0.52			13.359	1.18	0.37	2.28	3.84	15.82	4.99	30.44
16	0.125	0.396	0.52			13.545	0.70	0.22	1.35	2.28	9.53	3.01	18.33

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been Lost to Natural Causes	Weight of Fish that Would have Remained in Population
17	0.125	0.396	0.52			13.692	0.42	0.13	0.80	1.35	5.72	1.81	11.01
18	0.125	0.396	0.52			13.809	0.25	0.08	0.48	0.80	3.43	1.08	6.59
19	0.125	0.396	0.52			13.901	0.15	0.05	0.28	0.48	2.05	0.65	3.94
20	0.125	0.396	0.52			13.974	0.09	0.03	0.17	0.28	1.22	0.39	2.35
21	0.125	0.396	0.52			14.032	0.05	0.02	0.10	0.17	0.73	0.23	1.40
22	0.125	0.396	0.52			14.077	0.03	0.01	0.06	0.10	0.43	0.14	0.84
23	0.125	0.396	0.52			14.113	0.02	0.01	0.04	0.06	0.26	0.08	0.50
24	0.125	0.396	0.52			14.141	0.01	0.00	0.02	0.04	0.15	0.05	0.30
25	0.125	0.396	0.52			14.163	0.01	0.00	0.01	0.02	0.09	0.03	0.18
26	0.125	0.396	0.52			14.181	0.00	0.00	0.01	0.01	0.05	0.02	0.10
27	0.125	0.396	0.52			14.194	0.00	0.00	0.00	0.01	0.03	0.01	0.06
28	0.125	0.396	0.52			14.205	0.00	0.00	0.00	0.00	0.02	0.01	0.04
29	0.125	0.396	0.52			14.214	0.00	0.00	0.00	0.00	0.01	0.00	0.02
30	0.125	0.396	0.52			14.22	0.00	0.00	0.00	0.00	0.01	0.00	0.01
				Total =	**6626**		**2,027**	**4,599**	**11,157**	**17,783**	**10,443**	**9,596**	**28,955**
							Numbers				**Pounds**		

Table 4-96. Equivalent Yield Estimates for Sheepshead Based on Low Larval Natural Mortality and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Life History Stage of Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Total Mortality Per Stage	Number Potentially Entrained at Stage or Age	Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in the Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would have Been lost to Natural Causes	Weight of Fish that Would have Remained in Population
Egg	1.95568	0	1.955688	1400786.7	82.41								
Larvae	6.46625	0	6.46625	5002809.9	2371.25								
Juvenile	1.87968	0	1.879680										
1	1.98	0	1.98			0.981	0.00	2114.8	338.78	2453.6	0.00	2074.7	332.34
2	1.98	0	1.98			1.22	0.00	292.00	46.77	338.78	0.00	356.24	57.06
3	1.98	0.225	2.205			1.56	4.25	37.37	5.16	46.77	6.62	58.30	8.04
4	1.98	0.45	2.43			2.33	0.87	3.83	0.45	5.16	2.03	8.93	1.06
5	1.98	0.45	2.43			2.43	0.08	0.34	0.04	0.45	0.19	0.82	0.10
6	1.98	0.45	2.43			2.45	0.01	0.03	0.00	0.04	0.02	0.07	0.01
7	1.98	0.45	2.43			2.47	0.00	0.00	0.00	0.00	0.00	0.01	0.00
8	1.98	0.45	2.43			2.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.98	0.45	2.43			2.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	1.98	0.45	2.43			2.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	1.98	0.45	2.43			2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	1.98	0.45	2.43			2.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	1.98	0.45	2.43			2.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	1.98	0.45	2.43			2.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	1.98	0.45	2.43			2.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	1.98	0.45	2.43			2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Total =	**2454**		**5**	**2,448**	**391**	**2,845**	**9**	**2,499**	**399**
							Numbers				**Pounds**		

Table 4-97. Equivalent Yield Estimates for Spanish Sardines Based on Low Larval Natural Mortality and the Upper 95% Confidence Limit Entrainment Estimate—A Scenario That NMFS Considers Unlikely

Life History Stage or Age	Natural Mortality per Stage or Age (M)	Fishing Mortality per Stage or Age (F)	Number Potentially Entrained at Stage or Age	Projected Mortality of Age-1 Equivalents	Weight of an Individual Fish at Midpoint of Death	Number That Would Have Been Lost to Fishing	Number That Would Have Been Lost to Natural Causes	Number That Would Have Remained in Population at End of Year	Total Number	Weight of Fish That Would Have Been Lost to Fishing	Weight of Fish That Would Have Been Lost to Natural Causes	Weight of Fish That Would Have Remained in the Population
Egg	8.88	0	4,169,885	**0**	-	-	-	-	-	-	-	-
Larvae	22.36	0	14,892,446	**0**	-	-	-	-	-	-	-	-
Juvenile 1	7.03	0	-	-	-	-	-	-	-	-	-	-
1	0.78315	0.0072603	-	-	0.033	0	0	0	0	0	0	0
2	0.78315	0.0072603	-	-	0.068	0	0	0	0	0	0	0
3	0.78315	0.0072603	-	-	0.100	0	0	0	0	0	0	0
4	0.78315	0.0072603	-	-	0.124	0	0	0	0	0	0	0
			Total =	**0**		**0**	**0**	**0**	**0**	**0**	**0**	**0**
						Numbers				**Pounds**		

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Whitten 2007	Personal email communication between Patience Whitten (CG-5225) and Lisa Gregg. Email sent on August 2, 2007.

Appendix H
Essential Fish Habitat Assessment

ESSENTIAL FISH HABITAT ASSESSMENT

SUPPORTING THE

ENVIRONMENTAL IMPACT STATEMENT
FOR THE
PORT DOLPHIN LLC
DEEPWATER PORT LICENSE APPLICATION

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MARCH 2009

PORT DOLPHIN ESSENTIAL FISH HABITAT ASSESSMENT

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1. Essential Fish Habitat Assessment

This essential fish habitat (EFH) assessment has been prepared for the Port Dolphin Deepwater Port License Application Environmental Impact Statement (EIS). The EIS includes the components required for an EFH assessment. The U.S. Coast Guard (USCG) and the Maritime Administration request for EFH consultation, and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service's (NMFS) response appear in **Appendix C of the Port Dolphin EIS**. The following are the required components of this EFH consultation and the sections of the EIS containing the EFH discussions and other related material:

- A description of the Proposed Action is in **Section 2 of the EIS**.
- A description of fisheries resources and EFH within the project area is in **Section 3.2.8.3 and 3.2.9 of the EIS** and **Table 1-1** of this assessment.
- Analyses of the effects, including cumulative effects, of the Proposed Action on fisheries resources and EFH are presented throughout **Sections 4.2.1.6, 4.2.1.11, 4.2.1.12, 4.2.1.13, 4.2.2.3, and 6.3.2**; and **Appendix G of the EIS**.
- The USCG's and Maritime Administration's assessment and conclusion of the effects of the action on EFH are included at the end of each impact discussion outlined in **Sections 4.2.1.13**; and summarized in **Table 1-2** of this assessment.

Federally managed species that are managed by and have been identified by NMFS as having EFH in the proposed Port area are pink shrimp, stone crab, spiny lobster, red drum, red grouper, black grouper, gag grouper, goliath grouper, misty grouper, Nassau grouper, snowy grouper, Warsaw grouper, yellowedge grouper, yellowfin grouper, red hind, rock hind, schoolmaster, red snapper, Vermilion snapper, gray snapper, yellowtail snapper, lane snapper, blackfin snapper, Cubera snapper, dog snapper, mutton snapper, hogfish, greater amberjack, lesser amberjack, almaco jack, banded rudderfish, gray triggerfish, king mackerel, Spanish mackerel, cobia, and coral (Croom 2007). Habitat types that currently exist in the proposed project area include the water column, three types of hard/live bottom habitat, soft substrate/sediments, seagrass, and wetlands. The impacts on each habitat type are quantified in **Table 4.2-13 of the EIS** for offshore, coastal, and nearshore habitats, and **Table 4.2-27 of the EIS** for wetlands. A summary of potential EFH impacts from the proposed Port is presented in **Table 1-2** of this assessment.

Short- and long-term minor to moderate adverse effects on EFH would result from the Proposed Action. Based on the mitigation measures proposed below, impacts on EFH and commercial fisheries could range from minor to moderate throughout the life of the Proposed Action. All impacts on the water column, unvegetated sediments, hard bottom, and wetlands are expected to be localized.

As a condition of the deepwater port license (if issued), Port Dolphin Energy LLC would be required to develop and implement a *Prevention, Monitoring, and Mitigation Plan* (the plan) to assess, minimize, and mitigate impacts on marine fisheries species (including ichthyoplankton) associated with the seawater intake and impacts on hard bottom. The plan would require that the impacts of Port Dolphin be reassessed at least once every 3 years. If impacts are higher than the base-case impacts (estimated impacts based on the average entrainment estimate and base life history table) for red drum, red snapper, anchovies, Spanish sardines, and Gulf menhaden, as stated in the Final EIS, the Applicant shall develop and implement a plan to mitigate these additional impacts. Mitigation efforts would also extend to other marine fisheries species when, in the judgment of the Maritime Administrator and after consultation with NMFS, the monitoring program has identified major adverse impacts. Based on the analyses in

Table 1-1. Fish/Invertebrate Species, Life Stages, and EFH Categories in the Project Area

Species	Life Stage	System[1]	EFH
Pink shrimp[2]	Eggs	M	Sand/shell bottom
	Larvae	M	Planktonic, sand/shell bottom, submerged aquatic vegetation (SAV)
	Juvenile	E	Sand/shell substrate
	Adults	M	Sand/shell substrate
Stone crab	Eggs	E/M	<18 m to the North & <27 m to the South of Cape Sable; Soft/shell/hard bottoms, SAV, oyster reefs
	Larvae	E/M	18 m to the north & <27 m to the South of Cape Sable; Planktonic
	Juvenile	E/M	<18 m to the north & <27 m to the South of Cape Sable; Sand/shell/hard bottoms, SAV
	Adults	M	<18 m N & <27 m S of Cape Sable; Sand/shell/hard bottoms, SAV, reefs
Spiny lobster	Eggs	M	9-18 m to the North of Naples, <27 m S of Cape Sable; reefs
	Larvae	M	9-18 m to the North of Naples, <27 m S of Cape Sable; planktonic, SAV
	Juvenile	M	9-18 m to the North of Naples, <27 m S of Cape Sable; SAV hard bottoms, reefs
	Adults	M	9-18 m to the North of Naples, <27 m S of Cape Sable; SAV hard bottoms reefs
Red drum	Eggs	M	Planktonic
	Larvae/postlarvae	E	Planktonic, SAV, sand/shell/soft bottom, emergent marsh
	Juvenile	M/E	<5 m; SAV, sand/shell/soft/hard bottom, emergent marsh
	Adults	M/E	9-18 m S of Cape Sable and N of Naples (other areas 1-46 m); SAV pelagic, sand/shell/soft/hard bottom, emergent marsh
Red grouper	Eggs	M	20-100 m; planktonic
	Larvae	M	20-100 m; planktonic
	Juvenile	M/E	<50 m; hard bottoms, SAV, reefs
	Adults	M	3-190 m; reefs, hard bottoms
Black grouper	Eggs	M	18-28 m; planktonic
	Larvae	M	10-150 m; planktonic
	Juvenile	M/E	SAV, hard bottom, reefs
	Adults	E/M	10-150 m; hard bottoms, mangrove, reefs
Gag grouper	Eggs	M	50-120 m; planktonic
	Larvae	M	50-120 m; planktonic
	Juvenile	M/E	<50m; SAV, reefs, hard bottom
	Adults	M	20-100 m; hard bottom, reefs

Species	Life Stage	System[1]	EFH
Goliath grouper	Eggs	M	36-46 M; planktonic
	Larvae	M	36-46 M; planktonic
	Postlarvae/juvenile	M/E	<3 m; mangrove, SAV, hard bottom, reefs
Nassau grouper	Eggs	M	Planktonic
	Larvae	M	2-50 m; planktonic
	Juvenile	M	SAV, reefs
Snowy grouper	Eggs	M	30-183 m; planktonic
	Larvae	M	30-183 m; planktonic
	Juvenile	M	17-60 m; reefs
Warsaw grouper	Eggs	M	40-183 m; planktonic
	Larvae	M	40-183 m; planktonic
	Juvenile	M	20-30 m; reefs
Yellowedge grouper	Eggs	M	35-183 m; planktonic
	Larvae	M	35-183 m; planktonic
	Juvenile	M	35-183 m; hard bottom
	Adults	M	35-183 m; reefs bottom
Yellowfin grouper	Eggs	M	2-183 m; planktonic
	Larvae	M	2-183 m; planktonic
	Juvenile	M/E	2-4 m; SAV, hard bottom
Yellowmouth grouper	Eggs	M	20-183 m; planktonic
	Larvae	M	20-183 m; planktonic
	Juvenile	M/E	18-24 m; mangroves, reefs
Red hind	Eggs	M	18-110 m; planktonic
	Larvae	M	18-110 m; planktonic
	Postlarvae/juvenile	M	2-110 m; reefs
	Juvenile	M	18-24 m; reefs, hard/sand/shell bottom
Rock hind	Eggs	M	2-100 m; planktonic
	Larvae	M	2-100 m; planktonic
	Juvenile	M	2-110 m; reefs
Schoolmaster	Eggs	M	<90 m; planktonic
	Larvae	M	<90 m; planktonic
	Juvenile	M/E	<90 m; SAV, mangrove, emergent Marsh, reefs, hard bottom
Red snapper	Eggs	M	18-37 m; planktonic
	Larvae	M	18-37 m; planktonic
	Juvenile	M	17-183 m; hard/soft/sand/shell bottom
	Adults	M	7-146 m; reefs, hard/sand/shell bottoms
Vermillion snapper	Eggs	M	<183 m; planktonic
	Juvenile	M	<183 m; reefs, hard bottom
	Adult	M	<183 m; reefs, hard bottom

Species	Life Stage	System[1]	EFH
Gray snapper	Eggs	M	<180 m; planktonic, reefs
	Larvae	M/E	<180 m; planktonic, reefs
	Postlarvae/juvenile	E/M	<180 m; SAV, mangrove, emergent marsh
	Adults	E/M	<180 m; mangrove, emergent marsh, reefs, sand/shell/soft/hard bottoms
Yellowtail snapper	Eggs	M	1-183 m; planktonic
	Juvenile	M/E	1-183 m; SAV, mangrove, soft bottom, reefs
	Adults	M	1-183 m; reefs, hard bottom, shoals/banks
Lane snapper	Eggs	M	4-132 m; planktonic
	Larvae	M/E	4-132 m; reefs, SAV
	Juvenile	E/M	<20 m; SAV, mangrove, reefs, sand/shell/soft bottom
	Adults	M	4-132 m; reefs, sand/shell bottom, shoals/banks, shelf edge
Blackfin snapper	Eggs	M	40-183 m; planktonic
	Juvenile	M	12-40 m; hard bottom
Cubera snapper	Eggs	M	10-85m; planktonic
	Juvenile	M/E	<85 m; SAV, mangrove, emergent marsh
Dog snapper	Eggs	M	Planktonic
	Larvae	M	Planktonic
	Juvenile	M/E	SAV, mangrove, emergent marsh
Mutton snapper	Eggs	M	Reefs
	Larvae	M	Reefs
	Juvenile	M/E	Reefs, mangrove, SAV, emergent marsh
	Adult	E/M	Reefs, SAV, shoals/banks, shelf edge 25-95 m spawning
Hogfish	Juvenile	M/E	3-30 m; SAV
Dwarf sand perch	Juvenile	M	Hard bottom
Greater amberjack	Eggs	M	1-183 m; planktonic
	Larvae	M	1-183 m; planktonic
	Juvenile	M	1-183 m; drift algae (Sargassum)
	Adults	M	1-183 m; pelagic, reefs
Lesser amberjack	Eggs	M	Planktonic
	Larvae	M	Planktonic
	Juvenile	M	55-130 m; drift algae (Sargassum)
Almaco jack	Eggs	M	15-160 m; planktonic
	juvenile	M	15-160 m; drift algae (Sargassum)
Banded rudderfish	Eggs	M	Planktonic
	Larvae	M	10-130 m; planktonic
	Juvenile	M	10-130 m; drift algae (Sargassum)

Species	Life Stage	System[1]	EFH
Gray triggerfish	Eggs	M	10-100 m; reefs
	Larvae	M	Drift algae (Sargassum)
	Postlarvae/juvenile	M	10-100 m; drift algae (Sargassum), mangroves, reefs
King mackerel	Adults	M	35-180 m; pelagic
Spanish Mackerel	Adults	E/M	<75 m; pelagic
Cobin	Adults	M	<70 m; pelagic
Coral	All stages	M	Plankton, reefs

Source: Croom 2008

Notes:

1. E=Estuarine, M=Marine, m=meters
2. Shrimp EFH is generally less than 64 meters, but varies in some part of Ecoregion 1; refer to the 2005 fishery management plan and final environmental impact statement.

Appendix G of the EIS, potential impacts could range from minor to moderate in any given year. However, based on the proposed monitoring and mitigation plan, no long-term effects on stock size are expected.

The proposed onshore pipeline would cross wetlands and waterbodies, and would have 1.19 acres of permanent impacts and 10.71 acres of temporary impacts on wetlands (see **Section 4.2.2.2 of the EIS**). The Federal Energy Regulatory Commission (FERC) would require the Applicant to develop and implement a project-specific *Wetland and Waterbody Construction and Mitigation Procedures* document in consultation with all appropriate agencies. Therefore impacts on wetlands would be mitigated. The construction would comply with all state and Federal permit conditions. Final mitigation plans will be coordinated by the U.S. Army Corps of Engineers (USACE) with state resource agencies during the Section 404 water quality permitting process, and will become a condition of the Record of Decision (ROD), and the FERC certificate, if the license is issued.

1.1 Impacts on Commercial and Recreational Fisheries

Potential impacts on commercial and recreational fisheries resources were examined in **Section 4.9**. Long-term minor effects on commercial and recreational fisheries could result from entrainment of fish eggs and larvae in the seawater intake. These effects were analyzed using annual equivalent yield estimates (see **Appendix G in the EIS**). Annual equivalent yield estimates consider mortality beyond age 1 to the point that they would have entered the fishery to provide an estimated loss of biomass as compared to the loss related to commercial and recreational fishing activities. Annual equivalent yield estimates could be used to make reasonable comparisons among fisheries to assess potential stresses on a population.

Impacts on fisheries associated with vaporization alternatives are estimated using annual equivalent yield estimates for red drum, red snapper, bay anchovies, and Spanish sardines. The annual equivalent yield estimates represent biomass losses to the population and are compared to 1990-2006 average landings (commercial and recreational) in the entire Gulf of Mexico (GOM), the Northeast GOM (Mississippi, Alabama, and west coast of Florida), and on the west coast of Florida. These impacts are discussed in **Section 4.2.1.11 and 4.2.1.12 of the EIS**.

Table 1-2. Summary of the Proposed Action Impacts on EFH

Proposed Action Component/ Impact	EFH Type				
	Water Column	Soft Bottom	Hard/Live Bottom	Seagrass	Wetlands
Placement of STL Buoy System	▪ Temporary increase in turbidity, minor	▪ Displacement of sediments, not significant ▪ Secondary impact on prey species, negligible	▪ Long-term minor to moderate adverse impacts	▪ Long-term minor impacts on paddlegrass (would be mitigated)	▪ No expected impact
Pipeline Installation	▪ Temporary increase in turbidity, negligible	▪ Displacement of sediments, not significant ▪ Secondary impact on prey species, negligible	▪ Long-term minor to moderate adverse impacts	▪ Long-term minor impacts on paddlegrass (would be mitigated)	▪ Long-term and short-term impacts, mitigated under FERC and USACE permits
LNG Vaporization-Intake	▪ Impingement/entrainment, short-term minor impact could be minor to moderate, long-term impact expected to be minor	▪ No expected impact	▪ No expected impact	▪ No expected impact	▪ No expected impact
LNG Vaporization-Discharge	▪ 18 ºF (10 ºC) increase in water temperature in the immediate vicinity of the Port, 1.8 ºF (1 ºC) within 100 m, minor	▪ No expected impact	▪ No expected impact	▪ No expected impact	▪ No expected impact
Routine Discharges	▪ No expected impact	▪ No expected impact	▪ No expected impact	▪ No expected impact	▪ No expected impact
Vessel and Aircraft Noise	▪ No expected impact	▪ No expected impact	▪ No expected impact	▪ No expected impact	▪ No expected impact
STL Buoy Lighting	▪ Might attract ichthyoplankton, negligible	▪ No expected impact	▪ No expected impact	▪ No expected impact	▪ No expected impact

Proposed Action Component/ Impact	EFH Type				
	Water Column	**Soft Bottom**	**Hard/Live Bottom**	**Seagrass**	**Wetlands**
Increased Vessel Traffic	▪ No expected impact	▪ No expected impact	▪ No expected impact	▪ No expected impact	▪ No expected impact
Marine Debris	▪ No expected impact	▪ No expected impact	▪ No expected impact	▪ No expected impact	▪ No expected impact
Presence of Terminal and Pipeline	▪ Long-term minor adverse impacts from resuspended sediments ▪ Proposed safety zone would provide refuge from fishing, beneficial impact	▪ Long-term minor adverse impact from anchor sweep ▪ Proposed safety zone would provide refuge from fishing, beneficial impact	▪ Long-term minor moderate adverse impacts, natural hard/live bottoms would be replaced by buoy anchors and concrete mattresses	▪ No expected impact	▪ No expected impact
Accidental Release	▪ Minor release – no expected impact ▪ Unlikely, catastrophic release – Freezing of tissue, localized significant, short-term impact	▪ Minor release – no expected impact ▪ Unlikely, catastrophic release – no expected impact	▪ Minor release – no expected impact ▪ Unlikely, catastrophic release – no expected impact	▪ Minor release – no expected impact ▪ Unlikely, catastrophic release – no expected impact	▪ No expected impact
Decommissioning	▪ Explosives would not be used, impacts would be similar to construction	▪ Explosives would not be used, impacts would be similar to construction	▪ Explosives would not be used, short-term impacts would be similar to construction, additional long-term impacts on hard bottom would not occur	▪ Explosives would not be used, impacts would be similar to construction	▪ No expected impact

The potential impacts, based on age-1 equivalents, recruitment equivalents, and equivalent yield must be considered in light of the uncertainty and limitations inherent in their development and, therefore, could be higher and lower. The analyses found that entrainment of eggs and larvae would be small, and the impact has been characterized as minor to moderate, reflecting the uncertainty inherent in the model and underlying data. However, many fisheries resources (including invertebrates) are currently stressed from historic overharvest and other factors. In this context, any additional stress to the affected populations could be considered significant, and could result in further reductions in limits to commercial and recreational harvest. To meet established goals for fisheries stock, Port Dolphin Energy LLC would be required to develop and implement a *Prevention, Monitoring and Mitigation Plan* to assess, minimize, and mitigate impacts on marine fisheries species (including ichthyoplankton) associated with the operation of the seawater intake. As a result of these proposed mitigation measures, adverse effects over the life of the Proposed Action on EFH and commercial and recreational fish stocks are expected to range from negligible to moderate for any one stock in a given year.

1.2 Measures to Avoid, Minimize, and Mitigate Potential Impacts

To avoid and minimize the impacts of the Proposed Action on EFH and commercial and recreational fish stocks, The Applicant has proposed BMPs to reduce the impacts associated with the following:

1.2.1 Seafloor Disturbance

1. Geohazards and benthic video survey that are conducted providing a fine-scale delineation of seafloor structure, substrate, and habitat within the proposed Port Dolphin Project area.
2. The footprint of the terminals would be minimized.
3. Anchor locations would be optimized to minimize impacts on benthic habitat.
4. Additional geophysical surveys in water depths of 45 to 65 feet will be performed to look for reef gap. Unable to locate any for 3 NM north or 3 NM south of surveyed corridor.
5. Minimize duration of construction by using BMPs for installation.
6. Identify avoidance zones of critical habitat areas for placement of installation barge anchors.
7. Midline buoys would be utilized to the extent practicable on anchor chains to reduce the amount of anchor chain sweep.
8. During installation operations, vessel sizes would be selected to provide vessels adequate to perform the work, but minimized to reduce the number and type of anchors, where possible.
9. During detailed design, an anchoring plan would be developed that would provide procedures for anchor deployment to minimize impacts on hard- and live-bottom habitat.
10. A seagrass survey would be conducted prior to construction to determine the current status and location of seagrass both in deeper waters and in the area of HDD exit location.
11. A Mitigation Plan to compensate for unavoidable impacts on seagrasses and live- and hard-bottom habitats would be developed during the permitting process.

Proper design and implementation of BMPs and mitigation would minimize impacts on EFH from seafloor disturbance from the construction of the pipeline.

1.2.2 Turbidity

1. Trenching and burial of the gas transmission pipeline would be performed using a pipeline plow to the maximum extent practicable. The towed plow trenching and burial technology was selected primarily because it does not fluidize bottom sediments. Therefore, it causes minimal impacts from sediment resuspension in comparison to other more conventional trenching and burial technologies (e.g., clamshell dredging).
2. Minimize the duration of construction to minimize impacts on marine resources by using the most efficient and effective construction equipment and methods available.
3. The use of turbidity curtains when installation is performed by clamshell dredge under the Skyway Bridge and during HDD.
4. The use of turbidity curtains or other mitigation methods as practicable in OFW.
5. Apply for temporary variance for turbidity.

The first four of these measures are expected to be effective in reducing the magnitude and extent of impacts resulting from sediment suspension during pipeline construction, and therefore, the impact of turbidity on fish, shellfish, and EFH. However, the performance of the measures should be monitored during construction to verify their effectiveness. Application for variance from turbidity standards would not be effective in reducing adverse impacts, and could in fact result in an increase in adverse impacts.

1.2.3 Hydrostatic Testing

1. Filtered seawater would be used for the hydrotesting. An environmentally benign dye, Hydro Hib P and Hydro Tag Green Flourescent Dye, would be added to the flooding and test water.
2. Hydrostatic test water for the offshore pipe would be discharged in state waters; however, some of the intake would occur in Federal waters.
3. Fresh water for the onshore pipe would be discharged on land using industry standard filtering procedures prior to release.

These BMPs would be expected to be effective in reducing the magnitude and extent of impacts of hydrostatic testing on fish, shellfish, and EFH. However, the performance of the measures should be monitored during construction to verify their effectiveness.

1.2.4 Seawater Intake

1. The SRVs are closed systems, requiring no intake of water for heating LNG. However, a minimal amount of intake water would be required to cool generators. Discharge would be no greater than 10 °C above ambient temperature.
2. Thermal discharge of SRV cooling water meets USEPA criterion of less than or equal to 1.8 °F (1 °C) above ambient at edge of 100-m mixing zone.
3. Utilization of Best Technology Available (BTA), a closed-loop system, would significantly reduce the loss of marine organisms. The innovative engineering design has resulted in operational aspects of the terminal that would provide for significant reductions of daily intake volumes compared to other conventional regasification processes presently proposed throughout the United States.

4. An intake rate of 11.83 MGD of seawater for engine-cooling and ballast water for each SRV would substantially reduce the potential for entrainment of plankton individuals compared to open-loop vaporization systems, which can use five times more volume.
5. Limit seawater intake velocity to less than 0.15 m/s (0.5 feet/s) to ensure that older larval stages and juveniles would be able to avoid impingement or entrainment.

The use of a closed-loop system, as stated in BMPs 1, 3, and 4, would result in a reduction in entrainment of planktonic fish and shellfish, compared to an open-loop system. BMPs 2 and 5 would likely have no impact on plankton.

1.2.5 Vessel Discharges

1. No discharges would be made from the SRVs (i.e., bilge water, sanitary wastes, grey water).
2. Desalination freshwater-generation systems would be turned off while vessels are moored, therefore no chlorine or hypersaline wastewater would be discharged.
3. During the regasification operations, the vessel would not discharge any ballast water.

These BMPs would avoid the impact of routine vessel discharges on fish, shellfish, and EFH.

1.2.6 Hydrocarbon and LNG Spills

1. Spill response plan and emergency response plans would be implemented.
2. The SRVs would include secondary containment around hydrocarbon-containing equipment and systems.
3. Vessels would have secondary containment around hydrocarbon-containing equipment and systems as practicable.

These BMPs would both help to avoid and reduce the impacts of hydrocarbon and LNG spills, which would reduce potential impacts on fish, shellfish, and EFH.

1.2.7 Marine Debris

1. Vessels would be in compliance with MARPOL Annex I and Annex IV and USCG regulations.

Additionally, the following mitigation would be incorporated into the design and operation of the proposed Port and would be expected as a condition of the license, should it be issued:

1. If the proposed monitoring plan indicated that the effects were substantially larger than estimated, the system could be modified over time to reduce adverse effects.
2. The appropriate resource agencies would work directly with Port Dolphin Energy LLC to develop site-specific construction and wetlands mitigation. The construction plan would include best management practices for reducing impacts on wetlands and waterbodies. Site locations and construction techniques would comply with ongoing Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) projects and USACE activities in the area. Port Dolphin LLC would also be required to mitigate for the temporary loss of forested and non-forested wetlands during construction and the permanent conversion of wetlands for the operation of the proposed onshore pipelines.

3. As a condition of the license (if issued), Port Dolphin Energy LLC will be required to develop and implement a *Prevention, Monitoring, and Mitigation Plan* to assess, minimize, and mitigate impacts on marine fisheries species (including ichthyoplankton) associated with the operation of the cooling and ballast seawater intake. The plan would be developed in consultation with NMFS and other cooperating agencies, as appropriate, and subject to approval by the Maritime Administrator. The plan shall include the following:

   a) A monitoring plan that establishes baseline information on fish eggs and larvae in the area in and around the proposed Port site. This plan will specify techniques and frequencies of sampling and the type(s) of analysis and, at MARAD's request, will be reviewed for scientific adequacy and completeness by the National Research Council. A qualified third party, approved by the Maritime Administrator, will manage and implement this plan. This information will be furnished on a quarterly basis to the Maritime Administrator and NMFS.

   b) A monitoring plan to assess impacts of the proposed deepwater port on fish eggs and larvae in and around the deepwater port. This plan will focus on impacts on gag grouper, sheepshead, red drum, red snapper, bay anchovies, Spanish sardines, and Gulf menhaden identified from the baseline information gathered prior to installation. At the Maritime Administrator's request, the plan will be reviewed for scientific adequacy and completeness by the National Research Council. A qualified third party approved by the Maritime Administrator will manage and implement this plan. This plan will also be consistent with the monitoring plans for other offshore LNG facilities. This information will be reported on a quarterly basis to the Maritime Administrator and NMFS. This plan will commence upon operation of Port Dolphin. The plan will be part of the USCG-approved operations plan.

   c) The temperature increase in discharged water shall be monitored and maintained at 1 degree Celsius (°C) (1.8 degrees Fahrenheit [°F]) at a radial distance of 100 meters from the outfall.

   d) No biocide treatment would be used while the SRV is moored on the submerged turret loading (STL) buoy. If a sodium hypochlorite generator is available for use on the SRV, it would be turned off while the SRV is moored on the STL buoy.

   e) The Applicant shall pursue and implement practical and reasonable ways to minimize water use and ichthyoplankton entrainment. The Applicant will provide an annual report to the Maritime Administrator outlining the previous year's change(s) to design or operations and the results.

   f) It is recognized that the Proposed Action will have beneficial environmental and commercial impacts, such as providing a diverse and reliable source of clean-burning natural gas (displacement of oil and coal). Upon commencement of the operations at Port Dolphin, the Applicant shall develop and implement a mitigation program designed to offset the base-case impacts (estimated impacts based on the average entrainment estimate and base life history table) of the facility on gag grouper, sheepshead, red drum, red snapper, bay anchovy, Spanish sardines, and Gulf menhaden (as indicator species), as stated in the Final EIS. The program is subject to approval by the Maritime Administrator, in consultation with NMFS. These efforts shall be reasonable, timely, and practical, and designed to specifically counter the base-case impacts associated with the operation of the proposed Port.

   g) After an undetermined amount of time of operation (to be agreed on by NMFS and the Maritime Administrator and not to exceed 3 years), the licensee shall provide to the Maritime Administrator, NMFS, and other cooperating agencies a detailed report of the impact of the vaporization system on marine fisheries species (including ichthyoplankton), relative to the baseline information gathered prior to installation of the deepwater port. If, at that time, the impacts of the deepwater port on gag grouper, sheepshead, red drum, red snapper, bay

anchovy, Spanish sardines, and Gulf menhaden exceed the base-case impacts as stated in the Final EIS, the Applicant shall develop and implement a plan to mitigate these additional impacts. Mitigation efforts would also extend to other marine fisheries species when, in the judgment of the Maritime Administrator and after consultation with NMFS, the monitoring program has identified major adverse impacts. The mitigation efforts shall be reasonable, timely, and practical, and designed to specifically counter the impacts associated with the operation of the proposed Port. Depending upon the impacts, mitigation measures could include changes to the operation of the facility, aquaculture projects, wetland restoration or other habitat projects, additional artificial reefs projects, modification of the warming water inlet exclusion devices, research, and education programs.

4. To minimize potential fisheries impacts associated with the decommissioning of the proposed Port facilities, it would be possible to leave some of the facilities' underwater structure in place to function as an artificial reef (GMFMC 1998). All decommissioning activities would be conducted in accordance with approved plans required by the licensing authority, and in compliance with all applicable and appropriate regulations and guidelines in place at the time of decommissioning.

2. References Cited

Croom 2007 Croom, Miles. 2007. Letter from Mr. Miles Croom (Assistant Regional Administrator for Habitat Conservation, National Marine Fisheries Service, Southeast Region) to Ms. Patience Whitten (USCG, Deepwater Ports Standards Division) regarding an EFH Assessment for the Port Dolphin LLC Deepwater Port License Application. September 20, 2007.

GMFMC 1998 GMFMC. 1998. *Generic Amendment for Addressing Essential Fish Habitat Requirements in the Following Fishery Management Plans in the Gulf of Mexico: Shrimp Fishery of the Gulf of Mexico, United States Waters; Red Drum Fishery of the Gulf of Mexico; Reef Fish Fishery of the Gulf of Mexico; Coastal Migratory Pelagic Resources (Mackerels in the Gulf of Mexico and South Atlantic; Stone Crab Fishery of the Gulf of Mexico; Spiny Lobster in the Gulf of Mexico and South Atlantic; Coral and Coral Reefs of the Gulf of Mexico*. Tampa, FL: GMFMC. October 1998.

Crabtree 2008 Crabtree, R.E. 2008. Letter from Roy E. Crabtree (Regional Administrator NOAA NMFS) to Mark A. Prescott (USCG) providing comments addressing Magnuson-Stevens Fishery Conservation and Management Act, Endangered Species Act, and Marine Mammals Protection Act for Port Dolphin. May 29, 2008.

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Appendix I
Unanticipated Discoveries Plan for Cultural Artifacts and Human Remains

Onshore Unanticipated Discovery Plan – Cultural Resources
Port Dolphin LLC
Deepwater Port and Proposed 36-Inch Gas Pipeline
St. Petersburg Area Block 545 to Tampa Bay, Florida

Cultural resources surveys employ a sampling strategy that leaves open the possibility of unidentified deposits. Even at sites that have been previously identified and assessed, there is a potential for the discovery of additional archaeological components, features, or human remains that may require investigation and assessment. Therefore, a procedure has been developed for the treatment of any unexpected discoveries that may occur during construction.

The following applicable federal laws and state of Florida statutes concern cultural resources:

- Florida Historical Resources Act (Chapter 267, F.S., rev. 2004)
- Emergency Archaeological Properties Acquisition Act of 1988 (Chapter 253.027, Florida Statutes)
- Offenses Concerning Dead Bodies and Graves (Chapter 872, Florida Statutes)
- Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)
- National Historic Preservation Act of 1966, as amended (NHPA)

All project inspectors have the responsibility to monitor development and post development procedures for the inadvertent discovery of cultural resources. Under 36 CFR 800 of the NHPA, if during any of these phases, evidence of prehistoric or historic cultural remains is encountered, all activity in that area will cease immediately to preclude any further contact or damage to the resource. Reasonable efforts will be made to avoid or minimize impacts to the cultural resources. Port Dolphin LLC will contact the FERC and the Florida Division of Historic Preservation (FDHR).

Port Dolphin LLC will contract an archaeologist meeting the Secretary of the Interior's professional qualifications and standards to survey the findings and provide a report to the appropriate agencies describing the type of resource discovered, its location, size and any information concerning the resource's significance. If the resource is determined to be ineligible for inclusion in the National Register of Historic Places, Port Dolphin LLC will proceed with the project only after written notification of compliance from FDHR. If the site is determined eligible for inclusion in the National Register of Historic Places, additional work may include formulation and execution of a data recovery plan in consultation with the FERC and FDHR.

Human Remains

If human remains are discovered during site development, all work in the near vicinity of the human remains will cease immediately and efforts will be made to avoid and protect the remains from additional impact. When human remains are encountered, federal or state guidelines will be followed based upon the nature of the project, including those contained in the Native American Graves Protection and Repatriation Act of 1990 and Chapter 872.05, Florida Statutes. Regardless of which law takes precedence, consultation with FERC or the SHPO (or in the case of Ch. 872, F.S., the State Archaeologist). Every effort will be made to identify and notify next of kin, closest lineal descendant, or, for Native American remains, the Native American tribes who may be culturally affiliated with the remains, and to determine appropriate treatment and disposition of the remains. If the human remains are found to be non-Native American or less than 75 years old, then the County Medical Examiner and local law enforcement agencies will be notified.

Pursuant to any request from the FERC, the SHPO, or the State Archaeologist, a qualified professional archaeologist will be retained to investigate the reported discovery and to inventory and evaluate alternate work areas or routes that will avoid any further effects to the human remains. A plan for the avoidance of any further impact to the human remains or mitigate excavation, reinterment, or a combination of these treatments, will be developed in consultation with FERC, the State Archaeologist, the SHPO, and the next of kin, closest lineal descendents, or, if applicable, appropriate Native American tribes. All parties will be expected to respond with advice and guidance in an efficient time frame.

If Traditional Cultural Properties (TCPs) are identified during site development, consultation with representatives of the affected Native American tribe, the FERC, and the SHPO to develop procedures for the appropriate treatment of such properties will be initiated.

The Florida Division of Historic Resources points of contact are listed below:

Mr. Frederick Gaske, State Historic Preservation Officer
Dr. Ryan Wheeler, State Archaeologist
Florida Division of Historical Resources
R.A. Gray Building
500 S. Bronough St.
Tallahassee, FL 32399-0250
PH: 850-487-2299

Offshore Unanticipated Discovery Plan – Cultural Resources
Port Dolphin LLC
Deepwater Port and Proposed 36-Inch Gas Pipeline
St. Petersburg Area Block 545 to Tampa Bay, Florida

Port Dolphin Energy LLC (Applicant) has undertaken a systematic review of the high resolution geophysical data for the proposed project area to minimize the discovery of cultural resources, either in the form of historic shipwrecks or high probability areas for prehistoric archaeological sites, that follows the guidelines posted in U.S. Department of the Interior Minerals Management Service (USDI MMS) Gulf of Mexico OCS Region NTL 2006-G07 and standards for cultural resources in the state of Florida. This assessment has been prepared because the proposed Port Dolphin deepwater port and pipeline are within portions of St. Petersburg blocks of the Outer Continental Shelf and Florida State Waters that have been designated as having a high potential for archaeological resources as described in the USDI MMS Gulf of Mexico OCS Region NTL 20065-G07. The following applicable statutes of the state of Florida concern Cultural resources:

- Chapter 267 F.S., Florida Historical Resources Act
- Emergency Archaeological Properties Acquisition Act of 1988 (Chapter 253.027, Florida Statutes)
- Offenses Concerning Dead Bodies and Graves (Chapter 872, Florida Statutes)
- Performance Standards for Submerged Remote Sensing Surveys (May 17, 2001) issued by the Florida Department of State, Division of Historical Resources

The cultural resources assessment of these areas of potential effect did find evidence for potential historic and prehistoric cultural resources in the remote sensing data. These included one unidentified side scan sonar contact associated with three unidentified magnetic anomalies that could represent possibly significant historic cultural resources. An avoidance zone of 500 feet around these features has been recommended.

However, it is possible that small features representing high probability areas for prehistoric archaeological sites and historic shipwreck materials may not be detected by the geophysical instruments or may not be detected during interpretation of the data sets. Prehistoric archaeological sites have been discovered in nearshore Florida State and OCS waters previously (Goggin 1964; Ruppe 1980; Stright 1987; Dunbar, Webb, and Faught 1989; Anuskiewicz 1988; Dunbar, Webb, Faught, Anuskiewicz and Stright 1989; Murphy 1990; Milanich 1994:23). Recently, historic period cultural resources have been discovered offshore during the process of post development inspections, rather than during the predevelopment phases in areas not determined to have a high potential for archaeological resources (Irion, 2001; Church, Landry, Warren and Smith, 2003). In order to be in full compliance with all Federal and Florida State regulations regarding the protection of cultural resources, this unanticipated discovery plan has been prepared.

Port Dolphin LLC is fully aware that the USDI MMS has posted guidelines for the conduct of investigations at the USDI MMS Internet website at ***http://www.gomr.mms.gov/homepg/regulate/environ/archaeological/evaluation.html*** and that failure to comply with the USDI MMS regulations with respect to archaeological resources can result in civil penalties under 0 CFR 250.1404. In addition, Section 110(k) of the National Historic Preservation Act (16 U.S.C. 470h-2[k]) prohibits a Federal agency from granting a loan, loan guarantee, permit, license, or other assistance to an applicant who, with the

intent to avoid a historic property to which the grant would relate, or having legal power to prevent it, has allowed such adverse effect to occur, unless the agency, after consultation with the Advisory Council for Historic Preservation, determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant (see 36 CFR 800.9[c][1]).

All project inspectors have the responsibility to monitor development and post development procedures for the inadvertent discovery of cultural resources. If during any of these phases, evidence of prehistoric or historic cultural remains is encountered, all activity in that area will cease immediately to preclude any further contact or damage to the resource (36 CFR 800.11[b][3]). An avoidance zone of at least 1,000 feet (305 meters) for further work in that area will be established. If the cultural resource is discovered during the course of an investigation by a remotely operated vehicle (ROV), the USDI MMS has posted guidelines for the conduct of ROV investigations at the following web site ***http://www.gomr.mms.gov/homepg/regulate/environ/archaeological/ROV_2005_1.pdf.*** All ROV operators will be provided with these guidelines and will be required to comply with them. At no time will the ROV operators be permitted to disturb or pick up any artifacts, features, or components of the site.

If a discovery is made in Federal waters, the project inspector within 48 hours of the discovery will contact the Regional Supervisor, Leasing and Environment, and the archaeologists at the USDI MMS in New Orleans, as well as the U.S. Coast Guard (USCG), to notify them of the presence of such a cultural resource. If a discovery is made in Florida state waters, within the same period of time the project inspector will contact the State Historic Preservation Officer of Florida. After the initial consultation with the appropriate agencies, Port Dolphin LLC will contract an approved professional archaeologist to survey the findings and provide an immediate report to the appropriate agencies describing the type of resource discovered and its location and size. Such findings may include the following:

- Anomalous and distinct mounds of lithic material, which could represent ballast material from a shipwreck
- Intact articulated wooden ship timbers or sections of iron, steel, or metal clad hulls
- Substantial cargo remains, which may be scattered or closely grouped, that may include armaments, ammunitions, wooden crates and barrels, ceramics, glass, and other cultural materials, some of which may be heavily concreted and not readily identifiable
- A widely scattered debris field comprised of ship's rigging and other structural components, as well as cargo
- Anomalous mounds of mollusk shell that may include prehistoric lithic or worked shell material
- Human skeletal remains

A mitigation plan conducted under the direction of a professional archaeologist and using such equipment and techniques deemed necessary will be developed with the appropriate agencies to ascertain the eligibility of the resource for inclusion in the National Register of Historic Places. If the resource is determined to be ineligible for inclusion in the National Register of Historic Places, Port Dolphin LLC will proceed with the project only after written notification of compliance from the USDI MMS and the USCG or the Florida State Historic Preservation Officer. If the site is determined eligible for inclusion in the National Register of Historic Places, additional work that may include formal data recovery and the preparation of a determination of performed as required and approved by the appropriate agencies. Further work at the location of the discovery will be suspended until clearance to proceed is granted by the USDI MMS and the USCG or the Florida State Historic Preservation Officer.

The U.S. Department of the Interior Minerals Management Service contacts are listed below:

U.S. Department of the Interior Minerals Management Service Gulf of Mexico OCS Region Office of Leasing and Environment Attention: Social Sciences Unit (5411) 1201 Elmwood Park Blvd. New Orleans, Louisiana 70123-2394

Dr. Jack Irion, (504) 736 1742, jack.irion@mms.gov

Mr. David Ball, (504) 736 2859, david.ball@mms.gov

Dr. Chris Horrell, (504) 736 2796, christopher.horrell@mms.gov

The Florida State Historic Preservation Officer contact is listed below:

Frederick P. Gaske State Historic Preservation Officer or Barbara E. Mattick Deputy State Historic Preservation Officer

Bureau of Historic Preservation
R.A. Gray Building, 4th Floor
500 South Bronough St.
Tallahassee, FL 32399-0250
(850) 245 6333

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Appendix J
Independent Risk Assessment

FINAL REPORT

INDEPENDENT RISK ASSESSMENT FOR PORT DOLPHIN LNG DEEPWATER PORT

PREPARED FOR:

UNITED STATES COAST GUARD
CG-5225
DEEPWATER PORTS STANDARDS DIVISION

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OCTOBER 2, 2008

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Acronyms & Abbreviations

AIS	Automatic Identification System
ALARP	As Low as Reasonably Practicable
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
ATBA	Area-to-be-Avoided Zone
CFD	Computational Fluid Dynamics
CFR	Code of Federal Regulations
COLREG	International Convention for the Prevention of Collisions at Sea
DEGADIS	DEnse GAs DISpersion model
DOE	US Department of Energy
DOT	US Department of Transportation
DWP	Deepwater Port
DWPA	Deepwater Port Act
EIS	Environmental Impact Statement
FEED	Front End Engineering Design
FERC	Federal Energy Regulatory Commission
CG-522	USCG Office of Vessel and Facility Operating Standards
CG-5225	USCG Deepwater Ports Standards Division
HAZID	Hazard Identification
HIPPS	High Integrity Pressure Protection System
IGC	International Gas Code
IGIF	Inert Gas Injection Facility
IMO	International Maritime Organization
IRA	Independent Risk Assessment
ISM Code	International Safety Management Code
kg	kilogram
km	kilometer
Kts	Knots
kW	kilowatt
LFL	Lower Flammability Limit
LNG	Liquefied Natural Gas
LNGC	Liquefied Natural Gas Carrier
m	meter
MARAD	Maritime Administration
min	minute
Mmscfd	million standard cubic feet per day
MTSA	Maritime Transportation Security Act
NAA	No Anchoring Area
NEPA	National Environmental Policy Act
NG	Natural Gas
NM	Nautical Mile
NOAA	National Oceanographic & Atmospheric Administration
PLEM	Pipeline End Manifold
RACA	Risk Assessment and Consequence Analysis

RANS	Reynolds-Averaged Navier-Stokes
REM	Riser End Manifold
RS	Reynolds Stress
S	Second
SIGTTO	Society of International Gas Tanker and Terminal Operators
SOLAS	International Convention for the Safety of Life at Sea
SPM	Single-point mooring
SRV	Shuttle & Re-gasification Vessel
STL	Submerged turret loading
UFL	Upper Flammable Limit
UNCLASS	Unclassified
USC	United States Code
USCG	U.S. Coast Guard
VTS	Vessel Traffic Service

Executive Summary

A. Background

On March 29, 2007, the U.S. Coast Guard (USCG) and U.S. Maritime Administration (MARAD) received an application from Port Dolphin Energy, LLC, for all Federal authorizations required for a license to own, construct and operate a Deepwater Port (DWP) offshore of Tampa Bay, Florida. This document is a stand-alone technical report on the potential risks to the public from the proposed Port Dolphin project based on a large-scale release of Liquefied Natural Gas (LNG). The primary objective of this Independent Risk Assessment (IRA) is to assess impacts to humans and property not associated with the DWP from an event(s) that compromises LNG containment.

The unloading portion of the proposed Port Dolphin DWP, would be located in federal waters approximately 28 miles (45 kilometers) offshore of the Tampa Bay area of Florida in St. Petersburg (lease blocks PB 545 and PB 589). The DWP would consist of two buoys 2.7 nm (3.1 miles) apart, the northernmost buoy would be 9.55 nm (11 miles) south of the vessel safety fairway and the southernmost buoy would be 12.3 nm (14.1 miles) from the vessel safety fairway. The project location is shown below in Figure A .The water depth in this region is approximately 100 feet (30 meters). From this DWP location, a transmission pipeline approximately 42.1 miles (68 kilometers total) in length will be run to onshore interconnection facilities in Manatee County, Florida.

Port Dolphin[1] will be capable of mooring Shuttle and Re-gasification Vessels (SRVs), and is intended to provide a diverse source of natural gas delivery. The SRVs are vessels designed to carry liquefied natural gas and also to re-gasify the natural gas prior to off-loading for transport via pipeline to shore. These vessels will have a capacity range of 145,000 cubic meters (m^3) to 217,000 m^3 of LNG, transported and stored at a temperature of -261º F. The SRVs themselves are almost entirely fueled by natural gas.

Initially, it is expected that the average daily throughput of natural gas from the port will be approximately 400 million standard cubic feet per day (mmscfd). Port Dolphin would eventually be capable of achieving an average throughput of 800 million standard cubic feet per day (mmscfd) and a peak capacity of approximately 1,200 million mmscfd. Natural gas would be sent out by means of a 16-inch flexible riser from each buoy to two 36-inch subsea flowlines through a piggable-Y to a 36-inch gas transmission line. The gas transmission line would transport natural gas to onshore facilities inland in Manatee County, Florida. From there, the natural gas would be available to serve residential, commercial, industrial, and electrical generation customers primarily in Florida and the Southeastern United States.

[1] Information taken from the Port Dolphin LLC – Deepwater Port License Application – Volume 1 – Pages 2-3.

Figure A: Project Location

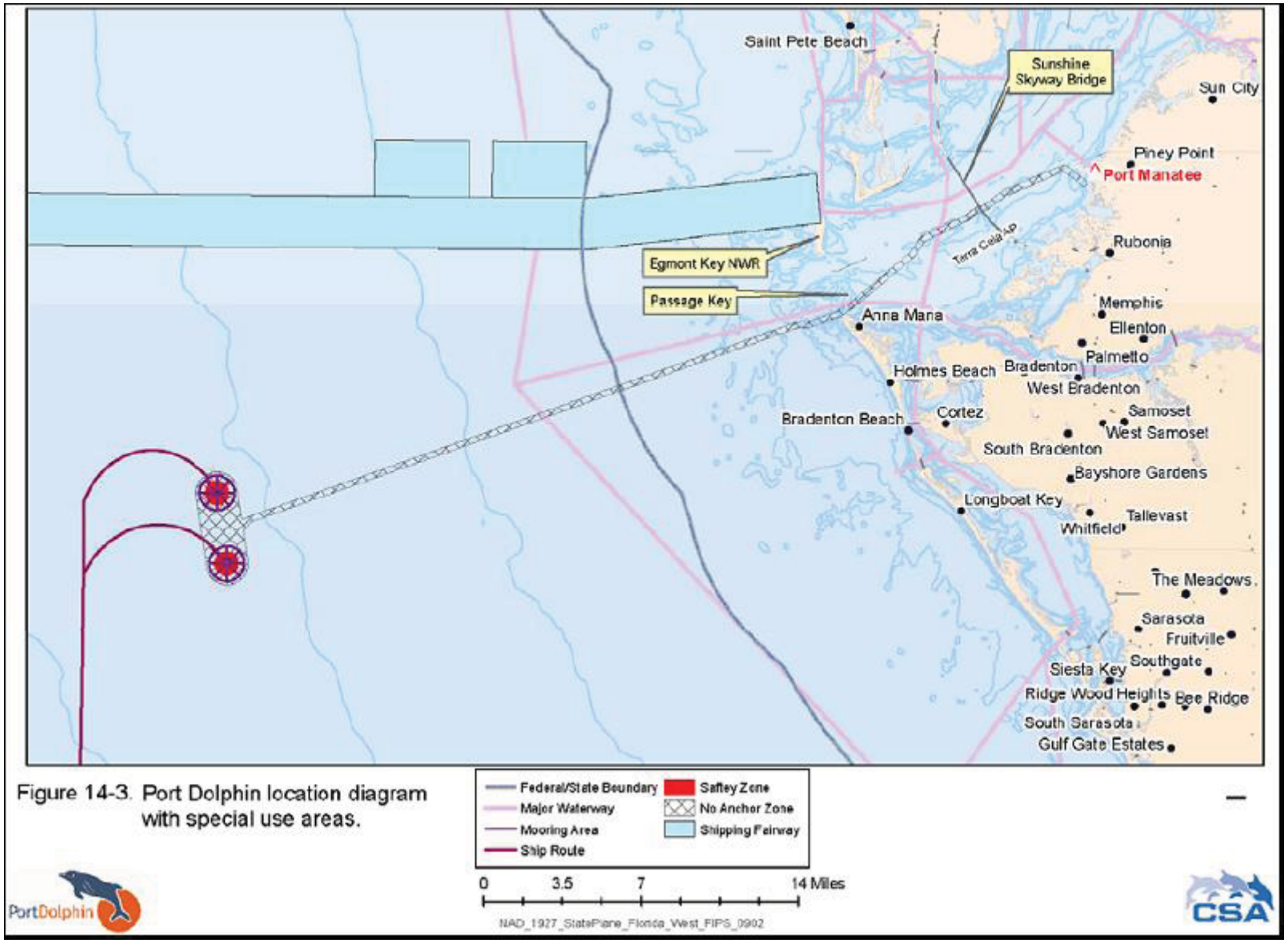


Figure 14-3. Port Dolphin location diagram with special use areas.

B. Study Process

The deepwater port (DWP) license application review process includes an analysis of the proposed project's impacts on public safety. As part of this analysis, a project's specific risk assessment is comprised of two parts:

- Phase I is an independent risk assessment (IRA) that evaluates potential maximum hazards of Liquefied Natural Gas (LNG) releases from credible scenarios (identification of the bounding or worst-credible consequences), and is an input to the Environmental Impact Statement (EIS) process.
- Phase II is a risk assessment (RA) that examines the range of scenarios that could result in an LNG release and evaluates proposed strategies to reduce the risk, providing input to Operations/Security (OPS/SEC) manuals required by 46 CFR 150.10 and potentially incorporating safety and security measures into the Secretary of Transportation's Record of Decision (ROD).

This report is limited to the Phase I IRA and involved six steps.

Table A: IRA Process

Step	Description
1. DWP Area Characterization	The DWP application was reviewed and additional data was gathered and analyzed about the port environment.
2. HAZID	Input was received from various stakeholders and the applicants to identify accidental and intentional scenarios.
3. Scenario Development	The HAZID scenarios were further analyzed to determine credible and bounding scenarios.
4. Vessel Collision and Frequency Analysis	The type of vessel and frequency of collisions was analyzed.
5. Consequence Analysis	The impacts of the bounding cases were analyzed using Computational Fluid Dynamics (CFD) modeling.
6. Results and Conclusions	The analysis results were assessed and are presented in this report.

The conclusions of this IRA are presented as the hazard zones for thermal radiation and flammable vapor cloud dispersion for the accidental and intentional release scenarios evaluated. The hazard zones have been presented as graphical overlays on the nautical charts for the proposed Port Dolphin DWP project location. The results of the study are presented without passing judgment on the merits of the applicant's proposed project.

While the study evaluated the potential impacts to the public and surrounding infrastructure, it did not attempt to predict the number of estimated fatalities or injuries from these events. Also, the study was done without considering any mitigation measures that could be implemented to reduce the risk of accidental or intentional release of LNG from this proposed project. These considerations may be subject to further review outside of the scope of this study.

C. Results

C.1 Scenarios Selected

The scope of the HAZID (Step 3, Table A) was the identification of "credible" scenarios for accidental and intentional events involving all parts of the proposed project under the jurisdiction of the USCG. Credible scenarios as defined in the HAZID process do not necessarily represent scenarios that are high risk – credible scenarios are the possible intentional and accidental scenarios identified through a multidisciplinary team evaluation of the project. The scenarios are identified regardless of likelihood and are used in the Phase I IRA for bounding the consequences of concern.

Scenarios derived in Steps 1-3 of the IRA process are shown in Table B. Based on information provided by the applicant, both membrane and Moss-style SRVs may call on the Port Dolphin DWP. Therefore, LNG release scenarios have been developed for both SRV types.

The intentional acts (Scenarios 1-3 and 5-7) were evaluated in cooperation with Sandia National Laboratories (Sandia). The most significant of these acts was evaluated although it was considered unlikely to occur due to the multiple countermeasures required by the Maritime Transportation Security Act (MTSA) and specific operational plans of the USCG and the applicants. The mitigation for specific acts of terrorism, such as hijacking or attacks by explosive weapons, will be addressed by the USCG and the applicants as required by Title 33, Chapter I, Part 150 Deepwater Ports: Operations, Subpart A, General, Sec. 150.15, Operations Manual.

Table B: Release Scenario Summary

Scenario	Description	Event Type
Membrane-Type Carrier - 217,000m^3		
1	One- 16 m^2 hole (single cargo tank release)	Intentional
2	Two – 12 m^2 holes (two cargo tank release)	Intentional
3	Three – 12 m^2 holes (three cargo tank release)	Intentional (Cascading Damage)
4	One – 17 m^2 hole	Vessel Collision
Moss-Type Carrier – 215,000 m^3		
5	One – 16 m^2 hole (single cargo tank release)	Intentional
6	Two – 12 m^2 holes (two cargo tank release	Intentional
7	Three – 12 m^2 holes (three cargo tank release)	Intentional (Cascading Damage)
8	One – 22 m^2 hole	Vessel Collision

As detailed in Table A, Scenarios 3 and 7 are intentional scenarios that lead to cascading damage and the release of three LNG cargo tanks. Since a sustained fire is required for cascading damage immediate ignition is assumed for these scenarios, resulting in only the potential for a pool fire, or thermal radiation hazard. Due to the assumed immediate ignition basis for these two scenarios, flammable vapor dispersion is not a credible outcome and the distance to LFL is not evaluated.

Since the purpose of the IRA is to identify and review the bounding scenarios, a series of screening analyses were conducted to identify the SRV type with the largest potential consequences. Based on

these results, the Moss-type SRV was identified as having the greatest potential consequences. Compared to the membrane SRV, the Moss SRV has a greater liquid head and liquid volume above the waterline, and results in a greater release rate and greater amount of LNG released for similar breach sizes.

Therefore, Scenario 6 and Scenario 7 are the bounding intentional scenarios and Scenario 8 is the bounding vessel collision scenario under consideration in the Port Dolphin IRA. For the intentional releases, Scenario 7 is the bounding thermal radiation hazard and Scenario 6 is the bounding flammable vapor dispersion hazard. The intentional scenarios have different bounding scenarios since Scenario 7 is limited to thermal radiation hazards of a pool fire as a result of immediate ignition and cascading damage.

C.2 Consequence Modeling Results

Thermal radiation hazard distances from a pool fire were estimated to two different thermal heat flux levels:

- 37.5 kW/m^2: Damage to process equipment and storage tanks[2] for unprotected exposures based on an average 10-minute exposure duration, as well immediate fatalities
- 5 kW/m^2: Permissible level for emergency operations lasting several minutes with appropriate clothing based on an average 10-minute exposure duration[3] and onset of second degree burns based on an average 40-second exposed duration[4]

The maximum thermal radiation hazard distances predicted for the intentional and vessel collision scenarios are listed in Table C. In this IRA, it is assumed that all spills originate at the SRV, with all hazard distances measured from the center of the LNG pool.

The flammable vapor dispersion hazard distance is determined as the maximum downwind distance to the Lower Flammability Limit (LFL). The flammable vapor cloud dispersion simulations were performed using Fluent, a commercial CFD code. Fluent was validated for this study by its favorable comparison with experimental LNG vapor dispersion data from the Burro tests (Appendix A). Given the right environmental conditions, the maximum distances could occur in any direction from the LNG release source. Therefore, for the purposes of this analysis, distances to the LFL are represented as a circle surrounding the SRV. All distances in Table C are measured from the center of the pool, which is the source of the LNG release (the SRV itself).

[2] Barry, Thomas, *Risk-Informed Performance-based Industrial Fire Protection* (Knoxville, TN: Tennessee Valley Publishing, 2002).
[3] Ibid.
[4] Federal Emergency Management Agency, *Handbook of Chemical Hazard Analysis Procedures*, (Washington, DC: FEMA, 1989).

Table C: Summary Risk Analysis Consequences for Bounding Scenarios

Result	Scenario 6 (Intentional)	Scenario 7 (Intentional)	Scenario 8 (Collision)
Breach Size, m^2	12	12	22
Number of Tanks	2	3	1
Total Capacity of Impacted Tank(s), m^3	108,724	163,086	54,362
Release Quantity, m^3	96,660	144,990	48,330
Pool Fire Maximum Distance to Endpoint (meters)			
Pool Diameter (immediate ignition)	1,060	1,260	840
Thermal Radiation Endpoint > 37.5kW/m^2	1,710	1,990	1,390
Thermal Radiation Endpoint > 5 kW/m^2	3,960	4,680	3,140
Flammable Vapor Cloud Dispersion (No Ignition)			
Distance to LFL, m	6,095	***Immediate Ignition No Vapor Cloud Hazard***	4,980
Time for Maximum Distance, min	30		26
Cloud Peak Elevation, m	112		110

The pool fire, thermal radiation results for Scenarios 7 and 8 are shown in Figure B and Figure C, respectively. These scenarios represent the bounding thermal radiation hazards for the intentional and vessel collision scenarios. In Figures B and C, the consequence is shown as the radial distance centered at the North or South buoy to the two thermal radiation hazard endpoints. These figures illustrate that neither a release of LNG from an intentional event (Scenario 7) nor from a vessel collision (Scenario 8) at either the North or South buoy would impact activities at the other buoy location from a sustained fire. For Scenario 7, the 5 kW/m^2 zone extends to within about 500 m of the adjacent project buoy, but the impacts to another SRV (if at the DWP) are expected to be less than the impacts defined by this hazard zone. Additionally, the thermal radiation zones from these scenarios do not impact the vessel safety fairway or the nearest landmass. However, since the thermal radiation zones extend farther than the expected Safety Zone and the area to be avoided (ATBA) there is a potential for a release and sustained fire at the DWP to impact private or commercial marine traffic in the vicinity of the DWP.

Figure D compares the flammable vapor dispersion results for Scenarios 6 and 8, represented as the distance to the LFL. As compared to the pool fire consequence, where the thermal radiation hazard extends radially from the pool fire center, the flammable vapor dispersion hazard will extend as a cloud dispersing in the downwind direction. However, the flammable vapor dispersion hazard (distance to LFL) is illustrated as a circle (Figure D), since the cloud could disperse in any of 360 degrees, depending on the wind direction at the time of release.

As illustrated in Figure D, the intentional scenario (Scenario 6) results in the greatest distance to LFL, and an incident at either buoy could potentially impact the other buoy location. As shown in Table C, the time to reach LFL is 30 minutes for Scenario 6 and 26 minutes for Scenario 8. Assuming the wind direction was toward a second SRV at the adjacent buoy, the other SRV has an emergency buoy disconnect that can shutdown re-gasification and disconnect the SRV in 15 minutes. The wind rose data for the DWP illustrates that if an unignited release were to occur at the North buoy, there is a 5.1% probability that the wind would be blowing toward the South buoy. Similarly, if the release were to occur at the South buoy, there is a 6.3% probability that the wind would be blowing toward the

North buoy. The predominant wind direction at the DWP is not toward either buoy, but from the east, and out to sea.

Neither the vessel safety fairway nor the shoreline would be impacted from a vapor cloud release at either buoy location, but the potential to impact private or commercial marine traffic in the vicinity of the DWP does exist due to the extent of the hazard distance.

Figure B: Scenario 7 – Thermal Radiation Hazard Zone

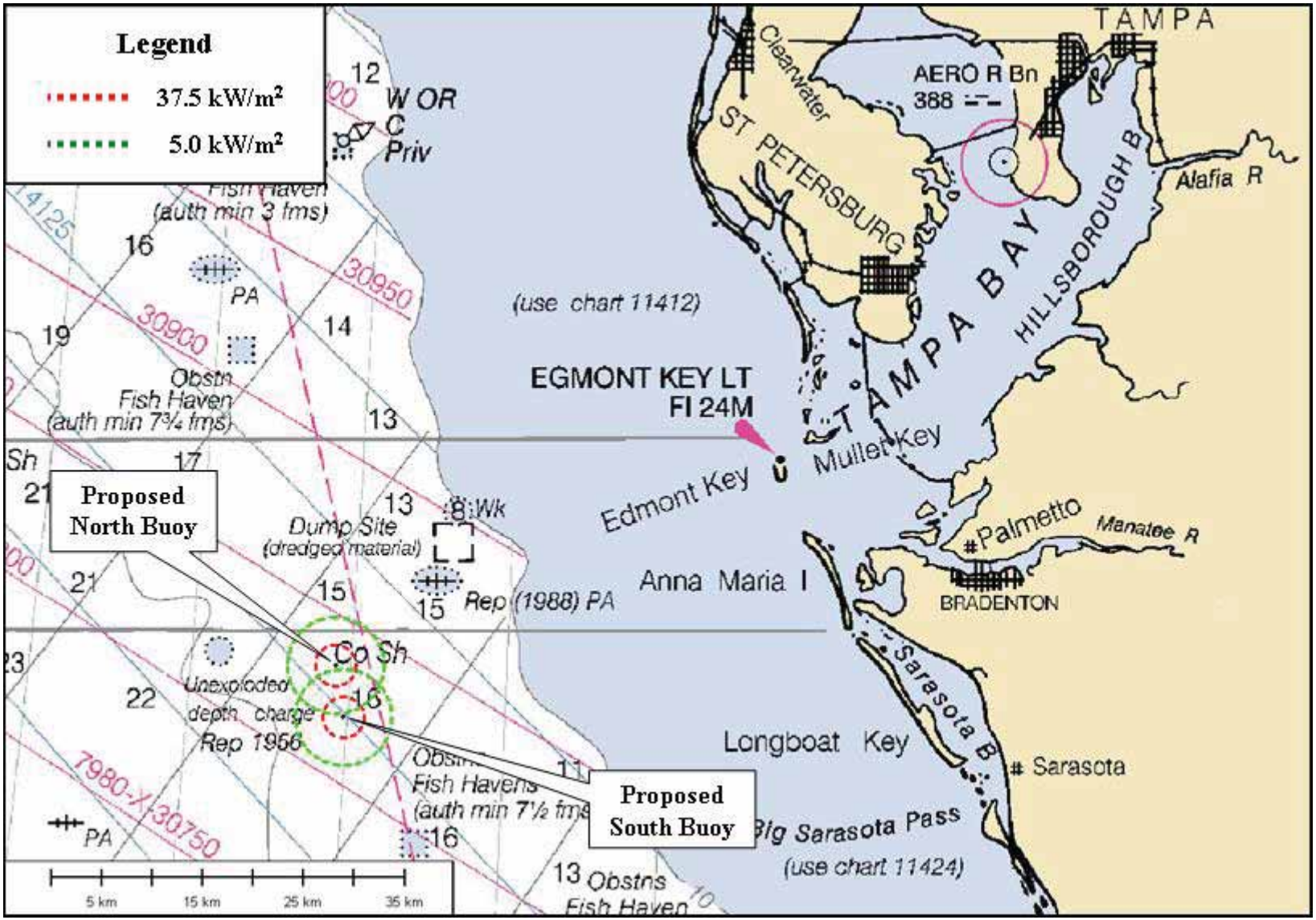


Figure C: Scenario 8 – Thermal Radiation Hazard Zone

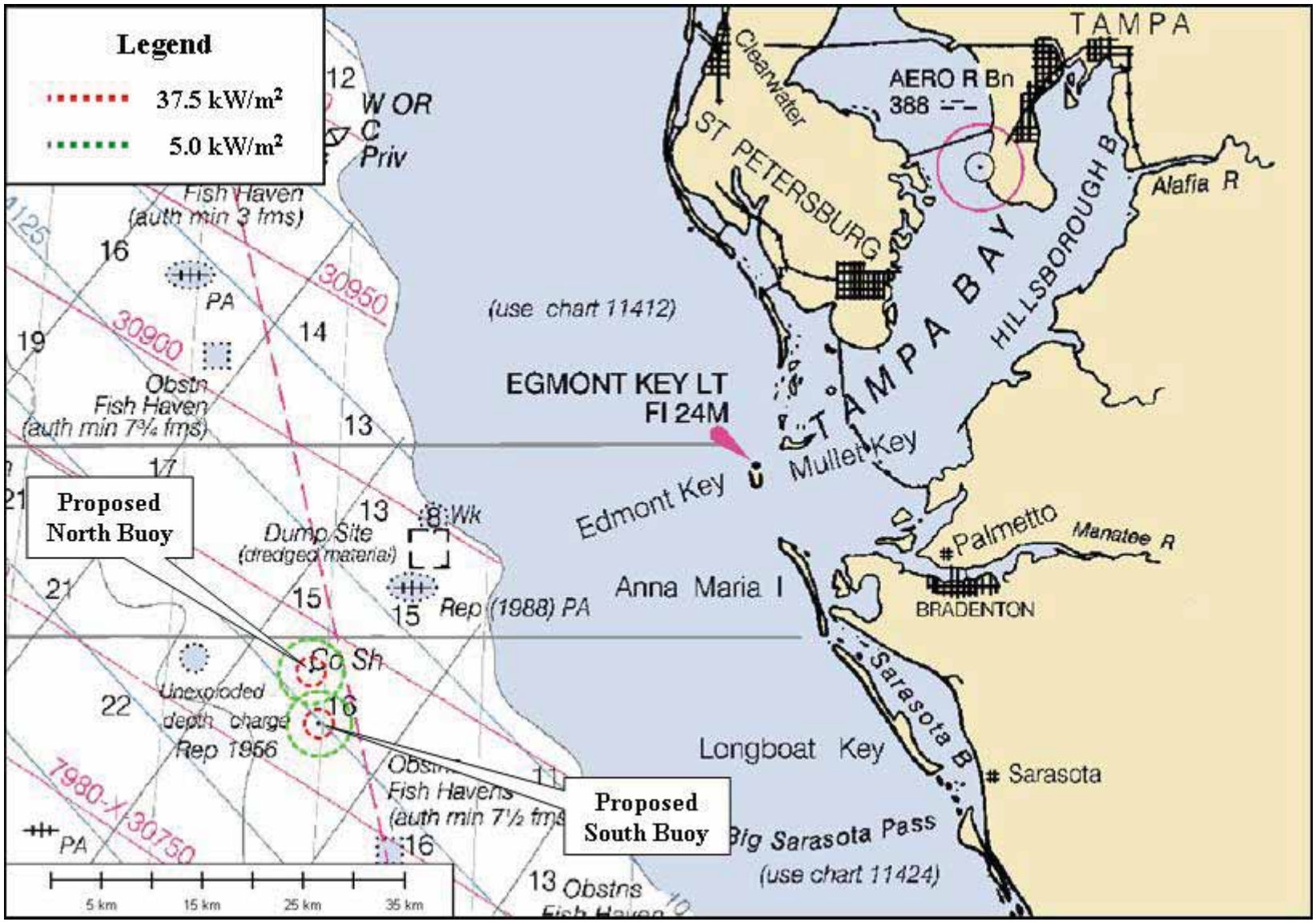
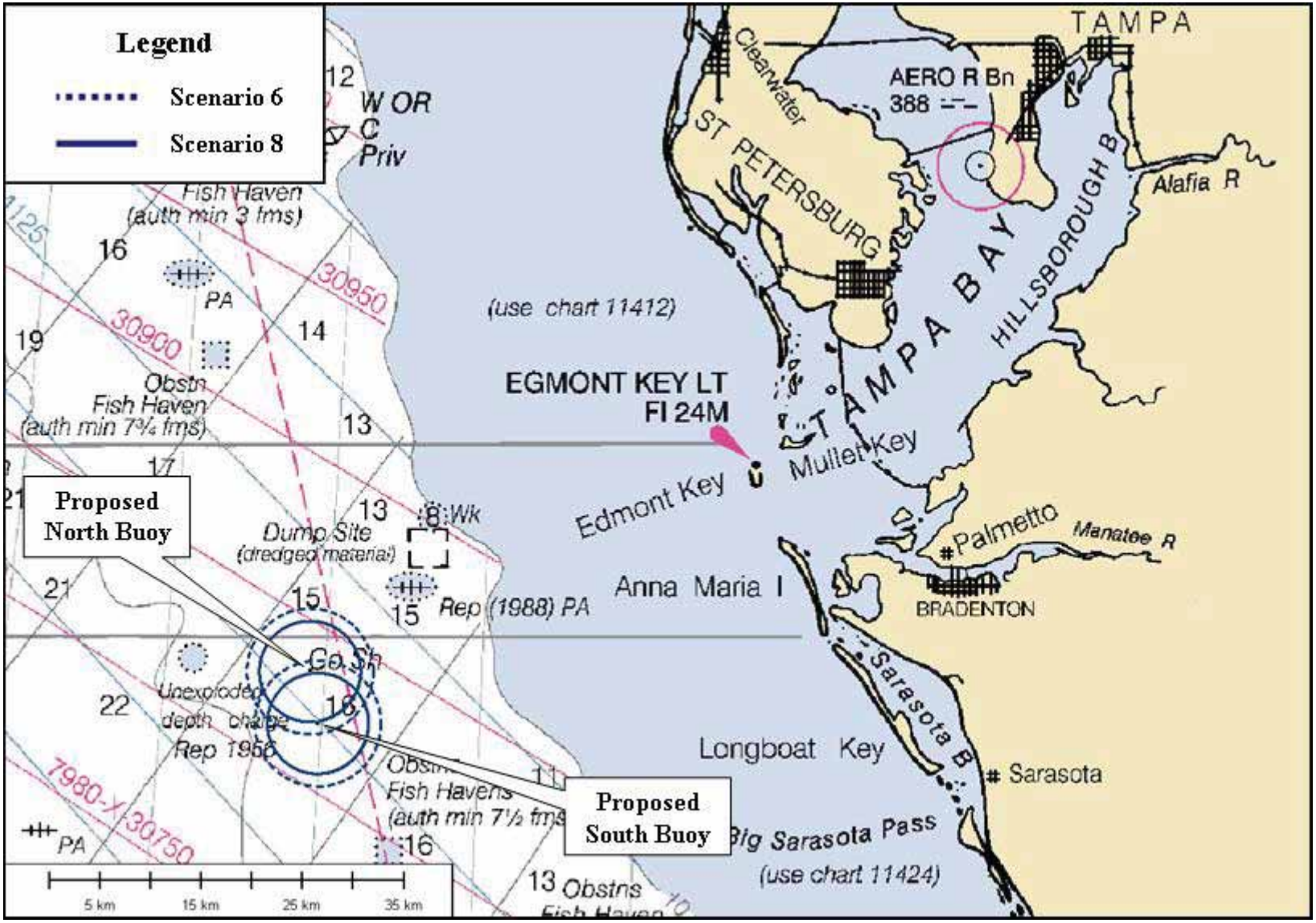


Figure D: Scenario 6 and 8 – Comparative Distance to LFL



C.3 Frequency of Events

The total frequency of a collision with an SRV at the DWP was calculated for two vessel types: 1) vessels in the established Port of Tampa Vessel Safety Fairway, and 2) vessels randomly passing the DWP location. This calculation utilized vessel traffic from the Automatic Identification System (AIS) dataset provided for this project by the USCG R&D Center, and only included those vessels with the potential to breach the inner hull of the SRV (resulting in a release of LNG from containment) in a collision.

Due to the distance from the safety fairway to the DWP (11 miles to the North buoy) the likelihood of a powered and drifting collision in this defined route and the SRV was very unlikely. In addition to vessels in the defined fairway, vessels of sufficient displacement and speed were identified that passed near the DWP. Using the collision frequency calculation for randomly distributed vessels, a collision frequency of 1.4×10^{-4} collisions per year was calculated. This vessel collision frequency can also be presented as one collision that could result in an inner hull breach of the SRV every 7,100 years.

The collision frequency for the proposed DWP considering both vessels in the safety fairway and randomly distributed around the DWP is shown in Table D.

Table D: Frequency of Vessel Collisions for Proposed DWP

LOCATION	FREQUENCY OF VESSEL COLLISION (PER YEAR BASIS)	FREQUENCY OF VESSEL COLLISION (YEARS PER COLLISION BASIS)
SRV at Port Dolphin DWP	1.4×10^{-4}	1 collision every 7,100 years

1.0 Project Overview

The Deepwater Port Act[5] authorized the Secretary of Transportation to issue licenses for the ownership, construction and operation of deepwater ports,[6] including liquefied natural gas facilities. The Secretary has delegated authority for processing license applications to the U.S. Coast Guard (USCG) and the U.S. Maritime Administration (MARAD).

To enable a more efficient application review process, the USCG established procedures for license applicants to hire third-party consultants, under direction of the Coast Guard, to conduct statutorily required analyses (e.g., Environmental Impact Statements (EISs) and Independent Risk Assessments (IRAs)).[7]

1.1 Introduction

On March 29, 2007, the USCG and MARAD received an application from Port Dolphin Energy, LLC, for all Federal authorizations required for a license to own, construct, and operate a deepwater port (DWP). USCG deemed the application complete subsequent to a review as required by the Deepwater Port Act.

This IRA is being submitted by AcuTech Consulting Group (AcuTech) to the USCG for the proposed Port Dolphin, Liquefied Natural Gas (LNG) DWP. This IRA provides the necessary data for the public safety section of the EIS being developed for the Project. AcuTech is the lead contractor for the IRA, responsible for the development of a stand-alone technical report on the potential risks to the public from potential large-scale release(s) of LNG or natural gas. Under contract to AcuTech, Exponent Inc. (Exponent) conducted the modeling for liquid spills, fire, and vapor dispersion for the LNG release scenarios defined in the IRA. This included three-dimensional computational fluid dynamic (CFD) for the flammable dispersion consequences.

The objective of this risk assessment is to assess the maximum impacts to the public and property not associated with the DWP from an event that compromises LNG containment, resulting in a release to the environment.

AcuTech is a global company providing consulting, training, and technologies to the public and private sectors to identify, evaluate, and manage risks in order to continually improve safety, security, health, environmental, and operational performance. AcuTech has expertise in LNG operations, security, process safety, offshore hazardous materials installation operations, risk assessment, fire protection, and homeland security for critical infrastructure.

[5] Deepwater Port Act (DWPA) of 1974 as amended by the Maritime Transportation Security Act of 2002 (MTSA); 33 United States Code 1501, *et seq*.
[6] The term "deepwater port" refers to any fixed or floating manmade structures other than a vessel, or any group of such structures, located beyond the territorial sea and of the coast if the United States, and intended for the loading or unloading and further handling of oil for transportation, except as excluded in 33 U.S.C. 1522.
[7] US Coast Guard, "Deepwater Port Third Party Handbook" (Washington, DC: US Department of Homeland Security, February 27, 2004), Section 4.0.

Exponent Inc. is an engineering and scientific consulting firm that provides solutions to complex technical problems. Their multidisciplinary team of scientists, physicians, engineers, and regulatory consultants performs in-depth research and analysis in more than 70 technical disciplines. Exponent is a recognized leader in the use of CFD models for LNG hazard estimation.

Port Dolphin Energy, LLC has filed for all Federal authorizations required for a license to own, construct, and operate a Deepwater Port (DWP) offshore of Tampa Bay, Florida

1.2 The Independent Risk Assessment (IRA)

The purpose of this work is to develop a stand-alone technical report on the potential risks to the public from the proposed Port Dolphin DWP based on a large scale release of LNG. The objective of this IRA is to assess impacts to humans and property not associated with the DWP from an event(s) that compromises LNG containment, resulting in a release to the environment. Therefore the scope of the IRA does not include the natural gas sub-sea pipeline or any additional onshore gas pipeline or facilities.

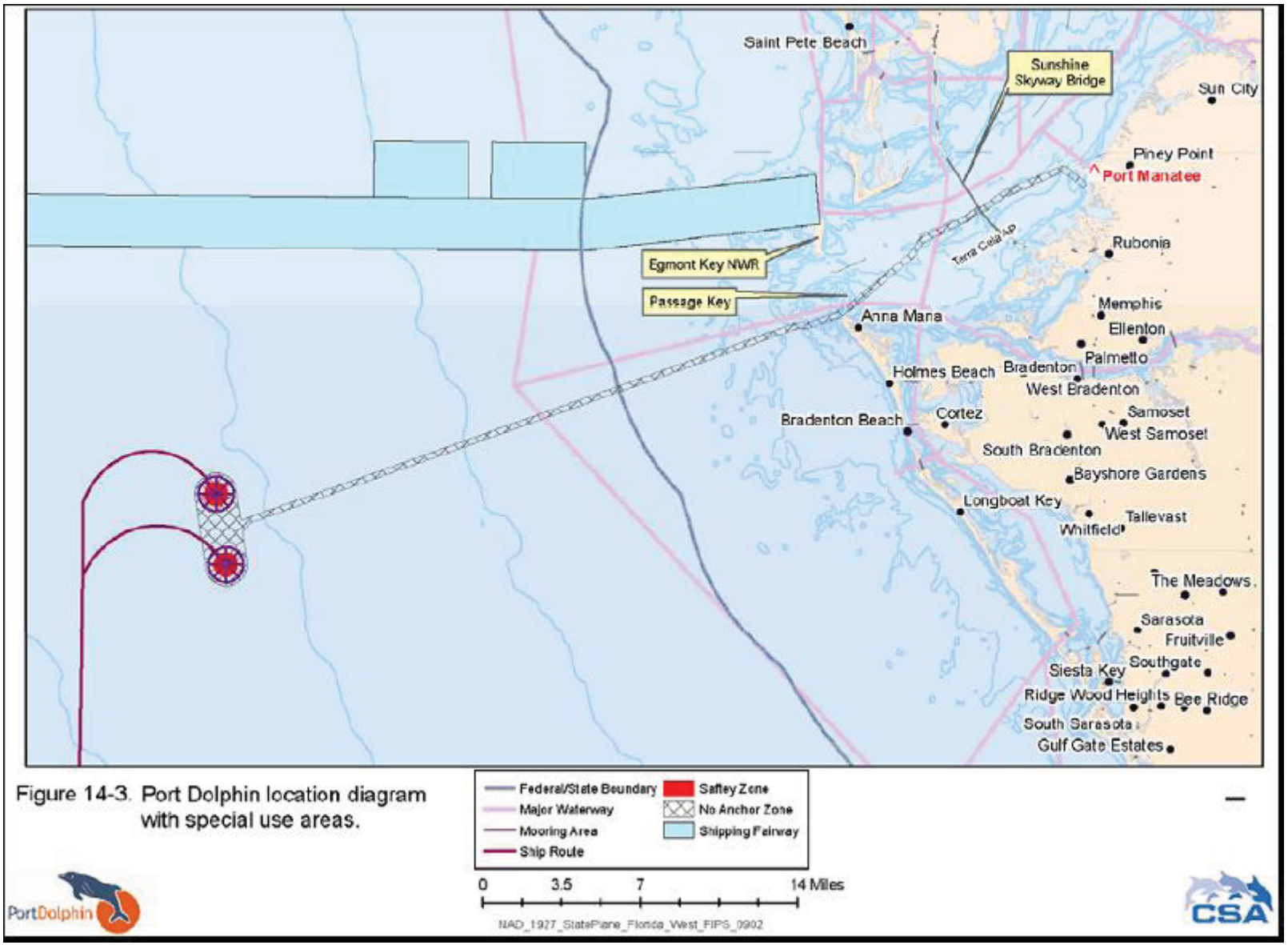
The assessment is not a full probabilistic risk assessment which estimates the cumulative frequency of all expected losses over the life of the DWP facilities, but instead is a deterministic study of the most significant credible loss scenarios that represent the maximum expected impacts from accidental and intentional scenarios developed and defined as part of the IRA. As such, the study provides representative scenarios for consideration and derives the most significant consequences (defined as the bounding intentional and accidental scenarios) for presentation of the maximum expected impacts to public safety.

The USCG Office of Operating and Environmental Standards, Deepwater Ports Standards Division (CG-5225) directed the scope, content, and quality of the report. The applicant, Port Dolphin LLC, had no technical direction of the work done under this contract, and was not able to review the work product before its release to the public. The applicant did, however present an overview of the Port Dolphin project to the IRA team as part of the Hazard Identification (HAZID), and answered additional question as requested.

1.3 Proposed Port Dolphin Deepwater Port

Port Dolphin Energy and its partners are proposing to construct, own, and operate a DWP offshore of Tampa Bay, Florida. The unloading portion of the proposed DWP, would be located in federal waters approximately 28 miles (45 kilometers) offshore of the Tampa Bay area of Florida in St. Petersburg (lease blocks PB 545 and PB 589). The location of the offshore components of the project is illustrated in Figure 1-1.

Figure 1-1: Port Dolphin Proposed Project Location



The DWP would consist of two buoys 2.7 nm (3.1 miles) apart and 9.55 nm (11 miles) and 12.3 nm (14.1 miles) south of the vessel safety fairway. The water depth in this region is approximately 100 feet (30 meters). From the project site, a transmission pipeline approximately 42.1 miles (68 kilometers total) in length will be run to shore, with interconnection facilities to the natural gas distribution network in Manatee County, Florida. The coordinates of the proposed North and South buoys of the DWP are detailed in Table 1-1.

Table 1-1: Unloading Buoy Coordinates

Buoy	Latitude	Longitude
North	27° 25' 12.14" N	83° 11'50.11" W
South	27° 22' 28.73" N	83° 11' 22.49" W

Initially, it is expected that the average daily throughput of natural gas from the port will be approximately 400 million standard cubic feet per day (mmscfd). Port Dolphin would eventually be capable of achieving an average throughput of 800 million standard cubic feet per day (mmscfd) and a peak capacity of approximately 1,200 million mmscfd. Natural gas would be sent out by means of a 16-inch flexible riser from each buoy to two 36-inch subsea flowlines through a piggable-Y to a 36-inch gas transmission line. The gas transmission line would transport natural gas to onshore facilities inland in Manatee County, Florida. From there, the natural gas would be available to serve residential, commercial, industrial, and electrical generation customers primarily in Florida and the Southeastern United States.

As part of the DWP, Port Dolphin would be capable of mooring Shuttle and Re-gasification Vessels (SRVs), as depicted in Figure 1-2. The SRVs are designed to carry liquefied natural gas and also to re-gasify the natural gas prior to off-loading for transport to shore.[8] These vessels would have a capacity range of 145,000 cubic meters (m^3) to 217,000 m^3 of LNG, transported and stored at a temperature of -261º F (-162 º C). The maximum SRV dimensions and capacities are the focus of the IRA since the larger SRV designs can carry a greater quantity of LNG, and thus have greater potential consequences if there were an accidental or intentional a release of LNG as part of this project.

[8] Information taken from the Port Dolphin LLC – Deepwater Port License Application – Volume 1 – Pages 2-3.

Figure 1-2: Shuttle and Re-gasification Vessel (SRV) Illustration



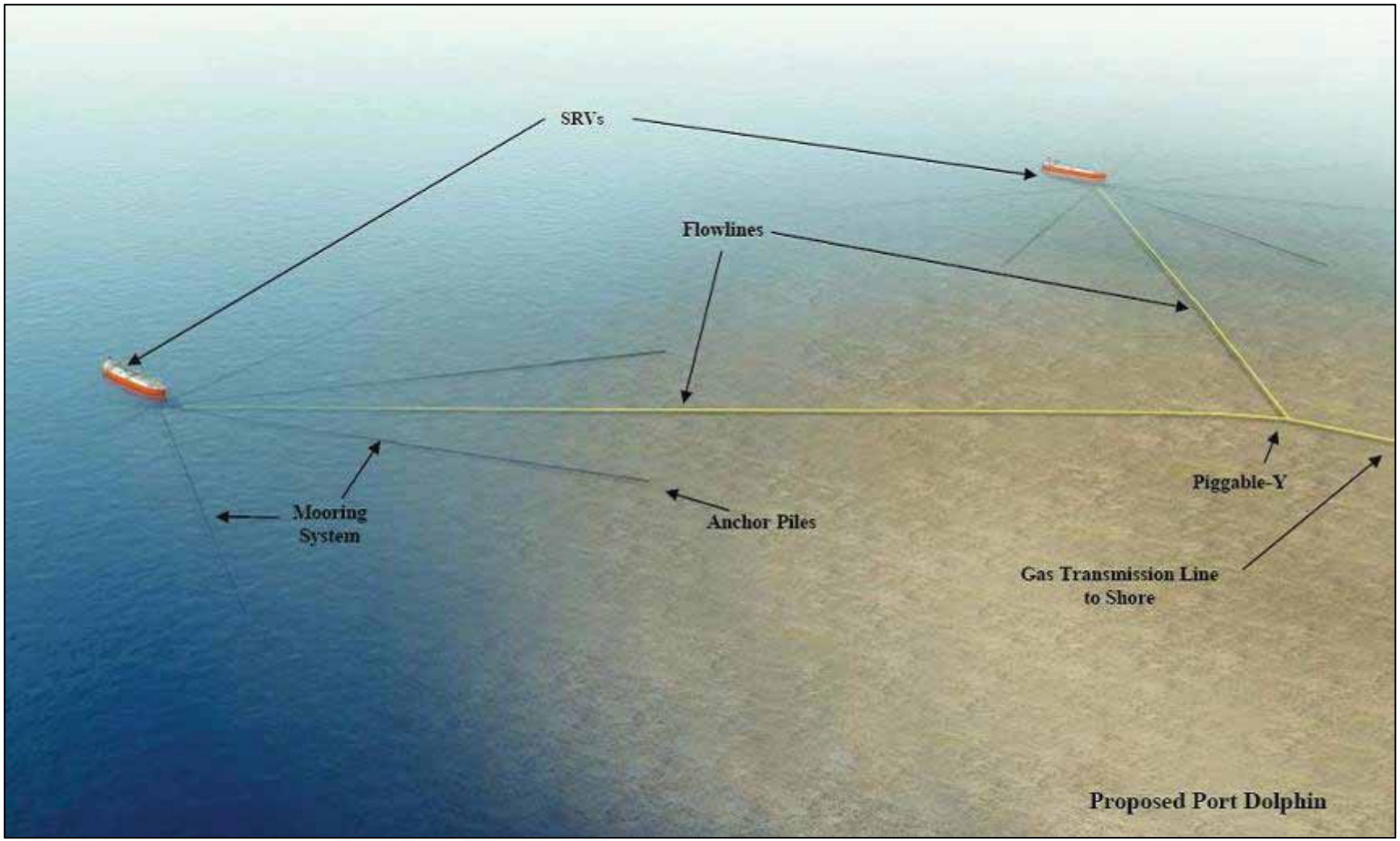
Figure 1-3 illustrates that the Port Dolphin project will be capable of mooring up to two SRVs simultaneously for uninterrupted off-loading and transmission of natural gas to onshore interconnection stations for delivery to customers in Florida and elsewhere in the Southeastern United States.

In addition to the SRVs, project vessels that are included as part of the Port Dolphin project will include:

- Support Vessel
- Crew Boat

The specifics of the SRVs and the additional project vessels are discussed in detail as part of Section 3.

Figure 1-3: DWP Illustration



2.0 Risk Assessment Methodology

2.1 Study Basis

In order to provide useful quantitative data regarding the potential safety and security impacts of the Port Dolphin LLC proposed DWP project, this assessment:

- Evaluates the potential risks utilizing appropriate site-specific data and credible scenarios to address public safety issues associated with the storage, handling, and re-gasification of LNG at the proposed the DWP.
- Is transparent and available for review to the greatest extent possible by the public and government agencies, subject to limitations imposed by security requirements.
- Establishes an independent and project-specific analysis, in lieu of extrapolation or regression of past studies or calculations.
- Follows the guidance for accidental and intentional LNG spills on water in the Department of (DOE) reports[9] (*Guidance on Risk Analysis and Safety Implications of a Large Liquefied Natural Gas (LNG) Spill Over Water*, 2004 and *Breach and Safety Analysis of Spills Over Water from Large Liquefied Natural Gas Carriers*, 2008) conducted by Sandia National Laboratories (Sandia).

This IRA relied on input and guidance from experts at Sandia, the USCG, and local stakeholders in the development of the intentional and accidental scenarios considered.

2.2 Bounding Scenarios and Credibility

To maintain objectivity and practicality which properly addresses the public's concerns, the following are the bounds of the assessment's scope:

- The assessment is a systems level risk assessment that considers operations related to the transfer, storage, and re-gasification at the DWP.
- The full range of hazards was evaluated as part of an initial HAZard IDdentification (HAZID).
- The assessment analyzed a defined subset of the HAZID cases to bracket the credible range of potential accidental and intentional LNG release scenarios.

Credible scenarios developed in the HAZID process include all possible intentional and accidental scenarios identified through a multidisciplinary team evaluation of the project. The scenarios are defined regardless of likelihood or consequence and are examined in the IRA to identify the one which will produce the bounding consequences of concern.

[9] SAND2004-6258 and SAND2008-3153

2.3 Significance Criteria and Assumptions

The risk assessment compares the results to the significance criteria and assumptions prescribed by the USCG in the Statement of Work and include SAND2008-3153 baseline criteria. Thermal radiation hazard distances from a pool fire were estimated to two different thermal heat flux levels:

- 37.5 kW/m^2: Damage to process equipment and storage tanks,[10] for unprotected exposures based on an average 10-minute exposure duration, as well immediate fatalities
- 5 kW/m^2: Permissible level for emergency operations lasting several minutes with appropriate clothing based on an average 10-minute exposed duration[11] and onset of second degree burns based on an average 40 second exposed duration[12]

The pool fire calculations report the maximum distance to each of these thermal radiation endpoints, estimated respectively from the center of the pool fire.

In addition to the thermal radiation hazards from pool fires, the vapor dispersion from an unignited cloud evolving from an LNG release is reported as the distance to the lower flammability limit (LFL) endpoint, which is 5% by volume for methane.

These modeling endpoints were considered from spills emanating from a pool assumed to be initiated from either accidental or intentional release scenarios at the DWP location itself. While the hazard zones would also apply to the LNG regasification vessels in transit to the DWP, the figures in this report depict a pool that is centered at the North or South buoy with the release originating at the LNG carrier. The significance criteria are limited specifically to acute and fatal effects to the public (either in nearby waters or on shore). Scenarios involving long-range transport to or from the source of the LNG were not included as they are outside the jurisdiction of the USCG.

2.4 Study Approach

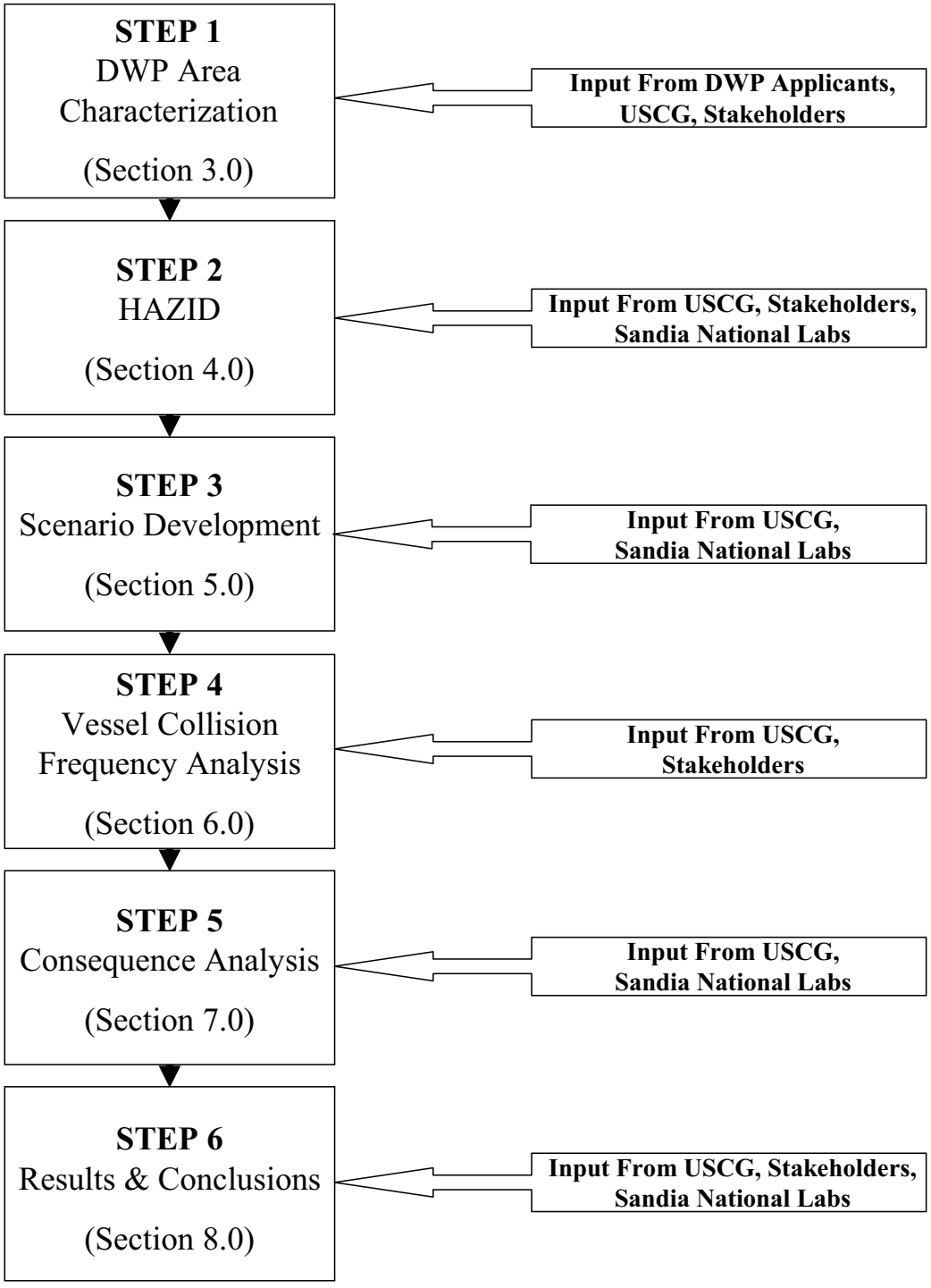
Figure 2-1 illustrates the risk assessment approach that was used to complete the analysis of this LNG DWP project. The approach was comprised of 6 steps, and included:

- **Step 1 – DWP Area Characterization**: Section 3 discusses the input data that was collected and reviewed for the risk assessment. The data included a description of the LNG DWP project, specifics on the design of the DWP location, expected size of the SRVs, operating conditions of the offloading, storage and re-gasification operation, and information on the marine traffic in the area of the proposed DWP location.

[10] Barry, Thomas, *Risk-Informed Performance-based Industrial Fire Protection* (Knoxville, TN: Tennessee Valley Publishing, 2002).
[11] Ibid.
[12] Federal Emergency Management Agency, *Handbook of Chemical Hazard Analysis Procedures*, (Washington, DC: FEMA, 1989).

- **Step 2 - HAZID**: The HAZard IDentification (HAZID) is a structured evaluation exercise that was used to identify accidental and intentional releases scenarios for this LNG DWP project. As discussed in Section 4, AcuTech facilitated a team consisting of representatives from USCG, Sandia National Laboratories, and State / Local stakeholders as well as other project stakeholders to identify initiating accidental and intentional events and a qualitative estimate of the potential consequences.
- **Step 3 – Scenario Development**: The development of the list of accidental and intentional scenarios evaluated in this risk assessment is discussed in Section 5. The final list of scenarios was determined by grouping similar cases from the HAZID, as well as screening out cases based on likelihood of occurrence and/or resulting consequence level, to identify the bounding accidental and intentional release scenarios for this project. Step 3 also includes a discussion of the development of the accidental and intentional release sizes. The intentional release sizes were selected based on guidance provided in SAND2008-3153 and guidance provided by Sandia specific to this project.
- **Step 4 – Vessel Frequency Collision Analysis**: Section 6 details the marine vessel traffic analysis and overall statistical likelihood of the occurrence of a vessel collision or allision with an SRV located at the DWP buoy locations.
- **Step 5 – Consequence Analysis**: Section 7 details the assumptions and consequence models that were used to evaluate the release scenarios defined in Step 3. This includes: LNG spill rate, pool evaporation, vapor dispersion, and thermal radiation models that were used in the analysis. A series of screening calculations were performed during this analysis to aid in evaluating the effects of certain parameters on the thermal radiation and vapor dispersion hazard distances. The screening calculations were performed using DEGADIS and a solid flame model, respectively, for the vapor cloud dispersion and the thermal radiation analysis. These models were used solely to identify those parameters that may be likely to have a significant effect on the outcome (or resulting consequence distances) of the release scenarios being evaluated in this risk assessment. Additional Computational Fluid Dynamics (CFD) was used for the actual consequence modeling for vapor dispersion in this risk assessment.
- **Step 6 – Results & Conclusions**: Section 8 combines the inputs and results of the supporting sections to evaluate the risk of this DWP project. This final step includes a discussion of the potential impacts to the public from the LNG DWP project based on the distances to the thermal radiation and flammable vapor dispersion endpoints for the accidental and intentional release scenarios modeled in the risk assessment.

Figure 2-1: DWP IRA Process



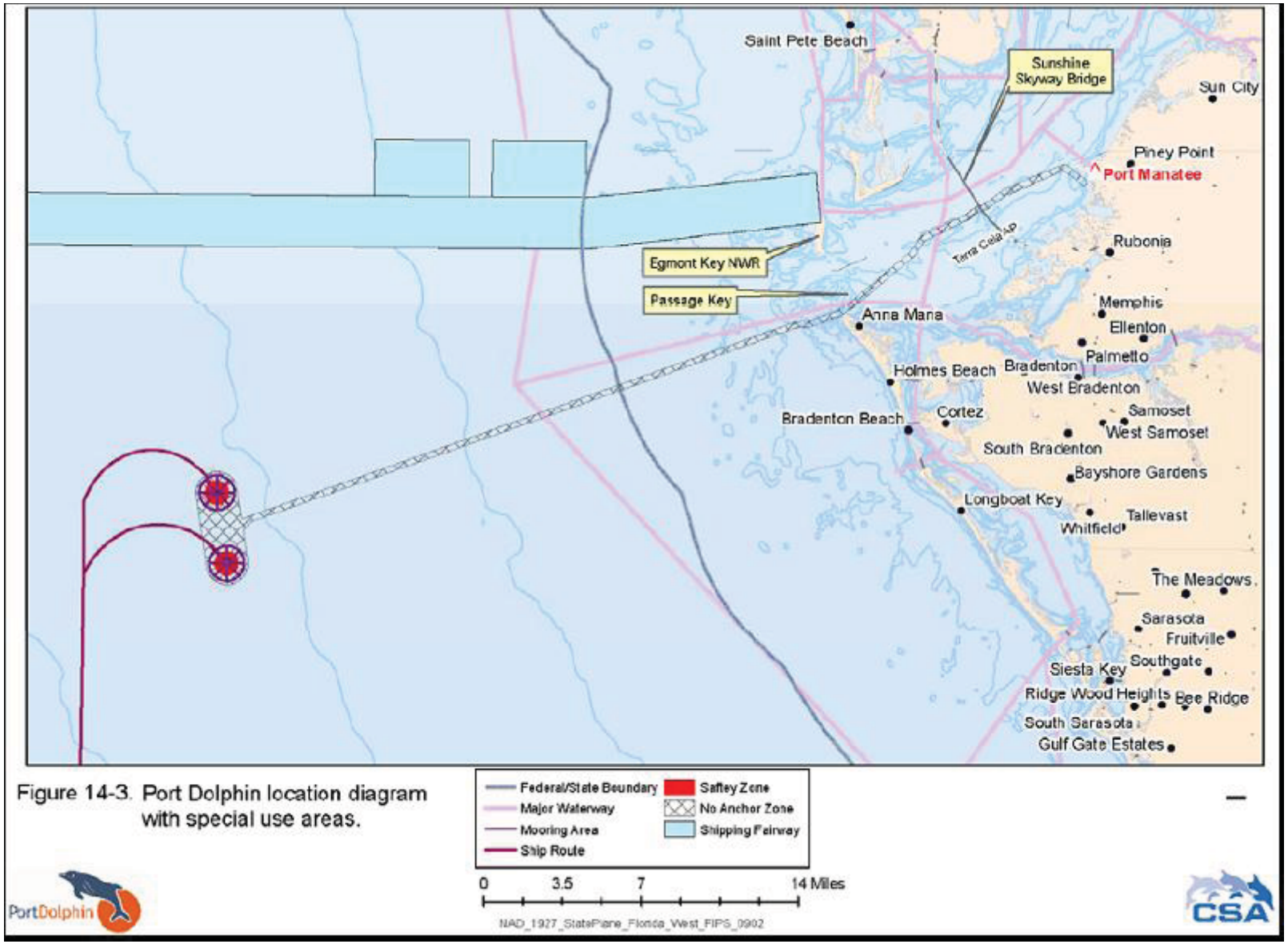
3.0 Deepwater Port Area Characterization

This section provides information to characterize and describe the proposed project area off the coast of Tampa, FL. Information in this section is derived from the applicant's materials. Most of the information is summarized from Port Dolphin's DWP license application (Volumes I and II General (Public)).

3.1 Proposed Port Dolphin DWP

The proposed DWP location and pipeline corridor shown in Figure 3-1 is in an area south of the Port of Tampa Safety Fairway that includes the Egmont Channel that runs into Tampa Bay. The pipeline route will provide a direct route to the mouth of the bay. The northernmost buoy location is 9.55 nm (11 miles) from the southernmost edge of the safety fairway; the southernmost buoy is 12.3 nm (14.1 miles) from the southernmost edge of the safety fairway. The pipeline corridor is 42.1 miles to the landing location at Port Manatee. This corridor was sited to avoid mapped wrecks, underwater obstructions, artificial reefs, ocean dredge material disposal sites, and fish havens. Additionally, to avoid impacts to Egmont Key, a National Wildlife Refuge and Florida state park, the pipeline corridor traverses south of Passage Key, another National Wildlife Refuge, to the north of Anna Maria.

Figure 3-1: Project Site Location



3.1.1 Shuttle and Regasification Vessels

Port Dolphin would be capable of mooring Shuttle and Re-gasification Vessels (SRVs). The SRVs are designed to carry liquefied natural gas and also to re-gasify the natural gas prior to off-loading for transport to shore.[13] These vessels would have a capacity range of 145,000 cubic meters (m^3) to 217,000 m^3 of LNG, transported and stored at a temperature of -261º F (-162 º C). Table 3-1 describes the approximate dimensions and capacities of the proposed SRVs that are expected to call on this DWP and, as shown, the SRVs may be of either membrane or Moss design. The maximum carrier dimensions and capacities are the focus of the IRA since the larger SRV designs can carry a greater quantity of LNG, and thus have greater potential consequences if there were an accidental or intentional a release of LNG as part of this project.

Table 3-1: Approximate Dimensions and Capacities of SRVs

Item	Description
SRV 217,000 m^3 SRV with Membrane Tanks	
Hull Type	Double bottom/Double hull
Total LNG Capacity	217,300 m^3
Number and Type of Cargo Tanks	5 Membrane-style tanks
Length Overall	315 m (1,035 ft)
Moulded Breadth	50 m (164 ft)
Design Draft	12 m (19.5 ft)
Laden Displacement (estimated)	143,500 tonnes
Vessel Speed (calm weather)	19.5 Knots (kts)
SRV 215,000 m^3 SRV with Moss Tanks	
Hull Type	Double bottom/Double hull
Total LNG Capacity	217,446 m^3
Number and Type of Cargo Tanks	4 Spherical (Moss)
Length Overall	315 m (1,035 ft)
Moulded Breadth	56 m (184 ft)
Design Draft	12 m (19.5 ft)
Laden Displacement (estimated)	152,000 tonnes
Vessel Speed (calm weather)	19.5 Knots (kts)

The SRVs would be equipped to transport, store, and vaporize liquefied natural gas, as well as meter natural gas exported to shore. The SRVs will be designed with insulated storage tanks for the liquefied natural gas located within its hull. Each tank would be equipped with an in-tank pump to circulate and transfer LNG to the vaporization facilities located on the deck of the SRVs. The vaporization system would have a closed-loop cycle utilizing glycol/water brine as the re-circulating heating medium. This re-circulating medium would heat the liquefied natural gas and the medium itself would be warmed using steam from the SRVs natural gas boilers.

[13] Information taken from the Port Dolphin LLC – Deepwater Port License Application – Volume 1 – Pages 2-3.

3.1.2 SRV Offloading Operation

An SRV would typically moor at the deepwater port for between four and eight days, depending on vessel size and natural gas send-out rate. The two separate buoys would allow natural gas to be delivered in a continuous flow, without interruption, by scheduling an overlap between arriving and departing SRVs. It is anticipated that the DWP would host 50-70 vessels per year (25-35 at each buoy location).

The unloading buoy technology and associated equipment proposed for Port Dolphin is similar to that used in the Gulf Gateway deepwater port and the Northeast Gateway and that which is planned for Neptune and Calypso LNG DWP projects.[14] The technology has also been successfully used in the offloading of oil at several locations overseas including the North Sea.

Each unloading buoy would have eight mooring lines consisting of wire rope and chain. The mooring lines would connect each unloading buoy to eight anchor points most likely consisting of driven piles on the seabed. The unloading buoy is designed by Advanced Production and Loading (APL), and is also commonly known as a Submerged Turret Loading (STL) buoy. See Figure 3-2 for an illustration of the STL system.

When not connected to an SRV, the unloading buoy would be submerged 60-70 feet (18-21 meters) below the sea surface. In this position, the buoy would be held in position by the mooring lines and would be resting on the STL buoy landing pad. A marker buoy and retrieval line would be used to locate and recover the buoy as the SRV arrives at the deepwater port. The unloading buoy would be retrieved from its submerged position by means of a winch and recovery line. It would be hoisted up through a moon-pool in the forward part of the SRV where it would be located in a receiving cone within the hull trunk as shown in Figure 3-3. After the buoy is locked in position, unloading of re-gasified natural gas would begin. The gas would be unloaded through the flexible riser into the pipeline end manifold (PLEM) for transportation to shore via the new subsea pipeline.

[14] Summary information on these other project is available on the MARAD website at http://www.marad.dot.gov/DWP/LNG/deepwater_ports/index.asp

Figure 3-2: DWP – STL Illustration

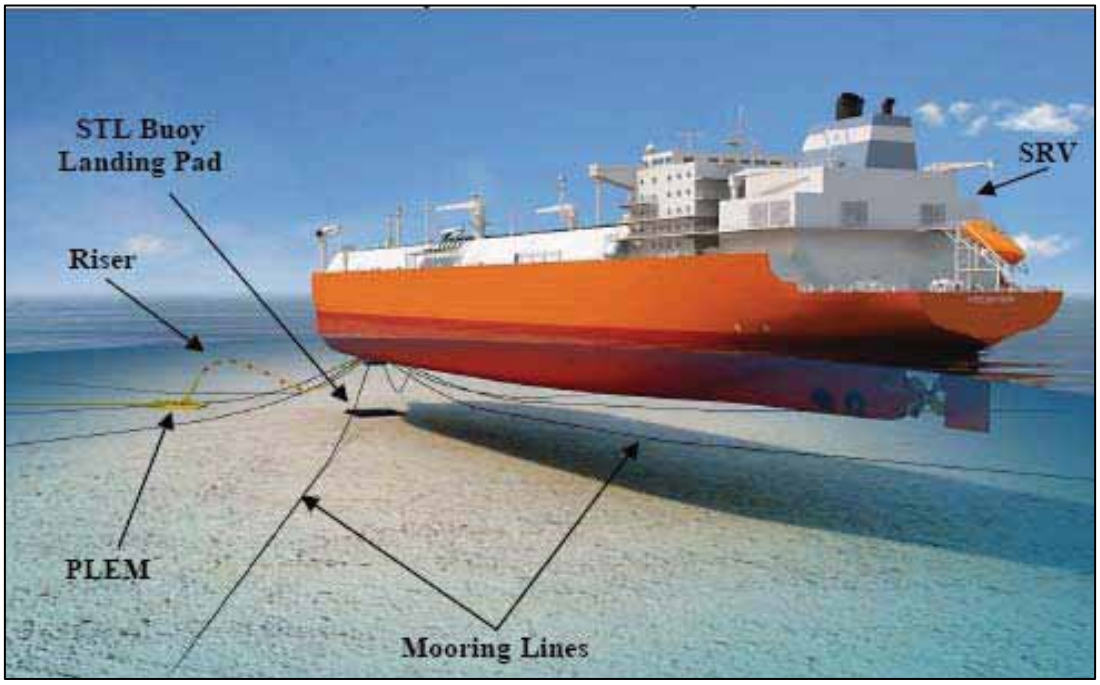
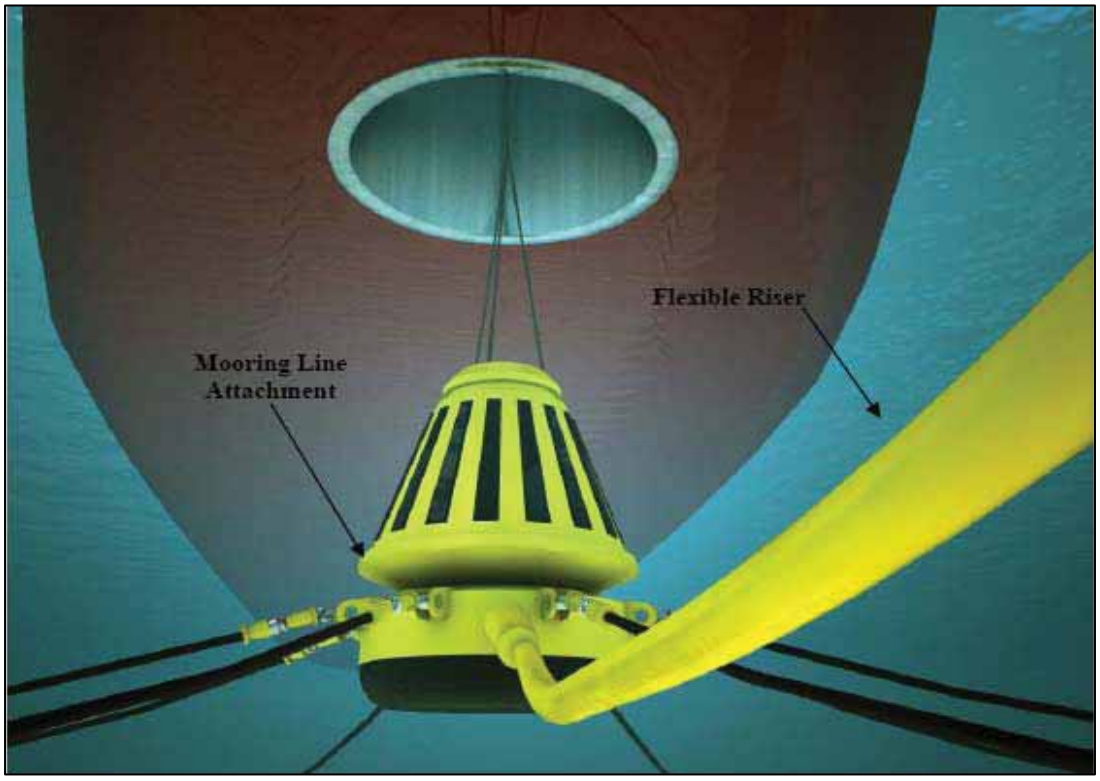


Figure 3-3: Moon Pool – STL Illustration



3.1.3 Additional Project Vessels

Port Dolphin will utilize a support vessel for logistics and delivery of consumables, stores and supplies; to assist in security surveillance of areas around the SRVs and unloading buoys; to provide Class 1 fire fighting capability; to assist in inspection/maintenance of DWP components; to assist in case of emergency evacuation of personnel; and to assist in traffic control and monitoring of the Safety Zone. This vessel is described by the applicant as having a length overall of 130 feet (40 m), a beam of 45 feet (14 m), a draft of 19 feet (6 m), an approximate speed of 8 knots (kts) and a crew of 2 to 3.

Port Dolphin will also utilize a crew boat for transportation of USCG inspectors or other authorities; to conduct transportation missions for up to 12 personnel; to assist in security surveillance of areas around the SRVs and unloading buoys; to assist in case of emergency evacuation of personnel; and to be able to conduct other emergency response missions upon request of the USCG. This vessel is described by the applicant as having a length overall of 75.5 feet (23 m), breadth (extreme) of 19 feet (6 m); and a maximum speed of 22-33 kts.

3.2 Local Population and the Economy

The following subsections highlight demographic and economic indicators for Manatee and Hillsborough Counties as well as information specific to Port Manatee, onshore areas which are closest to the proposed offshore portions of Port Dolphin.

Manatee County is in central Florida along Tampa Bay in the Gulf of Mexico. It covers a total of 741 square miles and has a population density of 356.3 persons per square mile (Census 2000). The most current estimated countywide population of Manatee County is 308,325 people (University of Florida, Bureau of Economic and Business Research 2006). The most populated city in Manatee County is Bradenton, but 74.1% of the countywide population lives in the unincorporated portion of the county. Between 1990 and 2000, Manatee County as a whole had a growth rate of 24.7%, which was slightly greater than the statewide growth rate of 23.5% in those 10 years. According to the Bureau of Economic and Business Research (BEBR) (2004), Manatee County's population is projected to grow steadily and reach an estimated 453,900 by 2030.

Hillsborough County is located in Central Florida along the Gulf of Mexico's coast in Tampa Bay and is part of the Tampa-St. Pete Clearwater Metropolitan Statistical Area. It covers a total of 1,051 square miles with a population density of 950.6 persons per square mile. The most current estimated countywide population of Hillsborough County is 1,164,425 people (University of Florida, Bureau of Economic and Business Research 2006). The most populated city in Hillsborough County is Tampa, but 66.8% of the countywide population lives in the unincorporated portion of the county. Between 1990 and 2000, Hillsborough County had a growth rate of 19.8%, which is slightly less than the statewide average of 23.5% for the same time period. According to BEBR (2004), Hillsborough County's population is projected to grow steadily and reach an estimated 1,653,800 by the year 2030.

3.2.1 Industrial Ports and Shipping

Port Manatee is the closest U.S. deepwater seaport to the Panama Canal and among Florida's largest deepwater ports. It is Fresh Del Monte Produce's second largest U.S. port facility and is the southeast's leading forestry product import facility. Port Manatee has approximately 84 full-time employees and supports an estimated 1,100 on-port employees.[15] A recent economic impact analysis of the port supported by Port Manatee states that the total annual economic impact to the county from the port was $2.3 billion.[16]

The major shipping lane, Egmont Channel, enters Tampa Bay from the eastern Gulf of Mexico and is dredged and maintained out to 6 miles west to a water depth of 43 feet (13 meters). Ships carrying products such as petroleum, coal, lumber, plywood, drywall, liquid and dry bulk, fruits, cement, fertilizer, liquefied sulfur, steel, anhydrous ammonia, citrus concentrate, containerized cargo, and aggregates such as limestone and granite pass in and out of Tampa Bay. Over 3,800 vessels pass through the facilities in the Port of Tampa annually, handling nearly 40 percent of the of the state's total tonnage.

3.2.2 Existing Activities Near the Proposed Project Area

The marine region offshore southwest Florida and within Tampa Bay is an important economic and recreational area that supports maritime transportation and other commercial industries such as commercial fishing and cruise ships. There are also several conservation areas within the larger eastern Gulf of Mexico. Recreational activities such as sailing, fishing, boating, and diving on natural and artificial reefs is another common use within the offshore region.

3.2.3 Commercial Fishing

Commercial fishing is an important industry within the Tampa Bay region, with 2,677 "commercial" vessels[17,18] registered in the counties of Hillsborough, Manatee, and Pinellas. The combined data sets (landings, effort, permits, and licenses) indicate that key fisheries exist for shelf and inshore Tampa Bay waters of the region. For shelf waters of the project area, the key fisheries in order of importance are reef fishes, pink shrimp, coastal pelagic fishes, and stone crab. Reef fishing for red grouper, gag and scamp, generally occurs in water depths ranging from 66 to 394 feet (20 to 120 meters). Pink shrimp are caught in shelf waters using bottom trawls. Primary water depths for pink shrimp are 66 to 197 feet (20 to 60 meters). The Sanibel shrimp grounds (west of Ft. Myers) and the Tortugas grounds (north of Dry Tortugas) are the primary pink shrimping areas in the region. Trawling can only take place on level sandy bottoms as hard bottom or other obstructions will snag and damage nets. Many members of the shrimp fleet are nomadic and only appear during peak seasons then move on to other ports.

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[15] Port of Manatee website, "Port Facts," accessed February 29, 2008. www.portmanatee.com

[16] Economic Impact Analysis of Port Manatee, Economics Research Associates, Table II-1 April 2003

[17] Florida Department of Highway Safety and Motor Vehicles. Alphabetical Vessel Statistics by County, 2007. http://www.flhsmv.gov/dmv/vslfacts.html#2b

[18] A "commercial vessel" is defined in these statistics as "any vessel primarily engaged in the taking or landing of saltwater fish or saltwater products, freshwater fish or freshwater products from within and without the waters of this state for sale either to the consumer, retail dealer or wholesale dealer; or any vessel engaged in any activity wherein a fee is paid by the user, either directly or indirectly, to the owner, operator or custodian of the vessel."

Tampa is one of the primary ports for shrimpers in the eastern Gulf of Mexico. Coastal pelagic species are caught by gillnetting or purse netting. Both of these activities are banned from state waters and can only occur in federal waters. Pompano, Spanish mackerel, and sharks are the main targets of gillnet fisheries in the region. Spanish sardine, thread herring, and ladyfish are the quarry of purse net fisheries. In the inshore waters of Tampa Bay, the primary fisheries are striped mullet, bait shrimp, and blue crab. Blue crabs are harvested with bottom tending traps throughout the bay.

3.2.4 Recreational Fishing

Recreational and charter boat fishing are important as well. Data presented by the applicant in Volume II, Section 6 of the application materials were obtained from the Marine Recreational Fisheries Statistical Survey (MRFSS) website (NOAA Fisheries 2006) and include estimated numbers of fish caught and trips made by recreational anglers fishing from shore, private/rental boats, and charter boats (data on the types of vessels engaged in recreational fishing is not available). Table 3-2details the average number of recreational trips made including inland areas, ocean waters less than or equal to 10 miles (16 kilometers) from shore, and ocean waters greater than 10 miles (16 kilometers) from shore.

Table 3-2: Average Number of Recreational Trips (2001 - 2005)

Area	Private/Rental	Shore	Charter
Inland	4,442,220	3,590,683	112,782
Ocean <=10 miles	3,121,339	2,935,211	161,100
Ocean >10 miles	1,164,752	--	304,629

Source: NOAA Fisheries and Marine Recreational Fisheries Statistical Survey (MRFSS) 2006.

The following paragraphs focus only on the trips made by recreational anglers greater than 10 miles from shore as that is the area closest to the proposed DWP site.

Species ranking highest in estimated total catches for charter vessels operating in oceanic waters greater than 10 miles (16 kilometers) from shore off west Florida during 1995 to 2005 included red snapper, *Mycteroperca* (e.g., gag and scamp) groupers, *Epinephelus* (e.g., red grouper, snowy grouper, goliath grouper) groupers, white grunt, vermilion snapper, triggerfishes/filefishes, and yellowtail snapper, and all reef species. Species most commonly caught by private/rental vessels in ocean waters greater than 10 miles (16 kilometers) offshore of west Florida were *Mycteroperca* groupers, *Epinephelus* groupers, black sea bass, herrings, pinfishes, and white grunt.

Charter vessels accounted for the fewest average trips per year; however, charter vessels spend most of their time in waters greater than 10 miles (16 kilometers) from shore.

Although the MRFSS data represented the entire coast of west Florida and not the specific project area, it appears that most of the general patterns and trends in the data should broadly reflect the situation in the project area. General patterns that emerged from the applicant's

analysis of the west Florida shelf as a whole noted that offshore fishers target reef fish and, to a lesser extent, coastal pelagic species. Species caught by charter vessels were mostly reef fish (snappers and groupers). Charter vessels contributed fewer overall trips as most trips went greater than 10 miles (16 kilometers) offshore; the private/rental vessels accounted for many more trips, but fished mostly in inland or coastal waters. Most trips were made by anglers fishing from shore either inland or along the Gulf beaches.

3.2.5 Recreational Boating and Water-Based Tourism

Recreational activities near the project area are primarily water-based, consisting of pleasure boating, surfing, diving, fishing, sailing, beach-going, dolphin-watching, and windsurfing. Other tourism-related activities include gambling cruises, dinner cruises, sight seeing, nature-viewing, picnicking and camping on islands, and parasailing.

Over 123,000 vessels were registered in Manatee, Hillsborough, and Pinellas counties in 2005, departing from private docks, boat ramps, and the many marinas throughout the region. Year-round favorable weather conditions allow for boaters to participate in various activities throughout the year with no strong seasonal fluctuations. Most recreational boating is focused around fishing, cruising, and nature viewing. Vessel types include various sized power boats, sailboats, kayaks, and fishing boats. Frequent destinations within the Tampa Bay region are Egmont Key, Terra Ceia Bay, and the Sunshine Skyway Bridge. Boaters' use patterns within the bay, and offshore center around the intended activity; diving trips tend to travel farther into the Gulf of Mexico to reach their destination whereas nature viewers remain closer to islands and the coastal area.

A large tourism-based economy supports a charter boat industry. Within the Tampa Bay region, numerous charter companies and private captains offer individual or group experiences in fishing, diving and snorkeling, cruising, gambling, dolphin-watching, harbor touring, kayaking, nature-viewing, and birdwatching. Chartered trips typically last from half a day up to one week and are offered year round. Of the 123,673 registered vessels in the region, 2,865 are considered commercial and include charter vessels and commercial fishing vessels. As noted previously, charter vessels engaged in fishing are the charter vessels most likely to travel greater than 10 miles from shore.

The Port of Tampa is currently the largest cruise ship port among Florida ports with over 770,000 cruise ship embarkments and disembarkments were reported in fiscal year 2004-2005.

3.3 Marine Traffic Management

Marine traffic in Tampa Bay is governed by several mechanisms. A safety fairway has been established in which no artificial island or fixed structure, whether temporary or permanent, is permitted. This vessel safety fairway is depicted on the project location chart (Figure 3-1) as the light blue rectangular area north of the proposed project site. As noted above, the northernmost buoy planned for the Port Dolphin project is 9.5 nm from the edge of the safety fairway. The USCG has recently begun activation of a Vessel Traffic Service for Tampa Bay which is

intended for the waters east of the Sunshine Skyway Bridge. Port Dolphin vessels and buoys are located far west of this area in deep water.

Once the SRV is moored at the buoy, 33 CFR 150 allows for the establishment of safety zones, no anchoring areas (NAA), and areas to be avoided (ATBA).

3.3.1 Safety Zone

Pursuant to the regulations of the DWPA, USCG is authorized to establish a safety zone, whether a vessel is present or not, to promote the safety of life and property on the facilities, their appurtenances and attending vessels, and the adjacent waters within the safety zone. The safety zone extends 500 meters in all directions around the vessel from the stern of the vessel as the vessel weathervanes on the STL, approximately 850 m from the center of each buoy. All unauthorized vessels would be prohibited from anchoring or transiting the proposed safety zone.

3.3.2 No Anchoring Area (NAA)

The extent of the NAA is proposed to avoid entanglement by any vessel's anchors and the mooring lines and anchors for the STL buoys and the pipeline. The NAA for the buoy site is proposed to be an area defined by the outer bounds of each STL buoy anchor system, with a radius of 4,925 ft (1500 m). Additionally, an area between the buoys extending 4,925 ft (1500 m) to both sides of a straight line between the buoys would be part of the NAA.

3.3.3 Area to Be Avoided (ATBA)

The ATBA proposed by the Applicant is to have the same shape as for the NAA for the buoy site. This ATBA would help to ensure that other vessels do not interfere with the DWP operations, including maneuvering of LNG carriers and support vessels. The actual size of the ATBA would be determined through advice and consent of the USCG Navigation and Standards Branch with input from the Captain of the Port. Upon its approval from IMO, the ATBA would appear on subsequent editions of nautical charts. The ATBA is recommendatory and is meant to discourage vessel traffic in the area. Vessels entering the ATBA are advised to maintain a speed of 10 kts or less.

3.4 Marine Traffic Data

The following issues related to marine traffic in the project area were considered and examined in this risk assessment as they constitute a possible impact to the public in or near the project area:

- Potential increased vessel traffic (traffic associated with the proposed DWP in the area surrounding the Port of Tampa)
- Potential impact of safety zones and areas to be avoided by vessel traffic around the Port Dolphin DWP
- Potential interference with use and access to current fishing areas and other mariners and vessels transiting areas around the DWP

- Potential for collision between ships entering or departing Port of Tampa with the SRVs calling at the proposed DWP location

3.4.1 Commercial Shipping Traffic

There is currently very little precise data regarding vessel traffic within the area where the proposed Port Dolphin project is planned partly due to the substantial distance offshore. The USCG has only recently begun collecting such data.

Automatic Identification System (AIS) data was obtained by the USCG R&D Center for vessel movements in and out of the Port of Tampa, and vessels transiting near the Port Dolphin proposed project location. This data confirms that the majority of vessel traffic bound for the Port of Tampa area stays within the safety fairway, north of the proposed DWP. The types of vessel identified in the AIS dataset included:

- Passenger Vessels
- Cargo Ships
- Tankers
- Fishing, Towing, Dredging, Military and Sailing Vessels
- Pilot Boats, Tugs and Port Tenders
- Other Vessels (including unknown)

AIS data was only available from August to December 2007, but has been extrapolated to an annual number of 2,543 vessel movements for these vessel types. Due to a lack of data, the extrapolation does not account for seasonal or any other variations in traffic. The extrapolated movements for each vessel type are detailed in Table 3-3.

Table 3-3: Annual Shipping Movements – 2007 AIS Data

VESSEL TYPE	NUMBER OF VESSEL MOVEMENTS (EXTRAPOLATED)
Passenger	65
Cargo	895
Tanker	379
Fishing, Towing, Dredging, Military and Sailing	430
Pilot Boats, Tugs and Port Tenders	395
Other Vessels (including unknown)	379
TOTAL	**2,543**

In addition to vessel types and counts, the AIS data also included:

- Displacement
- Speed
- Kinetic Energy

This AIS data set was used to determine the bounding vessel collision breach size for the SRV and was used as input to the vessel collision frequency analysis. In these analyses, the number of vessels has been limited to those with sufficient size (displacement) and speed to potentially breach the inner hull of a SRV in a vessel collision, resulting in a release of LNG.

Table 3-4 details the range of displacement, average speed, and absorbed energy for the subset of vessels identified from the AIS data with the potential to breach the inner hull of a SRV.

Table 3-4: Vessel Type Impact Energy

Vessel Type	Displacement (tonnes)	Average Cruising Speed (knots)	Kinetic Energy (N-m)
Passenger	4,000 – 55,400	19	$2.1 \times 10^8 – 3.5 \times 10^9$
Cargo	3,300– 128,000	23	$2.5 \times 10^8 – 9.8 \times 10^9$
Tanker	8,400 – 200,000	21	$5.4 \times 10^8 – 1.3 \times 10^{10}$

In addition to the extrapolated AIS dataset that does not account for seasonal or any other variations in traffic, some of the vessel records in this dataset had reported speeds that were not representative of a typical cruising speed in the area where the DWP is to be located. Therefore, an average vessel speed was estimated for each of the vessel types using the AIS records where a typical cruising speed was reported. The average vessel speed for each vessel type is shown in Table 3-4.

This vessel data has been applied in the breach size calculations in this Section 5, as well as the vessel collision frequency analysis in Section 6.

4.0 Hazard Identification (HAZID) Study

The HAZID was a comprehensive review of the applicant's proposed DWP operation, including operation of the Shuttle & Regasification Vessels (SRV) and offloading at the buoys. The purpose of the HAZID is to develop and review credible accidental and intentional events (scenarios) that could potentially impact the public, and that will be analyzed throughout the IRA process. The list of accidental and intentional scenarios considered in this IRA is detailed in Section 5.

The HAZID workshop was conducted on August 1 - 2, 2007, at the U.S. Coast Guard Sector, St. Petersburg, Prevention Office in Tampa, FL. The meeting was facilitated by AcuTech, and the HAZID team included representatives from USCG Sector, USCG CG-5225, Sandia National Laboratories, and representatives from Port of Tampa area stakeholders groups and agencies listed in Table 4-1.

The first day of the HAZID workshop included the applicant's overview presentation of the proposed Port Dolphin project to the HAZID team, allowing for questions to familiarize the group with the DWP project. This presentation from Port Dolphin LLC included an overall project familiarization including the re-gasification and transfer process, ship traffic data, meteorological conditions, and information on the SRVs. Following the presentation, the applicant was excused and the HAZID team utilized the remaining time to evaluate the potential events for the DWP operation.

4.1 HAZID Process

The HAZID process was intended to identify the worst credible accidental and intentional scenarios for the Port Dolphin DWP project that could lead to impacts on the public. Therefore, the emphasis of the HAZID was on the identification of events that could lead to a release of LNG and potentially impact populations including those onshore, and on private or commercial ships (those not associated with the project) in the vicinity.

Credible scenarios as defined in the HAZID process do not necessarily represent scenarios that are high risk – credible scenarios are the possible intentional and accidental scenarios identified through a multidisciplinary team evaluation of the project. The scenarios are identified regardless of likelihood for bounding or establishing the worst credible consequences of concern.

As a minimum baseline, the following scenarios were discussed and evaluated to determine their suitability for further analysis:

- Marine collision and/or allision that results in penetration of LNG cargo containment
- Major accidental LNG spills or cargo piping ruptures
- Spills in confined space
- Major cascading events leading to compromise of LNG cargo containment

The IRA focused solely on the specific maximum potential impacts to the public associated with offshore storage and regasification of LNG at the proposed DWP; therefore, processes beyond the Pipeline End Manifold (PLEM) and pipeline failures were not considered as part of the HAZID.

4.2 HAZID Scope

The Port Dolphin HAZID Workshop participants analyzed the following operational segments:

- SRV in Transit to DWP
- DWP
    - Mooring System
    - One and Two SRVs at DWP
- Transfer System
- Re-gasification Skids on SRV
- STL Buoy System
    - Flexible Riser to PLEM
    - PLEM
    - PLEM to pipeline

4.3 Port Dolphin HAZID Workshop Attendees

Table 4-1: Accidental / Intentional Scenario Development Team

Agency	Representative
USCG Sector **USCG Security** **USCG Pollution**	Capt. Joseph Servidio CDR. Christopher Palmer LCDR. Marc Knowlton Mr. Warren Weedon Mr. Edmond Morris Mr. Rafael Tirona
USCG Deepwater Ports Standards Division (CG-5225)	Mr. Ray Martin LCDR. Brian E. Moore Mr. Pavagada Vasanth
US Maritime Administration	Mr. Christopher Hanan
Sandia National Laboratories	Mr. Mike Hightower Ms. Anay Luketa-Hanlin
Cooperative Vessel Traffic Service	Mr. Mitchell Harvey
Florida Department of Law Enforcement	Mr. Mark Dubina
JTTF (FBI)	Mr. Tom Rowan
Florida Department of Environmental Protection	Capt. Jeff Tobergte
Tampa Police Dept/UASI Infrastructure Protection	Mr. Doug Pasley
Florida Fish and Wildlife Commission	Mr. Roger Young Capt. Leandro Isambert
Agency on Bay Management	Ms. Suzanne Cooper
Industry/Port security	Mr. Tony Austin
Manatee Port Authority	Mr. David St. Pierre
Local Emergency Planning Committee	Mr. Bill Lofgren
AcuTech	Mr. David Moore Mr. Steve Fruchtman
Exponent	Dr. Flippo Gavelli
Hoegh, LNG - Applicant Project Familiarization Presentation	
Capt. Knut Bentzrod Mr. Tony Armstrong Mr. German Castro	

5.0 Scenario Development

Following the HAZID, the identified scenarios were further reviewed and a subset was selected for further development in the risk assessment. A copy of the HAZID results was submitted to the USCG, but is not appended here as it contains information pertaining to intentional acts, which has a homeland security concern. While the full set of details from the HAZID is not presented, the key findings have been carried through this section.

A subset, as opposed to a full range of accidental and intentional scenarios, was analyzed in this risk assessment since the purpose of this analysis is to identify the results of the bounding credible worst-case release scenarios. The process that the USCG requires for the evaluation of a LNG DWP project application is comprised of two phases: Phase I, which is the IRA, evaluates the worst credible accidental and intentional scenarios; Phase II evaluates the full range of all possible releases to develop the safety and security strategy for the security and operations manuals. This section discusses all of the scenarios identified during the HAZID process and presents information and analysis used to screen-out cases which were deemed not to be the bounding cases.

In addition to discussing the method that was used to select the final accidental and intentional release scenarios, this section also details the resulting consequences that were modeled (i.e., breach sizes). For the release scenarios included in the risk assessment, this is defined as an expected breach size in the inner hull of a SRV, a release from process equipment, or any other locations or scenario where LNG could be potentially released.

Section 7 details the analysis of the consequences and the resulting thermal radiation hazard distances and flammable vapor cloud dispersion results from the intentional and accidental scenarios.

5.1 Accidental Scenario Development

The HAZID identified eleven potential accidental release scenarios that have the potential to result in a release of LNG. These accidental scenarios included:

- Scenario 1 – Vessel Collision / Allision
- Scenario 2 - Shipboard Mechanical System Failure
- Scenario 3 - Fire
- Scenario 4 - LNG Release at Process Equipment
- Scenario 5 - Severe Weather
- Scenario 6 -Structural Failure of LNG SRV
- Scenario 7 - Grounding
- Scenario 8 - Natural Phenomena
- Scenario 9 -Mooring System Failure

- Scenario 10 - Dropped Objects
- Scenario 11 - Aviation Accident

The accidental scenarios were discussed and reviewed with the HAZID participants and evaluated based on scenario significance. Based on that review, Scenario 1 – Vessel Collision / Allision was identified as the scenario with the greatest potential of significant LNG release.

5.1.1 Marine Release

During the past 45 years, there have been approximately 100,000 LNG carrier voyages,[19] covering more than 235 million miles.[20] There is no report of any accident involving a LNG carrier underway that has resulted in an unintentional release of LNG cargo. This covers export locations (e.g., Alaska, Algeria, Trinidad, Indonesia) and various import locations (e.g., Boston, Lake Charles, Savannah, and several locations in Japan and Korea). Many of these locations are in ports and environments more busy and complex than that of the proposed Port Dolphin DWP and present greater potential for collisions, allisions, and groundings than this location. It would be inaccurate to state that there have been no marine mishaps involving LNG carriers. Over the life of the industry, sixteen cargo transfer incidents worldwide have resulted in limited LNG spills with some damage, but no cargo fires have occurred.[21] In addition to these cargo transfer incidents, there have been collisions, groundings, loss of vessel propulsion, cargo tank leaks, vent riser fires, insulation fires, and other miscellaneous incidents involving LNG carriers, but none of these incidents have resulted in a release of LNG to the environment.

The maritime scenarios identified in the HAZID include collision/allision, mechanical failure, groundings, and other accidental and intentional acts. Even though historically there are no reported marine accidents that have resulted in a breach of containment, the vessel speeds and sizes that traverse the open waters and the vessel safety fairway near the Port Dolphin DWP location have the potential to significantly damage an SRV, if a collision were to occur.

The expected breach size on the inner hull of an SRV from a vessel collision scenario is presented in Section 5.3. Marine collision is also presented in Section 6 as part of the collision analysis to determine the frequency of a vessel collision with the SRV that could result in a breach of containment and loss of LNG to the environment.

The buoys for the Port Dolphin DWP project are located more than 28 miles away from any landmass or shallow water, reducing the chance of a grounding event. Therefore, the

[19] A "voyage" is defined as both the loaded and unloaded LNG carrier movement between the loading port and discharge port.
[20] Data compiled from SIGGTO 1976-2000 and International Group of Liquefied Natural Gas Importers, *The LNG Industry* (Clichy, France: International Group of Liquefied Natural Gas Importers, 2002-2006).
[21] USCG DWP Standards Division maintains LNG accident/incident data. This data will be included as an Appendix to the DEIS/FEIS.

grounding of an SRV in transit to and from the buoy has not been evaluated as a bounding scenario and screened-out for further consideration.

5.1.2 Process Release

In addition to the release of LNG associated with a possible collision/allision, several other types of scenarios are possible with the LNG carriers associated with the Port Dolphin project. Since an SRV has significant top-side processing equipment for the re-gasification of LNG and the distribution of natural gas to the subsea pipeline, there is a potential for process-related releases. These scenarios involve equipment failures, human errors, or external events (weather-related events are addressed separately) that can result in a release of LNG or natural gas leading to fires, explosions, or other serious shipboard events. Similar consequences could also be initiated intentionally via onboard sabotage.

The Applicant proposes that all project elements will integrate safety systems and equipment during all phases of the project. These systems and equipment include: hazard detection, emergency shutdown, spill containment, fire protection, flooding control, crew escape and safety shelters, and all other safe guarding systems as may be required by federal and international regulations and standards.

The Applicant states that the integrity of the re-gasification equipment, LNG storage, STL buoys, and pipeline systems will be assured through a formal and documented set of operational procedures, inspections, personnel training, as well as a quality assurance audit and maintenance program. All vessels, pumps, storage tanks, instruments, piping and environmental control equipment are to be inspected and maintained to high standards which will be specified in the final design of the Port Dolphin systems and equipment. All maintenance operations will be performed under strict guidelines designed to minimize risk of releases and to ensure the safety of people and systems.

In addition to the inherent designs and high standards for operational practice, the public, contractors, Port Dolphin personnel, the SRVs and the DWP offshore and onshore systems will be protected by comprehensive emergency shutdown systems. Emergency shutdown comprises multiple levels of action from an individual piece of equipment, to shutdown of a system or multiple systems in an area, to an overall facility or project shutdown. The Applicant states that these shutdown systems will be high-integrity, proven technology, and will be redundant systems that can initiate a range of shutdown actions depending upon the cause and nature of the event(s) that produced the emergency condition.

The applicant further states that the safe transfer of natural gas from the SRV will be ensured by a series of sensors that provide feedback to the operator panel and that can automatically shutdown gas transfer. Additionally, there are a series of emergency shutdown valves that will also interrupt gas transfer in the event of an unsafe condition along with emergency buoy disconnect procedures for interrupting gas flow as well.

These systems and associated procedures are summarized below and comprise the principal means for dealing with the unsafe discharge of natural gas.

There are three shutdown levels governing the transfer of natural gas from the SRV to the STL Buoy:

- Automatic Shutdown (ASD)
- Emergency Shutdown (ESD)
- Emergency Buoy Disconnect (EBD)

The safety related equipment and functions associated with these shutdown levels are described as follows.

Emergency Shutdown (ESD)

ESD is controlled by automatic or manually activated systems:

- Automatic shutdown through the fire and gas detection or other systems on the SRV requiring a total shutdown of gas export
- Manual shutdown through ESD buttons positioned at strategic locations

Automatic or manual operation activates closed all of the three ESD valves (ESDV) which are located:

- ESDV1 – ESD valve mounted on main deck upstream of the STL Buoy system
- ESDV2 -- ESD valve mounted in the STL Buoy
- ESDV3 – ESD valve mounted subsea in the PLEM

The ESD valves are operated by spring return, hydraulically powered actuators with a fail-safe spring return to the closed position. The hydraulic power for operation of the valves is supplied from the STL valve control system. The signal for indicating the open or closed position of the valves will be sent to the vessel control system.

Emergency Buoy Disconnect (EBD)

EBD can only be activated manually through the EBD button located on the STL operator panel on the SRVs navigation bridge. EBD involves a shutdown of the gas export operation followed by an automatic disconnection of the STL Buoy. The EBD is initiated through push-button activation in two steps. Step one disconnects the STL gas transfer system while step two releases the STL Buoy. Total time required for the vessel to complete an emergency STL buoy disconnect operation is estimated to be approximately 15 minutes.

Regulatory Vessel Design Requirements[22]

The SRVs are designed to be built to comply with the following rules, regulations, and requirements:

- Maritime regulations of the registered country
- International Convention for the Safety of Life at Sea (SOLAS), 1974 with Protocol of 1978, and the amendments up to 2003
- International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code)
- International Convention on Load Lines, 1966 with the Protocol of 1988
- International Convention for Preventing Collisions at Sea, 1972 including amendments of 1981, 1987, 1989 and 1993
- International Tele-Communications Union (ITU) Radio Regulations, 1982
- International Convention for the Prevention of Pollution from Ships (MARPOL), 1973 (Annexes I, IV, V and VI (Regulation 12,13, 14 and 16)) with Protocol of 1978 and up to the latest amendments
- MEPC 53/24/Add.2 Proposed Amendments to the Revised MARPOL Annex I
- (Addition of new regulation 13A on oil fuel tank protection) International Convention on Tonnage Measurement of Ships, 1969
- International Labour Conference concerning Crew Accommodation On Board Ship, Convention No. 92 and 133 (except swimming pool)
- ILO Codes of Practice, Safety and Health in Dock Work
- International Electro-Technical Commission (IEC) Publication No. 60092 and International Electro-Technical Commission (IEC) Publication No. 60533 "Electrical and Electronic Installations in Ships-Electromagnetic Compatibility"
- Suez Canal Navigation Regulations and Tonnage Measurement of Ships
- International Convention on Standards of Training, Certification and Watchkeeping (STCW), 1993 and later amendments
- IMO Resolution A.468 (XII) "Code on Noise Levels On Board Ships", 1981
- IMO Resolution MSC137 (76) "Standards for Ship Maneuverability"
- IMO Resolution A.330 (IX) "Amendment to the Recommendation on Safe Access to and Working in Large Tanks to Include Large Water Ballast Tanks"
- IMO Resolution A601(15) Provision and Display of Maneuvering Information On Board Ships
- IMO Publication No. 978 - Performance Standard for Navigational Equipment
- U.S. Coast Guard's Regulations for Foreign Flag Vessels Operating in Navigable Waters of the United States (except Alaskan waters, without Certificate or Inspection)
- 33 CFR Part 155: Oil Pollution Prevention Regulations for Vessels
- 33 CFR Part 156: Oil and Hazardous Material Transfer Operations
- 33 CFR Part 159: Marine Sanitation Devices
- 33 CFR Part 164: Navigation Safety Regulation

[22] Port Dolphin DWP Application – Volume II, Section 11, Pgs 8-10

In addition, the SRVs may be subject to the following recommendations and guidelines, as applicable:

- ISO 6954-2000: "Mechanical Vibration - Guideline for the Measurement, Reporting and Evaluation of Vibration with Regard to Habitability on Passenger and merchant ships"
- ISO 8309-1991: Refrigeration Light Hydrocarbon Fluids. Measurements of Liquid Levels in Tanks Containing Liquefied Gases Electric Capacitance Gauges
- U.S. Department of Labor Safety and Health Regulations for Longshoring
- Oil Companies International Marine Forum (OCIMF) “Recommendations on
- Equipment for the Towing of Disabled Tankers,” 1981
- OCIMF “Mooring Equipment Guidelines,” 1997
- OCIMF “Ship to Ship Transfer Guide (Liquefied Gases),” 1995
- OCIMF “Recommendations for Manifolds for Refrigerated Liquefied Natural Gas Carriers (LNG),” 1994
- Society of International Gas Tanker and Terminal Operators (SIGTTO) “Recommendations and Guidelines for Linked Ship/Shore Emergency Shutdown of Liquefied Gas Cargo Transfer,” 1997
- SIGTTO “Recommendations for the Installation of Cargo Strainers on LNG Carriers,” 1992
- International Chamber of Shipping (ICS) Guide to Helicopter / Ship Operations
- International Electro-Technical Commission (IEC) Publication 92
- ISO 4406: Hydraulic System Flushing
- VDI 2056 Criteria for Assessment of Mechanical Vibrations in Machines
- IMO Resolution A343(ix) Recommendation on Method of Measuring Noise Levels at Listening Posts
- ISO 8501-1, 1988 (Preparation of Steel Substrates before Application of Paints etc)

The Applicant will be required to comply with applicable codes and standards for the SRV safety systems and equipment onboard the vessel. These systems and equipment include: detection, emergency shutdown, spill containment, fire protection, flooding control, crew escape and safety shelters, and all other such equipment as required by applicable federal and international regulations and standards.

Like all LNG carriers, the SRVs (membrane and Moss design) will be double-hulled, with the interspaces continuously monitored for leaks. The ships will have cargo surveillance and electronic guidance equipment to ensure the integrity of the LNG cargo.

The SRVs will be designed and built under the survey of a selected Recognized Classification Society’s (RCS) Rules and IMO Regulations in force at the date of the design contract signing, with the objective of obtaining an IMO Certificate of Fitness.

SRVs are designed to carry cryogenic gases and follow stringent International Maritime Organization (IMO) regulations that govern their construction and operation. IMO is an independent organization that provides specific rules for the construction standards for LNG carriers, including safety equipment, marine pollution prevention, operational procedures, and crew training. The IMO conventions, codes, and resolutions that Port Dolphin will follow address the minimum acceptable requirements for such a vessel according to International and U.S. Regulations.

International Labor Organization (ILO)

- ILO Conventions Concerning Crew Accommodation on Board Ships (No. 92&133)

IMO – Conventions

- IMO 110E, International Convention for Safety of Life at sea, 1974 with protocol of 1978/1988 and current amendments (SOLAS)
- IMO 701E, International Convention on Load Lines, 1966 and protocol of 1988 and amendments up to and including the 2003 amendments and later amendments (ICLL)
- IMO 714E, International Convention on Tonnage Measurement of Ships, 1969 as amended by IMO Resolution A.493 and A.494 (XII)
- IMO 904E, Convention on the International Regulations for Prevention of Collisions at Sea (COLREGS) 1972 and later amendments, including IMO Resolution A.464 (XII)

IMO – Codes

- IMO 104E, "International Code For The Construction And Equipment Of Ships Carrying Liquefied Gases In Bulk", International Maritime Organization, 1993 Edition and Supplemental from 1994 and 1996 (IGC Code)
- IMO 116E, "International Ship and Port Facility Safety Code," International Maritime Organization, 2003 Edition (ISPS Code)
- IMO 117E (A), "International Safety Management Code & Revised Guidelines on Implementation of the ISM Code," International Maritime Organization, 2002 Edition (ISM Code)
- IMO 155E, "Fire Safety Systems (FSS) Code," International Maritime Organization, 2001 Edition
- IMO 520E, International Code for Safe Management of Ships and for Pollution from Ships, 1973 (Annex I, IV, V and VI), as modified by the Protocol of 1978 relating thereto and later amendments (MARPOL 73/78)
- IMO 978E, Performance Standards for Navigational Equipment (1997)
- IMO 982E (C), "Life-Saving Appliances," International Maritime Organization, 2002 Edition International Telecommunications Union Radio Regulations 2001 and SOLAS Chapter IV, as amended International Convention on Tonnage Measurement of Ships 1969 as amended by IMO Resolutions and later amendments

IMO – Resolutions

- IMO Resolution A272/A330 "Safe Access to and Working in Large Cargo Tanks and Ballast Spaces"
- IMO Resolution A.343 (IX) "Recommendation on Methods of Measuring Noise Levels at Listening Posts"
- IMO Resolution A.468 (XII) "Code on Noise Levels Onboard Ships"
- IMO Resolution A601 (15) "Provision and Display of Maneuvering Information Onboard Ships"
- IMO Resolution A.686 (17) "Code on Alarms and Indicators"
- IMO Resolution A.708 (17) "Navigation Bridge Visibility and Functions"
- IMO Resolution A719 (17) "Prevention of Air Pollution on Ships"
- IMO Resolution A751 (18) "Interim Standards for Ship Maneuverability"

Compliance with these regulations minimizes the likelihood of an accidental LNG release at the proposed DWP project. Additionally, these safety features would also mitigate any release, regardless of cause. The safety features of the SRV for this project are summarized below:

- **Double-Hull Construction**. The IMO/IGC requires LNG carriers to be constructed with an outer and inner hull to provide protection against collisions or groundings and resultant cargo loss. These hulls would be separated from each other by structural members and separated from the cargo by the membrane system. Thus, a collision, grounding, or other impact would need to penetrate up to four layers to result in cargo spillage.

- **Separation of Cargo Holds and Piping Systems**. The IGC requires the structural separation of cargo holds from other spaces as well as separation of cargo piping from other piping systems. This helps keep cargo leaks away from potential ignition sources and keeps cargo from inadvertently being pumped through the wrong pipes.

- **Accessibility for Inspection Access**. The IGC requires that a tank be constructed so that at least one side is visible and accessible to inspectors. This allows proper periodic inspection of the tank for integrity and signs of corrosion or stress.

- **Leak Detectors in Hold Spaces**. The IGC requires that gas detectors and low temperature sensors be placed in a cargo hold in order to detect cargo leakage. An alarm sounds if either is detected and appropriate precautions and mitigation repairs can be made.

- **Tank Requirements for Cargo Containment**. The IGC requires that a tank be constructed with materials that can withstand the temperatures involved so as to properly contain the cargo and have adequate relief valve systems to avoid over pressurization.

- **Structural Analysis**. The IGC requires structural analysis of the cargo containment system and specifies individual tank stress limitations.

- **Secondary Containment and Thermal Management**. The IGC requires partial secondary containment to contain leaks and prevent contact of cryogenic liquid with the inner hull. This prevents thermal stress. In addition, insulation in conjunction with a primary and backup heating system must be installed that would keep the cargo from exceeding the thermal limitations of the material selected for the inner hull if the leak prevention system should fail.

- **Tank Construction and Testing Requirements**. The IGC addresses standards for workmanship, quality, and testing of tanks under construction. Before cargo is pumped aboard, each tank on the LNG carriers would have had its welds nondestructively tested and a pressure test would have been performed to ensure integrity.

- **Isolation, Construction and Testing Requirements for Piping and Pressure Vessels**. The IGC specifies piping thickness, leak testing, pressure testing, isolation requirements, welding requirements, and many other aspects of pressure vessel and piping design and construction. This ensures the integrity of these systems before any cargo is brought aboard.

- **Emergency Shutdown Valves and Shutdown Systems**. The IGC requires remote-control shutdown systems for shutting down cargo and vapor transfer in an emergency. This system must have the ability to be activated from at least two locations on board the LNG carrier and would also be automatically activated in the event of a cargo fire.

- **Pressure Venting Systems**. The IGC specifies that appropriate venting of the cargo be installed to keep the cargo under the design pressure of the tank and keep relief valves from needing to operate

- **Vacuum Protection Systems**. The IGC requires the installation of relief valves that would prevent under-pressurization of cargo tanks in the event that cargo was pumped out without adequately providing for vapor return. The LNG carrier would have sufficient vapor return capacity to keep the pressures at appropriate levels; however, this system would prevent under-pressurization if this system should fail to be actuated or fail to work properly.

- **Fire Protection Systems**. The IGC requires that LNG carriers have a saltwater fire-main system for fighting fires throughout the ship and fixed dry chemical and carbon dioxide systems for cargo areas and compressor rooms, respectively.

- **Water-spray System.** The IGC requires that ships carrying flammable or toxic products or both install a water-spray system for cooling, fire prevention and crew protection to cover exposed cargo tank domes and any exposed parts of cargo

tanks; exposed on-deck storage vessels for flammable or toxic products; cargo liquid and vapor discharge and loading manifolds and other areas where control valves are situated; boundaries of superstructures and deckhouses that are normally manned, and other high fire risk items and cargo control rooms.

- **Cargo Tank Instrumentation**. The IGC requires that each cargo tank be outfitted with an integrated instrumentation/alarm system that notifies the crew of possible leaks via gas detection and temperature sensors and tank liquid levels, temperatures, and pressures. These systems, as well as the pressure relief systems mentioned above, provide a many-layered protection against cargo release either through equipment malfunction or human error.

- **Additional Gas Detection Systems**. The IGC requires gas detection systems and alarms in spaces where cargo is located, including compressor spaces, spaces where fuel gas is located, and other spaces likely to contain gasified cargo. Venting systems for certain spaces and portable gas detectors are also required.

- **Automatic Safety Shutdown Systems**. The IGC requires that cargo loading areas and docks be equipped with LNG vapor and fire detection systems that automatically shut down the transfer systems in the event of a leak or fire. Personnel on the loading dock or the LNG carrier can also manually operate these shutdowns.

The technical requirements for vessels to carry LNG in U.S. waters are set forth in 46 CFR 154. The requirements delineated in 46 CFR 154 are similar, but not identical, to those of the IMO IGC Code for new built LNG carriers.

In addition to carrying a valid IMO Certificate of Fitness, and complying with the specific U.S. requirements for LNG carriers, foreign-registered LNG carriers operating in U.S. waters must also comply with the following U.S. regulations:

- Pollution prevention regulations (33 CFR Parts 151, 155-157 and 159)
- Navigation safety regulations (33 CFR Part 164)
- Repair regulations (46 CFR Part 35.01-1)

Foreign registered tank vessels must further comply with:

- Cargo venting and handling system requirements (46 CFR Part 35.30 and 35.35)
- Inert gas systems (46 CFR Part 32.53)
- Fire fighting foam systems (46 CFR Part 34-05-5(a)(2))
- Vapor control systems (46 CFR Part 39)

The process-related scenarios identified in the HAZID have not been further analyzed in this study. These scenarios were determined to have smaller potential release sizes (potential breach size, inventory available for release, and duration of release) and a lower potential to escalate (due to the safety and emergency shutdown systems) as compared to other accidental

and intentional scenarios for which a detailed examination of the consequences has been performed. The lower likelihood for catastrophic accidental events is based on the codes, regulations, requirements, and additional spill controls to which Port Dolphin has committed for the LNG carriers, the safety record of the LNG industry (both onshore and transportation), and the associated safety features onboard an SRV. Therefore, while process releases are credible scenarios, they do not represent the bounding consequence for the range of accidental scenarios identified in the HAZID and have not been included in the IRA as a worst case consequence.

5.1.3 Weather-Related Release

Scenario 5 from the HAZID included severe weather at any point along the SRV transit and at the DWP. Due to the relatively predictable and mild climate in and around the Port of Tampa, combined with the robust ship and equipment design, procedures to predict adverse weather conditions, and the ability to disconnect from the buoy should severe weather develop suddenly during transfer operations,[23] significant damage to an SRV or the DWP due to severe weather is considered unlikely.

5.1.3.1 Weather of Tampa Bay Area

The weather in the Tampa Bay area is relatively predictable and mild. The prevailing winds in the region come from the east. Wind speed is less than 15.0 knots (7.74 meters/second [m/s]) approximately 80 percent of the year. The 100-year meteorological conditions include a significant wave height of 8.8 meters and a surface current of 1.7 m/sec. Table 5-1 details the metocean data at the Port Dolphin buoy locations. The Applicant states that the 100-year storm conditions are the maximum permissible operating limits for connecting to the buoy, for safe discharge of natural gas, and for safe disconnection from the STL Buoy.[24]

Table 5-1: Metocean Data for the Port Dolphin DWP

Parameter	Units	Value
100 Year Significant Wave Height	m	8.8
100 Year Wind Speed (one hour; 10 m elevation)	m/sec	38.1
100 Year Surface Current	cm/sec	173
Surface Seawater Temperature (min)	ºC	16.1
Surface Seawater Temperature (max)	ºC	32.5
Air Temperature (min)	ºC	7.4
Air Temperature (max)	ºC	32.6

[23] Port Dolphin Application, Vol. III, Sec. 9 (Draft Operations Manual)(Confidential).
[24] Port Dolphin Application, Vol. III, Sec. 11 (Metocean Data)(Confidential).

5.1.3.2 Hurricanes

It is noteworthy that Florida is among the wettest states in the U.S., with the Tampa area receiving an average annual rainfall of 48 inches. The rainy season runs from May or early June through October or November. In addition, the Tampa area can be affected by tropical systems such as depressions, storms, and hurricanes. Tropical systems affecting Florida develop in the Gulf of Mexico, the Caribbean Sea, or the Southern Atlantic Ocean. A hurricane begins as a tropical depression, an organized system of clouds and thunderstorms with a defined surface circulation and maximum sustained winds of less than 38 miles per hour. If conditions are favorable for development, the depression progresses into a tropical storm and finally, a hurricane.

A tropical storm becomes a hurricane when winds reach 74 miles per hour. The official hurricane season for the Atlantic Basin is from June 1 to November 30, with the weeks centered on mid-September having the highest frequency of storm occurrence. Based on hindcast data reported by the Applicant, there were 302 storms that attained tropical storm strength during the time period January 1, 1990 to January 1, 2000. The maximum permissible sea state for safe discharge of gas from the SRV is the 100-year extra-tropical storm (100-year non-hurricane condition), as detailed in the operating limits (Section 5.1.3.4). The Applicant states that through weather forecasts and observation of actual conditions, the initiation of disconnect procedures will occur well prior to reaching the operating limits, with the intent of allowing sufficient time for the SRV to avoid weather.[25]

5.1.3.3 Seismic Activity[26]

Florida is considered an area of low earthquake hazards. Only a few confirmable earthquakes, none of which were damaging, have been documented. Between 1780 and 1996, over 30 reports of earthquakes were documented. The Florida Platform is a seismically stable area, which shows only a handful of earthquakes that occurred during the period from 1990 to 2001. Of the reported events, most can be attributed to non-seismic phenomena or to events that occurred outside the state. Although the west coast of Florida is not a seismically active area, earthquakes and tremors have occurred there. There is a relatively low probability of earthquakes in the central West Florida Shelf. Faults associated with either gravity slumping or seismic activity can affect pipelines, but these types of shallow faults are not common within near-shore areas of the central West Florida Shelf.

5.1.3.4 Port Dolphin Operation Limits

The Port Dolphin project must plan the optimal routing for bad weather avoidance for the SRV delivering cargo to the DWP and the optimal weather conditions at the DWP for the unloading, vaporizing, and send out operations which may be dependent on relative humidity and temperature. Final project designs will take into account these considerations coupled with detailed metocean data and will be incorporated into the acceptance criteria in the operating manuals for both.

[25] Port Dolphin Application, Vol. III, Section 9-Draft Operations Manual (Confidential).
[26] Port Dolphin Application, Vol. II, Section 7 (Public).

The design of the STL buoy compartment and buoy mooring systems allows the SRV to connect in conditions of significant wave height of up to 11.5 ft (3.5 m), wind speed (1 hr mean) of 29.0 knots (15 m/s) and current speed of 3.0 knots (1.5 m/s) The STL and offloading system and SRV will be designed with the ability to operate in 100-year return environmental conditions where the significant wave height will be up to 20.3 ft (6.2 m), wind of 38.9 knots (20.0 m/s) and current of 3.0 knots (1.5 m/s).

If any of the identified limits are, or are expected to be exceeded, connection to the buoy will not be commenced or an SRV on the buoy may stop regasification and disconnect from the buoy and leave the area. The SRV Master will also continuously evaluate the conditions even when lower than the stated limits, and may impose stricter limits. The direction of final approach (last 3 nautical miles) to the unloading buoy will depend primarily on wind and current direction. Speed limits will be in force during operation of the SRVs.

Based on the meteorological data and the design specifications of the SRV and DWP equipment, it is unlikely that severe weather would cause a significant adverse consequence leading to a release of LNG or a public impact. Therefore, the severe weather scenario is not addressed in the risk analysis, as recommended by the HAZID team.

5.1.4 Aircraft Collision Release

Scenario 11 from the HAZID considered a large commercial jet, a smaller private jet, or a helicopter colliding with the SRV at any point in transit or at the DWP. Since the likelihood of such an accident with an aircraft not associated with the Port Dolphin project is remote, these types of aircraft scenarios have been screened out for further consideration.

5.2 Intentional Release Scenarios

As part of the HAZID, a thorough review of potential intentional attack scenarios against the SRV and DWP were developed. These included scenarios required by the USCG to be considered for development of a security vulnerability assessment and facility security plan under the Maritime Transportation Security Act (MTSA) such as standoff attack, ramming, hijacking, and other methods. Describing the weapons, tactics, and potential consequences in detail is not suitable for a public document; therefore, this combination of information is excluded from this report.

Since the probability of intentional attacks cannot be accurately determined based on historical data, the frequency of occurrence of these acts was not calculated. Therefore, the selection of intentional scenarios for analysis was based solely on events that were deemed to be credible and that bound the potential consequences of an LNG release.

For transparency in this IRA, the consequences of intentional releases are estimated to understand the potential impacts to public health and safety. Therefore, working directly with Sandia and the USCG, release scenarios have been defined for this risk assessment

without associating the weapons or tactics. The intentional acts were evaluated in cooperation with Sandia and the most significant of the credible threats identified were analyzed. The likelihood of these events will vary depending on the success of the multiple countermeasures required by the international and federal regulations, as well as the operational security plans developed by the USCG and Port Dolphin.

5.2.1 Intentional Scenario Breach Sizes

In preparing SAND2008-3153, Sandia met with intelligence agencies and other federal agencies to discuss potential threats against maritime shipping based on the possible capabilities and past actions of politically active groups. From these external and internal discussions with Sandia explosives and threat experts, a set of site-specific threat scenarios was developed to consider against the proposed Port Dolphin operations. As discussed previously, the threat scenarios developed are documented in a separate classified report.

Using this set of credible threat scenarios, Sandia performed a series of scoping calculations to estimate the possible breach sizes for a standard membrane-type LNG carrier for this range of threat scenarios. These calculations were conducted using shock physics-based computer models that can calculate the impact of an explosion or an attack with an explosive weapon on a structure, such as a LNG carrier. In SAND2008-3153, Sandia suggested that for the larger 215,000 – 265,000 m^3 LNG carriers where there might be less surveillance or control in an offshore environment, the breach sizes for a range of credible intentional events might vary from 5-12 m^2, with an expected nominal intentional breach size of 12 m^2. Additionally, given that the potential for multiple threats and possible escalating damage to additional tanks from fires or from cryogenic damage from the spilled LNG, Sandia suggested that as many as three LNG tanks may be compromised from a single intentional event.

While these results provide an understanding of the possible range of breach sizes from potential intentional threats, the guidance in SAND2008-3153 suggests that the threat, breach, spill, and hazard analyses should be conducted on a site-specific basis. Therefore, Sandia worked with AcuTech and the USCG to conduct a threat assessment and breach evaluation for specific, credible intentional threat scenarios for the Port Dolphin DWP project. Sandia considered site-specific factors such as ship size and design, LNG volumes, port location, vessel operations, and traffic control and vessel protection to estimate the credible threats and the associated range of possible breach sizes to consider for fire and vapor dispersion hazard distance calculations.

Based on the assessment of these factors for the Port Dolphin DWP location, a range of credible breach sizes was developed for what was considered to be credible threats for this DWP location. While the methodology and breach size results for specific threats are classified, the maximum breach size results estimated for the SRV for this project are summarized below.

While the SRVs are moored at the Port Dolphin DWP, there is less traffic control, surveillance, and escorts, but the vessels are more difficult to access due to their distance offshore. Taking this into consideration, Sandia recommended the intentional breach sizes

for membrane SRVs detailed in Table 5-2 and for Moss-style SRVs detailed in Table 5-3 be used in calculating LNG spill rates, spill volumes, and associated spill hazards for this project: Since there could be two SRVs at the Port Dolphin DWP to provide an uninterrupted flow of natural gas to the pipeline, the impacts of a breach of containment of one SRV on a SRV at the other buoy location was considered. Also considered was the possibility of a simultaneous attack against two SRVs while at the DWP.

Insulation proposed for the SRVs could potentially degrade in a fire. While the degradation will be most pronounced at the top of the cargo tanks where there is less shielding of the insulation, the potential of fire damage to additional cargo tanks and cascading spills should be considered. This scenario is represented by Scenarios 3 and 7 and addresses the insulation degradation cascading damage issues. Since the basis for these scenarios is a sustained fire degrading the insulation, immediate ignition is assumed for an intentional act that results in the breach of up to three cargo tanks. Therefore, the consequences for Scenario 3 and Scenario 7 are limited to thermal radiation from a resulting pool fire, and the distance to LFL is not evaluated. Specifically, there is no flammable vapor dispersion hazard since the release of LNG is assumed to burn immediately following release.

Table 5-2: Intentional Scenario Summary

Scenario	Description	Event Type
Membrane-Type Carrier - 217,000m^3		
1	One - 16m^2 hole (single cargo tank release)	Intentional
2	Two - 12m^2 holes (two cargo tank release)	Intentional
3	Three - 12m^2 holes (three cargo tank release)	Intentional (Cascading Damage)
Moss-Type Carrier – 215,000 m^3		
5	One - 16m^2 hole (single cargo tank release)	Intentional
6	Two - 12m^2 holes (two cargo tank release)	Intentional
7	Three - 12m^2 holes (three cargo tank release)	Intentional (Cascading Damage)

5.3 Vessel Collision Scenario Breach Sizes

The severity of a breach from a LNGC following a collision with another vessel depends on the location of impact, vessel design, relative vessel speeds, collision alignment, and mitigation or prevention systems in place to limit the potential damage. For the Port Dolphin DWP, the applicant is proposing both membrane- and Moss-type carriers. Therefore, both SRV design options have been examined in this section of the IRA to determine the breach size that will be applied in the consequence analysis for the vessel collision scenario. The

calculations for a membrane-type LNGC are presented in Section 5.3.1, Section 5.3.2 presents the moss-type LNGC calculations.

As detailed in this section, a collision with a membrane-type SRV will result in a 17 m^2 breach in the inner hull, and the Moss-type SRV results in a 22 m^2 breach. Section 7.7 provides an analysis of tank size, type, and breach area on the LNG hazards from an SRV. From this analysis, the bounding hazard distances from a vessel collision with the SRV are from the Moss-type LNGC, therefore the Moss-type SRV with a 22 m^2 breach has been evaluated as part of the consequence analysis and presented in the results of the IRA.

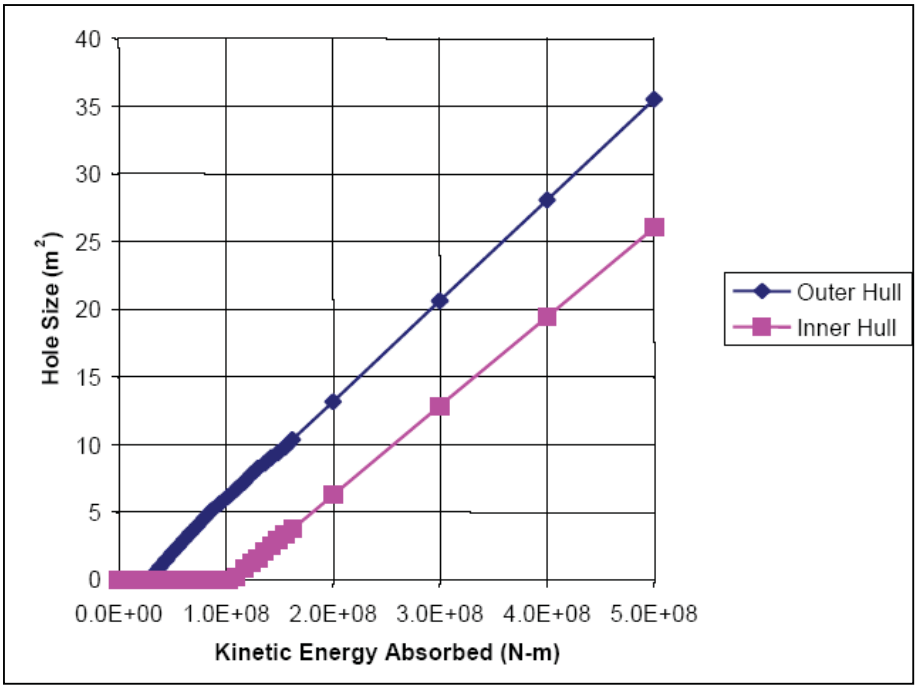
5.3.1 Calculations for Determining Breach Size for a Membrane-Style Cargo Tank

Published work is not available that relates damage to LNGCs (in the form of an inner hull breach size) to striking vessel type, speed, and energy. SAND2004-6258 includes finite element modeling of collisions for a series of double hulled oil tankers, similar in overall size, mass, and design to a membrane-type LNGC.[27] The results of this analysis are a set of curves to estimate the breach size on the outer and inner hull of a membrane-type LNG carrier as a function of the energy of the collision. This relationship, replicated from the Sandia Report, is shown in Figure 5-1.

While membrane-type LNG carriers and crude oil tankers differ, the nature of the double hull vessels are closer in design and response than traditional single hull tankers, where most of the empirical collision data has been obtained. Therefore, the recommendations in SAND2004-6258 were used to assess the expected inner hull breach size for a membrane-type LNGC following a collision with a passing vessel.

[27] SAND2004-6258 Appendix B

Figure 5-1: Double Hull Tanker Hole Size vs. Kinetic Energy (SAND2004-6258)

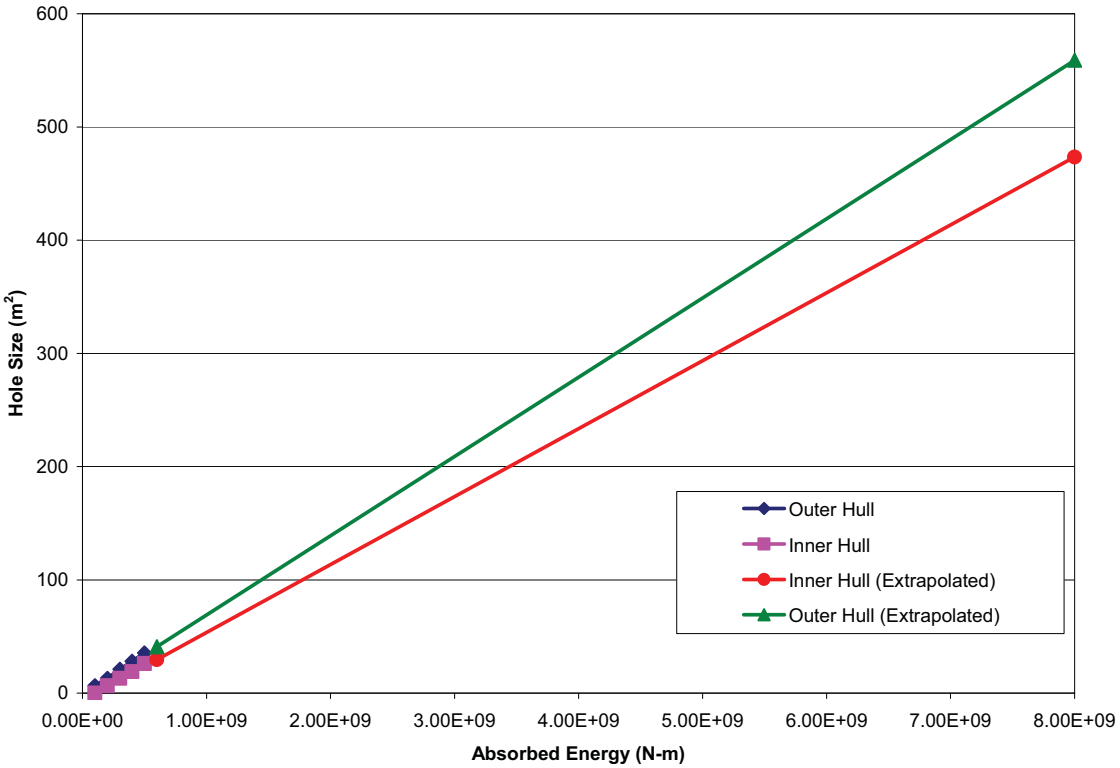


The methodology for calculating the size of an inner hull breach in a membrane-type LNGC (from a vessel-to-vessel collision) was developed with input from the USCG and Sandia, and includes the following steps:

- Calculate the kinetic energy of the vessels with the potential to collide with the LNG carriers for this project. The range of potential vessels is based on the AIS data from the USCG R&D Center, and the kinetic energy is calculated for each striking vessel based on the specific displacement and speed of each vessel.
- Calculate the absorbed energy of the SRV based on the kinetic energy of the striking vessel.
- Calculate the final breach size that will be applied in the vessel collision consequence modeling.

Based on discussions with Sandia and the USCG, it was determined that the empirical equations used for ship collisions can be represented as a linear relationship between breach size and absorbed energy. The curves presented in Figure 5-2 were extrapolated by AcuTech (from the data in SAND2004-6258) to determine the breach sizes for collisions with a membrane-type SRV.

Figure 5-2: Extrapolated Breach Size vs. Absorbed Energy Curve



(Membrane-type LNGC)

AIS data was collected for the area surrounding the proposed DWP project. From the AIS data analysis, there are three vessel types of sufficient size (displacement) and speed that have the potential to breach the outer and inner hull of a SRV in a collision. These vessel types include:

- Passenger
- Cargo
- Tanker

The following is the approach applied for determining the kinetic energy of the striking vessel and the absorbed energy of the SRV. These calculations were reviewed with USCG and Sandia as part of the IRA.

- M = mass of striking vessel
    - Displacement and speed from USCG R&D Center AIS data
        - Displacement = 1.026x C_b×Length(m) ×Breadth(m) ×Draft(m)
            - C_b = Block coefficient. The following were applied:
                - 0.85 for tankers

  - 0.68 for passenger vessels
  - 0.61 for cargo vessels
  - 0.75 for all other vessel types
- m = mass of struck vessel
  - Port Dolphin membrane-style SRV displacement:
    - Length = 315 meters
    - Breadth = 50 meters
    - Draft = 12 meters
    - Laden displacement (estimated) = 143,500 tonnes

- D = ratio of entrained water moving with the striking vessel (values of 0.05-0.1 are typically used)
  - The mass of the water that is moving along with the striking ship, either by being pushed in front of the vessel or by being dragged along due to friction over the length of the hull. The upper end of the range, specifically a value of 0.1, has been applied in these calculations.
- d = ratio of added mass for water resistance (0.4 is frequently used)
  - The resistive mass that acts on the struck vessel. Minorsky[28] recommended 0.4 times the mass of the struck vessel, and that ratio has been widely used.
- V = initial velocity of striking vessel (meters per second)
  - Assume struck vessel is initially at rest
- U = final velocity of both ships (meters per second)
  - Perfectly plastic collision
- E1 = initial kinetic energy (N-m)
  - $E1=0.5*(M+DM)*V^2$
- E2 = final kinetic energy
- H1 = initial momentum
  - $H1=(M+DM)*V$
- H2 = final momentum
  - $H2=(M+DM+m+dm)*U$

- Conservation of momentum gives H1=H2 which results in:
- $U=[(M+DM)/(M+DM+m+dm)]*V$
- $E2=0.5*(M+DM+m+dm)*U^2$
- $=0.5*(M+DM+m+dm)*[(M+DM)/(M+DM+m+dm)]^2*V^2$
- $=[(M+DM)/(M+DM+m+dm)]*E1$

- Absorbed energy = E1-E2
- $\{1-[(M+DM)/(M+DM+m+dm)]\}*E1$

[28] V.V. Minorsky, "An Analysis of Ship Collisions with Reference to Protection of Nuclear Power Plants", Journal of Ship Research, Vol. 3, No. 1 (1959), pp. 1-4.

In these calculations, only the three vessel types (passenger, cargo, and tanker), and only those vessels within this subset with the appropriate combination of displacement and speed have been included in the estimation of the resultant collision breach size of a membrane-type SRV. Therefore, any vessels from the AIS dataset passing the DWP location with an absorbed energy of less than 1.0×10^8 N-m are not included, as these would not result in a calculated inner hull breach[29]. This minimum absorbed energy for inner hull damage is illustrated in Figure 5-1.

Table 5-3: Estimated Vessel Collision Parameters (Membrane SRV)

Parameter	Vessel Type		
	Passenger	**Cargo**	**Tanker**
Number of Vessels (per year)	51	798	368
Maximum Absorbed Energy (N-m)	2.76×10^9	5.79×10^9	6.13×10^9
90th Percentile Absorbed Energy (N-m)	2.46×10^9	2.89×10^9	2.91×10^9
Extrapolated Hole (m^2)	141	167	168
Breach Size (m^2)	14.1	16.7	16.8

Table 5-3 details the vessel collision parameters for vessels surrounding the DWP and shows that a collision with a cargo vessel or tanker results in a breach size of 17 m^2, the largest breach size for a collision with a membrane-type SRV. The calculated breach size is based on the following:

- 90th percentile absorbed energy: While the maximum absorbed energy can be calculated, it is only representative of the worst-case or a single and specific vessel transiting near the DWP location. The 90th percentile absorbed energy is a more representative upper bound, eliminating outliers in the upper end of the AIS dataset.
- Extrapolated hole size: Table 5-1 shows that 90th percentile absorbed energy for a tanker collision with the membrane-style SRV is 2.91×10^9 N-m. This value along with the data in Figure 5-2 is used to determine the extrapolated hole size of 168 m^2.
- Breach size: The work of Ammerman[30] has been used to support reducing the predicted extrapolated breach size resulting from an accidental collision with LNGCs[31]. Ammerman's work was originally commissioned to provide a comparative analysis of oil outflow from breached cargo tanks among double hull crude oil carriers. The hypothesis that Ammerman's work supports is that the

[29] It is possible that there may be two SRVs at the Port Dolphin DWP simultaneously to ensure constant natural gas supply. These LNG vessels do not have sufficient kinetic energy at their approach speed within the safety zone to result in an inner hull breach if a collision between two LNG project vessels were to occur. Therefore, the SRVs have been screened out from further consideration in these calculations.
[30] Ammerman, D.,"Marine Safety Systems, Control Ballast Tanker Interactive CD," SAND2002-3188P, (Albuquerque, NM: Sandia National Laboratories, 2002).
[31] SAND2004-6258.

striking ship remains lodged in the structure of the damaged vessel thus reducing the outflow of cargo. This reduction in extrapolated breach size (a value of 90%) was informally derived from a survey of worldwide tanker collision events. A reduction of the breach size by 90% plugging of the breach by the striking vessel was applied in this analysis to derive the final breach size of 16.8 m^2 for consequence modeling. This approach is consistent with Ammerman's double-hull tanker study.

Based on this analysis, the consequences of a vessel collision with a membrane-type SRV (Scenario 4) will be a 17 m^2 hole in the inner hull of a single cargo tank.

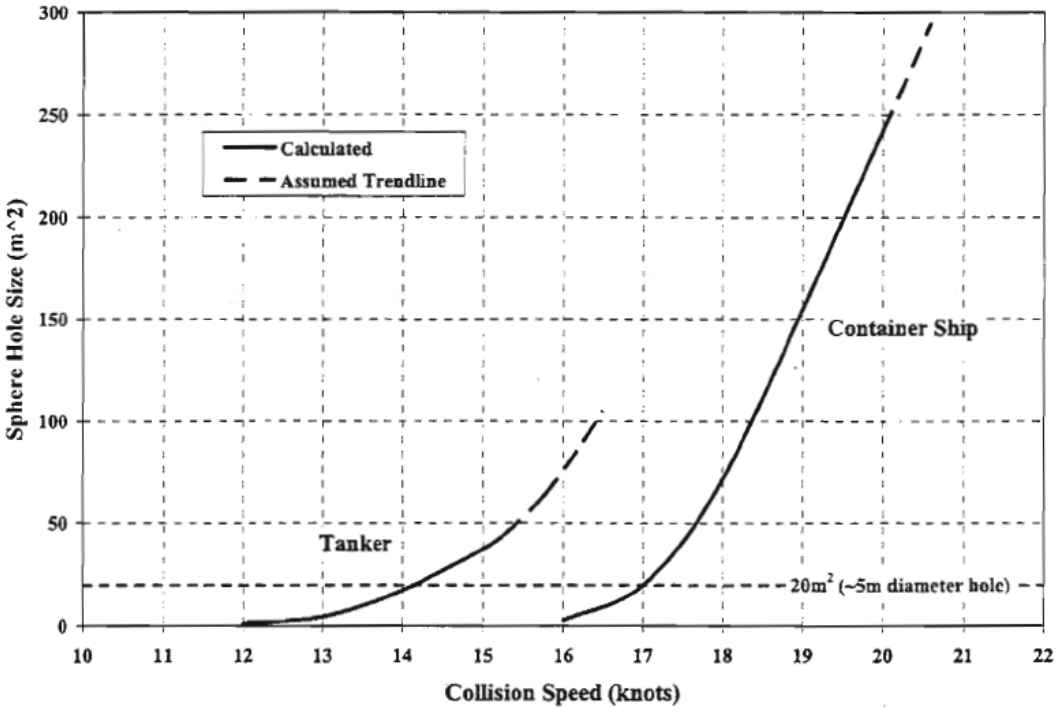
5.3.2 Calculations for Determining Breach Size for a Moss-Style Cargo Tank

The Port Dolphin project may use SRVs of similar size but with different cargo tank configurations. Section 5.3.1 details the calculation for developing an inner hull breach size for a SRV with membrane-type cargo tanks. This section presents the technical basis and calculations for the collision breach size for a Moss-type SRV for the Port Dolphin project.

In the absence of published, peer-reviewed work regarding the effects of collisions with double-hulled LNG carriers with Moss-type cargo tanks, calculations to determine the breach size for a Moss-type SRV are based on the work completed for the Cabrillo DWP IRA. The Cabrillo Port IRA included structural finite element method (FEM) analysis that was used to generate a set of hole size versus collision speed curves for a 190,000 tonnes Moss-type Floating Storage and Regasification Unit (FSRU). These curves are illustrated in Figure 5-3. As shown, the Cabrillo Port analysis considered two vessel types:

- Container Ship
- Oil Tanker

Figure 5-3: FSRU Sphere Hole Size vs. Collision Speed (Cabrillo Port) (Moss-type LNGC)



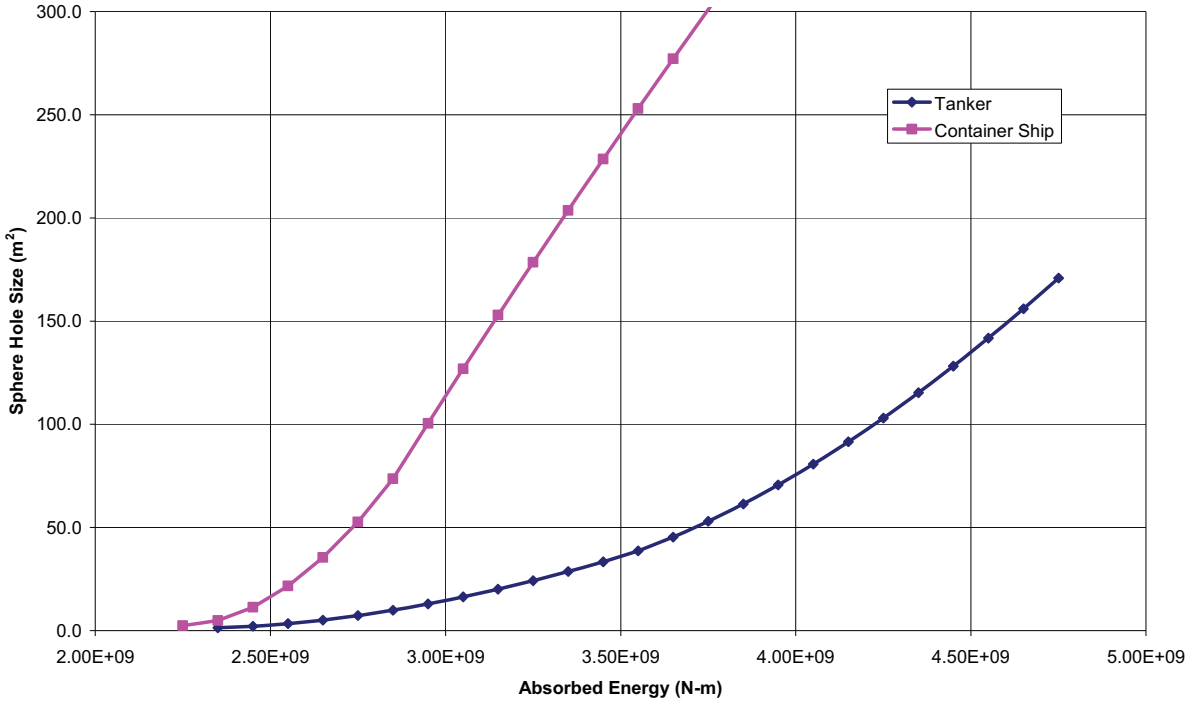
While the FEM analysis developed for Cabrillo Port provides a detailed analysis of the response of a Moss spherical tank in a collision, the limitation is that the curves developed are for only two specific ship sizes, one container ship and one tanker. Therefore, the direct application of the Cabrillo Port curves for the proposed Port Dolphin DWP does not enable the use of site specific data that has been collected and developed for the IRA. Specifically, this data includes the SRV displacement and the range of vessel type, size, and speed near the proposed DWP location.

Since the FRSU evaluated in Cabrillo Port and the Moss-type SRV proposed for Port Dolphin are different sizes, and the non-project vessels passing near these DWPs have different sizes and speeds, the curves developed for Cabrillo Port are further evolved in this IRA so that the estimated breach size of the inner hull of a Moss-type LNGC is based on the absorbed energy of the collision. Additionally, even though the Moss-type LNGCs from Cabrillo Port and Port Dolphin are of the larger (greater than 200,000 m^3) class, the displacements are different. This results in different absorbed energies in a collision with similar sized vessels. Therefore, what has been developed as part of the Port Dolphin IRA is a new set of hole size versus absorbed energy curves for Moss-type LNGCs. These curves, shown in Figure 5-4 are:

- Based on the FEM analysis of Moss-type LNG carriers from Cabrillo Port.
- Take into account the need for site specifc data on vessel type, size, and speed surrounging the DWP .

- Take into account the need or additional project specific information of the size of the LNGC, and the resuling absorbed energy of collision.

Figure 5-4: Moss-type LNGC Hole Size vs. Absorbed Energy



The methodology for calculating the size of an inner hull breach in a Moss-type LNGC (from a vessel-to-vessel collision) at the Port Dolphin DWP was developed for tankers and container ships using the data in Figure 5-4 and the AIS data provided by the USCG R&D Center for this proposed location. The final calculated breach size for Moss-type LNGCs includes:

1. Calculate the impact kinetic energy of the vessels surrounding the proposed DWP location. The range of potential vessels is based on the AIS data from the USCG R&D Center, and the kinetic energy is calculated for each vessel based on the specific displacement, vessel type, and speed.
2. Calculate the absorbed energy of the Moss LNGC based on the kinetic energy of the striking vessel. Displacement of the Moss LNGC provided by Port Dolphin is 152,000 tonnes.
3. Calculate the final breach size that will be applied in the vessel collision consequence modeling using Figure 5-4 (hole size vs. absorbed energy) and the assumption of 90% plugging.

In these calculations, only those vessels with the appropriate combination of displacement and speed to result in an inner hull breach of the Moss-type LNGC have

been included in the estimation of the resultant collision breach size. Therefore, any vessels from the AIS dataset passing the DWP location with an absorbed energy of less than 2.25×10^9 N-m are not included, as these would not result in a calculated inner hull breach. This minimum absorbed energy for inner hull damage is illustrated in Figure 5-4. Table 5-4 details the vessel collision parameters for vessels surrounding the Port Dolphin DWP and shows that a container ship collision with the Moss-style SRV results in an estimated breach size of 22 m^2. This is the maximum hole size created by either a tanker or container ship with the Moss-type LNGC.

Table 5-4:Vessel Summary Surrounding Port Dolphin DWP

Parameter	Vessel Type	
	Tanker	Container
Number of Vessels (per year)	216	216
Maximum Absorbed Energy (N-m)	5.79×10^9	6.13×10^9
90th Percentile Absorbed Energy (N-m)	3.21×10^9	3.39×10^9
Extrapolated Hole (m^2)	27	216
Breach Size (m^2)	2.7	21.6

The calculated breach size is based on the following:

- 90th percentile energy: While the maximum absorbed energy can be calculated, it is only representative of the worst-case, or a single and specific vessel transiting near the DWP location. The 90th percentile absorbed energy is a more representative upper bound, eliminating outliers in the upper end of the AIS dataset.
- Extrapolated hole size: Table 5-4 illustrates that 90th percentile absorbed energy for a container ship collision with the Moss-type SRV is 3.39×10^9 N-m. This absorbed energy along with the data in Figure 5-4 is used to determine the extrapolated hole size of 216 m^2 for the Moss-style SRV.
- Breach size: The work of Ammerman[32] has been used to support reducing the predicted extrapolated hole size resulting from a collision with a LNGC[33]. Ammerman's work was originally commissioned to provide a comparative analysis of oil outflow from breached cargo tanks among double hull crude oil carriers. The hypothesis that Ammerman's work supports is that the striking ship remains lodged in the structure of the damaged vessel thus reducing the outflow of cargo. This reduction in extrapolated hole size (a value of 90%) was informally derived from a survey of worldwide tanker collision events. A reduction of the breach size by 90% to account for the plugging by the striking vessel was applied in this analysis to derive the final breach size of 22 m^2 for consequence modeling. This approach is consistent with Ammerman's double-hull tanker study.

[32] Ammerman, D., "Marine Safety Systems, Control Ballast Tanker Interactive CD," SAND2002-3188P, Sandia National Laboratories, Albuquerque, NM, 2002.
[33] SAND2004-6258.

Based on this analysis, the consequences of a vessel collision with a Moss-type SRV (Scenario 4) will be a 22 m^2 hole in the inner hull of a single cargo tank.

6.0 Vessel Collision Frequency Analysis

This section focuses on the frequency of collisions between ships and between ships and a fixed object. A ship striking a fixed object is formally referred to as an allision. Although SRVs moored at the DWP buoys can weathervane with the wind and current, they are not underway while unloading at a DWP. Nevertheless, for the purposes of this analysis, a ship striking a moored SRV will be referred to as a collision.

A powered collision for the Port Dolphin project may involve:

- Collisions between an SRV and ships transiting near the proposed DWP (typical maritime traffic off the coast of Tampa) and under way.

A drifting collision may involve any of the following:

- Collisions between an SRV and ships transiting near the proposed DWP (typical maritime traffic off the coast of Tampa) that loses steerage.

Passing vessel collisions for the Port Dolphin project can be divided into two categories. The first category is for vessels transiting in defined routes, represented by vessels that use the Port of Tampa Vessel Safety Fairway. The second category is for randomly distributed vessels near the DWP.

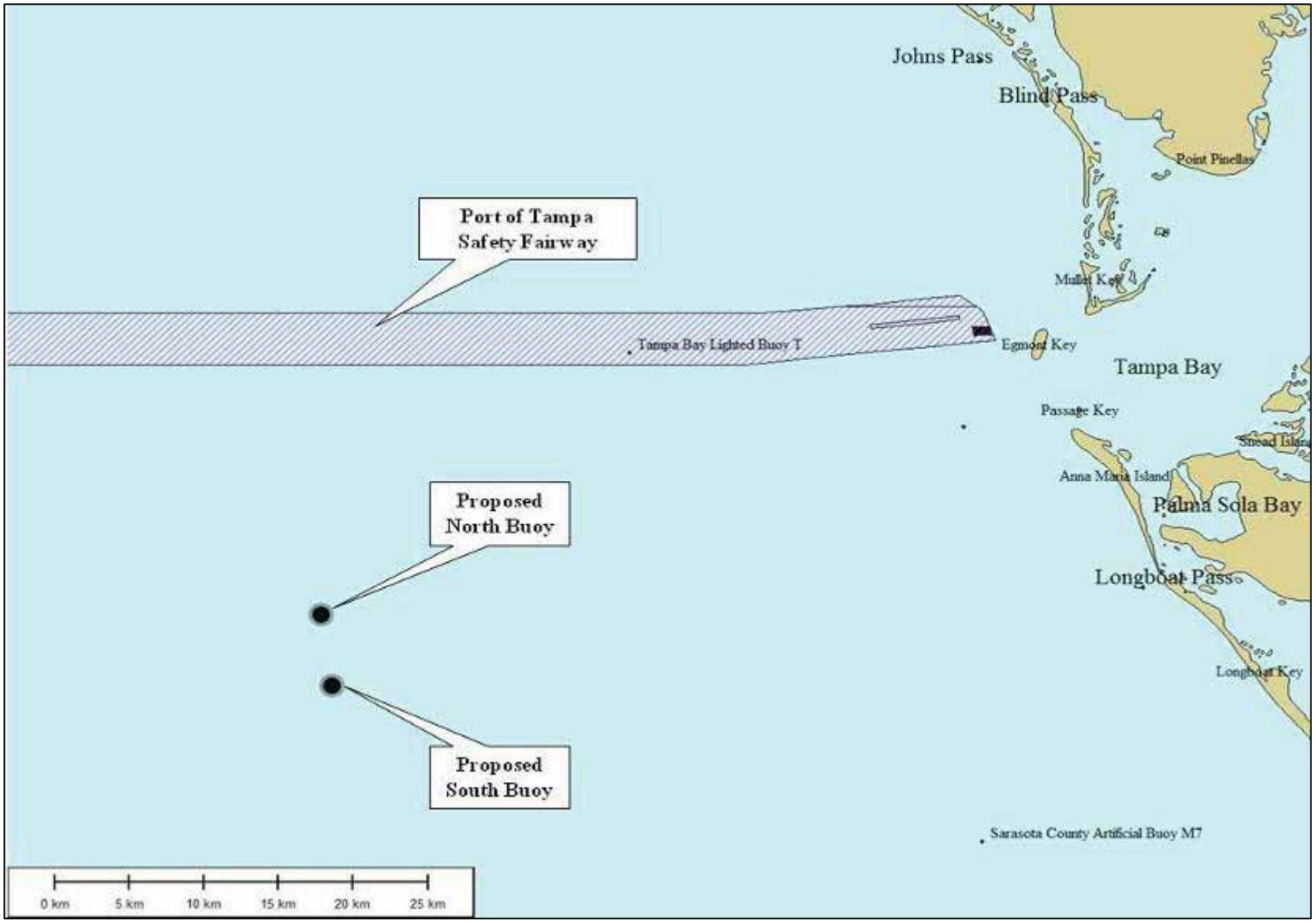
As discussed in Section 5, both drifting collisions and groundings were screened-out for further analysis by the HAZID team due to the distance of the DWP from the safety fairway. The North Buoy is 11 miles (9.55 nm) from the safety fairway and the South Buoy is 14.1 miles (12.3 nm) from the safety fairway. Additionally, the DWP is located 28.1 miles (24.3 nm) from shore making an accidental grounding scenario very unlikely. Even though these scenarios were screened out qualitatively in the HAZID, this section presents the collision frequency analysis methodology and applies the site-specific maritime characteristics to confirm or deny the remote likelihood of a vessel collision at this DWP location for ships in the safety fairway.

The AIS dataset for this project indicates that there are vessels that pass the proposed DWP location, but do not use a defined route (a formal or informal shipping or transit lane). Additionally, the data indicates that some of these vessels do have sufficient displacement and speed to result in an inner hull breach of the SRV in a collision. Therefore, the frequency of these vessels colliding with an SRV at the DWP has been evaluated as part of this analysis.

6.1 Vessel Traffic - Port of Tampa Safety Fairway

Automatic Identification System (AIS) data was obtained for this analysis from the USCG R&D Center. The use of the vessel safety fairway by the majority of the large vessels in the area was confirmed by a review of this limited AIS data. This vessel safety fairway is presented in Figure 6-1: Port Dolphin Buoy Locations and Safety Fairway.

Figure 6-1: Port Dolphin Buoy Locations and Safety Fairway



Section 5 presents the SRV inner hull damage calculations for vessel collisions. As detailed in this section, only vessels with the combination of displacement and speed that can result in an absorbed collision energy with the SRV of 1.0×10^8 N-m or greater have the potential to breach the inner hull of the SRV. This level of absorbed energy is the minimum required to breach the hull of a membrane-style SRV. As discussed in Section 5.3, the minimum absorbed energy to breach the inner hull of the Moss-style SRV is higher, 3.0×10^9 N-m. Since there are two different SRV-types that could be used for the Port Dolphin project, the minimum absorbed energy, consistent with the membrane SRV, is used in the collision analysis. Therefore, to be conservative, only vessels that can result in an absorbed collision energy greater than or equal to 1.0×10^8 N-m have been included in the analysis. The remaining vessels[34] are assumed to be incapable of causing an inner hull breach of the SRV, and a collision with these vessels is assumed not to result in a release of LNG.

The AIS data that was collected for the Port Dolphin project area included not only all vessel traffic, but also data to identify vessels with sufficient displacement, speed, and kinetic energy to breach the inner hull of a SRV. Using this data and the traffic located in the vessel safety fairway, there are 316 annual vessel movements in the safety fairway to the north of the Port Dolphin DWP. All of these 316 vessel movements have the potential to breach the inner hull of the SRV at cruising speed.

6.1.1 Powered Collisions

The frequency of powered collisions is given as follows. This model was developed by DNV and has been used for ship collision analyses for DWP application IRAs over the past four years.[35] .

$$F_{power} = N \times P_{coll} \times P_2 \times P_3$$

Where:
F_{power} = Frequency of powered collision, per year
N = Number of transits in safety fairway or other route, per year
P_{coll} = Probability of collision
P_2 = Probability of steering system failure when on collision course = 2.0×10^{-4}
P_3 = Probability of failure to recover from collision course given a warning from moored SRV = 0.67

The selection of the probability distribution function (P_{coll}) depends on the route followed by the vessels transiting past the SRV. Because the safety fairway is located 11 miles from the North buoy, the vessels in the safety fairway can be represented as a skewed normal distribution between the fairway and the DWP.

[34] In the future, it is possible that there may be up to two SRVs at the Port Dolphin DWP simultaneously to ensure constant natural gas supply. These LNG vessels do not have sufficient absorbed energy at their approach speed within the safety zone to result in an inner hull breach if a collision between two LNG project vessels were to occur. Therefore, the SRVs have been screened out from further consideration in these calculations.

[35] Det Norske Veritas (DNV), *Concept Safety Assessment of LNG Floating, Storage & Re-gasification Unit (FSRU)*. Final Report, March 14, 2003, Project No. 230-11749.

There are many skewed continuous distribution functions that can be used to model the vessel routes. After reviewing these, the Rayleigh distribution function was selected for its simplicity. It is defined with only one parameter, namely the mode, *b*. For application to vessels in the safety fairway, a value of *b* of 0.5 nm was selected, and is consistent with an assumption that vessels could deviate up to one-half mile to pass other vessels, or that the vessels may drift within the safety fairway since it is not a defined traffic separation scheme (TSS).

The Rayleigh probability density function is P(r):

$$P(r) = \frac{r}{b^2} \exp\left[-0.5 \left(\frac{r}{b} \right)^2 \right]$$

The cumulative distribution function is D(r):

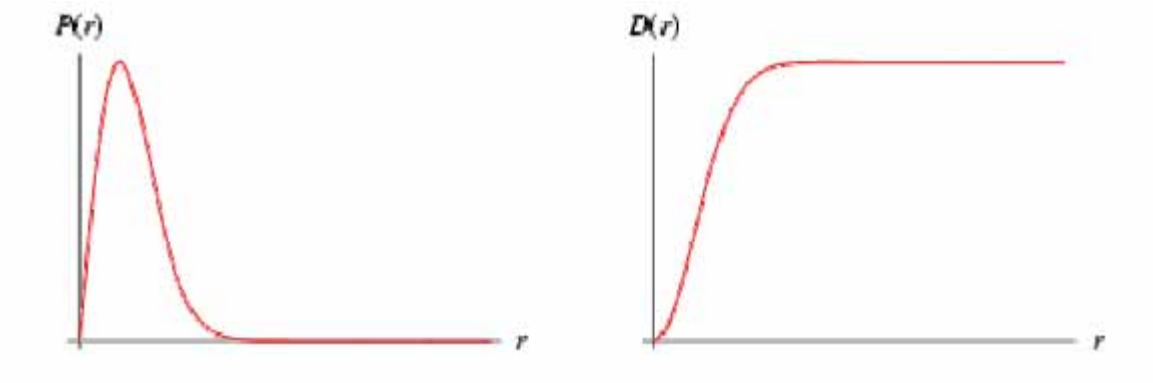
$$D(r) = 1 - \exp\left[-0.5 \left(\frac{r}{b} \right)^2 \right]$$

Where:

- D(r) = Cumulative distribution function
- r = Distance from the DWP buoys to marine traffic track or lane (when measuring distances to the safety fairway, the southern edge of the fairway was used)
- b = Mode value of distribution = 0.5 nm

The form of the Rayleigh distribution function is shown in Figure 6-2.

Figure 6-2: Rayleigh Probability Density and Cumulative Distribution Functions



To determine the probability that a SRV will be within the distance defined by the mode of the distribution (i.e., 0.5 nm), the value of D(r) must be calculated for two distances: the distance from the moored SRV to the safety fairway or track plus half the length of the SRV, and the distance from the moored SRV to the safety fairway or track minus half the length of the SRV. Therefore, the two distances are:

$r_1 = r + 0.5(\text{length of SRV})$

$r_2 = r - 0.5(\text{length of SRV})$

The length of the SRV is 315 m (same for both membrane and Moss-style SRVs). Once $D(r_1)$ and $D(r_2)$ are determined, the probability of collision is the difference between these two values:

$P_{coll} = D(r_1) – D(r_2)$

Table 6-1 shows a summary of the P_{coll} calculations for the DWP location with respect to the Port of Tampa Safety Fairway. As shown, due to the distance of the safety fairway from the DWP, the calculated frequency of a powered collision from this group of vessels is zero, Table 6-2. This resultant frequency of zero is a direct result of the 11 mile separation between the safety fairway and the DWP.

Table 6-1: Summary of Calculated P_{coll} Values[36]

DESCRIPTION OF DWP BUOY & TRAFFIC LOCATION	DISTANCE FROM DWP BUOY TO SAFETY FAIRWAY/ROUTE, r (nm)	r_1 (nm)	r_2 (nm)	$D(r_1)$	$D(r_2)$	P_{COLL}
North Buoy to Fairway	9.55	9.635043	9.464957	1	1	0
South Buoy to Fairway	12.3	12.38504	12.21496	1	1	0

Table 6-2: Summary of Frequencies of Powered Collisions

DESCRIPTION OF DWP BUOY & TRAFFIC LOCATION	N	P_{COLL}	P_2	P_3	F_{POWER}
North Buoy to Fairway	316	0	2.00×10^{-4}	0.67	0
South Buoy to Fairway	316	0	2.00×10^{-4}	0.67	0

6.1.2 Drifting Collisions

Drifting collisions are possible at the proposed DWP location if a vessel in the safety fairway loses propulsion and the wind and current cause the damaged vessel to collide at low speed with a moored SRV. As with powered collisions, the only vessels of concern are those with the requisite mass at the assumed drifting speed that have enough kinetic energy to possibly breach the inner hull of a SRV. The drifting speed of a vessel is dependent on the vessel type/size and the wind speed.[37] As discussed in Section 7.4.6, the prevailing wind speed at the DWP is 10 m/s (19.4 kts). This wind speed translates into a Beaufort Wind Strength of 6[38], and for the larger passenger, cargo and tankers operating near the DWP, a drifting speed of 1.7 kts is applied for this analysis. Using the displacement data from the AIS and a speed of 1.7 kts, there are no vessels surrounding the Port Dolphin area of operation that have the potential to breach the inner hull of a SRV in a drifting collision. Specifically, there is no vessel of sufficient displacement drifting at a speed of 1.7 kts that would result in an absorbed energy of 1.0×10^8 N-m or greater. This includes another SRV related to the Port Dolphin Project which would approach the DWP at a speed of less than 3 kts.

Based on these results the frequency of a drifting collision between a vessel in the safety fairway and an SRV at the DWP is not considered.

[36] Based on the calculations performed for the Table 6-1 values, it is clear that for any value of r that is greater than 4.0 nm, the values of $D(r_1)$ and $D(r_2)$ become so small ($< 1 \text{ X } 10^{-12}$) that the value of P_{coll} approaches zero. Therefore, for any combination of vessels either in the vessel safety fairway or at a distance of more than 4.0 nm, the probability of collision is calculated as zero.

[37] Centre for Marine and Petroleum Technology (CMPT), "A Guide to Quantitative Risk Assessment for Offshore Installations," 1999.

[38] http://www.spc.noaa.gov/faq/tornado/beaufort.html

6.1.3 Randomly Distributed Vessels

The underlying technical basis for the collision frequency for randomly distributed vessels was published by DNV (2003).[39]

As discussed, the AIS dataset for this project shows vessel traffic near the proposed DWP with no defined routes. Additionally, there is a subset of these randomly distributed vessels that have sufficient displacement and cruising speed to result in an inner hull breach of the SRV in a collision.

In this analysis, the vessel traffic with a collision absorbed energy potential of 1.0×10^8 N-m or greater is defined in terms of a density (i.e., the number of vessels per square nautical mile). The collision frequency model for random vessel motion is outlined below.

$$F_{random} = N \times P_1 \times P_2 \times P_3$$

Where:
$N = \rho \times \pi \times R^2$ = the number of vessels within a circle with radius R
ρ = density of vessels (vessels/m^2)
$R = 365 \times 24 \times 3600 \times V$ = the distance traveled in one year
V = vessel speed (m/s)
$P_1 = D/(\pi \times R)$ = the mean geometric collision probability
D = collision diameter of the SRV (m)
P_2 = probability of loss of control onboard the ship
P_3 = probability of failure of warning or diverting a ship on collision course

For this calculation, the values for P_2 and P_3 are the same as for the powered vessel collision calculation, Section 6.1. Specifically:

- $P_2 = 2.0 \times 10^{-4}$
- $P_3 = 0.67$

From the AIS dataset, it can be assumed that vessels with sufficient displacement to breach the inner hull of the SRV could be passenger vessels, cargo vessels, or tankers. From Table 3-3 the minimum cruising speed for these vessel types, at this distance from shore, would be approximately 20 kts (10.3 m/s). In addition, the mean width (or beam) of these vessels, from the AIS dataset, is approximately 26 meters.

Evaluating the vessel traffic around the DWP, approximately 120 vessels (with the potential to breach the inner hull of the SRV in a collision) pass within an area of 5 nm radius of the project buoys in a given year. Based on this annual number of vessels, speed of the vessels, and the area around the DWP, the density of vessels around the DWP is estimated to be 0.004 in an area of 5 nm radius around the DWP, at any given time.

[39]DNV Project No. 230-11749, 2003.

Since these vessels can approach the DWP from any direction, the collision diameter (D) of the SRV is equal to the average apparent width of the SRV.

$$D = (\text{Length} + \text{Beam}) \times 2 / \pi$$

Given an SRV length of 315 meters and a beam of 56 meters, D is calculated to be 236.2 meters.

Using the collision frequency calculation above, and the listed assumptions, the collision frequency for vessels randomly passing the DWP is calculated to be 1.4×10^{-4} collisions per year (one collision that could result in an inner hull breach of the SRV every 7,143 years). It should be noted that this frequency does not take into account any safety and security zones and or ATBA that may be established as part of the DWP. In addition to collision detection and avoidance systems that may be placed on both the SRV and the potential colliding vessel, the actual likelihood of a vessel collision with an SRV at the DWP by a passing vessel would be expected to be much lower than calculated.

6.2 Final DWP Collision Frequencies

The final frequencies for collisions between various deep draft vessels transiting the Tampa Bay area and SRVs moored at the Port Dolphin DWP locations are shown below.

The total frequency of a collision with an SRV at the DWP was calculated for two vessel types: 1) vessels in the established Port of Tampa Vessel Safety Fairway; and 2) vessels randomly passing the DWP location. This calculation utilized vessel traffic from the AIS dataset for this project and only included those vessels with the potential to breach the inner hull of the SRV in a collision.

Due to the distance from the safety fairway to the DWP (11 miles to the North buoy) the likelihood of a powered collision between vessels in this defined route and the SRV was calculated to be zero. Additionally, due to the low drift speed (as well as the distance between the fairway and the DWP), no vessels from the fairway were found that had a drifting collision absorbed energy high enough to breach the inner hull of the SRV.

In addition to vessels in the defined fairway, vessels of sufficient displacement and speed were identified in the AIS dataset that passed near the DWP. Using the collision frequency calculation for randomly distributed vessels, a collision frequency of 1.4×10^{-4} collisions per year was calculated. This vessel collision frequency can also be presented as one collision that could result in an inner hull breach of the SRV every 7,100 years.

Therefore, the collision frequency for the proposed DWP considering both vessels in the safety fairway and randomly distributed around the DWP is shown in Table 6-3.

Table 6-3: Frequency of Vessel Collisions for Proposed DWP

LOCATION	FREQUENCY OF VESSEL COLLISION (PER YEAR BASIS)	FREQUENCY OF VESSEL COLLISION (YEARS PER COLLISION BASIS)
SRV at Port Dolphin DWP	1.4×10^{-4}	1 collision every 7,100 years

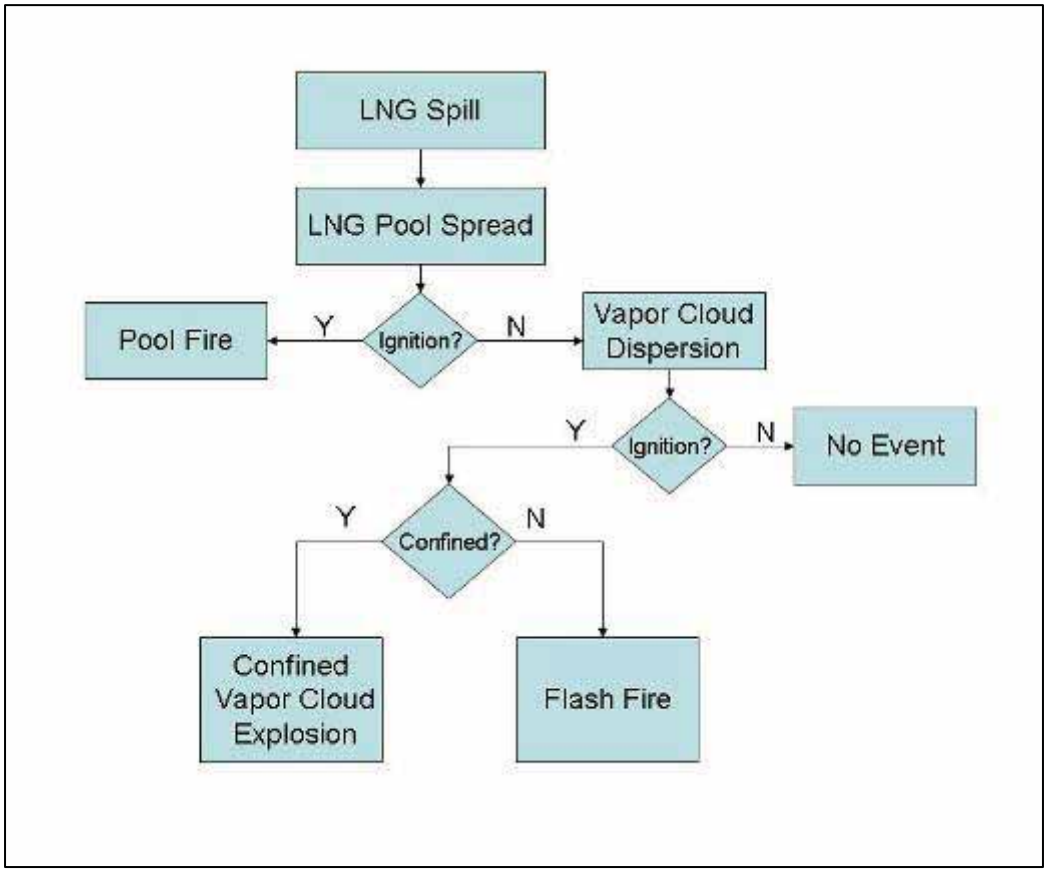
7.0 Consequence Analysis

This section includes a discussion of the modeling approach to the consequence analysis as well as a discussion of the modeling parameters and bounding conditions applied to the models.

7.1 Background

The scope of the consequence analysis for this IRA is to estimate the thermal radiation and flammable vapor dispersion hazards from the accidental and intentional release scenarios developed in Section 5. The impacts that are evaluated for these hazards are consistent with injuries to humans and damage to property. A large scale release is defined as any release of LNG in which the spilled LNG volume and flow rate are greater than those obtained from process systems failures (e.g., pipe or valve failures). Figure 7-1 shows the event tree following a large scale release of LNG over water.

Figure 7-1: Event Tree for a Large-scale LNG Release Over Water



Of the four potential consequences of an LNG release shown in the event tree (i.e., pool fire, flash fire, vapor cloud explosion and no event), the thermal radiation hazard zones from pool fires and the flammable vapor dispersion that defines the extent of a flash fire are specifically addressed in the IRA. These consequence types have the potential it impact the public surrounding the DWP. The reasons the other consequence types are not specifically addressed in a DWP IRA are:

- Vapor Cloud Explosion: The release of a flammable material may lead to a vapor cloud explosion if ignited. A vapor cloud explosion results from the rapid combustion of a fuel/air cloud with the flame speed approaching sonic velocity, thereby producing a blast wave. Turbulence is required for the acceleration of flame front to speeds required to produce the blast overpressure associated with an explosion. In the absence of turbulence, a flash fire will occur without any appreciable overpressure. Flame turbulence is typically formed by the interaction between the flame front and obstacles. For this DWP location, vapor cloud explosions are not considered likely, given the absence of other structures that could provide confinement of the flammable vapor cloud.
- Cryogenic: Defined as a "no event" in Figure 7-1, cryogenic contact hazards are limited to areas that can be reached by the LNG pool. Based on available pool size estimates,[40] cryogenic contact hazards are not expected to extend far enough from the proposed project to affect the public.
- Asphyxiation: Defined as a "no event" on Figure 7-1, a risk of asphyxiation from LNG vaporization may be present if the gas concentration is sufficiently high to reduce the oxygen concentration below tolerable levels. A literature review by Sandia[41] indicates minimal frequency of permanent injury to the general population for oxygen levels above 14%. As the vapor cloud disperses away from the LNG pool, the gas concentration decreases and so does the risk of asphyxiation. Since the public will not be allowed within the Safety Zone around the SRV, asphyxiation hazards to the public are not considered to be an issue in this study.

7.2 LNG Release Scenarios

As detailed in Section 5, a subset of the release scenarios based on the HAZID process, led by AcuTech, were selected for inclusion in the risk assessment. The identified scenarios represent the worst credible scenarios, or the bounding scenarios, for inclusion in the risk assessment. These scenarios lead to large scale releases of LNG from either a 217,000 m^3 membrane-style SRV or a 215,000 m^3 Moss-style SRV, either at berth or en route to the DWP, and include:

- Membrane SRV
    - Intentional attack leading to a 16 m^2 breach in a single tank
    - Intentional attack leading to a 12 m^2 breach in two (2) tanks
    - Intentional attack leading to a 12 m^2 breach in three (3) tanks
    - Collision/allision leading to a 17 m^2 breach in a single tank

[40] SAND2004-6258.
[41] Ibid., pg. 117.

- Moss SRV
    - Intentional attack leading to a 16 m^2 breach in a single tank
    - Intentional attack leading to a 12 m^2 breach in two (2) tanks
    - Intentional attack leading to a 12 m^2 breach in three (3) tanks
    - Collision/allision leading to a 22 m^2 breach in a single tank

The scope of the consequence modeling for the above scenarios includes the separate analysis of LNG pool fire and of flammable vapor cloud dispersion for each scenario. Scenarios 3 and 7 address the potential for insulation degradation and cascading damage issues. Since the basis for these scenarios is a sustained fire degrading the insulation, immediate ignition is assumed for an intentional act that results in the breach of three cargo tanks. Therefore, the consequences for Scenario 3 and Scenario 7 are limited to thermal radiation from a resulting pool fire and the distance to LFL is not evaluated.

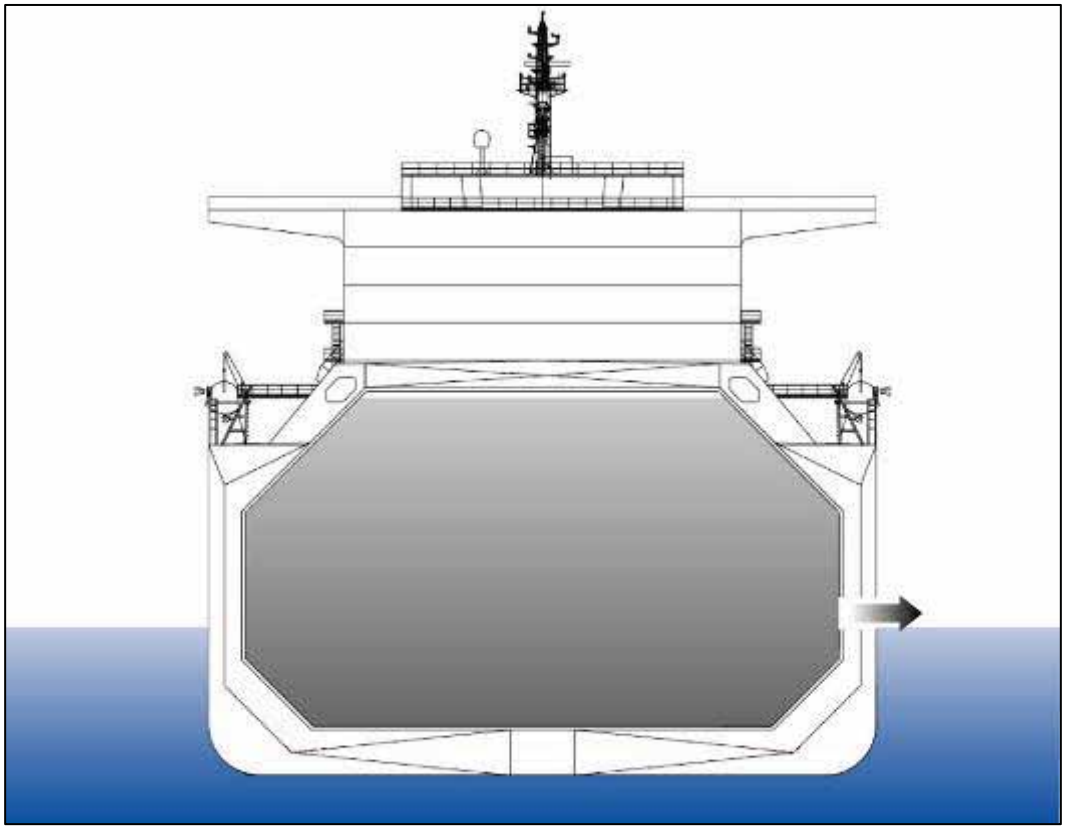
The outcome of the consequence assessment for each of these scenarios will be affected by the choice of the modeling tools as well as of the numerical values used for the various parameters, such as ambient conditions, that affect the modeling results. This section discusses some of the assumptions made in this study, as well as the parameter values used in the analysis, with the basis for their selection.

The scope of the consequence modeling does not include an estimate of the probability of occurrence of any one of the above four scenarios.

7.2.1 Breach Locations

The total volume of LNG spilled as well as the flow rate of LNG through a tank breach depends on the location of the breach. The LNG spill volume and flow rate are maximum for breaches at (or just above) the waterline. If the breach is below the waterline, the flow of LNG out of the tank is decreased by the backpressure caused by the water above the hole, as well as by the flow of water into the tank. Other phenomena, such as ice formation around the hole and increased LNG vaporization as the spill flows towards the water surface, are also likely to result in overall smaller LNG pools for an underwater release, and consequently, smaller hazards to the public. Therefore, the conservative approach in all scenarios considered in this study is to assume that the tank breach occurs at, or just above the waterline.

Figure 7-2: Cross-section of Typical Membrane-type SRV Tank, with Waterline Breach



7.3 Screening Calculations

A series of screening calculations were performed during this study, to aid in evaluating the effects of certain parameters on the thermal radiation and vapor dispersion hazard distances. The screening calculations were performed using DEGADIS for vapor cloud dispersion and a standard solid flame model[42] for pool fire thermal radiation. These models were used solely to identify those parameters that may be likely to have a significant effect on the outcome of a spill scenario. More sophisticated models were used for the actual hazard distance calculations for the scenarios identified in the HAZID. Therefore, the screening calculation results should not be used in lieu of, or compared with, the final results provided later in the IRA report.

7.4 Selection of Modeling Parameters

Physical parameters, such as the LNG composition and the atmospheric conditions, affect the physical mechanisms that control events such as the formation and dispersion of an LNG vapor cloud or the size, duration and intensity of an LNG pool fire. These parameters need to be defined before the consequences of a large LNG release scenario can be quantified.

[42] Beyler, C.L., "Chapter 3-11: Fire Hazard Calculations for Large, Open Hydrocarbon Fires," in SFPE Handbook of Fire Protection Engineering, 3rd Edition, P. DiNenno, ed. (Quincy, MA: National Fire Protection Association, 2002).

7.4.1 LNG Composition

LNG is typically composed primarily of methane (approximately 90 – 95%), with smaller fractions of heavier hydrocarbons (ethane, propane, butane, etc.). Methane is the most volatile compound in the LNG mixture, with a boiling temperature of approximately -261°F or -162°C (ethane, the next most volatile compound, has a boiling temperature of -87°C). The vapor cloud formed from an LNG pool over water will contain primarily methane, regardless of the LNG composition, until most of the methane has evaporated and the pool has reduced to a fraction of the original volume. If the vapor cloud is ignited, the resulting flash fire will be fueled by methane vapors. Similarly, in the event of an LNG pool fire, methane gas will be the primary fuel, regardless of LNG composition, until most of the methane has been consumed and the pool has reduced to a fraction of the original volume. This IRA will assume LNG to be composed of 100% methane for the purpose of determining the LNG physical properties to be used in the consequence models.

7.4.2 Ambient Conditions

Ambient conditions that affect the flammable vapor cloud dispersion and thermal radiation hazard distances include: air temperature and relative humidity, atmospheric stability, wind speed, and water temperature. Other parameters, such as wave height and frequency, also have an effect on the LNG pool formation and vaporization rate; however, there are no available peer-reviewed models that account for these effects. The effects of waves on the LNG pool are therefore not included in this study.

There are currently no regulations for offshore LNG terminals that specify which models and which ambient or other conditions should be used for LNG hazard calculations. Federal regulations for land-based LNG terminals list specific requirements for the ambient conditions to be used in thermal radiation and flammable vapor dispersion hazard distance calculations. These requirements can be used as reference to select the parameters for this study. For thermal radiation calculations, 49 CFR 193.2057 states that:

- The wind speed producing the maximum exclusion distances shall be used except for wind speeds that occur less than five percent of the time, based on recorded data for the area.
- The ambient temperature and relative humidity that produce the maximum exclusion distances shall be used except for values that occur less than five percent of the time, based on recorded data for the area.

For flammable vapor dispersion calculations, 49 CFR 193.2059 states that:

- Dispersion conditions are a combination of those which result in longer predicted downwind dispersion distances than other weather conditions at the site at least 90 percent of the time, based on figures maintained by the National Weather Service of the U.S. Department of Commerce, or as an alternative, where the model used gives longer distances at lower wind speeds.
- Atmospheric Stability (Pasquill-Gifford Class) “F”.

- Wind speed = 2.01 meters/sec (4.5 miles per hour, or 3.9 knots).
- Wind speed reference height of ten meters.
- Relative humidity = 50 percent.
- Atmospheric temperature = average in the region.

In order to select conservative but realistic conditions for the hazard distance analysis of the Port Dolphin DWP project, a series of screening calculations were performed. The purpose of the screening calculations was to evaluate the effect of individual parameters (such as air temperature, humidity, and wind speed) on the estimated hazard vapor dispersion and thermal radiation hazard distances. Approximately four years worth of meteorological data from buoy station No. 42013 were used to select realistic ranges of the parameters to be tested.[43] Buoy station No. 42013 is located approximately 15 nm southwest of Tampa, Florida, and thus in proximity of the proposed project.

7.4.3 Air Temperature

Calculations were performed for temperatures ranging between 13.7°C and 29.7°C (57°F and 85°F). These values respectively correspond to the 5th and 95th percentile highest temperature measured at buoy station No. 42013. These values are consistent with the ambient conditions selection criteria in 49 CFR 193, which are being used as reference for the screening calculations.

Higher temperatures were observed to give longer vapor dispersion distances, likely due to the lower density of warmer air. If the transmissivity of thermal radiation in air is assumed constant (as specified in the parametric analysis matrix – see Table 7-10), high temperatures also give slightly longer distances to selected heat flux levels. Based on these results, the air temperature assumed for this analysis is:

- Thermal Radiation Heat flux Calculations - air temperature of 29.7°C (85°F)
- Vapor Dispersion Calculations - air temperature of 29.7°C (85°F)

7.4.4 Relative Humidity

Relative humidity screening calculations were performed for values between 5% and 95%, to estimate its effects on vapor dispersion and heat flux distances. Low humidity was observed to give longer distances to selected heat flux levels, due to the lower air density.[44] The longest dispersion distance for the flammable vapor cloud was obtained for dispersion in 50% relative humidity. Based on these results, the relative humidity assumed for this analysis is:

[43] The data is currently available on the National Oceanic and Atmospheric Administration (NOAA) website (http://www.ndbc.noaa.gov/station_page.php?station=42013).
[44] Lower humidity also reduces the moisture content in the atmosphere, increasing the transmissivity of heat flux. However, this effect is not accounted for in the parametric sensitivity matrix as air transmissivity is assumed constant.

- Thermal Radiation Heat Flux Calculations – relative humidity of 5%
- Vapor Dispersion Calculations – relative humidity of 50%

7.4.5 Atmospheric Stability

Atmospheric stability affects the mixing of a dense gas cloud with ambient air. A stable atmosphere is typical of nighttime, low wind conditions, and is characterized by low ground-level turbulence. An unstable atmosphere is typical of daytime, sunny conditions that induce convective air motions that stir the lower portion of the boundary layer and increase mixing.

The effect of atmospheric stability on vapor cloud dispersion is typically a strong one: an increase in the stability of the atmosphere corresponds to a decrease in the near-ground turbulence, which decreases mixing between the dense gas cloud and the ambient air. Typically nighttime has the most stable atmosphere while the atmosphere becomes more turbulent as the day progresses due to daytime heating. While the stability class does range from A to F, no control or estimate is made to when or under what conditions a release may occur. Therefore, vapor dispersion calculations assume very stable atmospheric conditions (identified with the Pasquill-Gifford stability class "F") for conservative results.

The following is a definition of the different stability classes and the conditions for when they typically occur:

- A Stability: Extremely unstable conditions
- B Stability: Moderately unstable conditions
- C Stability: Slightly unstable conditions
- D Stability: Neutral conditions
- E Stability: Slightly stable conditions
- F Stability: Stable conditions

Table 7-1: Atmospheric Stability for Various Conditions[45]

Surface Wind Speed (m/s)	Daytime Isolation (Solar Radiation)			Nighttime Conditions (Cloud Cover)	
	Strong	Moderate	Slight	> 50%	< 50%
<2	A	A-B	B	e	F
2-3	A-B	B	C	E	F
3-4	B	B-C	C	D	E
4-6	C	C-D	D	D	D
>6	C	D	D	D	D

[45] Turner, D. Bruce. *Workbook of Atmospheric Dispersion Estimates: An Introduction to Dispersion Modeling. Second edition.* (Baca Raton, Florida: Lewis Publishers, 1994).

Atmospheric stability is not a factor in heat flux calculations, as radiation heat flux to a target is not affected by turbulence levels.

This analysis assumes the following atmospheric stability conditions for the consequence analysis:

- Thermal Radiation Heat Flux Calculations – not a factor
- Vapor Dispersion Calculations – stability class "F"

7.4.6 Wind Speed

Wind speed screening for the heat flux hazard calculations included wind speeds between 0 m/s (0 knots) and 10 m/s (19.4 knots), measured at the buoy anemometer height (2.8 m above the water). These correspond, respectively to the 5th and 95th percentile highest wind recorded at buoy station No. 42013. These values are consistent with the ambient conditions selection criteria in 49 CFR 193, which are being used as reference for the screening calculations. The screening calculations for thermal radiation hazards showed that higher wind speeds tend to give longer distances to given heat flux levels, due to the flame tilt induced by high winds. For vapor dispersion, the value of 2.01 m/s (specified in 49 CFR 193.2059) was selected as a known conservative value.[46]

Based on these results, the wind speeds assumed for this analysis are:

- Thermal Radiation Heat Flux Calculations – wind speed of 10 m/s at 2.8 meters (approximately 14.7 m/s (28.6 knots) at 10 meters)
- Vapor Dispersion Calculations – wind speed of 2.01 m/s (3.9 knots) at 10 meters

7.4.7 LNG Evaporation Rate

SAND2008-3153 performed a sensitivity study on the effect of LNG evaporation rates on thermal radiation heat flux distance from an LNG spill over water. In the study, the LNG pool regression rate was varied over a broad range that covers most of the available experimental data for large scale LNG spills. The Sandia results show that the pool regression rate has an effect on the hazard distances, as the rate of LNG evaporation directly affects the growth of the LNG pool on water. Sandia used a regression rate of $3 \cdot \times 10^{-4}$ m/s as the nominal value for the sensitivity study, which is consistent with the experimental data reported by Koopman.[47] This value has been since used by Sandia and others.[48,49]

[46] The choice of 2 m/s as the wind speed for vapor dispersion hazard calculations has been challenged in the public forum when applied to spills within impoundments. However, its validity as a conservative wind speed for spills over water remains unchallenged.
[47] Koopman, R. P., Bowman, B. R., and Ermak, D. L., "Data and calculations of dispersion on 5 m^3 LNG spill tests," UCRL-52876, 10-1-1979.
[48] Sandia National Labs, "Review of the Independent Risk Assessment of the Proposed Cabrillo Liquefied Natural Gas Deepwater Port Project," SAND2005-7339 (Albuquerque, NM: Sandia National Laboratory, 2005).
[49] ACE, "Cabrillo Port FSRU LNG Hazard Scenario Consequence Modeling, January 2006.

Screening calculations to evaluate the effects of the LNG regression rate (between $2 \cdot \times 10^{-4}$ and $5 \cdot \times 10^{-4}$ m/s) on the thermal radiation and vapor dispersion hazard distances indicated that lower vaporization rates tend to give larger hazard distances: lower vaporization rates (per unit area of LNG pool) result in larger LNG pools and therefore larger pool fires, as well as larger vapor clouds that can travel farther before dissipating below the LFL.

For unignited LNG pools, regression rates smaller than $3 \cdot \times 10^{-4}$ m/s are not consistent with most experimental data and correspond to water-to-LNG heat fluxes considered too low by several experts.[50] Therefore, consistent with previous analyses performed for large LNG spills over water, a liquid regression rate of $3 \cdot \times 10^{-4}$ m/s is used in this report for the vapor dispersion calculations.

In the absence of a generally accepted heat transfer model to calculate the vaporization rate of LNG over water, the effect of ocean water temperature variation on the LNG pool vaporization rate is neglected (the regression rate selected above does not depend on water temperature). This is a reasonable approximation, given the large temperature difference between water and LNG (on the order of 170-190°C, or 300-340°F, for the range of water temperatures recorded at buoy station No. 42013) and the non-uniform conditions that can be expected given the large area of the LNG/water interface.

7.5 Summary of Modeling Parameters

The vapor dispersion and thermal radiation hazard distance calculations in this study are performed using the parameter values listed in Table 7-2 and Table 7-3, respectively. The values of these parameters were applied consistently in the consequence analysis of all scenario specified in the IRA.

Table 7-2: Flammable Vapor Dispersion Modeling Parameters

Ambient Air Temperature	29.7°C (85°F)
Ambient Relative Humidity	50%
Wind Speed	2.0 m/s (3.9 knots) at 10 m elevation
Atmospheric Stability Class	F (Very stable)
LNG Vaporization Rate	$3 \cdot \times 10^{-4}$ m/s (0.135 kg/m^2-s)
LNG Composition	100% Methane

[50] FERC, 2004.

Table 7-3: Thermal Radiation Hazard Modeling Parameters

Ambient Air Temperature	29.7°C (85°F)
Ambient Relative Humidity	5%
Wind Speed	10 m/s (19.4 knots) at 2.8 m elevation
LNG Vaporization Rate	Parameterized (see Table 7-10)
LNG Composition	100% Methane

7.6 Threshold Criteria

7.6.1 Flammable Vapor Dispersion

A flammable vapor cloud can only be ignited if the gas concentration is between the Lower Flammability Limit (LFL) and the Upper Flammability Limit (UFL). For methane, the LFL is 5% (by volume) and the UFL is 15% (by volume). Federal regulations for land-based LNG terminals require 50% of the LFL to be used as the threshold concentration to determine the hazard distance for flammable vapor dispersion.[51] This approach effectively introduces a safety factor of two in the vapor dispersion calculations. This is reasonable when integral-type models, such as DEGADIS, are used to perform the calculations, since those models cannot account for localized effects that may allow pockets of higher concentration gas to travel farther than the bulk of the vapor cloud.

This consequence analysis uses a Reynolds-Averaged Navier-Stokes (RANS) based CFD model that is designed to account for flow perturbations that may cause non-uniform distribution of the flammable gas concentration as the vapor cloud disperses downwind. Transient simulations using RANS models provide results that are equivalent to a time-averaged solution of the flow field (the averaging time is approximately on the order of 30-60 s for the type of scenarios considered here). It has been argued that unsteady eddies, which are not captured by a RANS simulation, could extend farther than the time-averaged cloud boundary calculated by the model. However, the comparison of model predictions with experimental data (see Appendix A) showed that the model prediction is conservative by more than 10%. Therefore, it is appropriate to set the threshold concentration for flammable vapor dispersion to the LFL for methane.

7.6.2 Thermal Radiation Hazard Distance

Two different thermal radiation levels are considered of interest in the evaluation of risk to the public and property. The thermal radiation thresholds are defined as follows:

- 37.5 kW/m^2: Damage to process equipment and storage tanks for unprotected exposures based on an average 10-minute exposure duration, as well immediate fatalities
- 5 kW/m^2: Permissible level for emergency operations lasting several minutes with appropriate clothing based on an average 10-minute exposed duration and onset of second degree burns based on an average 40 second exposed duration

[51] 49 CFR 193.2057.

The results of the pool fire calculations will list the distance to each of these heat fluxes estimated from the center of the pool (i.e., from the spill location).

7.7 Effect of Tank Size and Breach Area on LNG Hazards

According to data from the applicant, two vessel types may be delivering LNG cargo to the DWP: a membrane-type SRV and a Moss-type SRV. The membrane-type vessel has five (5) separate membrane tanks, for a total cargo volume of approximately 217,000 m^3. The five tanks have different sizes, with tank No. 1 being the smallest (approximately 25,130 m^3 volume) and the other tanks (No. 2 through No. 5) being larger (approximately 48,050 m^3 volume each). These membrane-type LNGC tanks are expected to be filled to 98.5% capacity.

The Moss-type vessel has four (4) separate spherical tanks, for a total cargo volume of approximately 215,000 m^3. The four tanks are the same size with a volume of approximately 54,362 m^3 each. These Moss-type tanks are expected to be filled to 98.5% capacity. The total volume of LNG that will be spilled is equal to the volume of LNG above the hole(s) in every tank that is breached. In the scenarios considered here, the holes are assumed to be at the waterline; therefore, the total volume of LNG above the waterline will be spilled from every breached tank.

The worst-case release for the single-tank breach scenarios of the membrane-type LNGC (Scenario 1 and Scenario 4) will assume that one tank, No. 2-5, is breached. The worst-case release for the multiple-tank breach scenarios of the membrane-type LNGC (Scenario 2 and Scenario 3) will assume that two or more of tanks No. 2-5 are breached. Calculations based on the geometry of the proposed membrane-type LNGC resulted in a spilled volume equal to approximately 68% of the volume of each tank.

Since the four tanks in a Moss-type LNGC have the same diameter, it is irrelevant which tanks are assumed to be breached for any given scenario. Calculations based on the geometry of the proposed Moss-type LNGC resulted in a spilled volume equal to approximately 90% of the volume of each tank.

Scenarios 1 and 4, as well as Scenarios 5 and 8, assume single-tank breaches of similar size (16 m^2 vs. 17 m^2 for a membrane LNGC and 16 m^2 vs. 22 m^2 for a Moss LNGC). As such, the consequences associated with each pair of scenarios are expected to be very similar. Screening calculations were performed to determine whether separate simulations should be performed for Scenarios 1 and 4 (see Table 7-4) and for Scenarios 5 and 8 (see Table 7-5). Based on the screening results, it was decided that the vapor dispersion hazard distances for Scenarios 4 and 8 could be assumed as equal to those of Scenarios 1 and 5, respectively.

Table 7-4: Screening Comparison - Estimated Hazard Distances for Similar Hole Sizes of Membrane-type Tanks

	Intentional Scenario 1:	Accidental Scenario 4:	Difference
Breach Size Area (1 tank)	16 m^2	17 m^2	6.3 %
Breach Size Diameter	4.51 m	4.65 m	3.1 %
Spilled LNG Volume	32,256 m^3	32,256 m^3	0 %
Spill duration	361 s	344 s	4.9 %
Maximum pool size[52]	758 m	764 m	0.8 %
Distance to 5 kW/m^2	2,870 m	2,900 m	1.0 %
Distance to LFL	7,344 m	7,934 m	8.0 %

Table 7-5: Screening Comparison - Estimated Hazard Distances for Similar Hole Sizes of Moss-type Tanks

	Intentional Scenario 5:	Accidental Scenario 8:	Difference
Breach Size Area (1 tank)	16 m^2	22 m^2	38 %
Breach Size Diameter	4.51 m	5.29 m	17.3 %
Spilled LNG Volume	48,330 m^3	48,330 m^3	0 %
Spill duration	379 s	368 s	9.0 %
Maximum pool size[53]	886 m	890 m	0.5 %
Distance to 5 kW/m^2	3,340 m	3,360 m	0.6%
Distance to LFL	8,904 m	9,170 m	3.0 %

The three intentional breach scenarios (resulting hole sizes) are identical for the membrane-type and Moss-type SRVs. Therefore, screening calculations were performed to determine whether one type of SRV resulted in consistently greater hazard distances than the other and would serve as the bounding SRV type. Table 7-6 shows a comparison between Scenarios 1 and 5. The results indicate that the Moss-type SRV spill scenarios result in more conservative hazard distances (i.e., the spill volumes are larger and the distances to the thermal and flammable vapor dispersion endpoints are greater).

[52] Diameter, assuming a circular pool spread.
[53] Diameter, assuming a circular pool spread.

Table 7-6: Screening Comparison - Estimated Hazard Distances for Membrane-type and Moss-type Tanks

	Membrane-type Tank	Moss-type Tanks	Difference
Spilled LNG volume (1 tank)	32,256 m^3	48,330 m^3	49.8 %
Percentage (of tank volume spilled)	68.2%	90.3%	32.4 %
	Scenario 1: One tank, 16 m^2 breach	**Scenario 5: One tank, 16 m^2 breach**	
Spill duration	361 s	379 s	5.0 %
Maximum pool size[54]	758 m	886 m	16.9 %
Distance to 5 kW/m^2	2,870 m	3,340 m	16.4 %
Distance to LFL	7,344 m	8,904 m	21.2 %

The vapor dispersion CFD analysis was performed only for the bounding cases, or the most conservative hazard scenarios. Therefore, based on the screening comparisons in Table 7-4, Table 7-5, and Table 7-6, the CFD analysis was performed on the intentional scenarios applied to the Moss-type SRV(Scenarios 5 and 6). As noted previously, Scenarios 3 and 7 are based on immediate ignition and cascading damage of the SRV. Therefore, only the pool fire consequence is evaluated for these scenarios.

The pool fire hazard calculations, being performed using a faster analytical model, have been performed for each carrier type on all eight scenarios.

7.8 LNG Flow from a Tank Breach

If one or more tanks of an SRV are breached below the liquid level, LNG will flow through the breach(es). The flow of LNG through a breach is generally modeled as flow through an orifice, driven by the hydrostatic pressure of the LNG above the hole. The simplest form of the orifice model equation, which assumes atmospheric pressure at the top of the tank, is as follows:

$$Q = A C_D \sqrt{2 g h}$$

where:

- Q = volumetric flow rate (m^3/s)
- A = cross-sectional area of the breach (m^2)
- C_D = discharge coefficient
- g = acceleration due to gravity (m/s^2)
- h = LNG hydrostatic head above the breach (m)

The discharge coefficient accounts for flow reductions due to the shape of the hole; it typically ranges from approximately 0.3 (when the hole is partially obstructed) to 0.6 (for an unobstructed

[54] Diameter, assuming a circular pool spread.

hole with clean edges). The spill flow rate calculations for the vapor dispersion modeling are performed using a discharge coefficient equal to 0.6, which maximizes the LNG outflow rate and therefore represents a conservative assumption. The spill flow rate calculations for the purpose of the thermal radiation calculations are performed by varying C_D between 0.3 and 0.6, as part of the sensitivity study described below.

The hydrostatic head of LNG above the breach varies as a function of time during the spill, decreasing as LNG flows out of the tank(s). The initial hydrostatic head was calculated to be approximately 18.5 m for a membrane-type tank or 34.6 m for a Moss-type tank, assuming the tanks to be 98.5% full.

The orifice model does not take into account the actual shape of the breach, the presence of distorted metal surfaces, or the possibility that some of the LNG flowing out of the tank may not spill onto the water surface but instead fall into the ballast space between the hulls. The orifice flow model also assumes that the LNG free surface inside the tank remains at atmospheric pressure, and therefore ignores the possibility of any vacuum formation inside the tank, should flow through the vacuum breakers be overwhelmed by outflow through the breach. Therefore, the orifice flow model tends to overestimate the actual flow rate of LNG onto the water surface.

The LNG outflow model used in this study is based on calculations performed by the Federal Energy Regulatory Commission (FERC) staff.[55] The FERC model was modified to account for the non-uniform cross-section of the LNG carrier membrane tanks. The orifice flow model gives a time-dependent flow rate, which is maximum at the onset of flow and decreases monotonically as the LNG inventory is depleted. A summary of the LNG flow rates is given in Table 7-7. The LNG flow rates for all 8 scenarios are compared graphically in Figure 7-3 and Figure 7-4 for Scenarios 1-4 and Scenarios 5-8, respectively.

It should be noted that the total LNG volume spilled in Scenario 3 is one third more than Scenario 2, the individual tank breach diameters for Scenario 2 and Scenario 3 are equivalent, and the multiple tanks are emptied simultaneously. Therefore, the tanks empty in the same amount of time for Scenarios 2 and 3. A similar analogy can be made for Scenario 6 and Scenario 7.

[55] FERC, 2004.

Table 7-7: LNG Outflow for Scenarios 1-8

Scenario No.	Spilled Volume (m^3)	Maximum Flow Rate (kg/s)	Total Time to Discharge (s)
Scenario 1	32,256	77,267	361
Scenario 2	64,512	115,901	482
Scenario 3	96,769	173,851	482
Scenario 4	32,256	77,267	361
Scenario 5	48,330	105,668	379
Scenario 6	96,659	158,502	506
Scenario 7	144,989	237,753	506
Scenario 8	48,330	105,668	379

Figure 7-3: LNG flow rate for the Membrane-type Scenarios 1-4

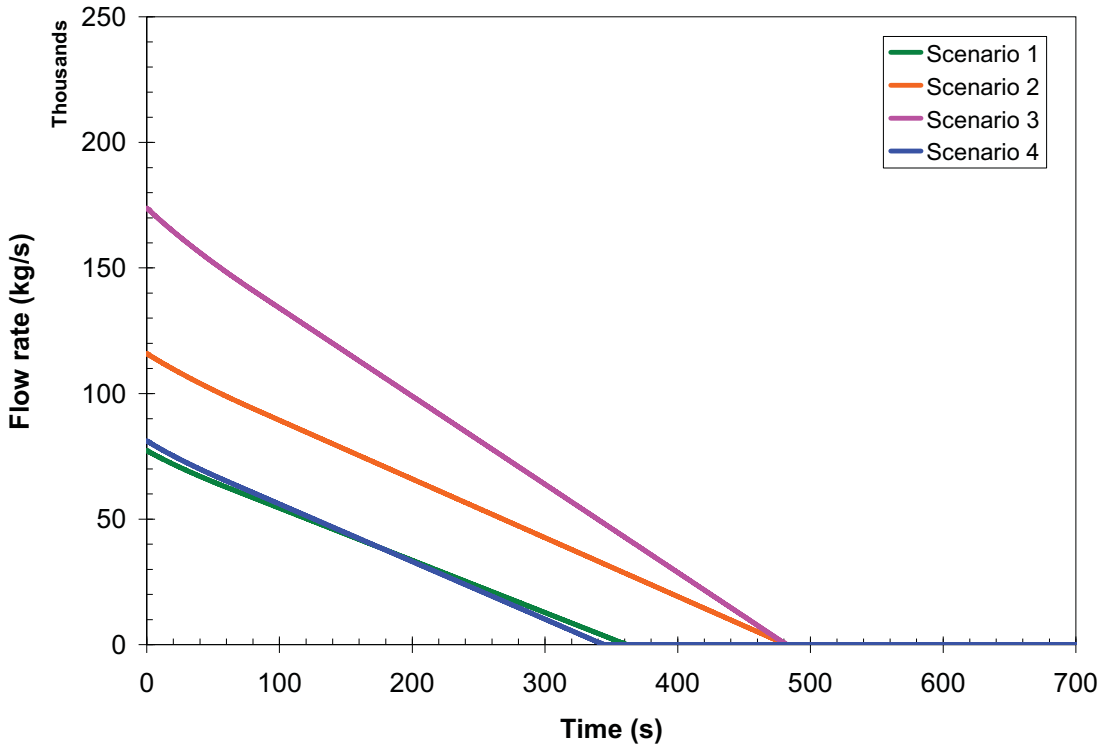
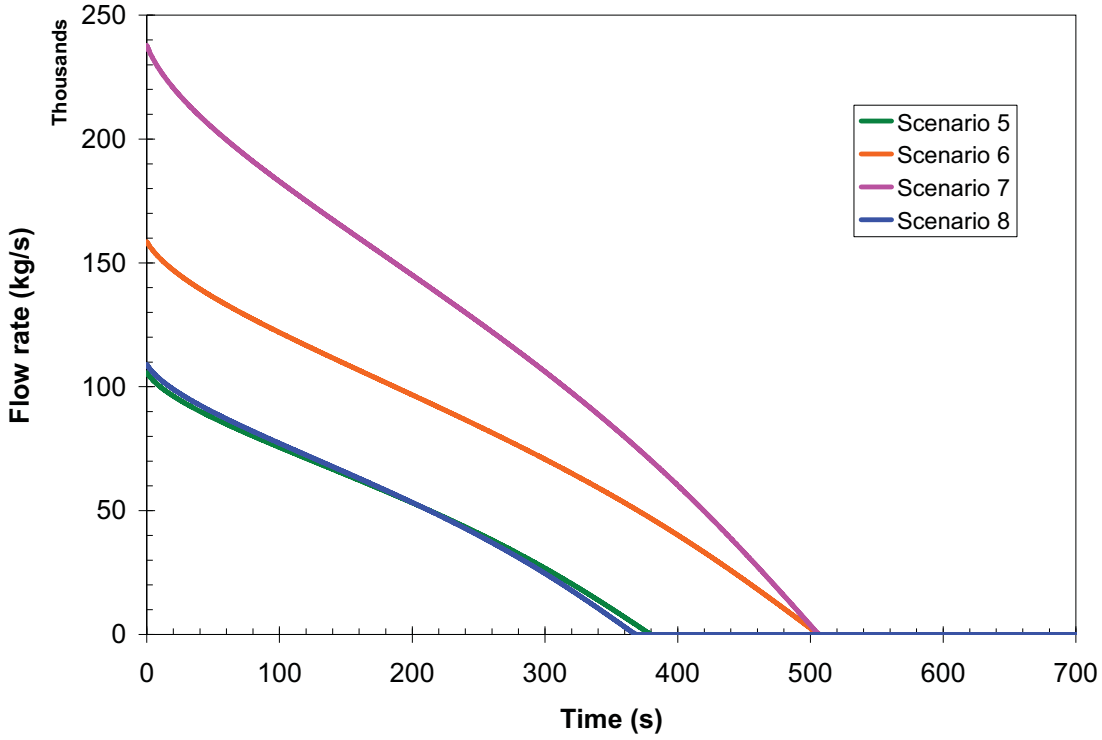


Figure 7-4: LNG flow rate for the Moss-type Scenarios 5-8



7.9 LNG Pool Spread over Water

LNG is lighter and much colder than seawater. The LNG flowing out of a tank breach and onto the water will form a floating pool. The LNG pool will spread onto the water surface and LNG will evaporate due to heat transfer from the water. The balance between LNG supply (spill flow from the tank) and removal (evaporation from the pool) determines how much LNG is in the pool as a function of time. The growth of the LNG pool also depends on the dynamic balance of forces such as inertia, gravity and friction acting on the pool.

The LNG pool spreading model proposed by FERC is used in this study.[56] The model describes the dynamic behavior of the LNG pool while LNG is flowing from the breached tank and, after the spill has stopped, until a minimum pool thickness (determined by surface tension effects) is reached and most of the LNG has evaporated. The FERC model assumes the LNG pool to have a time-dependent but uniform thickness, to remain at boiling temperature and to be subject to uniform heat transfer from the underlying water surface. The model accepts a time-varying LNG spill flow rate for the source term, which is calculated using the orifice flow model described in the previous section. A liquid regression rate of 3×10^{-4} m/s is adopted for the vaporization of LNG from an unignited pool over water as discussed in Section 7.4.7.

[56] FERC, 2004.

A summary of the LNG pool spread is given in Table 7-8. The pool results are compared graphically in Figure 7-5 and Figure 7-6 for Scenarios 1-4 and Scenarios 5-8, respectively. For the purpose of calculating the maximum pool size, as well as the maximum vapor dispersion distance, the LNG vapors are assumed to remain unignited. As discussed, Scenarios 3 and 7 are releases from a cascading failure of the LNG vessel. Since these scenarios assume immediate ignition, the results presented below are for illustration only since the distance to LFL is not evaluated.

The breach is assumed to occur on one side of the LNG carrier, so the spill begins to form a pool alongside the vessel. The size of the breach and the volume of LNG spilled are such that the pool will grow well past the stern and bow of the vessel. Therefore, the presence of the vessel is neglected for the purpose of calculating the rate of pool spread, and the pool is assumed to spread in a circle. Note that the high inertia of the pool, due to the large initial LNG flow rate, is such that the pool continues to grow until the LNG volume in the pool is depleted.

Table 7-8: LNG Pool Spread over Water, without Immediate Ignition

Scenario No.	Spilled Volume (m^3)	Discharge Duration (s)	Maximum Pool Diameter (m)	Time to Vaporize LNG Pool (s)
Scenario 1	32,256	361	758	522
Scenario 2	64,512	482	966	625
Scenario 3	96,769	482	1146	671
Scenario 4	32,256	361	758	522
Scenario 5	48,330	379	886	572
Scenario 6	96,659	506	1,130	686
Scenario 7	144,989	506	1,340	737
Scenario 8	48,330	379	886	572

Figure 7-5: LNG pool spread over water, Membrane-type Scenarios 1-4

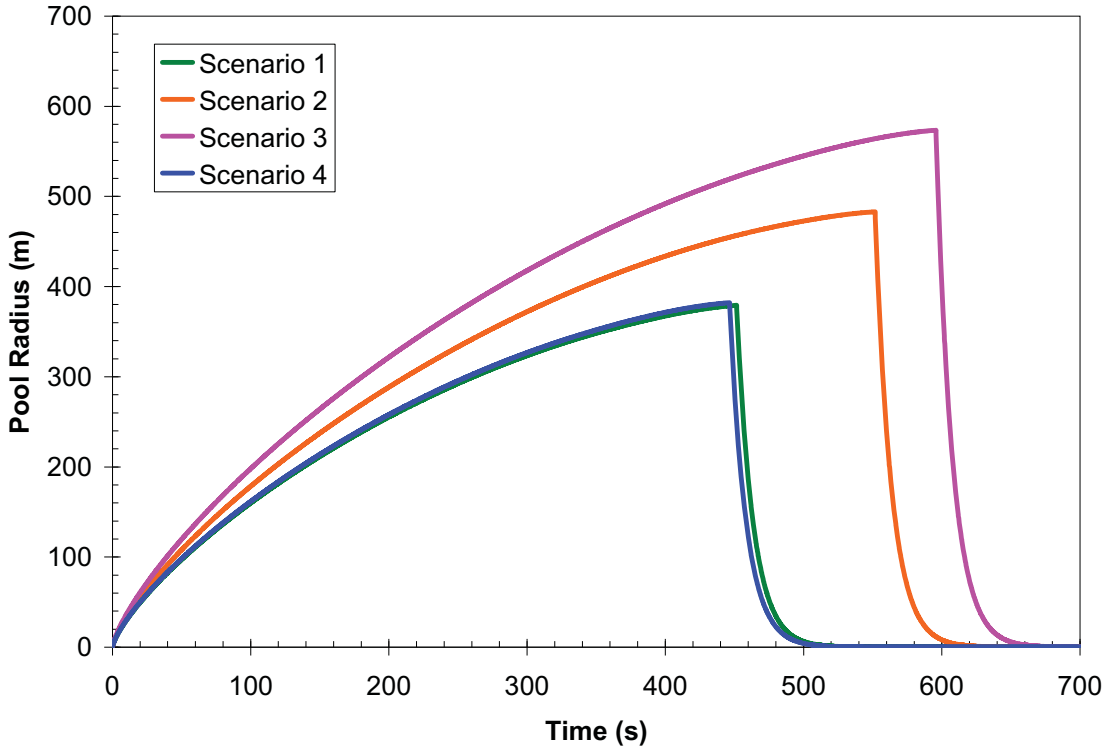
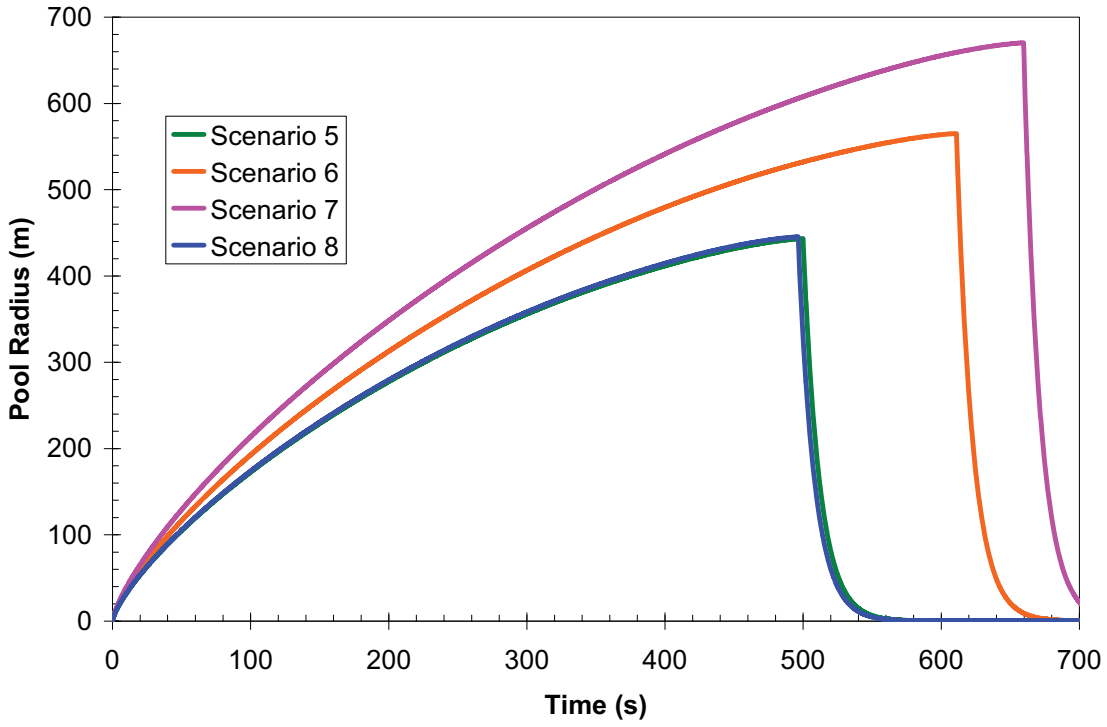


Figure 7-6: LNG pool spread over water, Moss-type Scenarios 5-8



7.10 Pool Fire Modeling

An LNG spill scenario can result in a pool fire when an LNG pool is formed onto the water surface and the vapors emanating from the pool are ignited close to the pool. The pool fire is fueled by the LNG that evaporates from the pool, as a result of heat transfer from the water underneath and the radiation from the fire above. The size of the LNG pool, and therefore the size of the pool fire, change with time as the pool spreads and recedes (see previous section). Therefore, the thermal radiation heat flux to a stationary target is a function of time, increasing when the pool expands towards the target and decreasing when the pool recedes towards the vessel. A conservative estimate of the radiation heat flux to a stationary target can be obtained by assuming the pool size to remain constant and equal to the maximum size reached by an unignited pool for a given LNG spill scenario. This conservative assumption is made in this study.

With the exception of the SRV, there are no other structures or geometric obstacles expected to be in proximity of the proposed DWP that could affect the growth of a pool fire or shield potential targets from the fire's radiation. Therefore, CFD models of the pool fire are not deemed necessary and simpler models can be used to calculate the thermal radiation hazard distances. A very common model for these scenarios is the solid flame model[57]: the fire is represented as a cylinder, whose base is equal to the area of the pool of fuel and whose height is determined from semi-empirical correlations. The radiation from the cylinder to a target depends on the emissive power of the fire surface, the transmissivity of the atmosphere, and the position of the target relative to the fire (the "view factor").

The characteristics of LNG pool fires are not known precisely. Therefore, the thermal radiation hazard distances are calculated for each scenario by performing a sensitivity analysis on several parameters, and obtaining average hazard distances based on the cases considered. As recommended by Sandia, five different parameters are included in the sensitivity analysis:

- Flame height correlation (nominal case evaluated below)
- Discharge coefficient is varied from 0.3 to 0.6 (0.6 is the nominal case)
- Burn rate (or liquid regression rate) is varied from 2×10^{-4} to 8×10^{-4} m/s (3×10^{-4} m/s is the nominal case)
- Surface emissive power is varied from 175 to 350 kW/m^2 (220 kW/m^2 is the nominal case)
- Atmospheric transmissivity is varied from 0.5 to 0.8 (0.8 is the nominal case)

To determine the nominal flame height correlation, a single release scenario was selected arbitrarily (Scenario 5 for the Moss-style LNG carrier), using the following solid flame model parameters

- Discharge coefficient = 0.6
- Burning rate = 3×10^{-4} m/s

[57] Beyler, 2002.

- Surface Emissive Power = 220 kW/m^2
- Transmissivity = 0.8

The flame height correlations that were evaluated included:

- Heskestad[58], based on many fire scenarios including burners using various fuels 5-50 cm in diameter, gasoline pool fires from 0.3 to 23 m in diameter, square pools of JP-4 fuel from 1 to 10 m, and under-ventilated wood cribs.
- Moorhouse[59] based on LNG pool fires with rectangular pools as large as 13.7 m.
- Pritchard and Binding[60] based on hydrocarbon (primarily LNG) pool fires 6-22 m in diameter.
- Thomas[61] based on wood crib fires 10 – 200 cm on a side.
- Zukoski[62] based on natural gas burners 10-50 cm in diameter.

Table 7-9 details the results of the flame height correlation analysis using the five flame height correlations, the nominal parameters for the solid flame model, and the release conditions for Scenario 5. From these results, the Moorhouse flame height correlation was selected as the nominal case. The Moorhouse correlation does not result in a flame height or thermal radiation distances that are at the upper and lower end of results range. Additionally, Moorhouse compares well with the average results of all five flame height correlations, with the Moorhouse flame height and thermal radiation distances slightly more conservative.

Table 7-9: Height Correlation Comparison

(Scenario 5 – Nominal Solid Flame Parameters)

Flame Height Correlation	Flame Height (m)	Distance (m) to 37.5 kW/m2	Distance (m) to 25 kW/m2	Distance (m) to 5 kW/m2
Heskestad	765	1,350	1,590	2,960
Moorhouse	966	1,500	1,770	3,340
Pritchard and Binding	1,181	1,630	1,950	3,720
Thomas	472	1,100	1,270	2,320
Zukoski	827	1,400	1,640	3,080
Average (of 5 correlations)	**842**	**1,410**	**1,660**	**3,110**

Given the selection of the Moorhouse flame height correlation, seven (7) sensitivity cases were evaluated for each intentional and accidental release scenario to determine the pool fire results for the IRA. Table 7-10 summarizes the numerical values of the parameters included in the pool fire sensitivity analysis.

[58] Heskestad, G., "Luminous Heights of Turbulent Diffusion Flames," Fire Safety J. 5 (1983) pp. 103-108.
[59] Moorhouse, J., "Scaling criteria for pool fires derived from large-scale experiments," J. I. Chem. Sym. 71 (1982) pp. 165-179.
[60] Pritchard, M.J., and Binding, T.M., "FIRE2: A New Approach for Predicting Thermal Radiation Levels from Hydrocarbon Pool Fires." I. Chem. E. Symposium Series, 130 (1992) pp. 491-505.
[61] Thomas, P.H., "The size of flames from natural fires," Proc. Combust. Inst. 9 (1963) pp. 844-849.
[62] McCaffrey, B., "Chapter 2-1: Flame Height," in SFPE Handbook of Fire Protection Engineering, 2nd Edition, edited by P. DiNenno, (Quincy, MA: National Fire Protection Association, 1995.

Table 7-10: Pool Fire Model Sensitivity Analysis Matrix

Case No.	Discharge Coefficient	Burn Rate (m/s)	Surface Emissive Power (kW/m^2)	Transmissivity	Flame Height Correlation
1	0.6	3×10^{-4}	220	0.8	Moorhouse
2	0.3	3×10^{-4}	220	0.8	Moorhouse
3	0.6	2×10^{-4}	220	0.8	Moorhouse
4	0.6	8×10^{-4}	220	0.8	Moorhouse
5	0.6	3×10^{-4}	175	0.8	Moorhouse
6	0.6	3×10^{-4}	350	0.8	Moorhouse
7	0.6	3×10^{-4}	220	0.5	Moorhouse

7.10.1 Scenario 1 - Thermal Radiation Hazard Distance Results

The maximum pool size was calculated based on the Scenario 1 spill flow rate and on the parameters for each of the seven sensitivity analysis cases (Table 7-10). The maximum pool fire diameter and the hazard distances to the two selected thermal radiation hazard levels (37.5 and 5 kW/m^2) are listed in Table 7-11 and distances measured from the center of the pool. In addition to each sensitivity case, the average pool fire diameter and distance to 37.5 and 5 kW/m^2 are reported. The average pool fire diameter and thermal radiation distances are the final pool fire results for Scenario 1 reported in the IRA.

Table 7-11: Scenario 1 – Thermal Radiation Hazard Results

Case No.	Pool Diameter (m)	Distance (m) to 37.5 kW/m^2	Distance (m) to 5 kW/m^2
1	760	1,300	2,870
2	580	1,030	2,230
3	840	1,390	2,950
4	530	970	2,380
5	760	1,180	2,620
6	760	1,570	3,480
7	760	1,040	2,380
Average	**710**	**1,210**	**2,700**

7.10.2 Scenario 2 - Thermal Radiation Hazard Distance Results

The maximum pool size was calculated based on the Scenario 2 spill flow rate and on the parameters for each of the seven sensitivity analysis cases (Table 7-10). The maximum pool fire diameter and the hazard distances to the two selected thermal radiation hazard levels (37.5 and 5 kW/m^2) are listed in Table 7-12, and distances measured from the center of the pool. In addition to each sensitivity case, the average pool fire diameter and distance to 37.5 and 5 kW/m^2 are reported. The average pool fire diameter and thermal radiation distances are the final pool fire results for Scenario 2 reported in the IRA.

Table 7-12: Scenario 2 – Thermal Radiation Hazard Results

Case No.	Pool Diameter (m)	Distance (m) to 37.5 kW/m^2	Distance (m) to 5 kW/m^2
1	970	1,610	3,630
2	730	1,270	2,780
3	1,070	1,730	3,740
4	670	1,170	2,970
5	970	1,450	3,310
6	970	1,960	4,410
7	970	1,270	3,000
Average	**900**	**1,490**	**3,410**

7.10.3 Scenario 3 - Thermal Radiation Hazard Distance Results

The maximum pool size was calculated based on the Scenario 3 spill flow rate and on the parameters for each of the seven sensitivity analysis cases (Table 7-10). The maximum pool fire diameter and the hazard distances to the two selected thermal radiation hazard levels (37.5 and 5 kW/m^2) are listed in Table 7-13, and distances measured from the center of the pool. In addition to each sensitivity case, the average pool fire diameter and distance to 37.5 and 5 kW/m^2 are reported. The average pool fire diameter and thermal radiation distances are the final pool fire results for Scenario 3 reported in the IRA.

Table 7-13: Scenario 3 – Thermal Radiation Hazard Results

Case No.	Pool Diameter (m)	Distance (m) to 37.5 kW/m^2	Distance (m) to 5 kW/m^2
1	1,150	1,870	4,280
2	890	1,500	3,360
3	1,260	2,000	4,400
4	810	1,360	3,530
5	1,150	1,680	3,890
6	1,150	2,280	5,210
7	1,150	1,470	3,530
Average	**1,080**	**1,740**	**4,030**

7.10.4 Scenario 4 - Thermal Radiation Hazard Distance Results

The maximum pool size was calculated based on the Scenario 4 spill flow rate and on the parameters for each of the seven sensitivity analysis cases (Table 7-10). The maximum pool fire diameter and the hazard distances to the two selected thermal radiation hazard levels (37.5 and 5 kW/m^2) are listed in Table 7-14, and distances measured from the center of the pool. In addition to each sensitivity case, the average pool fire diameter and distance to 37.5 and 5 kW/m^2 are reported. The average pool fire diameter and thermal radiation distances are the final pool fire results for Scenario 4 reported in the IRA.

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Table 7-14: Scenario 4 – Thermal Radiation Hazard Results

Case No.	Pool Diameter (m)	Distance (m) to 37.5 kW/m^2	Distance (m) to 5 kW/m^2
1	760	1,300	2,870
2	580	1,030	2,230
3	840	1,390	2,950
4	530	970	2,380
5	760	1,180	2,620
6	760	1,570	3,480
7	760	1,040	2,380
Average	**710**	**1,210**	**2,700**

7.10.5 Scenario 5 - Thermal Radiation Hazard Distance Results

The maximum pool size was calculated based on the Scenario 5 spill flow rate and on the parameters for each of the seven sensitivity analysis cases (Table 7-10). The maximum pool fire diameter and the hazard distances to the two selected thermal radiation hazard levels (37.5 and 5 kW/m^2) are listed in Table 7-15, and distances measured from the center of the pool. In addition to each sensitivity case, the average pool fire diameter and distance to 37.5 and 5 kW/m^2 are reported. The average pool fire diameter and thermal radiation distances are the final pool fire results for Scenario 5 reported in the IRA.

Table 7-15: Scenario 5 – Thermal Radiation Hazard Results

Case No.	Pool Diameter (m)	Distance (m) to 37.5 kW/m^2	Distance (m) to 5 kW/m^2
1	890	1,500	3,340
2	680	1,180	2,580
3	980	1,590	3,430
4	620	1,100	2,760
5	890	1,350	3,050
6	890	1,810	4,060
7	890	1,190	2,770
Average	**840**	**1,390**	**3,140**

7.10.6 Scenario 6 - Thermal Radiation Hazard Distance Results

The maximum pool size was calculated based on the Scenario 6 spill flow rate and on the parameters for each of the seven sensitivity analysis cases (Table 7-10). The maximum pool fire diameter and the hazard distances to the two selected thermal radiation hazard levels (37.5 and 5 kW/m^2) are listed in Table 7-16, and distances measured from the center of the pool. In addition to each sensitivity case, the average pool fire diameter and distance to 37.5 and 5 kW/m^2 are reported. The average pool fire diameter and thermal radiation distances are the final pool fire results for Scenario 6 reported in the IRA.

Table 7-16: Scenario 6 – Thermal Radiation Hazard Results

Case No.	Pool Diameter (m)	Distance (m) to 37.5 kW/m^2	Distance (m) to 5 kW/m^2
1	1,130	1,850	4,220
2	850	1,450	3,220
3	1,250	1,990	4,360
4	780	1,330	3,430
5	1,130	1,660	3,840
6	1,130	2,260	5,140
7	1,130	1,450	3,480
Average	**1,060**	**1,710**	**3,960**

7.10.7 Scenario 7 - Thermal Radiation Hazard Distance Results

The maximum pool size was calculated based on the Scenario 7 spill flow rate and on the parameters for each of the seven sensitivity analysis cases (Table 7-10). The maximum pool fire diameter and the hazard distances to the two selected thermal radiation hazard levels (37.5 and 5 kW/m^2) are listed in Table 7-17, and distances measured from the center of the pool. In addition to each sensitivity case, the average pool fire diameter and distance to 37.5 and 5 kW/m^2 are reported. The average pool fire diameter and thermal radiation distances are the final pool fire results for Scenario 7 reported in the IRA.

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Table 7-17-: Scenario 7 – Thermal Radiation Hazard Results

Case No.	Pool Diameter (m)	Distance (m) to 37.5 kW/m^2	Distance (m) to 5 kW/m^2
1	1,340	2,140	4,980
2	1,040	1,720	3,890
3	1,480	2,300	5,120
4	940	1,530	4,080
5	1,340	1,920	4,520
6	1,340	2,630	6,070
7	1,340	1,670	4,090
Average	**1,260**	**1,990**	**4,680**

7.10.8 Scenario 8 - Thermal Radiation Hazard Distance Results

The maximum pool size was calculated based on the Scenario 8 spill flow rate and on the parameters for each of the seven sensitivity analysis cases (Table 7-10). The maximum pool fire diameter and the hazard distances to the two selected thermal radiation hazard levels (37.5 and 5 kW/m^2) are listed in Table 7-18, and distances measured from the center of the pool. In addition to each sensitivity case, the average pool fire diameter and distance to 37.5 and 5 kW/m^2 are reported. The average pool fire diameter and thermal radiation distances are the final pool fire results for Scenario 8 reported in the IRA.

Table 7-18: Scenario 8 – Thermal Radiation Hazard Results

Case No.	Pool Diameter (m)	Distance (m) to 37.5 kW/m^2	Distance (m) to 5 kW/m^2
1	890	1,500	3,340
2	680	1,180	2,580
3	980	1,590	3,430
4	620	1,100	2,760
5	890	1,350	3,050
6	890	1,810	4,060
7	890	1,190	2,770
Average	**840**	**1,390**	**3,140**

7.10.9 Summary of Thermal Radiation Hazard Distances

Based on the solid flame model sensitivity results, the maximum pool fire diameter and distances to 37.5 and 5 kW/m^2 are presented in Table 7-19 for each release scenario. Scenarios 1-4 are the pool fire results for the membrane-style LNG carrier and Scenarios 5-8 are the pool fire results for the Moss-style LNG carrier. As compared with the individual scenario results, the pool fire results for the IRA are represented by the average results from the solid flame model sensitivity analysis.

Table 7-19: Distances to Selected Thermal Radiation Hazard Levels (measured from the center of the pool)

Scenario No.	Pool Diameter (m)	Distance (m) to 37.5 kW/m^2	Distance (m) to 5 kW/m^2
Scenario 1	710	1,210	2,700
Scenario 2	900	1,490	3,410
Scenario 3	1,080	1,740	4,030
Scenario 4	710	1,210	2,700
Scenario 5	840	1,390	3,140
Scenario 6	1,060	1,710	3,960
Scenario 7	1,260	1,990	4,680
Scenario 8	840	1,390	3,140

7.11 Flammable Vapor Cloud Dispersion Modeling

If the LNG vapors emanating from the LNG pool water surface are not ignited in proximity of the pool, the LNG vapors will be transported downwind. The vapor cloud is initially cold and dense, but becomes lighter as it moves away from the pool, entrains warmer air and absorbs heat from the environment. If the vapor cloud encounters a viable ignition source before the gas concentration drops below the LFL (5% by volume for methane in air), the cloud will ignite, resulting in a flash fire. Otherwise, the vapor cloud dissipates harmlessly in the atmosphere.

The commercial code Fluent was selected to simulate the dispersion of the flammable vapor cloud resulting from the evaporation of an LNG spill over water. Fluent has been used extensively in dispersion analysis and has sophisticated atmospheric turbulence models that allow it to simulate different types of boundary layer profiles. In previous simulations of dense, large volume releases of cold air performed by Exponent, Fluent results compared favorably with validated models. Before modeling the vapor dispersion from the LNG tanker spill scenarios prescribed for this study, Fluent was also tested using data from test No. 8 of the U.S. Department of Energy's Burro Tests series[63], as described in Appendix A.[64]

[63] R.P. Koopman et al., "LLNL/NWC1980 LNG spill tests. Burro Series Data Report", UCID-19075-Vol.1, Dec. 1982.

[64] This validation exercise was performed for Fluent version 6.3, which is also the version used for the consequence analysis modeling results presented in this report.

The flammable vapor dispersion results to the LFL are discussed below for the Membrane and Moss-style SRVs. Of the eight release scenarios, Scenario 3 and Scenario 7 are not evaluated for distance to LFL. The reason these scenarios have been omitted is that they represent the cascading release of three storage compartments of an SRV--Scenario 3 is a release from the membrane-style and Scenario 7 is a release from the Moss-style LNG carrier. Since these scenarios assume immediate ignition, the only potential consequence evaluated for these scenarios in the IRA is a pool fire and resultant thermal radiation.

Since the intentional and vessel collision breach sizes for both the membrane and Moss-style LNG carrier are similar for this project, only the LNG vessel style that results in the greatest flammable vapor dispersion distances (bounding case) for the intentional and accidental scenarios is reported in the IRA. From Section 7.7 it was shown that for a given release size, the Moss-style LNG carrier will results in the greatest flammable vapor dispersion distance. Therefore, only the results of the Moss-style LNG carrier are presented in this section (Scenarios 5, 6, and 8).

7.11.1 Scenario 5 - Vapor Cloud Dispersion Results

Snapshots from the simulation of the flammable vapor cloud dispersion for Scenario 5 are shown in Figure 7-7. The plots show the footprint of the 5% (by volume) gas concentration cloud, color-coded to show the thickness of the flammable cloud. The sequence of images shows the initial growth of the flammable cloud and its progressive dissipation once the LNG pool is depleted.

The downwind evolution of the LNG vapor cloud is described in Figure 7-8, which shows the maximum downwind distance to LFL as a function of time. The maximum distance reached by the flammable vapors in Scenario 5 is approximately 4,980 m from the location of the spill. The maximum distance to LFL is reached approximately 26 minutes after the initiating event.

The crosswind dispersion of the flammable vapor cloud as a function of time is shown in Figure 7-9. The maximum cloud half width is approximately 2,285 m and occurs approximately 23 minutes after the initiating event.

The LNG vapor cloud is initially cold (approximately -162°C) and heavier than air. The CFD simulation indicates that the vapor cloud remains heavier than air while in the flammable range. Figure 7-10 shows the thickness of the flammable vapor cloud as a function of time. The flammable cloud reaches approximately 110 m high, approximately 10.3 minutes after the initiating event.

Figure 7-7: Snapshots of the LFL Vapor Cloud Simulation for Scenario 5

(from left to right, top to bottom: t = 420 s; 720 s; 1020 s; 1200 s; 1380 s; 1560 s). Domain Size is 17.5 km in the X direction by 20 km in the Y direction. Cloud is color-coded according to the local cloud thickness in meters.

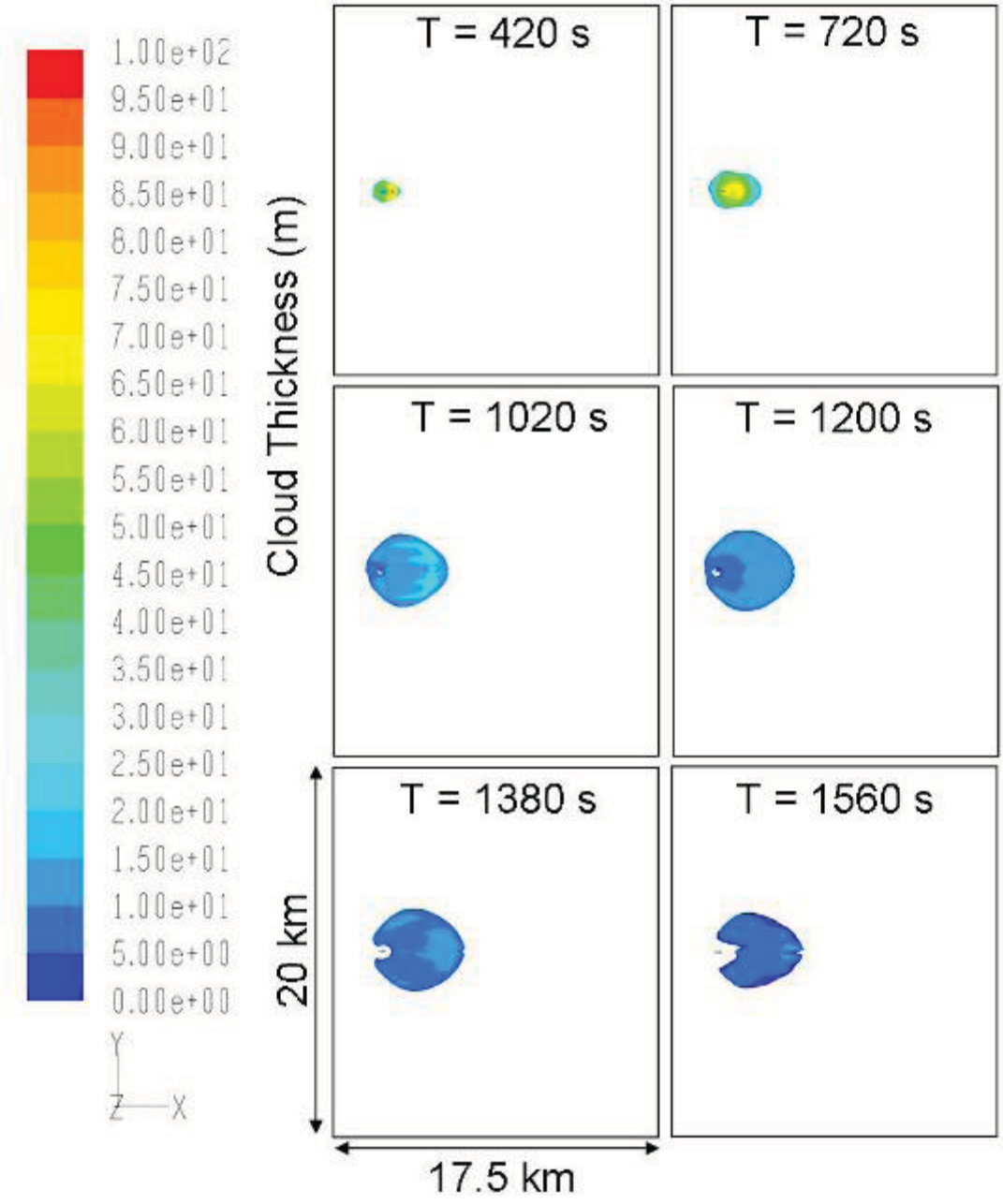


Figure 7-8: Distance to LFL as a Function of Time (Scenario 5)

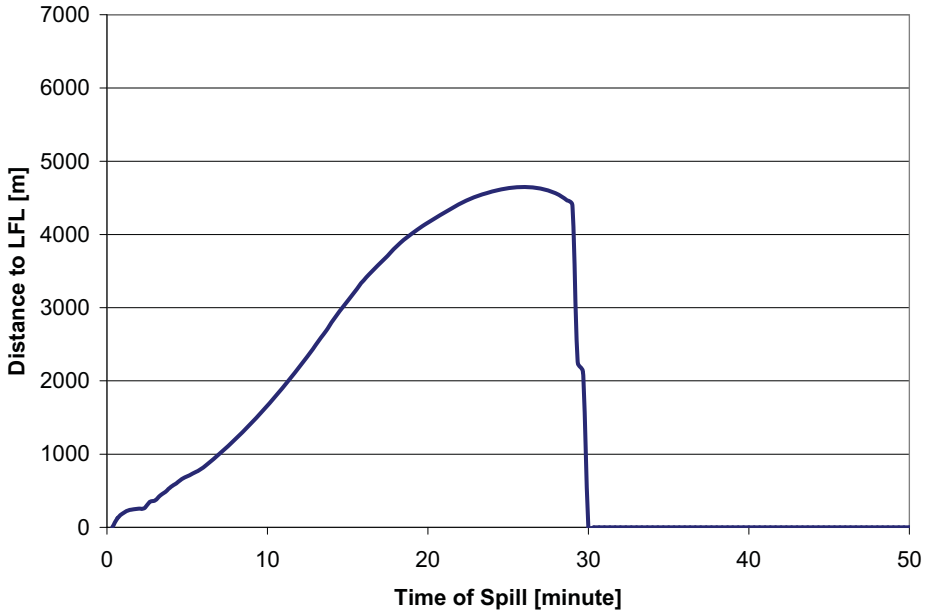


Figure 7-9: Flammable Vapor Cloud Half Width (Crosswind) as a Function of Time (Scenario 5)

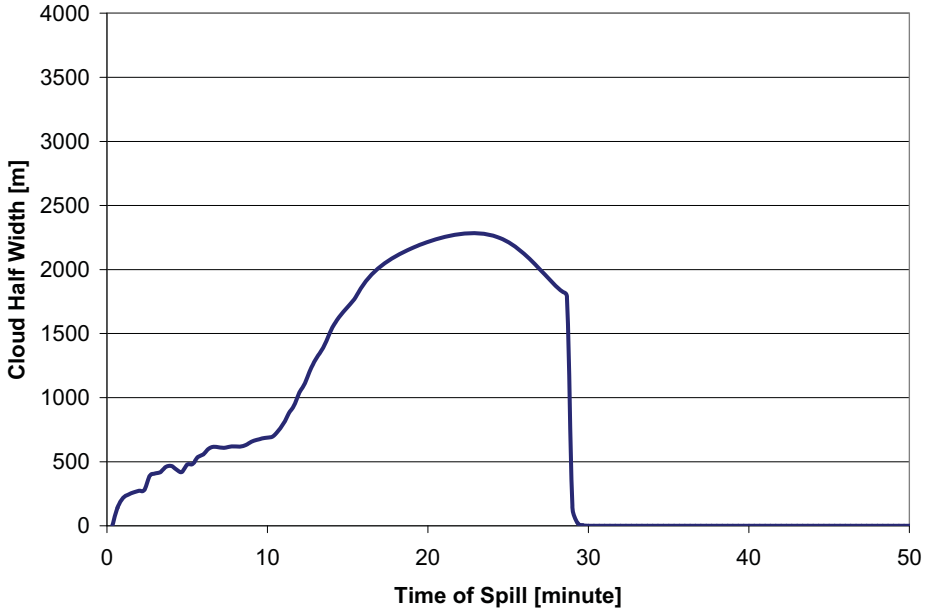
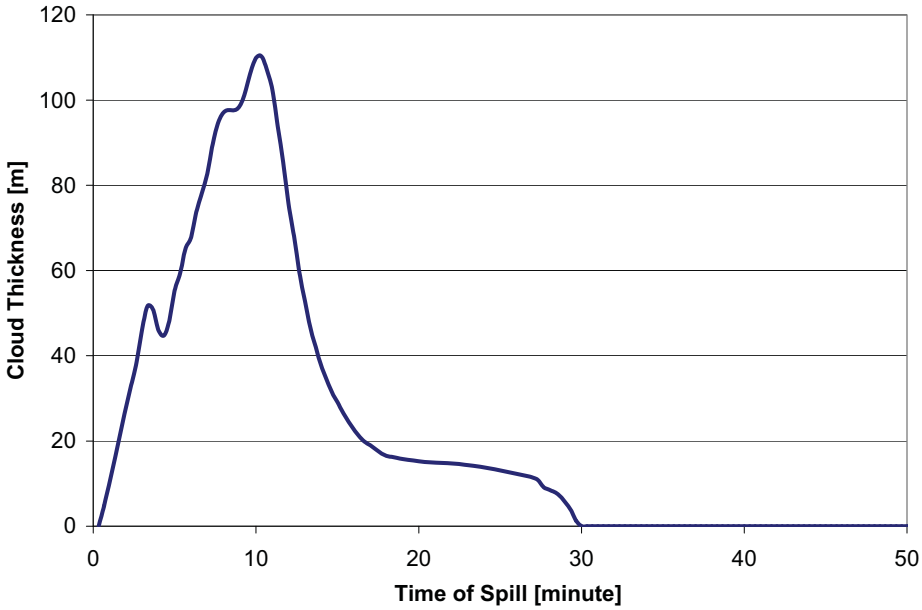


Figure 7-10: Flammable Vapor Cloud Thickness as a Function of Time (Scenario 5)



7.11.2 Scenario 6 - Vapor Cloud Dispersion Results

Snapshots from the simulation of the flammable vapor cloud dispersion for Scenario 6 are shown in Figure 7-11. The plots show the footprint of the 5% (by volume) gas concentration contour, color-coded to show the thickness of the flammable cloud. The sequence of images shows the initial growth of the flammable cloud and its progressive dissipation once the LNG pool is depleted.

The downwind evolution of the LNG vapor cloud is described in Figure 7-12, which shows the maximum downwind distance to LFL as a function of time. The maximum distance reached by the flammable vapors in Scenario 6 is approximately 6,095 m from the location of the spill. The maximum distance to LFL is reached approximately 30 minutes after the initiating event.

The crosswind dispersion of the flammable vapor cloud as a function of time is shown in Figure 7-13. The maximum cloud half width is approximately 3,205 m and occurs approximately 27 minutes after the initiating event.

The LNG vapor cloud is initially cold (approximately -162°C) and heavier than air. The CFD simulation indicates that the vapor cloud remains heavier than air while in the flammable range. Figure 7-14 shows the thickness of the flammable vapor cloud as a function of time. The flammable cloud reaches approximately 112 m high, approximately 12.3 minutes after the initiating event.

Figure 7-11: Snapshots of the LFL Vapor Cloud Simulation for Scenario 6

(from left to right, top to bottom: t = 480 s; 840 s; 1020 s; 1260 s; 1440 s; 1800 s). Domain Size is 17.5 km in the X direction by 20 km in the Y direction. Cloud is color-coded according to the local cloud thickness in meters

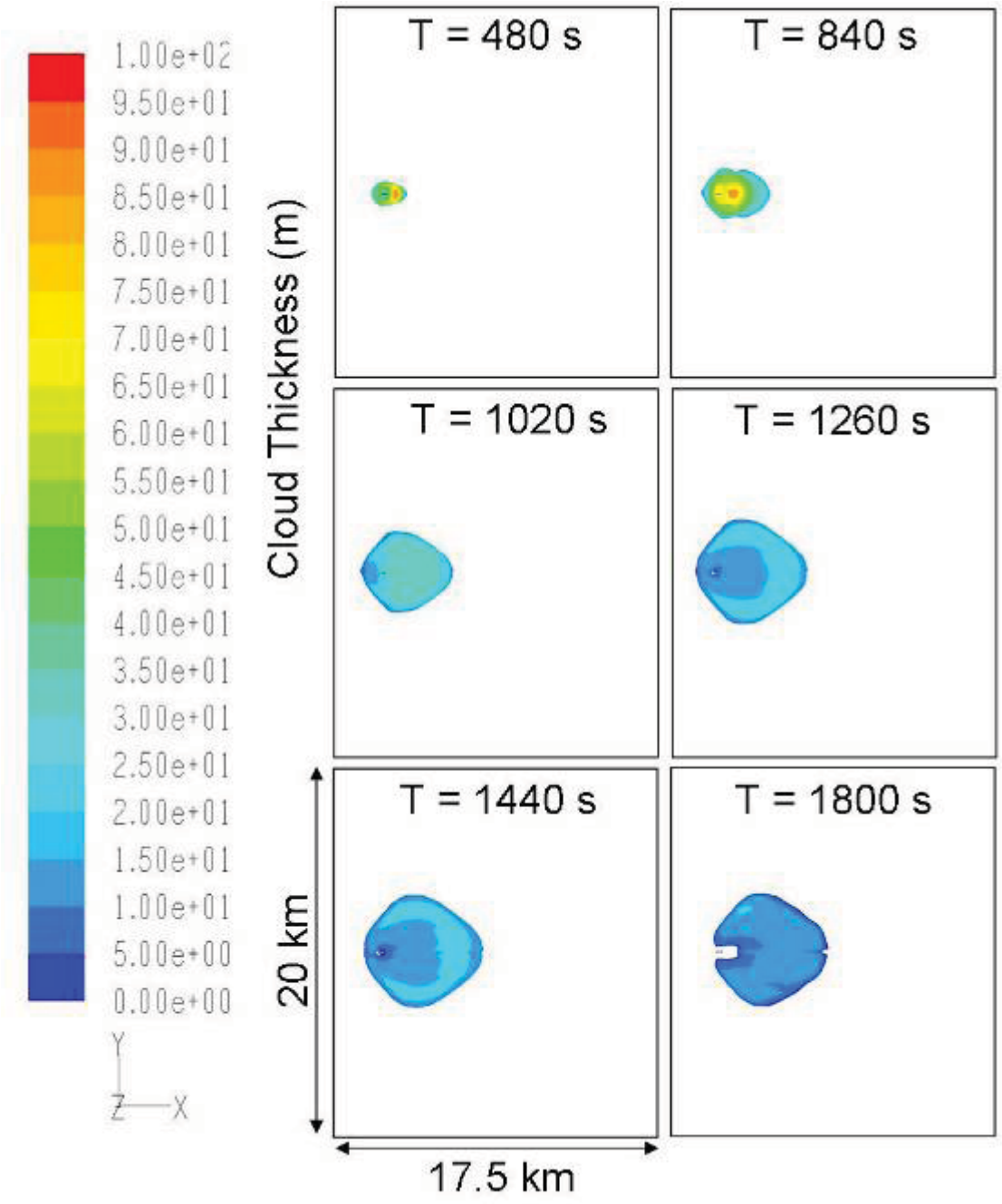


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Figure 7-12: Distance to LFL as a Function of Time (Scenario 6)

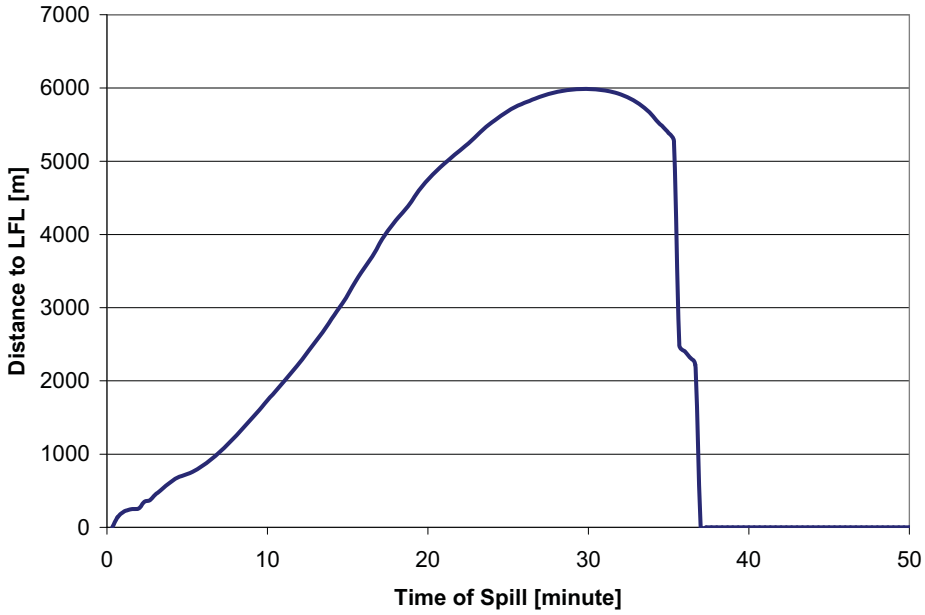


Figure 7-13: Flammable Vapor Cloud Half Width (Crosswind) as a Function of Time (Scenario 6)

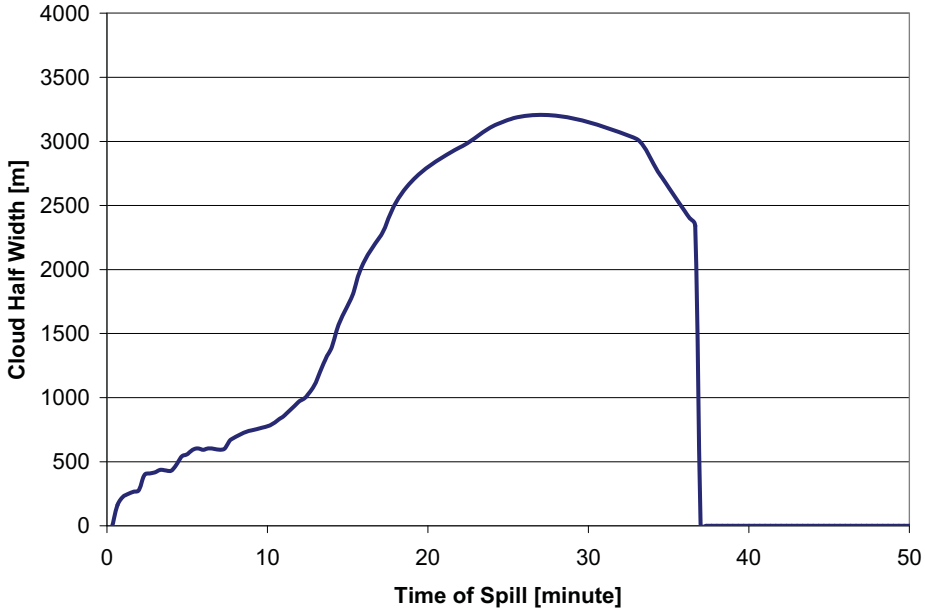
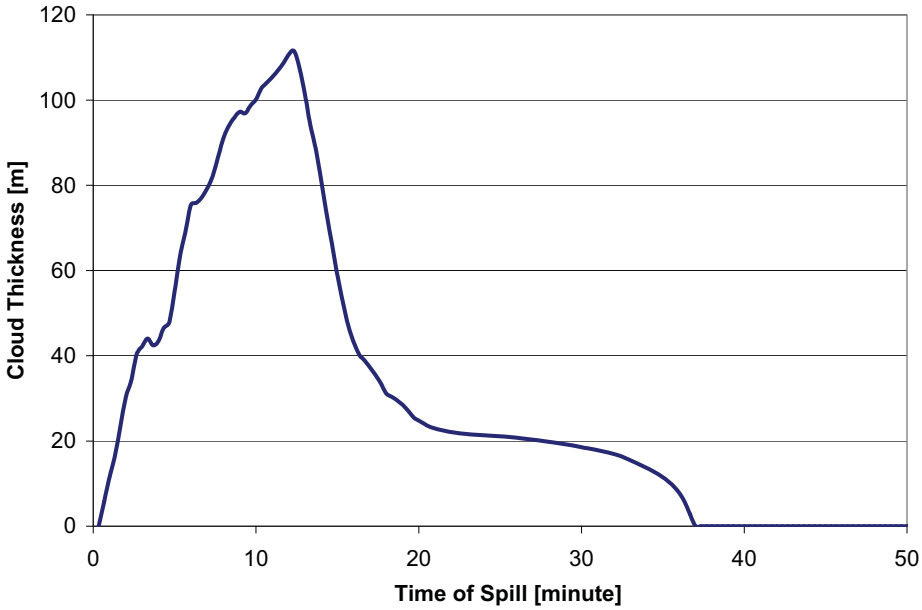


Figure 7-14: Flammable Vapor Cloud Thickness as a Function of Time (Scenario 6)



7.11.3 Scenario 8 - Vapor Cloud Dispersion Results

As discussed earlier Section 7.7, as part of the screening calculations, it was determined that the vapor dispersion hazard distance for Scenario 8 were similar to Scenarios 5, due to similar holes sizes for the intentional and accidental release scenarios. Therefore, as shown below in Table 7-20 the distances to LFL for scenario 5 and 8 are both equal to 4,980 meters.

7.11.4 Summary of Flammable Vapor Dispersion from LNG Pool on Water

The vapor cloud dispersion hazard distance was determined as the maximum downwind distance to the LFL. The vapor dispersion simulations were performed using Fluent, a commercial CFD code. Fluent was validated for this study by comparing it with experimental LNG vapor dispersion data from the Burro tests and demonstrating good agreement between the two (Appendix A). The vapor dispersion CFD analysis was performed for the most conservative hazard scenarios, specifically the intentional scenarios developed for a Moss-type SRV (Scenarios 5 and 6). The distances to LFL predicted by Fluent for these scenarios are listed in Table 7-20. Vapor dispersion distances are measured from the center of the LNG pool.

The vessel collision scenarios (Scenario 4 and 8) have consequences equal to intentional Scenarios 1 and 5 (for the respective SRV type). This is because the release size for these scenarios is comparable.

There are no flammable vapor dispersion results for the cascading failure scenarios (Scenario 3 and Scenario 7). Since these cases assume immediate ignition, the consequence of a release is a pool fire.

Table 7-20: Distances to LFL for vapor cloud dispersion from an LNG pool on water (measured from the center of the pool)

Scenario No.	Distance to LFL (meters)
Scenario 1	4,980
Scenario 2	6,095
Scenario 3	Not Evaluated (Immediate Ignition)
Scenario 4	4,980
Scenario 5	4,980
Scenario 6	6,095
Scenario 7	Not Evaluated (Immediate Ignition)
Scenario 8	4,980

8.0 IRA Results and Conclusions

The following section details the results of the consequence modeling and collision frequencies. Consequence results are depicted graphically on nautical charts.

8.1 Consequence Modeling Results

Thermal radiation hazard calculations from both pool fires and flammable vapor dispersion CFD modeling to the LFL were performed for the following LNG release scenarios:

- Intentional attack leading to a 16 m^2 breach in a single SRV tank.
- Intentional attack leading to a 12 m^2 breach in two (2) SRV tanks.
- Intentional attack leading to a 12 m^2 breach in three (3) SRV tanks.
- Vessel collision leading to a 22 m^2 breach in a single SRV tank.

Since the IRA defines and analyzes only the bounding intentional and vessel collision scenarios, the intentional scenario with the largest thermal radiation and flammable vapor dispersion results and the vessel collision scenario will be the focus of the Port Dolphin results. As detailed in Section 7 and presented below:

- Even though the membrane and Moss SRVs have different tank dimensions, the screening showed that the estimated hazard distances would be bounded by a release from the Moss-style SRV. Therefore, the consequence modeling for all release scenarios was performed for the parameters of a Moss SRV. Specifically, the result from Scenarios 5, 6, 7, and 8 have been modeled.
- Scenario 6 (Intentional attack leading to a 12 m^2 breach in two (2) SRV tanks) is the bounding intentional scenario for vapor cloud dispersion.
- Scenario 7 (Intentional attack leading to a 12 m^2 breach in three (3) SRV tanks) is the bounding intentional scenario for pool fire. Since this scenario assumes immediate ignition (there would be no vapor cloud hazard) and cascading damage, the consequences are limited to thermal radiation. As such, Scenario 7 is the bounding thermal radiation scenario and Scenario 6 in the bounding flammable vapor dispersion scenario for the intentional attacks.
- Scenario 8 results for thermal radiation and vapor cloud dispersion are presented for a vessel collision with a Moss-design SRV and can be compared to the bounding intentional scenarios (22 m^2 breach).
- Scenario 5 graphical overlays centered at the DWP are not presented in the results and conclusions as the consequence zones for this intentional scenario are smaller than for Scenario 6 and 7 (Scenario 5 is not the bounding intentional scenario).

8.1.1 Thermal Radiation Hazard Distances from Pool Fire

Thermal radiation hazard distances from a pool fire were estimated to two different heat flux levels:

- 37.5 kW/m^2: Damage to process equipment and storage tanks for unprotected exposures based on an average 10-minute exposure duration, as well immediate fatalities
- 5 kW/m^2: Permissible level for emergency operations lasting several minutes with appropriate clothing based on an average 10-minute exposed duration and onset of second degree burns based on an average 40-second exposed duration

Table 8-1 details the pool fire consequence results for the intentional (Scenario 5-7) and vessel collision (Scenario 8). This table details the number of tanks breached, release quantity (from the tank(s) breached), pool fire diameter (from the ship which is the origin of the spill), and distances to the 37.5kW/m^2 and 5kW/m^2 thermal radiation endpoints. For the Moss-style SRV the release quantity is equal to 90.3% of the storage volume in each tank involved in the scenario. This is the volume of LNG at, or above, the waterline of the SRV.

Table 8-1: Distances to Selected Thermal Radiation Hazard Levels

(distances measured from the center of the pool)

Result	Scenario 5 (Intentional)	Scenario 6 (Intentional)	Scenario 7 (Intentional)	Scenario 8 (Vessel Collision)
Breach Size, m^2	16	12	12	22
Number of Tanks	1	2	3	1
Capacity of Tank(s), m^3	54,362	108,724	163,086	54,362
Release Quantity, m^3	48,330	96,660	144,990	48,330
Thermal Radiation Hazard Maximum Distance to Endpoint (meters)				
Pool Diameter (immediate ignition)	840	1,060	**1,260**	**840**
Heat Flux > 37.5kW/m^2	1,390	1,710	**1,990**	**1,390**
Heat Flux > 5 kW/m^2	3,140	3,960	**4,680**	**3,140**

The results and conclusions for this risk analysis have considered the most conservative thermal radiation distances. These results have been highlighted in bold-face type in Table 8-1. As shown, Scenario 7 is the bounding case for the intentional scenarios.

8.1.2 Flammable Vapor Cloud Dispersion

The vapor cloud dispersion hazard distance was reported as the maximum downwind distance to the Lower Flammability Limit (LFL).

The flammable vapor cloud dispersion simulations were performed using Fluent, a commercial CFD code. Fluent was validated for this study and compared favorably with experimental LNG vapor dispersion data from the Burro tests (Appendix A). The distances to LFL predicted by

Fluent for the intentional and accidental release scenarios are detailed in Table 8-2. All distances are measured from the center of the LNG pool.

Table 8-2: Distance to LFL

(distance measured from the center of the pool)

Release Scenario	Distance to LFL (m)
Scenario 5 (Intentional)	4,980
Scenario 6 (Intentional)	6,095
Scenario 7 (Intentional)	***Immediate Ignition No Vapor Cloud Hazard***
Scenario 8 (Vessel Collision)	4,980

The major hazard of this consequence is the ignition and combustion of the flammable gas within the cloud--called a flash fire. A flash fire can result in potential impacts to the public and property. Due to the speed of the flame (as it propagates from the ignition source through the flammable range of the cloud), the impacts will be highly dependent on an individual's location (indoors vs. outdoors) and on the construction of the property exposed to the fire.

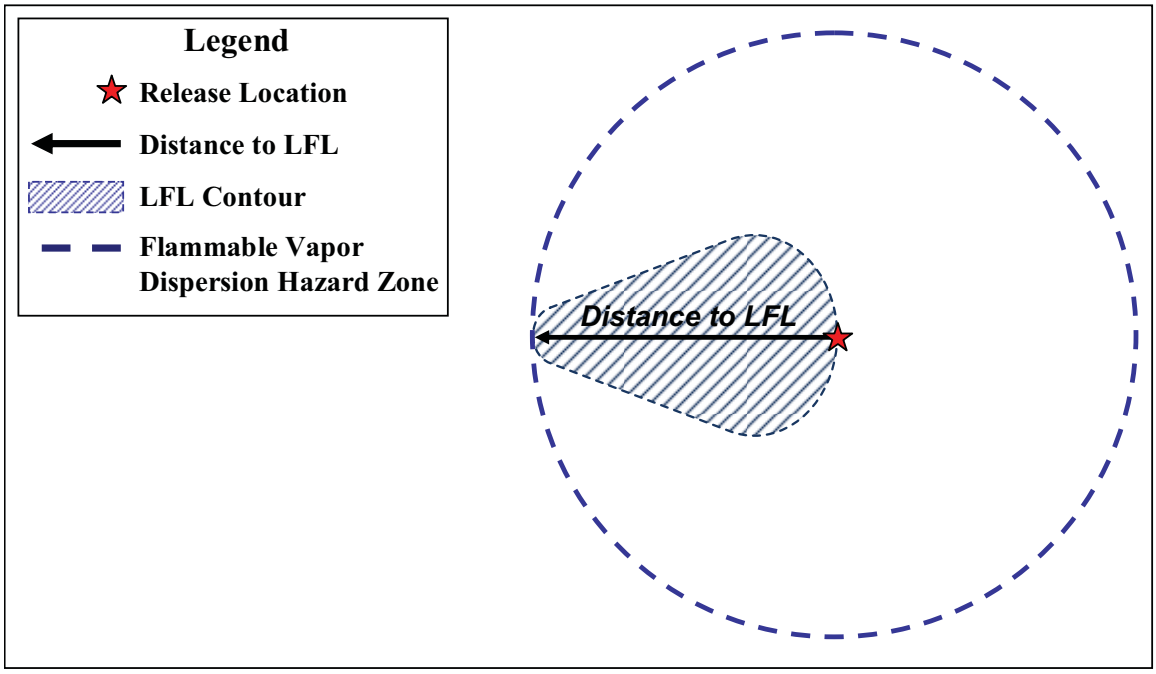
Thermal radiation effects from the vapor cloud fire can extend outside the flammable portion of the cloud and could result in a larger hazard distance as compared to the distance to LFL. But, due to the transient nature of this fire, the exposure duration from a flash fire is much shorter than exposure duration of a pool fire and is thus much shorter than the basis for the thermal radiation endpoints presented in Section 8.1.1. Assuming the flame acceleration of the flash fire is not impacted significantly by obstacles (consistent with the open nature of the DWP locations), the expected flame speed through the cloud could range from 8-17 m/s.[65] At these flame speeds, the exposure duration would not be significant, thus requiring a much higher thermal radiation exposure to result in comparable impacts to those listed in Section 8.1.1. Due to the uncertainty in the thermal radiation effects outside the flammable range of the vapor cloud, no additional thermal radiation has been considered and the hazard distances reported are limited to the distance to LFL.

For both the thermal radiation and flammable vapor dispersion consequence results, the hazard zones are presented in Section 8.3 as overlays at the DWP buoy locations. As compared to the pool fire consequence, where the thermal radiation hazard extends radially from the pool fire center (assumed to be the ship), the flammable vapor dispersion hazard will extend as a cloud dispersing in the downwind direction. Since the flammable vapor dispersion hazard zone is dependent on the wind direction at the time of release, the flammable vapor dispersion hazard zone overlays for the IRA are depicted as a circular area, with a radius equal to the maximum distance to the LFL, and centered at the spill location (assumed to be the ship). This representation of the flammable vapor hazard is independent of wind direction, illustrating the hazard from all wind directions.

[65] P.K. Raj, et al., *Experiments involving pool and vapor fires from spills of liquefied natural gas on water*, Arthur D. Little, ADA 077073, June 1979.

As shown in Figure 8-1, the actual hazard of the flammable vapor dispersion consequence is only in the downwind direction, and only within the LFL contour. The contour is the outer shape of the cloud out to a concentration equal to the LFL. As a result of the large release quantities and large pool sizes associated with the bounding cases of the IRA, the LFL contour (5% methane concentration level) does not result in a dispersion profile with a classical cigar/elliptical shape. This cloud shape is also illustrated in the CFD results in Section 7, showing that near the origin of the spill the shape of the cloud is dominated by heavy gas effects and, farther down wind the cloud transitions to the more classical dispersion profile, tapering off at the maximum LFL distance. It should be noted that the illustration in Figure 8-1 has not been drawn to scale, and only illustrates the portion of the cloud with a concentration greater than or equal to the LFL. The illustration is presented here to inform the public that while the hazard zone is overlaid as a circle in Figure 8-4 and Figure D (in the Executive Summary), not all portions within the circular hazard zone are expected to be impacted from a release.

Figure 8-1: Example Flammable Vapor Dispersion Hazard Zone
(illustrated with predominate wind direction from the east)



8.2 Ship Collision Frequency Results

The total frequency of a collision with an SRV at the DWP was calculated for two vessel types: 1) vessels in the established Port of Tampa Vessel Safety Fairway; and, 2) vessels randomly passing the DWP location. This calculation utilized vessel traffic from the AIS dataset for this project and only included those vessels with the potential to breach the inner hull of the SRV in a collision.

Due to the distance from the safety fairway to the DWP (11 miles to the North buoy) the likelihood of a powered and drifting collision in this defined route and the SRV was very unlikely. In addition to vessels in the defined fairway, vessels of sufficient displacement and speed were identified that passed near the DWP. Using the collision frequency calculation for randomly distributed vessels, a collision frequency of 1.4×10^{-4} collisions per year was calculated. This vessel collision frequency can also be presented as one collision that could result in an inner hull breach of the SRV every 7,100 years.

Therefore, the collision frequency for the proposed DWP considering both vessels in the safety fairway and randomly distributed around the DWP is shown in Table 8-3.

Table 8-3: Frequency of Vessel Collisions for Proposed DWP

LOCATION	FREQUENCY OF VESSEL COLLISION (PER YEAR BASIS)	FREQUENCY OF VESSEL COLLISION (YEARS PER COLLISION BASIS)
SRV at Port Dolphin DWP	1.4×10^{-4}	1 collision every 7, 100 years

8.3 Conclusions

The conclusions of the IRA are presented as the analysis of the following proposed Project combinations as specified by USCG:

- Alternative A: Baseline, no DWP built
- Alternative B: Port Dolphin built

If the Port Dolphin project is built (Alternative B), there is only one area where the potential hazard zones for thermal radiation and flammable vapor dispersion need to be considered and that is directly around the DWP buoys as illustrated by the consequence modeling zones. No results are shown for Alternative A (Baseline, no DWP built) as this alternative is simply the "as-is" case for the Tampa Bay area and the proposed DWP location.

The conclusions of this risk assessment are presented as the hazard zones for thermal radiation hazard and vapor cloud dispersion for the worst case bounding scenarios evaluated. The hazard zones have been presented as graphical overlays on the nautical chart for the proposed DWP project location. The results of the Port Dolphin IRA are presented without passing judgment on the merits of the applicant's proposed DWP. While the IRA evaluated the potential impacts to the public or surrounding infrastructure, it did not attempt to predict the number of estimated fatalities or injuries from these events. Also, the IRA was completed without considering any mitigation measures that could be implemented to reduce the risk of accidental or intentional release of LNG from this proposed project.

For reference, two thermal radiation endpoint levels are evaluated and presented and are defined as:

- 37.5 kW/m^2: Damage to process equipment and storage tanks for unprotected exposures based on an average 10-minute exposure duration, as well immediate fatalities
- 5 kW/m^2: Permissible level for emergency operations lasting several minutes with appropriate clothing based on an average 10-minute exposed duration and onset of second degree burns based on an average 40-second exposed duration

The pool fire calculations report the distance to each of these two thermal radiation hazard zones estimated, respectively, from the SRV release location, and measured from the center of the pool fire. The vapor cloud dispersion hazard distance was determined as the maximum downwind distance to the Lower Flammability Limit (LFL).

8.3.1 Port Dolphin DWP Area Consequence Results

This section presents the thermal radiation and flammable vapor dispersion hazard zones at the Port Dolphin DWP buoy locations. As discussed in this report, the project consists of two buoy locations (North and South) where an SRV can be moored, regasify LNG, and distribute natural gas into the subsea pipeline to shore. A summary table detailing the consequence modeling results for the bounding release scenarios (Moss-type carrier) evaluated in the risk assessment is presented in Table 8-4.

Table 8-4: Consequence Modeling Summary Results - Moss Carrier

(distances measured from the center of the pool)

Result	Scenario 6 (Intentional)	Scenario 7 (Intentional)	Scenario 8 (Collision)
Breach Size, m^2	12	12	22
Number of Tanks	2	3	1
Total Capacity of Impacted Tank(s), m^3	108,724	163,086	54,362
Release Quantity, m^3	96,660	144,990	48,330
Pool Fire Maximum Distance to Endpoint (meters)			
Pool Diameter (immediate ignition)	1,060	1,260	840
Thermal Radiation Endpoint > 37.5kW/m^2	1,710	1,990	1,390
Thermal Radiation Endpoint > 5 kW/m^2	3,960	4,680	3,140
Flammable Vapor Cloud Dispersion (No Ignition)			
Distance to LFL, m	6,095	***Immediate Ignition No Vapor Cloud Hazard***	4,980
Time for Maximum Distance, min	30		26
Cloud Peak Elevation, m	112		110

The pool fire and thermal radiation results for Scenarios 7 and 8 are shown in Figure 8-2 and Figure 8-3, respectively. These scenarios represent the bounding thermal radiation hazards for the intentional and vessel collision scenarios. In Figures 8-2 and 8-3, the consequence is shown as the radial distance overlaid and centered at the North or South buoy to the two thermal radiation hazard endpoints. The hazard zones of Scenario 7, modeled as an intentional 12 m^2 breach in three of the LNG compartments of an SRV, extend farther than the thermal radiation zones for Scenarios 8 (vessel collision). As shown in Table 8-4, the thermal radiation distances for Scenario 7 extend 1,990 meters to 37.5 kW/m^2 and 4,680 meters to 5 kW/m^2. For Scenario 8, the distances are 1,390 meters to 37.5 kW/m^2 and 3,140 meters to 5 kW/m^2. These results and graphical overlays illustrate that neither a release of LNG from an intentional event (Scenario 7) nor from a vessel collision (Scenario 8) at either the North or South buoy would impact activities at the other buoy location from a sustained fire. For Scenario 7, the 5 kW/m^2 zone extends to about 500 m to the adjacent project buoy, but the impacts to another SRV (if at the DWP) are expected to be less than the impacts defined by this hazard zone. Additionally, the thermal radiation zones from these scenarios do not impact the vessel safety fairway or the nearest landmass. However, since the thermal radiation zones extend farther than the expected Safety Zone and the ATBA, there is a potential for a release and sustained fire at the DWP to impact private or commercial marine traffic in the vicinity of the DWP.

Figure 8-4 compares the flammable vapor dispersion results for Scenarios 6 and 8, represented as the distance to the LFL overlaid at the DWP buoy locations. As compared to the pool fire consequence, where the thermal radiation hazard extends radially from the pool fire center, the flammable vapor dispersion hazard will extend as a cloud dispersing in the downwind direction. The flammable vapor dispersion hazard (distance to LFL) is illustrated as a circle, since the

cloud could disperse in any of 360 degrees, depending on the wind direction at the time of release, as illustrated in Figure 8-1.

As illustrated in Figure 8-4, the intentional scenario (Scenario 6) results in the greatest distance to LFL, and an incident at either buoy could potentially impact the other buoy location. As shown in Table 8-4, the time to reach LFL is 30 minutes for Scenario 6 and 26 minutes for Scenario 8. Assuming the wind direction was toward a second SRV at the adjacent buoy, the other SRV has an emergency buoy disconnect that can shutdown re-gasification and disconnect the SRV in 15 minutes.

Since there is a potential to impact the adjacent buoy in a flammable vapor dispersion, or flash fire consequence, continuous Oceanweather hindcast from grid point 7919 was used to develop the wind rose for the Port Dolphin DWP. The full annual wind rose is presented in tabular format in Table 8-5. The wind rose data shows that if an unignited release were to occur at the North buoy there is a 5.1% chance the wind would be blowing toward the South buoy. Similarly if the release were to occur at the South buoy there is a 6.3% change the wind would be blowing toward the North buoy. Therefore, the predominant wind direction at the DWP is not toward either buoy, but rather from the east (11.6%) and out to sea.

Regardless of wind direction, neither the vessel safety fairway nor the shoreline would be impacted from a vapor cloud release at either buoy location, but the potential to impact private or commercial marine traffic in the vicinity of the DWP from a flash fire does exist due to the extent of the hazard distance.

Table 8-5: Port of Tampa - Wind Rose Data

Wind Direction (from)	Annual Percentage
N	6.1 %
NNE	7.2 %
NE	9.1 %
ENE	10.7 %
E	11.6 %
ESE	9.8 %
SE	7.3 %
SSE	6.3 %
S	5.1 %
SSW	4.2 %
SW	3.5 %
WSW	3.2 %
W	3.2 %
WNW	3.3 %
NW	4.3 %
NNW	5.1 %

Figure 8-2: Port Dolphin DWP (Thermal Radiation Hazard Zones - Scenario 7)

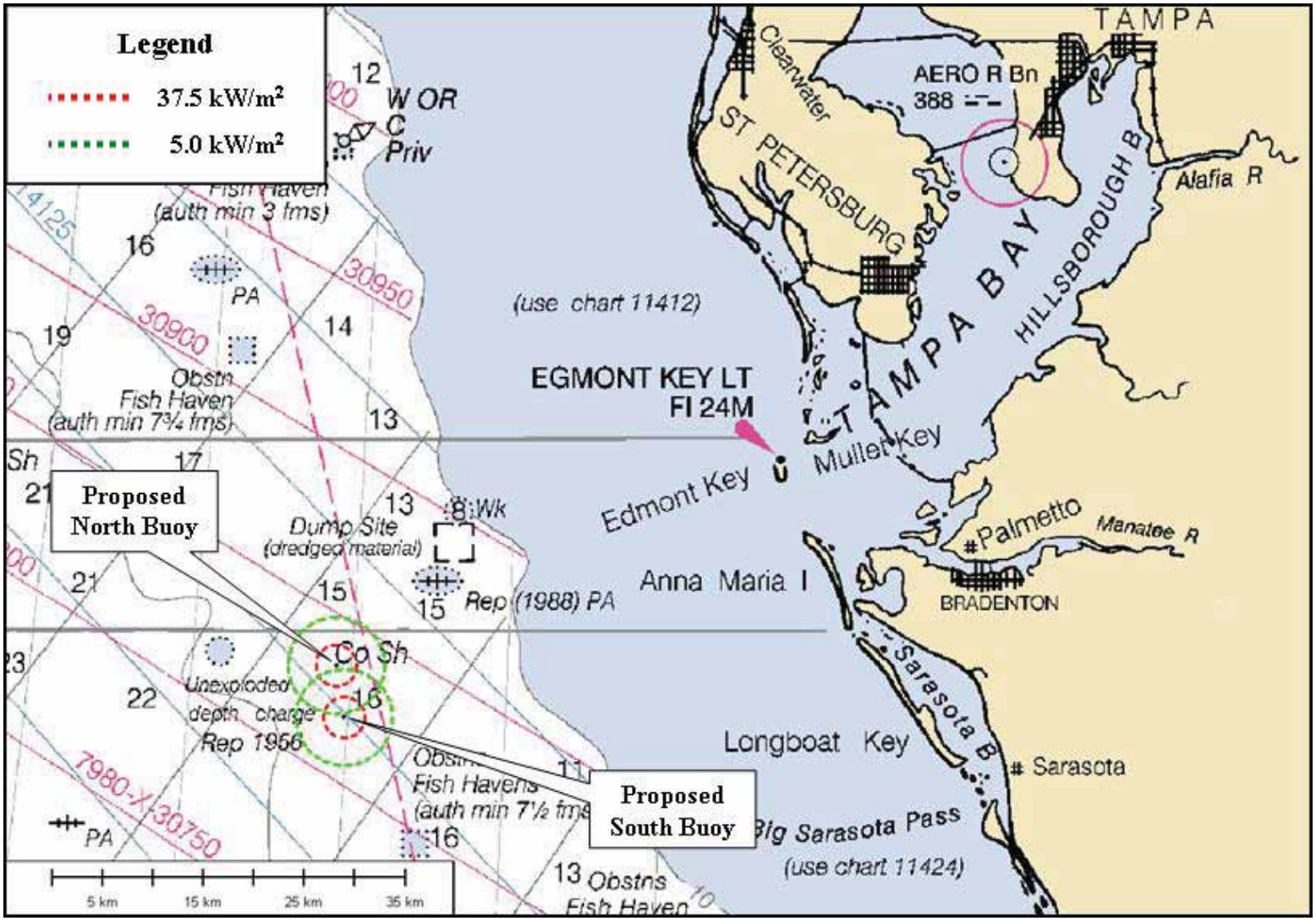


Figure 8-3: Port Dolphin DWP (Thermal Radiation Hazard Zones - Scenario 8)

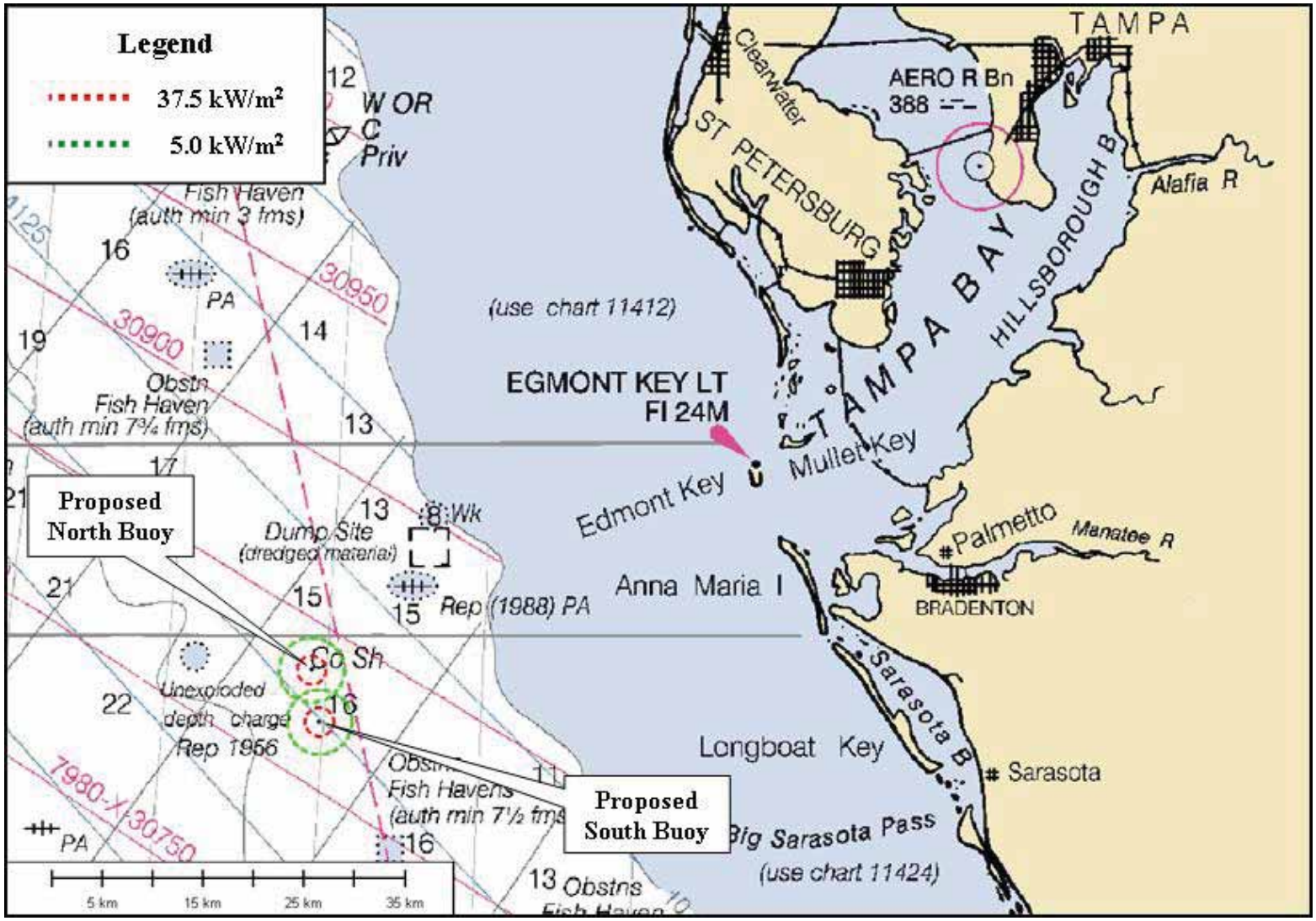
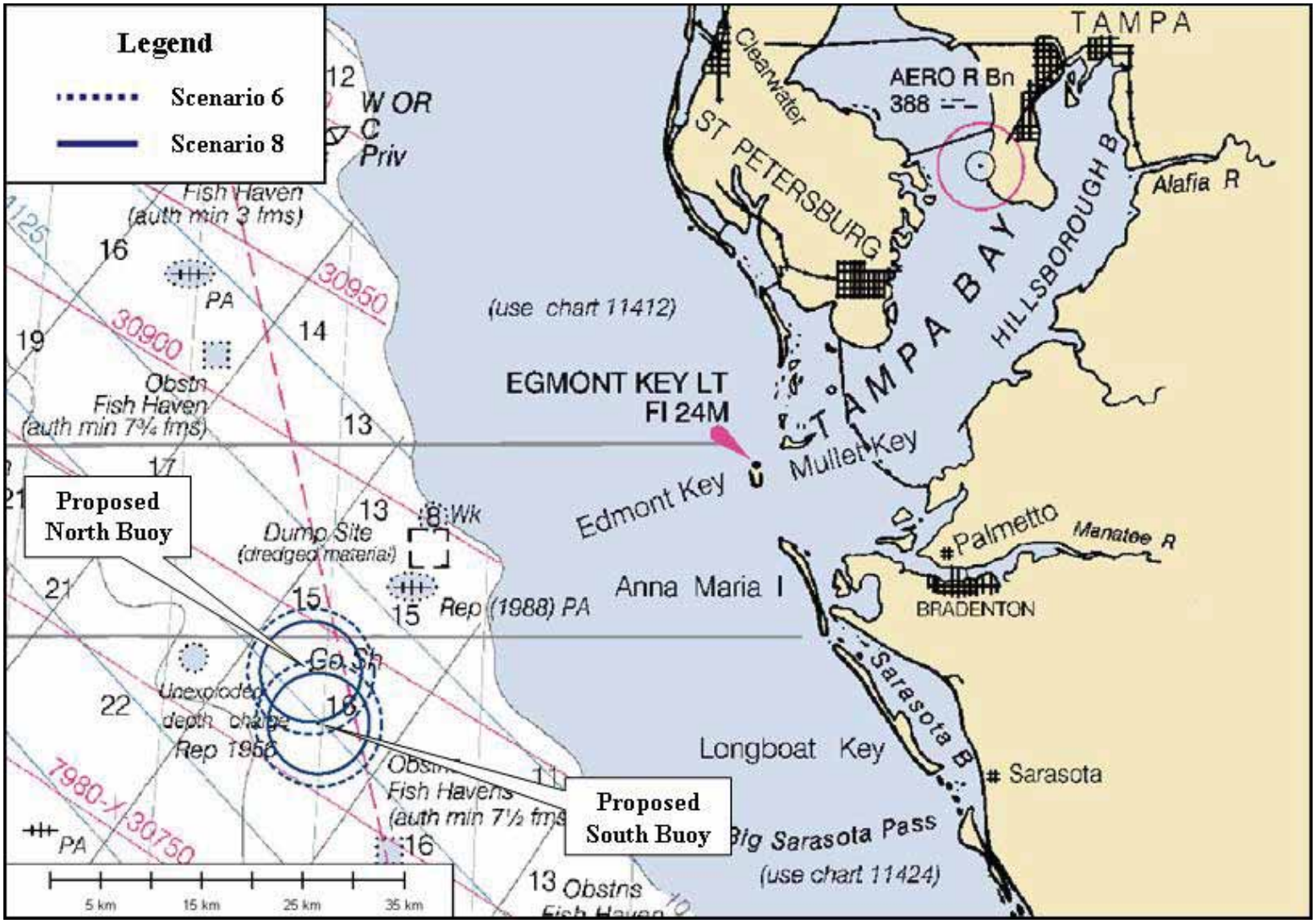


Figure 8-4: Port Dolphin DWP Vapor Cloud Dispersion - Distance to LFL



9.0 References

9.1 Standards:

- Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (Gas Carrier Code), 1983
- 1994/1996 Amendments to the IGC (replaced the Gas Carrier Code)
- DNV OS-F101, Det Norske Veritas, Submarine Pipeline Systems
- International Code for Ships Carrying Liquefied Gases in Bulk (International Gas Code [IGC])1993.
- International Convention for the Prevention of Collisions at Sea (COLREG)
- International Convention for the Safety of Life at Sea (SOLAS) (1974/1981)
- International Convention on Standards of Training, Certification and Watchkeeping (STCW) for Seafarers, 1978
- International Management Code for the Safe Operation of Ships and for Pollution Prevention (International Safety Management Code [ISM Code], adopted by IMO Resolution A.741 (18) in 1994
- International Safety Management Code

9.2 Regulatory References:

- Deepwater Port Act of 1974 as amended by the Maritime Transportation Security Act of 2002; (33 United States Code 1501)
- LNG Facilities: Federal Safety Standards (49 CFR 193)
- Maritime Transportation Security Act of 2002 (MTSA)
- Natural Gas Pipeline Safety Act of 1968, as amended, (NGPSA) and Hazardous Liquid Pipeline Safety Act of 1979 as amended (HLPSA) both recodified as 49 U.S.C. Chapter 601
- National Environmental Policy Act (NEPA)
- Notice of Availability of Detailed Computations for the Consequence Assessment Methods for Incidents Involving Releases from Liquefied Natural Gas Carriers, Federal Energy Regulatory Commission, Docket No. A04-6-000, June 29, 2004.
- Title 33 USC 1501 (Deepwater Port Act of 1974 as amended by the Maritime Transportation Security Act of 2002)
- Title 49 CFR 190-199 (Pipeline Safety Programs)
- Title 49 CFR 193.2057 (Liquefied Natural Gas Facilities: Federal Safety Standards -- Thermal Radiation Protection)
- Title 49 CFR 193.2059 (Liquefied Natural Gas Facilities: Federal Safety Standards -- Flammable Vapor-Gas Dispersion Protection)

Appendix A - Benchmark Test for Fluent Validation

Flammable Vapor Cloud Dispersion Modeling

If the LNG vapors emanating from the LNG pool water surface are not ignited in proximity of the pool, the LNG vapors will be transported downwind. The vapor cloud is initially cold and dense, but becomes lighter as it moves away from the pool, entrains warmer air and absorbs heat from the environment. If the vapor cloud encounters a viable ignition source before the gas concentration drops below the LFL (5% by volume for methane in air), the cloud will ignite, resulting in a flash fire. Otherwise, the vapor cloud dissipates harmlessly in the atmosphere. The commercial code Fluent was selected to simulate the dispersion of the flammable vapor cloud resulting from the evaporation of an LNG spill over water. Fluent has been used extensively in dispersion analysis and has sophisticated atmospheric turbulence models that allow it to simulate different types of boundary layer profiles. In previous simulations of dense, large volume releases of cold air performed by Exponent, Fluent results compared favorably with validated models. Before modeling the vapor dispersion from the LNG tanker spill scenarios prescribed for this study, Fluent was also tested using data from test No. 8 of the U.S. Department of Energy's Burro Tests series[66], as described below.[67]

Benchmark Test for Fluent Validation

The Burro 8 test was selected as the benchmark to validate Fluent for the simulation of LNG vapor cloud dispersion over flat terrain (i.e., ocean). In the Burro 8 test, LNG was spilled onto a 58 m diameter water pond at a rate of 16 m^3/min for 107 seconds. The average wind speed during the test was 1.8 m/s (3.5 knots), and the direction of the wind was offset approximately 10 degrees with respect to the direction of the instrumentation array centerline. The LNG was allowed to vaporize and the dispersion of the vapor cloud was tracked by an array of detectors. The spill pond was surrounded by flat terrain without significant obstructions, which makes the geometry of the Burro tests similar to that of an LNG spill offshore. The terrain surrounding the Burro spill pond sloped slightly upwards, which contributed to limiting the dispersion of the vapor cloud; therefore, a simulation that does not account for the terrain slope is expected to result in longer distances to LFL.

A critical component of a CFD model of atmospheric flows is the selection of the wind, temperature and turbulence profiles. These profiles can only be imposed at one or more domain boundaries, and are then propagated throughout the domain by the CFD solver. An inadequate turbulence model will tend to smooth out the profiles imposed at the boundaries, which would effectively subject the LNG vapor cloud to a different environment than desired. The Burro 8 benchmark case was modeled with Fluent by implementing the Reynolds Stress (RS) turbulence model. The velocity and temperature profiles were imposed at the upwind boundary, to be

[66] R.P. Koopman et al., "LLNL/NWC1980 LNG spill tests. Burro Series Data Report", UCID-19075-Vol.1, Dec. 1982.
[67] This validation exercise was performed for Fluent version 6.3, which is also the version used for the consequence analysis modeling results presented in this report.

consistent with those measured during the Burro 8 test.[68] Figure A-1 shows the wind velocity profile at different locations along the simulation domain. The horizontal axis represents the wind velocity (wind blows along the X direction in the simulation domain), and the vertical axis represents the elevation above the water surface. Figure A-2 shows the temperature profile at different locations along the simulation domain. The horizontal axis represents the local temperature, and the vertical axis represents the elevation above the water surface. The off-center locations (top plots) show that both the velocity and temperature profiles remain consistent with the imposed boundary conditions throughout the domain (there is no effect from the cold plume at those locations). The locations along the plume centerline (bottom plots) show the strong effect of the cold vapor cloud on the velocity and temperature profiles.

[68] R.P. Koopman et al., "LLNL/NWC1980 LNG spill tests. Burro Series Data Report", UCID-19075-Vol.1, Dec. 1982.

Figure A-1: Vertical profile of wind velocity at different downwind locations for Burro 8 simulation (top: 500 m off-center; bottom: along plume centerline).

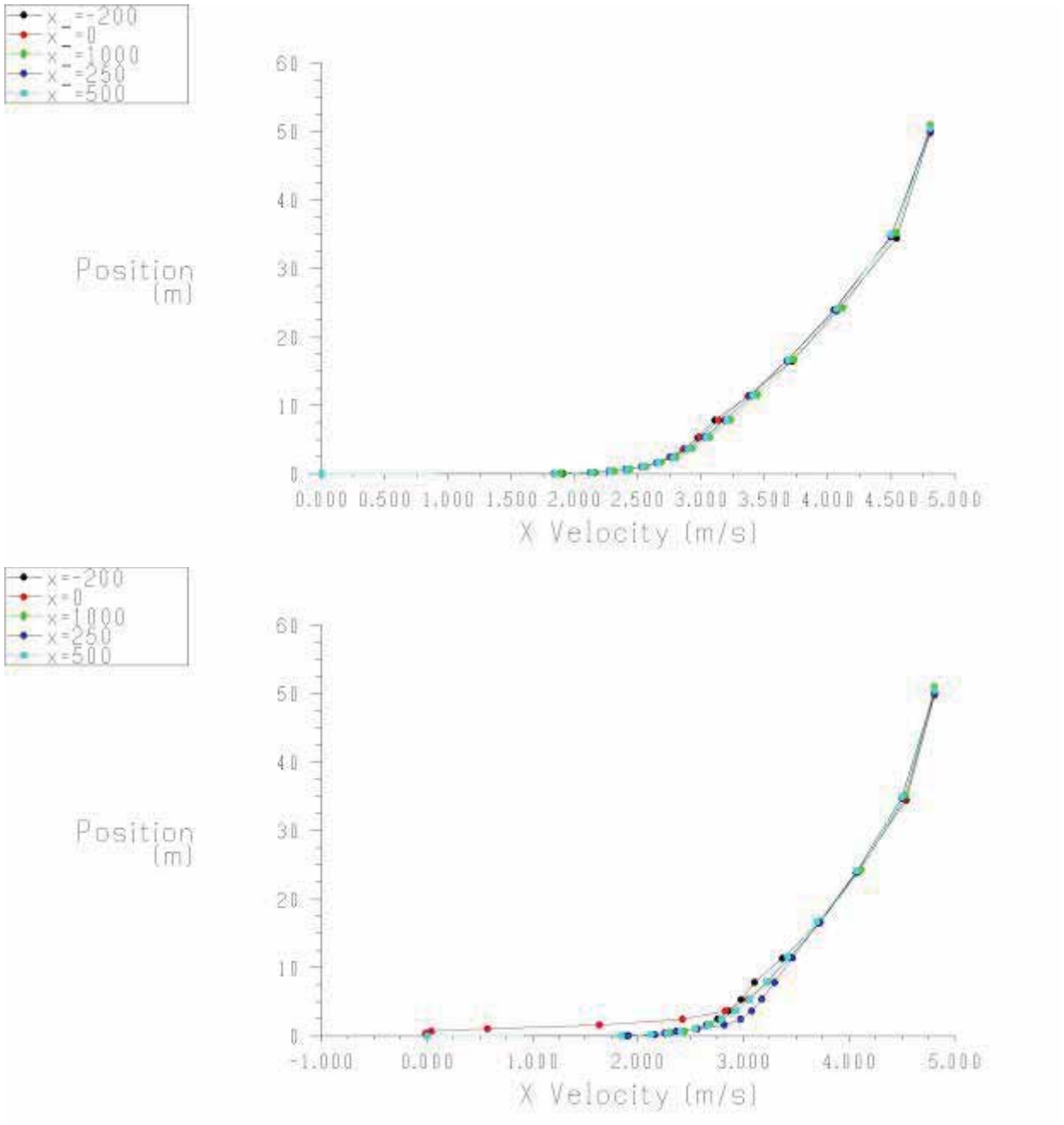
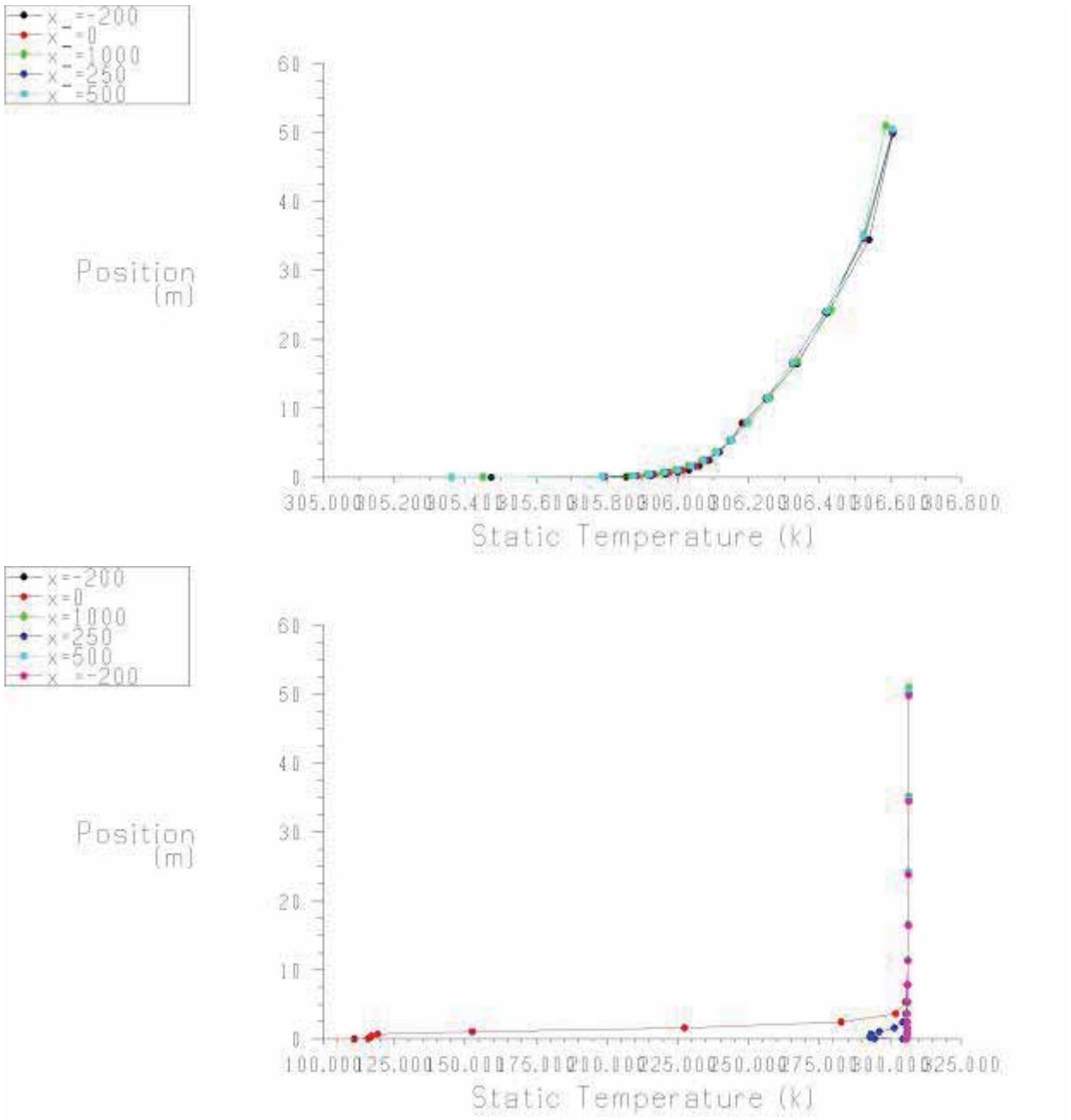


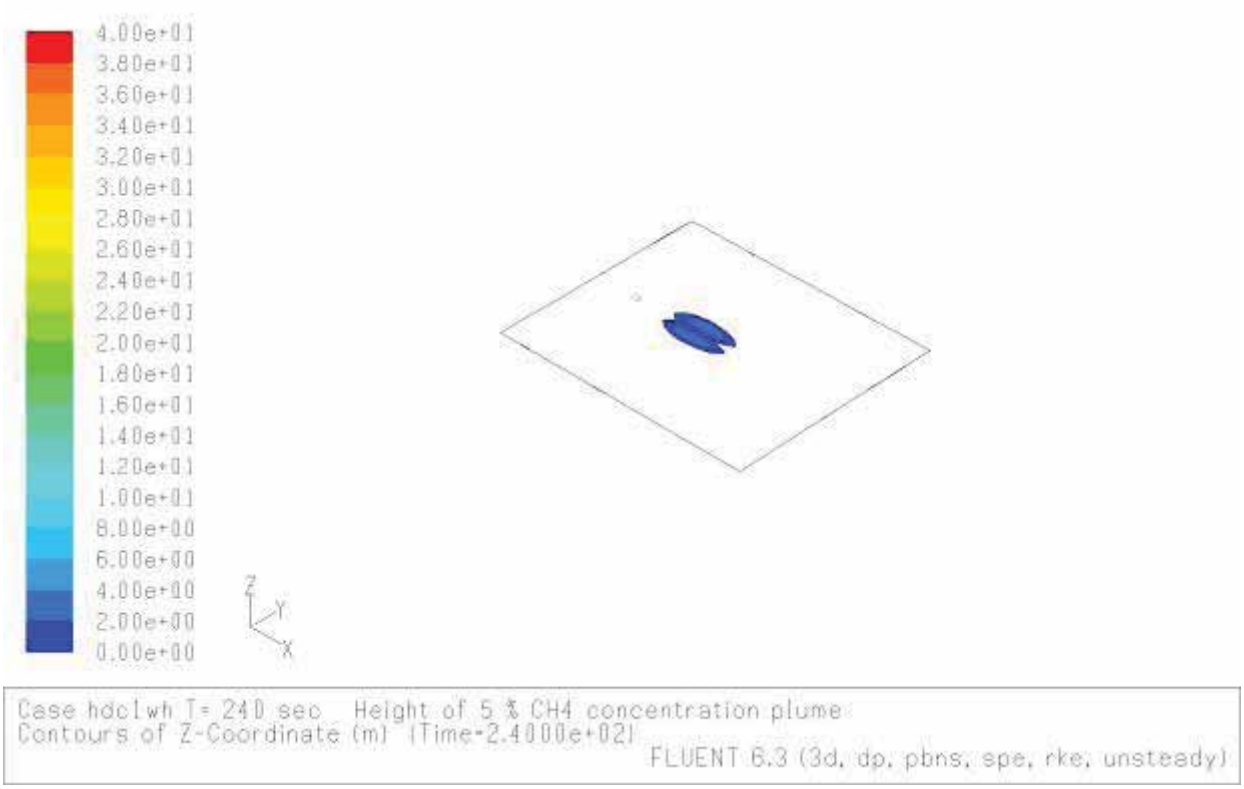
Figure A-2: Vertical profile of air temperature at different downwind locations for Burro 8 simulation (top: 500 m off-center; bottom: along plume centerline).



Downwind Dispersion Distance

A snapshot of the flammable vapor cloud footprint from the Fluent simulation of Burro 8 is shown in Figure A-3 (for scaling purposes, the dimensions of the simulation domain in the horizontal plane are 1.2 km long by 1.0 km wide). Fluent predicted a maximum downwind distance to LFL of approximately 477 m from the spill location. Sandia reported the maximum distance to LFL in the Burro 8 test to be approximately 420 m, when the wind direction offset is taken into account. The distance to LFL calculated by Fluent over predicts the experimental data by approximately 13.5%.

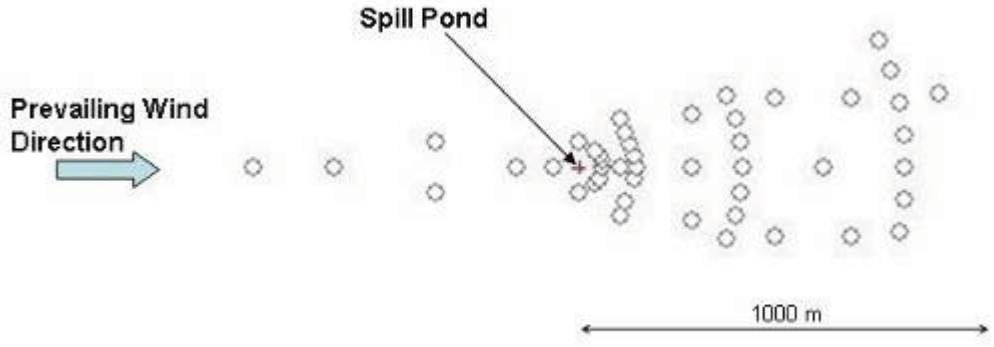
Figure A-3: Snapshot of Fluent's Burro 8 vapor dispersion simulation, showing the LFL isocontour for the vapor cloud 240 seconds into the test. The domain size is 1.2 km in the X direction by 1 km in the Y direction.



Gas Concentration at Selected Sensor Locations

The Burro test series setup included a large number of instruments, that were placed at several locations both upwind and downwind of the spill pond and measured various quantities, such as: air temperature and humidity; wind speed and direction; and gas concentration (Figure A-4).

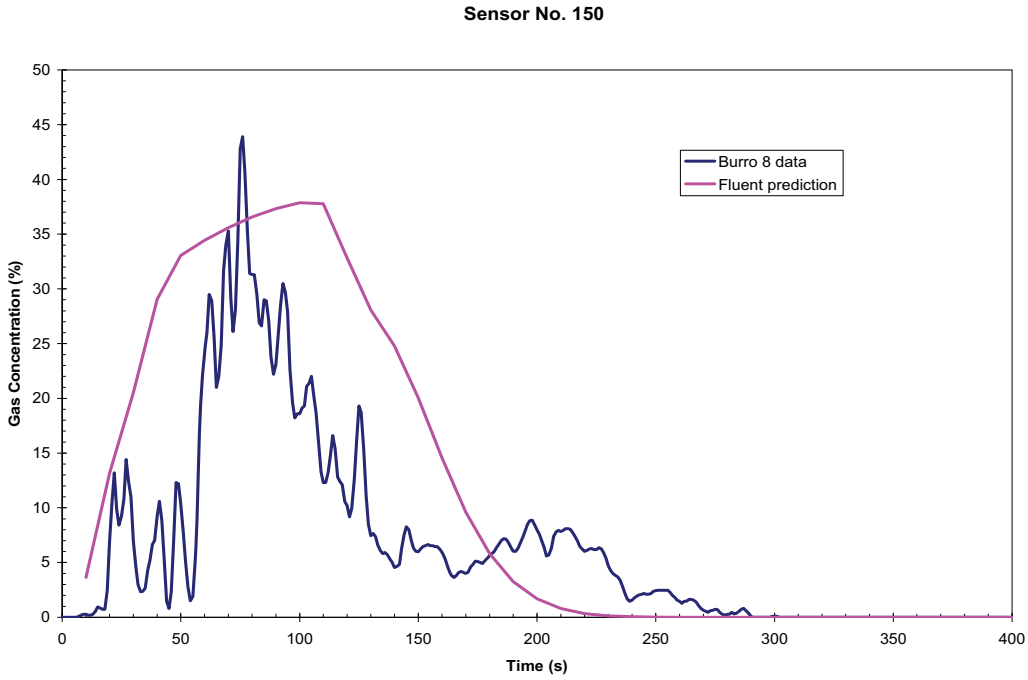
Figure A-4: Instrumentation locations for Burro 8 test.



A comparison between the gas concentration measurements performed during the Burro 8 test and the values predicted by the Fluent simulation showed very good agreement at several locations, primarily near the vapor cloud centerline and at lower elevations. Figure A-5 and Figure A-6 show the comparison between experimental and predicted gas concentration traces at sensors in the near-field (approximately 57 m distance) and far-field (approximately 400 m distance). The Fluent simulation matches the near-field data very closely, both in terms of peak concentration as well as in the timing of the cloud's arrival at the sensors. The Fluent simulation also predicts the peak concentration at the far-field sensor with good accuracy, although the simulated vapor cloud reaches the far-field sensor much earlier than the experimental trace. The main reason for this discrepancy is that during the Burro 8 test the wind speed progressively decreased and the wind direction fluctuated around the mean direction, whereas the Fluent simulation assumes the wind speed and direction to remain constant; as a result, the vapor cloud is expected to reach the far-field sensors faster in the simulation than during the test.

Figure A-5:

Comparison of experimental vs. predicted gas concentration traces at sensors 150 and 151 (both approximately 57 m downwind, 1 m above ground, and 15 m apart in the crosswind direction).



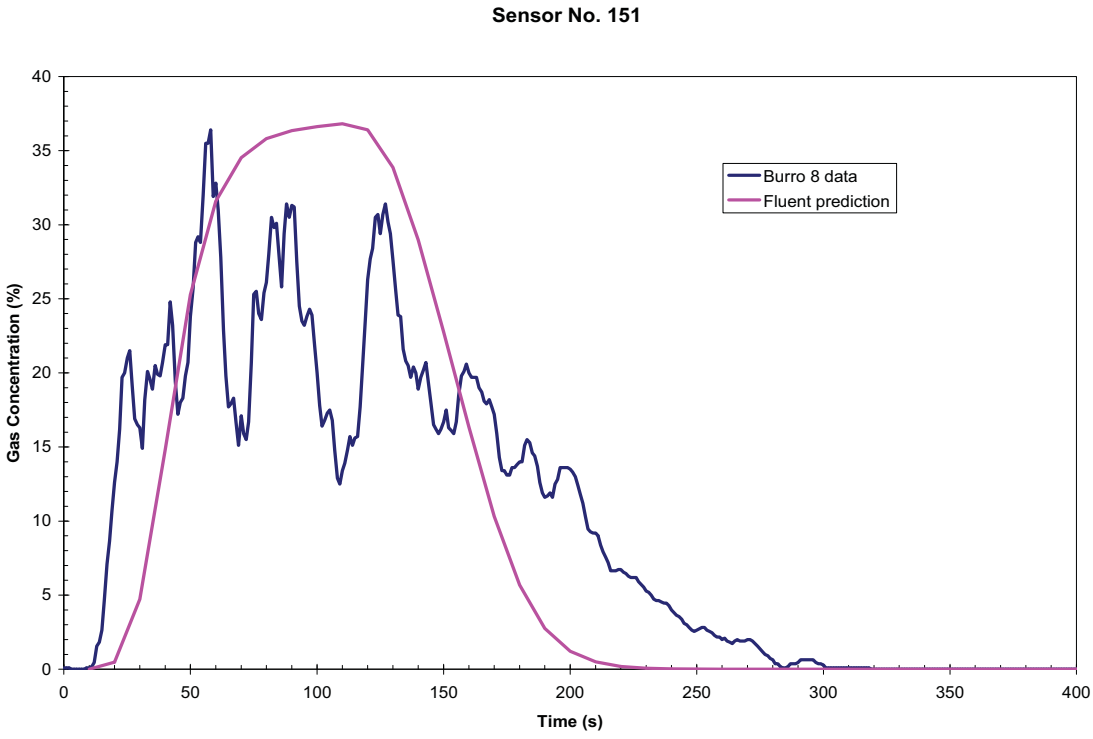
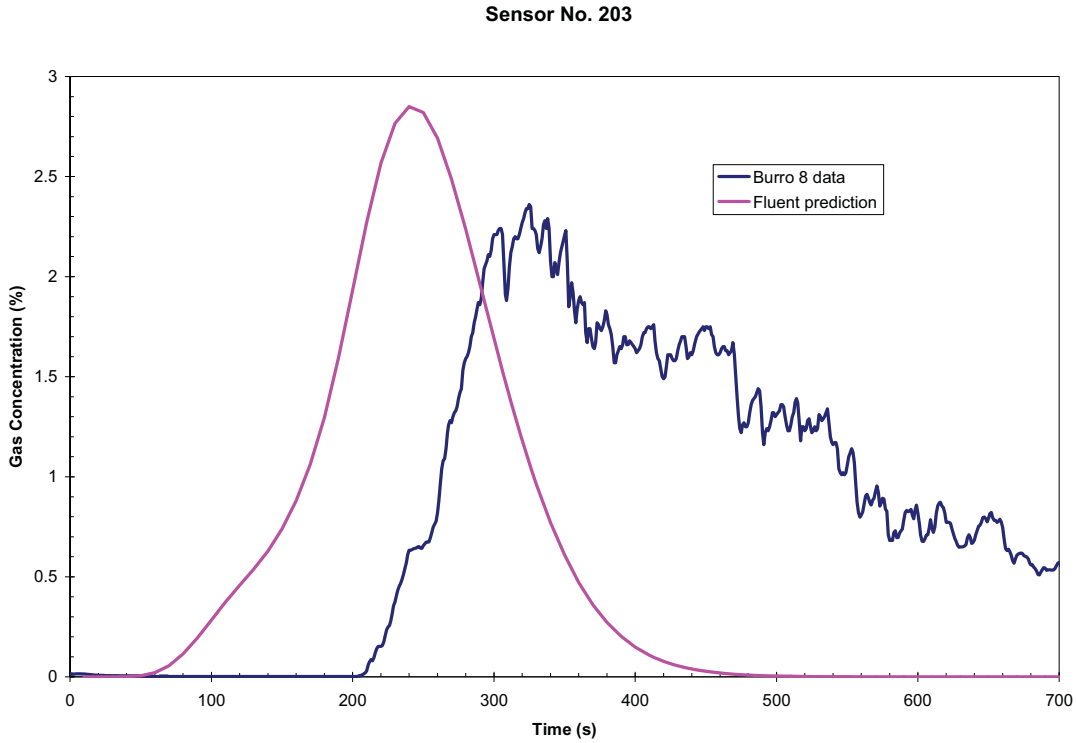


Figure A-6:

Comparison of experimental vs. predicted gas concentration traces at sensor 203 (approximately 400 m downwind, 3 m above ground and 22 m away from the cloud centerline in the crosswind direction).



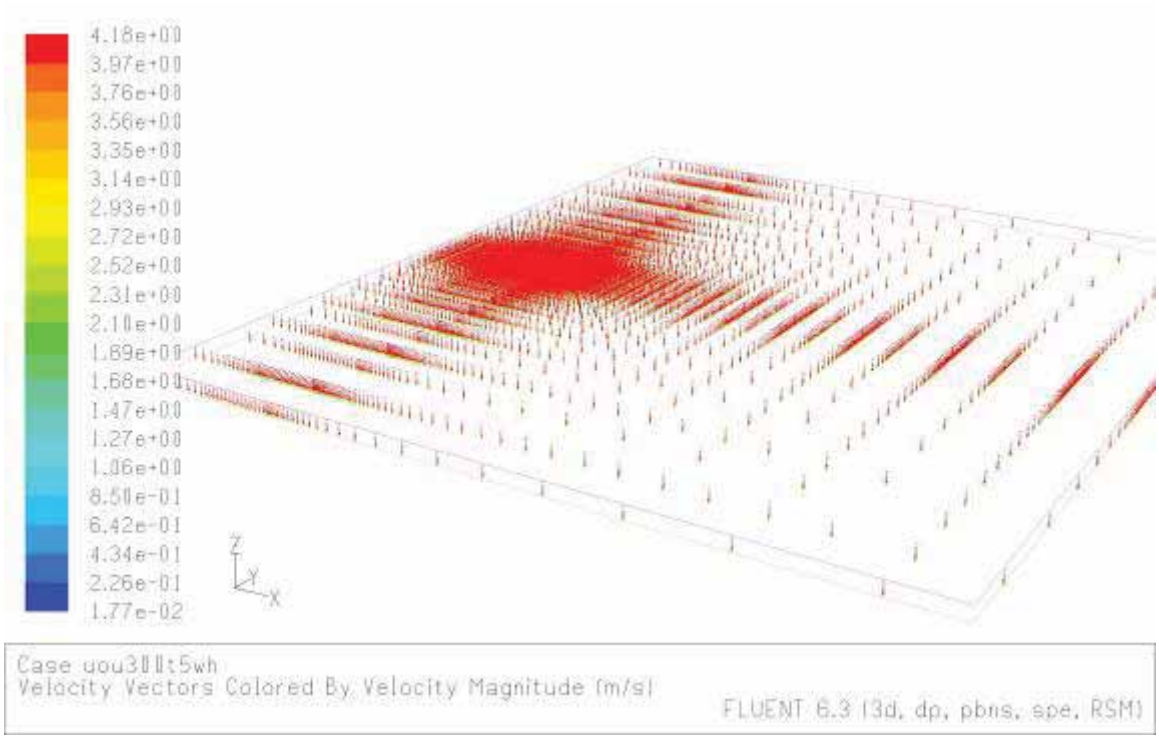
CFD Model of the Vapor Cloud Dispersion Scenarios

The domain for the vapor cloud dispersion simulation is shown in Figure A-7. The wind blows from the top-left to the bottom-right faces of the domain. The simulation domain extends from 2.5 km upwind of the spill to 15 km downwind, and spans 10 km crosswind on either side of the spill location. The ceiling for the simulation domain is set to 300 m.

An atmospheric wind profile is imposed on the upwind face of the domain (top-left) and on the top surface. Symmetry boundary conditions are imposed on the crosswind boundaries. The downwind boundary is left open.

A simple outline of the LNG carrier is included in the model. According to the proposed plans, the unloading vessels will be moored to the buoy and therefore will be able to weathervane while at berth. Therefore, in the simulation the vessel is assumed to be aligned with the wind direction. The tank breach is assumed to occur at the waterline, at midship on the port side.

Figure A-7: Simulation domain for the vapor dispersion scenarios.



The velocity and temperature profiles are imposed along the upwind side of the domain. The velocity and temperature profiles are determined using the selected reference velocity and temperature (Table 7-2), as well as the Monin-Obukhov equation for Pasquill-Gifford "F" stability class.[69] Above the surface boundary layer, which is approximately 50 m high, the wind velocity is assumed to remain constant.[70] The RS turbulence model is used, as in the Burro 8 benchmark simulation. Figure A-8 shows the wind velocity profile at different locations along the simulation domain, for Scenario 5. The horizontal axis represents the wind velocity (wind blows along the X direction in the simulation domain), and the vertical axis represents the elevation above the water surface. The off-center locations (5 km crosswind from the pool mid-plane) show that the velocity profiles remain consistent with the imposed boundary conditions throughout the domain (there is no effect from the tanker at those locations). The plots along the pool mid-plane show the effect of the LNG tanker on the atmospheric profile (wind speed is approximately zero (0) up to the elevation of the tanker deck).

The source term for the vapor cloud dispersion model is represented by the LNG that vaporizes from the pool formed onto the water surface by the LNG spill. The pool spread model, described

[69] DEGADIS manual
[70] R.B. Stull, "An Introduction to Boundary Layer Meteorology", Kluwer Academic Publishers, Dordrecht, Netherlands, 1988, pg. 513

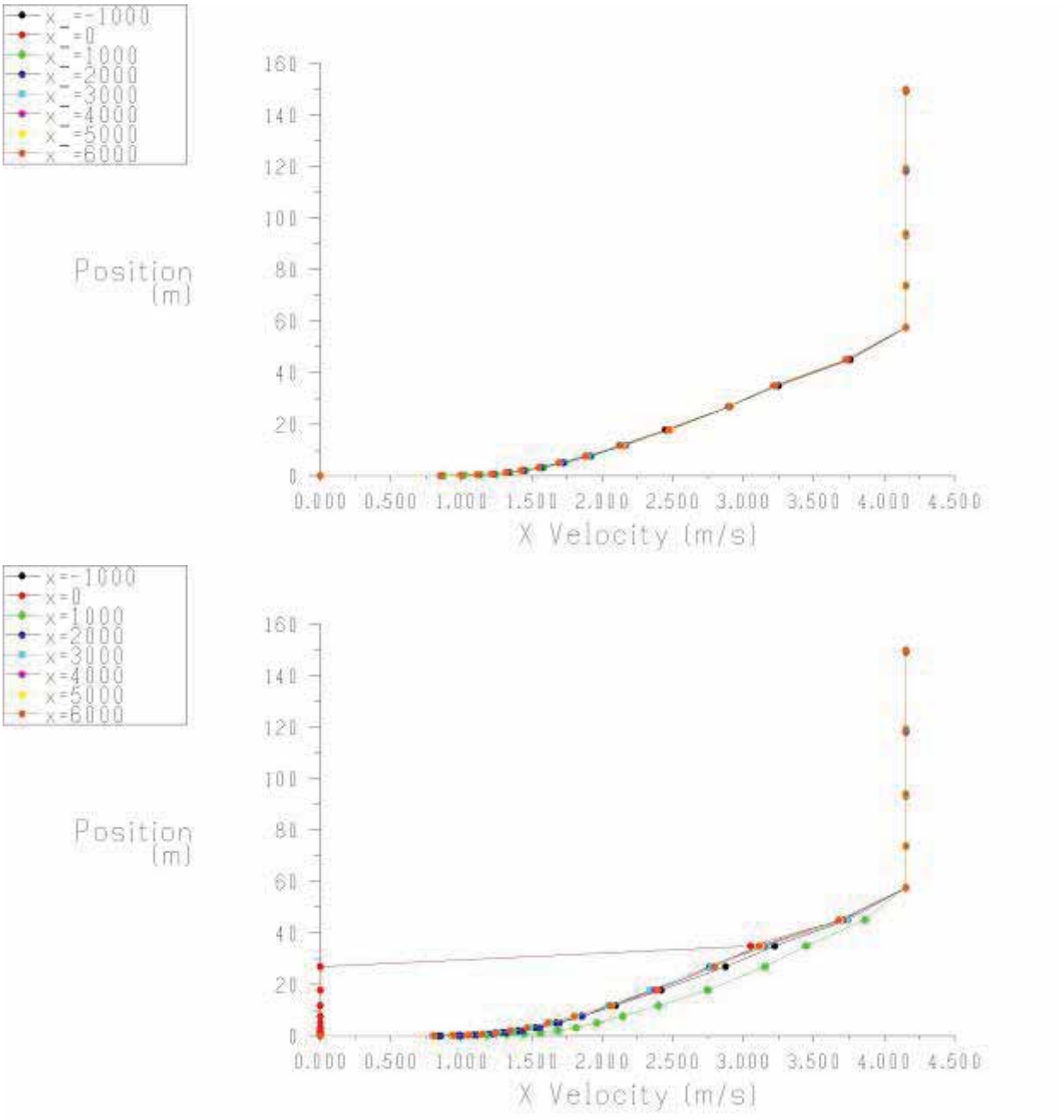
in Section 7 of the main IRA report, was used to calculate the time-dependent size of the LNG pool for each scenario. The pool growth profiles were applied as boundary conditions to the CFD simulation to provide a time-dependent source of LNG vapor. The LNG vapor was injected into the CFD simulation domain at a temperature of -162.2°C and at a rate of 0.135 kg/m^2-s (corresponding to a liquid pool regression rate of 3×10^{-4} m/s).

CFD simulations yield results that are affected, in part, by the resolution of the simulation grid. As the grid is refined, the results tend to asymptote towards a grid independent value. Therefore, each scenario was run with three progressively finer grid resolutions ('low", "medium" and "high", each producing a grid refinement factor of approximately 1.2 over the previous run), and the Richardson extrapolation method was applied to verify the convergence of the different results towards a grid-independent solution.[71] Non-uniform computational grids were used. The horizontal grid dimensions grew progressively, from a minimum of 50 m adjacent to the vessel, to a maximum of 800 m at the downwind boundary. The vertical grid dimensions started at 0.1 m at sea level and grew to 65 m at the ceiling boundary, which was at 315 m above sea level.

In Section 7 of the main IRA report the grid-independent value for the maximum distance to LFL, obtained by applying the Richardson extrapolation method to the CFD results.

[71] G. F. Carey, "*Computational Grids. Generation, Adaptation, and Solution Strategies*", Taylor & Francis Ed., 1997, pp. 150-153.

Figure A-8: Vertical profile of wind velocity at different downwind locations for Scenario 5 (top: 5 km off-center; bottom: along pool centerline).



Appendix K
LNG Incident History

Major LNG Incidents Involving LNG Release

Incident Date	Ship/Facility Name	Location	Ship Status	Injuries/ Fatalities	Ship/ Property Damage	LNG Spill/ Release	Incident Summary
October 1944	East Ohio Gas LNG Tank	Cleveland	NA	128 deaths	NA	NA	Tank failure and no earthen berm. Vapor cloud formed and filled the surrounding streets and storm sewer system. Natural gas in the vapor izing LNG pool ignited.
1964 and 1965	Methane Progress	Arzew, Algeria	Loading (1964); Shortly after leaving port (1965)	None	None		In 1964, a lightning strike to the forward vent riser of the Methane Progress ignited vapor which was being routinely vented through the venting system at the time. A similar occurance also occurred in early 1965. Both times, the flame was quickly extinguished by purging with nitrogen through a connection in the riser.
1965		Canvey Island, UK	Transfer operation	1 injury; serious burn		Yes	During LNG transfer, an error resulted in the release of LNG. The release became ignited, causing one person to be seriously burned.
May 1965	Jules Verne	Arzew, Algeria	Loading	No	Yes	Yes	Overflowing of a cargo tank. Resulted in a tank cover and adjacent deck fracture.
1965	Methane Princess		Disconnectin g after discharge	No	Yes	Yes	Valve leakage. Deck fractures.
1969		Portland, Oregon	Under construction	NA	Yes	Yes	An explosion occurred in an LNG tank under construction. No LNG had ever been introduced into the tank. The cause of the accident was the accidental removal of blinds from natural gas pipelines which were connected to the tank. This led to the flow of natural gas into the tank while it was being constructed.

Incident Date	Ship/Facility Name	Location	Ship Status	Injuries/ Fatalities	Ship/ Property Damage	LNG Spill/ Release	Incident Summary
1971	LNG ship Esso Brega, La Spezia LNG Import Terminal	La Spezia, Italy	Unloading LNG into the storage tank	NA	Yes	Yes	First documented LNG "rollover" incident, where two differing temperatures and densities of LNG mix. Tank developed a sudden increase in pressure, causing LNG vapor to discharge safely from the tank safety valves and vents. Tank roof slightly damaged. No ignition.
January 1972	Montreal East	Montreal, Canada	Defrosting operations	NA	NA	NA	During defrosting, a back flow of natural gas from the compressor to the nitrogen valve when the valve remained unclosed caused over-pressurization of the compressor. This led to a leak and subsequent ignition.
February 1973		Staten Island, New York	Repair on empty storage tank	Yes-37 fatalities.	Yes	No	While repairing the interior of an empty storage tank, a fire started. The increase in pressure inside the tank occurred so quickly that the concrete dome collapsed down inside the tank. 37 construction workers inside the tank were killed.
1974	Methane Progress		In port	No	Yes	No	Touched bottom at Arzew.
July 1974	Massachusetts Barge	Massachusetts	Loading	NA	NA	Yes	40 gallons of LNG leaked during loading, as a result of a power failure and the resulting automatic closure of the safety valves. The leak resulted in several fractures to the deck plates.

Incident Date	Ship/Facility Name	Location	Ship Status	Injuries/ Fatalities	Ship/ Property Damage	LNG Spill/ Release	Incident Summary
1975	Philadelphia Gas Works		NA	No	Yes	NA	Not caused by LNG. An iso-pentane intermediate heat transfer fluid leak caught fire and burned the entire vaporizer area.
1977	Arzew	Algeria	NA	1 worker frozen to death	NA	Yes	Aluminum valve failure on contact with cryogenic temperatures. Wrong aluminum alloy on replacement valve. LNG was released, but no vapor ignition occured.
September 1977	LNG Aquarius	Boatang, Indonesia	Loading	No	No	Yes	During filling, LNG overflowed through the vent mast. Possible casue was difficulties in the liquid level gauge system.
1979	Columbia Gas LNG Terminal	Cove Point, Maryland	NA	1 killed 1 seriously injured	Yes	Yes	LNG leaked through the LNG pump electrical penetration seal and entered the substation. A circuit breaker ignited the natural gas-air mixture, resulting in an explosion.
April 1979	Mostefa Ben-Boulaid Ship		Unloading	No	Yes	Yes	Valve leakage. Deck fractures.
April 1979	Pollenger Ship		Unloading	No	Yes	Yes	Valve leakage. Tank cover plate fractures.
1979	El Paso Paul Kayser Ship		At sea	No	Yes	No	Stranded. Severe damage to bottom, ballast tanks, motor was water damaged, bottom of containment system set up.

Incident Date	Ship/Facility Name	Location	Ship Status	Injuries/ Fatalities	Ship/ Property Damage	LNG Spill/ Release	Incident Summary
1980	LNG Libra		At sea	No	Yes	No	Shaft moved against rudder. Tail shaft fractured.
1980	LNG Taurus		In port	No	Yes	No	Stranded. Ballast tanks all flooded and listing. Extensive bottom damage.
1984	Melrose		At sea	No	Yes	No	Fire in engine room. No structural damage sustained – limited to engine room.
1985	Gradinia		In port	No	Not reported	No	Steering gear failure. No details of damage reported.
1985	Isabella		Unloading	No	Yes	Yes	Cargo valve failure. Cargo overflow. Deck fractures.
1989	Tellier		Loading	No	Yes	Yes	Broke moorings. Hull and deck fractures.
1990	Bachir Chihani		At sea	No	Yes	No	Sustained structural cracks allegedly stressing and fatigue in inner hull.

Incident Date	Ship/Facility Name	Location	Ship Status	Injuries/ Fatalities	Ship/ Property Damage	LNG Spill/ Release	Incident Summary
2002	LNG ship Norman Lady	East of the Strait of Gibraltar	At sea	No	Yes	No	Collision with a U.S. Navy nuclear-powered attack submarine, the U.S.S Oklahoma City. In ballast condition. Ship suffered a leakage of seawater into the double bottom dry tank area.

Sources: CEC 2006, CEE 2003
Note: There have been no reported incidents involving LNG shipping and shipping port and terminals since 2002.

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RECORD OF DECISION
ISSUANCE OF LETTERS OF AUTHORIZATION TO PORT DOLPHIN ENERGY LLC TO TAKE MARINE MAMMALS INCIDENTAL TO CONSTRUCTION AND OPERATION OF A DEEPWATER LIQUEFIED NATURAL GAS PORT

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Office of Protected Resources
Silver Spring, Maryland

As required by the National Environmental Policy Act (NEPA), this document comprises the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service's (NMFS) Record of Decision (ROD) for issuance of 5-year regulations and letters of authorization (LOAs) pursuant to section 101(a)(5)(A) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1361 *et seq.*) to the Port Dolphin Energy LLC (Port Dolphin) for the taking, by Level B harassment, of small numbers of two species of marine mammals incidental to construction and operation of a deepwater liquefied natural gas (LNG) port in the Gulf of Mexico offshore from Tampa Bay, Florida.

Introduction

In February, 2011, NMFS received a complete application from Port Dolphin requesting a 5-year rulemaking and issuance of subsequent LOAs, under section 101(a)(5)(A) of the MMPA, to take small numbers of two species of marine mammals, by Level B harassment, incidental to construction and operation of a deepwater LNG port in the Gulf of Mexico offshore from Tampa Bay, Florida. The 5-year regulations and LOAs would cover construction of the port, expected to require approximately one year, and four subsequent years of port operations, from approximately June 2013 through May 2018.

The U.S. Coast Guard and Maritime Administration (lead federal agencies responsible for licensing of the deepwater port) prepared a *Final Environmental Impact Statement on Port Dolphin LLC Deepwater Port License Application* (FEIS). The NMFS Office of Protected Resources (PR) has reviewed the information contained in the FEIS and determined that the FEIS accurately and completely describes the proposed action alternative, reasonable additional alternatives, and the potential impacts on marine mammals, endangered species, and other marine life that could be impacted by the proposed action and the other alternatives.

Because noise generated during construction and operation of the port has the potential to disrupt the behavior patterns of marine mammals in the vicinity, an incidental take authorization is warranted under the MMPA. Therefore, NMFS participated as a cooperating agency in the preparation of the Draft and Final EISs, and this ROD has been prepared in accordance with NMFS' decision-making requirements under NEPA and is intended to: (a) state the NMFS decision, present the rationale for its selection, and describe its implementation; (b) identify the alternatives considered in reaching the decision; and (c) state whether all practicable means to avoid or minimize environmental harm from implementation of the selected alternative have been adopted (40 CFR 1505.2).

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1361 *et seq.*) directs the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and regulations are prescribed setting forth the permissible methods of taking pursuant to the specified activity, other means of effecting the least practicable adverse impact on the species or stock and its habitat, and requirements pertaining to the monitoring and reporting of such taking. Under the MMPA, permission shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses. NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

Decision to Be Made

This ROD documents the decision by NOAA NMFS to issue 5-year regulations and LOAs to Port Dolphin for harassment of marine mammals incidental to construction and operation of the port, based on the FEIS, Port Dolphin's application for an authorization, NMFS' analysis, and comments received on the proposed rulemaking. The final rule and LOAs are specific to the proposed action alternative in the FEIS. This ROD is based on and incorporates the FEIS, Port Dolphin's application for an authorization under the MMPA, and all of NMFS' analytical documents prepared for this action.

Pursuant to the requirements of NEPA, a notice of intent to prepare an EIS was published in the *Federal Register* on July 12, 2007. The action proponents conducted public scoping and released a notice of availability of a draft EIS for public comment on April 18, 2008. Comments submitted during this period, as well as at public hearings, were considered during the development of the FEIS. After careful review of the proposed measures and the associated analyses in the FEIS and the public comments that NMFS received on the proposed rulemaking *Federal Register* notice, NMFS has decided to finalize the rulemaking and issue an LOA to Port Dolphin, provided that mitigation, monitoring, and reporting requirements described below and analyzed in the FEIS are incorporated.

Alternatives Considered by NMFS

NMFS' proposed action (issuance of a final rule and LOAs to Port Dolphin) would establish a framework for authorizing the take of marine mammals incidental to a subset of the activities analyzed in the EIS that are anticipated to result in the take of marine mammals, i.e., activities that produce underwater sound. Thus, these components of the proposed action are the subject of NMFS' proposed MMPA regulatory action. The EIS contains a thorough analysis of the environmental consequences of Port Dolphin's proposed action on the human environment, including specific sections addressing the effects of underwater sound on marine mammals and describing mitigation measures designed specifically for marine mammals.

NMFS was a cooperating agency in the development of the EIS. This allowed NMFS to ensure that the necessary information and analyses were included in the EIS to support NMFS'

proposed action and allow for adoption of the document for NMFS' NEPA purposes. In adopting the EIS, NMFS considered two alternatives, as well as the No Action Alternative. The following briefly summarizes these alternatives:

Alternative 1: NMFS issues a final rule and LOAs authorizing take of marine mammals incidental to activities described in Port Dolphin's preferred alternative, with the mitigation, monitoring and reporting measures presented in the EIS.

Alternative 2: NMFS issues a final rule and LOAs authorizing take of marine mammals incidental to activities described in Port Dolphin's preferred alternative, but with additional mitigation requirements for marine mammals, potentially including additional measures developed by NMFS or suggested to NMFS via public comment on the proposed rulemaking.

No Action: NMFS would not issue a final rule and LOAs to Port Dolphin for the take of marine mammals incidental to activities described in the preferred alternative.

Alternatives Considered in the EIS

The Deepwater Port Act of 1974 requires the Secretary of Transportation to approve, approve with conditions, or deny a deepwater port license application. Consistent with NEPA, in determining the provisions of the license, the Secretary of Transportation must also consider alternative means to construct and operate a deepwater port. Alternatives for a natural gas deepwater port can extend to matters such as its specific location, methods of construction, and technologies for regasifying LNG. Considering alternatives helps to avoid unnecessary impacts and allows analysis of reasonable ways to achieve the stated purpose. Consistent with NEPA, the FEIS considered impacts to marine mammals and their habitats associated with each alternative considered.

Screening of alternatives was conducted in several steps. First, the conceptual design of the deepwater Port was considered and two designs were selected for evaluation: a submerged turret loading (STL) buoy system with special purpose SRV and a floating storage and regasification unit (FSRU). A three-phase assessment was then conducted to narrow the potential alternative sites. After site alternatives were identified, alternate routes for the pipelines necessary to interconnect with the existing natural gas transmission structure were evaluated. Finally, specific technology choices, such as vaporization technology, anchoring methods, and construction methods, were evaluated.

Upon application of the screening criteria, alternatives that were eliminated from detailed consideration included Port design concepts, some regasification technologies, design features, and construction methods. Alternatives evaluated in detail in the EIS are the STL and FSRU port concepts, two vaporization technologies, two alternatives for siting of the port, three natural gas pipeline route alternatives (i.e., a Proposed Site and Route, a Southern Site and Route, and the Offshore Interconnection with Gulfstream Pipeline), and the No Action Alternative. Alternatives evaluated in detail in the EIS are summarized below:

No Action Alternative: The No Action Alternative is required by CEQ regulations as a baseline against which the impacts of the Proposed Action are compared. Under the No Action

Alternative, the EIS considers the possible satisfaction of demand through increased use of other types of energy sources (e.g., fossil fuels, nuclear, alternative energy).

Deepwater port design: There are six basic deepwater port design concepts that have been developed by industry and are currently considered commercially available for use as an offshore LNG import port; all six port concepts include use of subsea natural gas pipelines to transport regasified LNG from the port to the existing onshore pipeline system. The EIS evaluates in detail the STL and FSRU design concepts while rejecting gravity-based structures, fixed and floating platforms, and artificial islands as unsuitable for the purpose and need.

Port location: According to the Purpose and Need, the Project is intended to supply natural gas to the west-central Florida market and surrounding areas, and therefore only locations that meet these fundamental criteria can be considered. Initial regional site-screening evaluation identified five areas within the region where it would be reasonable and feasible to locate an SRV facility, including north of Tampa Bay; the St. Petersburg area; off of Tampa Bay; off of Sarasota; and near the Caloosahatchee River area near Fort Myers. Following a secondary suitable area analysis, only the Tampa Bay area was deemed suitable and carried forward as the preferred alternative for detailed evaluation.

Pipeline routes: Following identification of the preferred port location, a site-specific analysis identified alternative site locations and associated pipeline route corridors. These are the proposed (preferred) site and route alternative, proposed site and offshore interconnection with Gulfstream Pipeline alternative, northern site and route alternative, and southern site and route alternative. The northern alternative was deemed unsuitable and was not carried forward for detailed analysis.

Anchoring methods: There are a variety of available anchoring systems for installation of the buoy mooring anchors. Embedment anchors, drilled and grouted anchors, suction piles, driven piles, and gravity anchors were considered. Only suction piles and driven piles (preferred) were carried forward for detailed analysis.

SRV propulsion: The EIS identified gas-fired propulsion steam boilers, gas-fired turbines, slow-speed diesel propulsion, and high-speed diesel propulsion. Only the steam boiler and high-speed diesel alternatives were carried forward.

Vaporization technologies: There are three available heating methods used to vaporize LNG: burning part of the vaporized LNG, using the surrounding seawater to warm the LNG, or using the surrounding air to warm the LNG. Burning part of the LNG with no use of ambient seawater is generally referred to as a closed-loop system, while using the surrounding seawater in a once-through system to warm the LNG is generally referred to as an open-loop system. Use of ambient air to warm LNG is referred to generally as ambient air vaporization. There are several commercially tested vaporization systems currently used as heat exchangers to vaporize LNG: submerged combustion vaporizers (SCVs), shell-and-tube vaporizers (STVs), open rack vaporizers (ORVs), and ambient air vaporization (AAV) equipment with or without backup heating systems (usually SCVs). Vaporization systems can be configured in numerous ways to use one or more of the available heat sources to vaporize LNG. The EIS evaluates in detail use of

a closed-loop STV technology (appropriate for use with the STL port design concept) and use of an AAV system (appropriate for use with the FSRU port design concept).

Marine life exclusion systems: SRVs will be required to obtain engine cooling water via sea chests below the waterline. The proposed (preferred) design provides for a through slot intake of 0.25 inches with a velocity of less than or equal to the recommended velocity of 0.15 m/s, and provides for exclusion of most juvenile fish. Alternative technologies were deemed unsuitable for the purpose and need, and only the preferred alternative was carried forward for detailed evaluation.

Biocide systems: Biocide systems are used for seawater required for engine cooling and ballast control. However, the installed biocide system will not be used while SRVs are at the port. Therefore, there would be no use or discharge of biocide while at the port and no alternative biocide systems were evaluated. Any alternatives to not using the system while at the port would involve greater environmental impacts.

Pipeline construction methods: Conventional pipeline construction methods include alternatives for the placement of the pipeline in offshore and onshore areas, and alternatives in offshore vessels used to connect pipeline sections into a continuous pipe and lay the pipeline on the seafloor. Alternative methods to bury the pipeline include dredging, plowing, jetting, and directional drilling. Dredging, plowing, and directional drilling were carried forward for detailed evaluation.

Environmentally Preferred Alternative(s)

CEQ regulations require that an agency identify the environmentally preferred alternative when preparing a ROD for actions considered in an EIS. The Council on Environmental Quality has advised that such an alternative is to be based solely on the physical and biological impacts of the proposed action on the resources in question and not the social or economic impacts of the action. The FEIS determines that the Proposed Action (Preferred Alternative) is the environmentally preferred action alternative. The Proposed Action would have the least impact on the human environment based on the analyses of location and construction design and schedule.

Rationale for Selection of the Preferred Alternative

The decision is to issue a final rule and LOAs to Port Dolphin for the take of marine mammals incidental to the construction and operation of the deepwater LNG port. This decision is made based on the evaluations in the FEIS and in consideration of NMFS' statutory responsibilities under the MMPA, as well as in compliance with the Endangered Species Act (ESA), Magnuson-Stevens Fishery Conservation and Management Act, Coastal Zone Management Act, and other laws and implementing regulations as fully analyzed in the FEIS.

Based upon review of the Proposed Action and all other alternatives, NMFS has determined that the impact of construction and operation of the port may result, at worst, in a temporary modification in behavior of small numbers of certain species of marine mammals that may be in close proximity to construction operations, or in close proximity to the facility during subsequent years of operations. These activities are expected to result in some local, short-term

displacement resulting in no more than a negligible impact on the affected species or stocks of marine mammals. These impacts will be reduced to effect the least practicable adverse impact by incorporation of the mitigation and monitoring measures summarized below. No injuries or mortalities of marine mammals are expected to result from this activity.

NMFS participated as a cooperating agency in the preparation of the FEIS to ensure that the potential impacts to marine mammals and their habitat were fully considered in the evaluation of the environmental consequences of the proposed action and alternatives. Any of the proposed alternatives would be conducted in a manner that would be expected to result in only temporary Level B (behavioral) harassment of two marine mammal species. However, the Project as presented for NMFS consideration in Port Dolphin's application represents the environmentally preferable action alternative (Preferred Alternative) when evaluated in accordance with the NEPA and in consideration of the MMPA. Although NMFS evaluated an alternative that would require additional mitigation measures, those measures are not feasible for implementation, and therefore would not meet the purpose and need of the proposed action.

There has been substantial opportunity for public review and comment in association with preparation of the EIS, as well as through the MMPA incidental take authorization process. The scoping period began with the publication of a Notice of Intent in the *Federal Register* on July 12, 2007. The scoping period included one public scoping meeting. The draft EIS was responsive to comments received, and was made available for public review and comment on April 18, 2008 through a Notice of Availability published in the *Federal Register*. During the review period, one public meeting was held and a total of 34 formal comments were received. No comments were received on the EIS that are related to NMFS' action.

In addition, NMFS received public comment on the proposed rulemaking *Federal Register* notice from the Marine Mammal Commission (MMC). The MMC made several recommendations, including some additional mitigation measures. While NMFS agreed with certain recommendations from the MMC, additional mitigation measures were deemed unnecessary, as the measures agreed upon by NMFS and Port Dolphin and required under the terms of the final rule and LOAs would effect the least practicable impact on the affected species or stock. The numbers of incidental take analyzed in Port Dolphin's application, as well as the numbers in the final rulemaking *Federal Register* notice, are small relative to the relevant stock sizes. NMFS responded to these comments more fully in the final rulemaking *Federal Register* notice of issuance. NMFS has made the decision to finalize the rulemaking and issue the LOA after careful review of these comments.

Mitigation Measures and Monitoring

In accordance with the MMPA, an extensive series of mitigation and monitoring measures were analyzed in the FEIS and will be required as part of the 5-year regulations and LOA. These measures will effect the least practicable adverse impact on the affected species or stock of marine mammals under NMFS jurisdiction. The mitigation, monitoring, and reporting requirements that will be included in the 5-year regulations and LOA are summarized below, and were developed by NMFS in cooperation with Port Dolphin to achieve the least practicable adverse impact to marine mammal species or stocks and consider all practicable means to avoid or minimize harm to resources under NMFS jurisdiction:

Visual Monitoring Program
For each component of the activity with the potential to cause the incidental take of marine mammals, Port Dolphin will establish zones of acoustic influence to be monitored by professional observers. These zones will include harassment zones, within which the presence of marine mammals will be recorded and noted as instances of behavioral harassment, and shutdown zones. Shutdown zones correspond with areas where underwater sound could result in acoustic injury of marine mammals, and activity will cease if marine mammals approach these zones in order to prevent such an occurrence. Monitoring of activities will take place throughout the time required to complete the activity.

Sound Attenuation Devices
Sound attenuation devices would be utilized during all impact pile driving operations. Port Dolphin plans to use a bubble curtain as mitigation for in-water sound during construction activities. Bubble curtains absorb sound, attenuate pressure waves, exclude marine life from work areas, and control the migration of debris, sediments and process fluids.

Vessel Strike Avoidance Measures
Construction and support vessels will follow the NMFS Vessel Strike Avoidance Measures and Reporting for Mariners. Standard measures would be implemented to reduce the risk associated with vessel strikes.

Line and Cable Entanglement Avoidance Measures
Best Management Practices (BMPs) would be implemented to prevent entanglement in any lines or cables or siltation barriers used in any construction area. For example, lines, cables, and in-water barriers would not be made of any materials in which a protected species can become entangled (e.g., monofilament), would be properly secured, and would be regularly monitored to avoid protected species entrapment.

Marine Debris and Waste Management Protocols
BMPs would be implemented to prevent potential impacts to protected species from debris discarded within any construction area, including mandatory marine debris training.

Reporting
Required reporting on Port Dolphin's activities and implementation of these mitigation measures will be submitted to NMFS, and will include reporting of data collected during acoustic monitoring required to verify sound source levels and site-specific acoustic propagation characteristics used to evaluate potential effects to marine mammals. The report will include observations of all marine mammal behavior, including potential reactions to the activities.

Conclusions
Through adoption of the FEIS and as documented in this ROD, NMFS has fulfilled the requirements of NEPA to consider the objectives of the proposed action and analyze a reasonable range of alternatives that adequately address the objectives of the proposed action. Furthermore, NMFS has analyzed the associated environmental consequences and impacts of the alternatives and identified mitigation and monitoring measures to address, to the extent practicable, those

consequences and impacts. NMFS has also considered public comments on promulgation of regulations and issuance of LOAs. Consequently, NMFS concludes that issuance of the 5-year regulations and LOAs for the take of marine mammals incidental to construction and operation of Port Dolphin in the Gulf of Mexico is warranted under the MMPA, as long as the mitigation, monitoring, and reporting requirements described above are implemented.

Further information regarding this ROD may be obtained by contacting Ben Laws, NOAA NMFS PR, 1315 East-West Highway, Silver Spring, MD 20910, (301) 427-8425.

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National Marine Fisheries Service

Date