



On Scene Coordinator Report *Deepwater Horizon* Oil Spill

Submitted to the
National Response Team
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We would like to thank the agencies listed below and all of the agencies, companies, organizations, and individuals that contributed to the *Deepwater Horizon* response efforts.





The Man in the Arena

*I*t is not the critic who counts; not the man who points out how the strong man stumbles, or where the doer of deeds could have done them better. The credit belongs to the man who is actually in the arena, whose face is marred by dust and sweat and blood; who strives valiantly; who errs, who comes short again and again, because there is no effort without error and shortcoming; but who does actually strive to do the deeds; who knows great enthusiasms, the great devotions; who spends himself in a worthy cause; who at the best knows in the end the triumph of high achievement, and who at the worst, if he fails, at least fails while daring greatly, so that his place shall never be with those cold and timid souls who neither know victory nor defeat.

Theodore Roosevelt
April 23, 1910

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The purpose of this report is to document the response to the oil spill that resulted from the explosion on the *Deepwater Horizon* mobile offshore drilling unit on April 20, 2010.

On November 18, 2010, the National Response Team (NRT) requested submission of an On-Scene Coordinator (OSC) Report for the *Deepwater Horizon* spill to the NRT Response Committee, pursuant to the National Contingency Plan (NCP). The NRT's request listed 33 specific topics to be addressed in the report. The list of specific topics addressed in the report expanded to 56 to cover additional focus areas of the Federal On-Scene Coordinators (FOSCs).

Organization of the Report

The NCP directs that OSC Report record the situation as it developed, the actions taken, the resources committed, and the challenges encountered (40 CFR 300.165(b)). This report consists of ten chapters that generally apply these themes to the 56 topics. The first of the NCP requirements is to account for the situation as it developed. Chapter 1 is a brief summary of significant events. At the end of the report is a much more detailed and comprehensive daily chronology of events to address the situation as it developed. Beginning with Chapter 2, the report is organized by the Incident Command System (ICS) structure: Command (Chapter 2), Operations (Chapter 3), Planning (Chapter 5), Logistics (Chapter 6), and Finance (Chapter 7). There is a separate chapter on Health and Safety (Chapter 4) although health and safety is usually within the Command Section under ICS. The Safety program was a significant FOSC focus. Given the scale of the response, and unique public health aspects, it merited a chapter of its own. Three other chapters that could have been included under existing ICS based chapters were covered in separate chapters. Natural Resources and Wildlife (Chapter 8) normally falls within the operations section, yet there was such a significant component of the response dealing with these issues that the subject stands on its own. This chapter also includes a discussion of Section 106 of the National Historic Preservation Act compliance, normally found under the Planning Section, as trustee agencies central to wildlife activities were also critical to historic preservation efforts. Government Personnel staffing is addressed in Chapter 9 to capture the challenges in sustaining the requisite number of trained personnel for a response of this scope and duration. Finally, Communications (Chapter 10) includes knowledge

management and communication with elected officials, the public, and the media, which were a key part of the response given the national and global level of interest in the disaster.

The report relies heavily on the written documentary record and the experiences of subject matter experts directly involved in the response. More than 200 people participating in the response, including Coast Guard members, representatives of other federal and state agencies, and private organizations, provided written input to be used in this report. Where needed, the Report Writing Team, consisting of the Deputy FOSC, four other Coast Guard officers, a petty officer, and three contract technical writers and design specialists, provided research assistance in extracting archived and response generated documents stored on the Homeland Security Information Network, the dedicated response server established by the Coast Guard, and federal government websites such as RestoreTheGulf.gov.

The report covers the period of April 20, 2010, the day the explosion took place on the *Deepwater Horizon* mobile offshore drilling unit, through March 1, 2011. Although the detailed chronology stops at January 31, 2011 and shoreline clean-up operations continue, this report does not capture operations occurring since March 1.

The FOSC is responsible for directing and coordinating actions to remove the oil from the environment. Restoration and recovery action taken to repair damage caused by the spill are outside the scope of the FOSC's responsibility and thus are not covered by this report.

Chapter 1 and the Chronology: Situation as it Developed

The report addresses the requirement to describe the situation as it developed in two parts. Chapter 1 contains a short timeline of the spill and describes the efforts to contain and finally seal the Macondo well. Appendix I provides a much more detailed chronology, listing major response activities from April 20, 2010 through the end of January 2011. The magnitude of the spill cleanup can be surmised to a certain degree by the number of resources committed, and its impacts. Oil flowed from the well for 87 days. Two drilling ships, numerous oil containment vessels, and a flotilla of support vessels were deployed to control the source of the well, while 835 skimmers and approximately 9000 vessels were involved in

the cleanup. On the single most demanding day of the response, over 6000 vessels, 82 helicopters and 20 fixed wing aircraft and over 47,849 personnel/responders were assigned; 88,522 square miles of fisheries were closed; 168 visibly oiled wildlife were collected; 3,795,985 feet of containment boom was deployed; 26 controlled in situ burns were conducted, burning 59,550 barrels of oil; 181 miles of shoreline were heavily to moderately oiled; 68,530 gallons (1632 barrels) of dispersant were applied, and 27,097 barrels of oil were recovered.

Chapter 2: Command and Control

The states viewed the spill as a disaster, declared states of emergency, and activated their emergency response agencies. Each of the Gulf Coast states and local governments were accustomed to the Stafford Act process. Emergencies that fall under the Stafford Act give state and local governments a lead role in organizing response, paid largely, but not entirely, by the federal government. The NCP that governs oil spill response, however, gives the federal government lead, impacted states a role in the unified command, and the Responsible Party (RP) a role in cleaning up the spill in terms of funding and participation in the unified command. The difference between these two frameworks was not well known or understood outside of the spill response community, and contributed to challenges and delays in the integration between federal, state, and local response efforts.

The FOSC is the lead federal official for oil removal and response operations in accordance with the NCP. The role of the National Incident Commander (NIC) is described from the perspective of the FOSC and the working relationship between the two. The working relationship between the NIC and the FOSC is designed to unburden the FOSC in the event of a Spill of National Significance (SONS). The SONS exercise process prepared the Coast Guard for the establishment of the National Incident Command, provided an understanding of the role of the NIC, and how the NIC supported the FOSC. From the FOSC perspective, the NIC stand up and assumption of responsibilities was very smooth, although there was constant readjustment of roles as the response progressed.

An exercise environment, however, is not the same as a bona fide Spill of National Significance. Actual establishment of an NIC was unprecedented. The exercise process did not emphasize the federal governance structure for oil spill response. The NCP

process was not familiar to the impacted communities. Through repeated natural disasters and emergency declarations, they were accustomed to a state-centric response organization as outlined under the Stafford Act. The NCP also did not address all of the key issues that came to the forefront during the response. The NIC, interacting with cabinet-level officials, was well positioned to adjudicate some of these issues. An example was seafood sampling and testing to ensure the safety of Gulf of Mexico seafood.

The FOSC served as the Unified Area Commander in accordance with established incident command doctrine, and under the Unified Area Command (UAC) eventually there were five Incident Command Posts (ICPs): Houston, Galveston, Houma, Mobile, and Miami. Houston focused on source control, while Galveston and Miami remained relatively small operations as the impact from the spill on their operating areas was limited. Houma and Mobile, however, became very large incident command posts, with many, large geographic branches reporting to them. The branches became so large that they became incident management teams of their own, and the sheer scale of the operation stretched existing ICS doctrine.

The size of the operation, duration of the spill, and public and political interest in the spill impacted the operation of the incident command structure in other ways. Regional Response Teams (RRTs), and the NRT assist the FOSC during the course of large spills. Because of the involvement of senior officials in each participating agency and the state and federal governments the NRT role was effectively subsumed into a NIC staff element called the Interagency Solutions Group. The RRTs also functioned in a manner different from previous spills due to the need to coordinate agency positions with very senior agency officials. State and local participation also differed, with senior state officials rather than the state spill response agencies often participating in the decision making process. The senior state officials and local officials did not fully integrate into the unified command construct in each case.

Chapter 3: Operations

Response operations took place in four zones: at the source of the spill, offshore, near shore, and in shore. At the source, the drilling rigs and remotely operated vehicles necessary for deep water drilling were the only means of accessing the well. Offshore, as

close to the source as possible, the response focused on removal of the oil. Key to these operations was large skimmers and in situ burn task forces. Skimmers, storage for the oil recovered by the skimmers, and fire boom were key resources. When oil could not be removed through these means due to environmental conditions (such as sea conditions), aerial application of dispersants was used. Near shore operations focused on skimming and the use of boom to protect sensitive areas, and later the protection of as much of the shoreline as possible. Obtaining as much boom as possible was a central concern of near shore operations. In shore operations used barriers such as Hesco Baskets to minimize shoreline impact. Once oil reached the shore, the long, arduous, labor intensive process of shoreline cleanup began. After the well was capped shoreline cleanup became the focus of continued response operations.

A key to effective response was understanding the oil. The Macondo well released Louisiana sweet crude oil. The term “sweet” refers to the low amount of sulfur. “Light” indicates the oil has many lighter ends, which evaporate quickly. Thus the oil was not as persistent as some other forms of crude oil, making it easier to remove.

Source Control. In any oil spill response, one of the first priorities is to secure the source. The NIC and FOSC directly participated in the efforts to stop and contain the oil flowing from the Macondo well, ensuring federal government involvement in the decision-making process for source control efforts in Houston. Next, the National Oceanic and Atmospheric Administration (NOAA) and other agencies applied many modeling techniques to provide the FOSC with information on oil spill trajectory to aid in planning response operations, and the flow rate to estimate the amount being spilled. Those agencies also participated in the development of the Oil Budget, to produce a scientific estimate of the fate of the oil spilled. The source control effort was a whole-of-government and industry response. The Department of Energy (DOE), Department of Interior (DOI), U.S. Geological Survey (USGS), and Coast Guard engaged extensively with the RP in these efforts. Other oil companies, including Shell and Exxon-Mobil, assisted with source control strategy discussions.

Dispersants. Dispersant was applied during this spill in three ways:

- subsea, at the source of the spill,
- on the surface, by vessels and support ships working at the well site near the drill rigs in order to control Volatile Organic Compounds (VOCs) that posed a health and safety threat to those crews, and
- aerially, to disperse oil slicks more than five nautical miles from the source control effort.

On May 26, 2010, after discussions with the Environmental Protection Agency (EPA), the FOSC issued Addendum III to existing directives on dispersants that required a significant reduction in dispersant use. The FOSC continued to approve the use of dispersants applied sub-sea, and on the surface by vessels for the control of VOCs in the vicinity of vessels at well site. Aerial applications were pre-authorized by the RRT, and approved by the FOSC on days when weather and sea conditions limited the effectiveness of skimming or in situ burns, or when slicks were headed toward land and alternative response methods would not be able to combat the slick in time. Surface application took place well away from shore. Dispersants effectiveness decreases dramatically within hours of the oil being released. Thus dispersant application near shore would have been ineffective, as the oil would then have been on the surface for days. Additionally, no dispersant was applied within 3 miles of shore in accordance with the existing preapproval criteria.

In Situ Burning. Significant in situ burning (411) operations were conducted during the course of the response that removed an estimated 250,000 barrels of oil. The in situ burn operation eventually grew to include three task forces each consisting of a three vessel ignition team, two task force vessels, one supply vessel, a safety team, and five fire boom teams. The task forces were directed to targets by spotter aircraft. There was also a complex process to make sure skimming teams, dispersant operations, and in situ burn teams stayed clear of one another. There were no injuries as a result of in situ burns and air quality testing near the burns was conducted to ensure worker safety.

Skimming. Skimming operations were divided into several different types:

- Offshore near the spill source (three nautical miles in the vicinity of the source and the leading edge of any observed oil slicks),
- Near shore (within three nautical miles), and
- Inshore at beaches, bays, and marshes.

Different types of skimming equipment were needed depending on location, sea conditions, and type of operation. Oil skimmers were the most critical oil removal resource at the peak of the response.

Oil coverage was not uniform. Rather than covering large areas of the open ocean as was perceived, recoverable oil away from surface waters just above the source could be found only in a very small percentage of the impacted northern Gulf of Mexico's surface waters. Offshore skimming required aircraft surveillance support and maneuverable vessels to locate and follow the streamers and tendrils of oil. These streamers were anywhere from a meter to several hundred meters in width.

Shoreline Protection. Protecting the shorelines of the impacted states was a critical part of the response operation. Containment boom was another critical resource. The desire of state and local governments to obtain and deploy boom led to negotiation of booming plans in the midst of the response. Generally, Area Contingency Plans identify sensitive areas and habitats for booming. The renegotiation process brought beaches used by the public within the scope of areas that had to be boomed. Many other protection strategies were used, including piling projects, water filled boom lined on the shore, and Hesco Baskets filled with sand. Louisiana also obtained funding from the RP at FOSC direction and permitting approval from the Army Corps of Engineers, to build sand berms along barrier islands, at an estimated cost of \$360 million dollars. Alabama also obtained funding for smaller berm projects including a barrier for Katrina Cut.

Search and Respond Standards and Quick Reaction Forces. The Unified Incident Command developed a system, modeled after launch times for search and rescue assets, to use Coast Guard Maritime Safety and Security Team resources to do an on-scene assessment of new reports of oiling and allow cleanup assets to be prioritized based on that information. In order to ensure the highest priority impacts could be promptly addressed, Houma created Quick Reaction Forces and assigned response resources to them. These teams, mostly consisting of contract Oil Spill Response Organization personnel, could respond wherever most needed and were not tied to specific jurisdictions. Because of the competition among local governments for response assets, the initial work of these forces was complicated. However, once they proved their effectiveness and demonstrated that they kept response assets in reserve

in staging areas outside impacted jurisdictions, they became less problematic to local officials.

National Guard and Department of Defense Support. The National Guard provided support in many ways throughout the response, from helping to place barriers along the shoreline, to transportation, and coordinating emergency response communications. The process of obtaining National Guard and other Department of Defense (DOD) support involved arranging for payment of funding in advance, coordination with the Assistant Secretary of Defense for Homeland and America's Defense, the Joint Staff, NORTHCOM, the National Guard Bureau, and each state's Adjutant General. For the National Guard, Oil Spill Liability Trust Fund (OSLTF) funds were provided to fund activation under Title 32, thus the personnel worked for their respective states. This bifurcated process posed a challenge to the establishment of unity of effort within the federally-led Unified Area Command. Navy Supervisor of Diving and Salvage participated significantly. DOD also provided planners, public affairs support, and transportation resources. Tyndall Air Force Base provided the resources necessary to establish and operate the Aviation Coordination Center to prevent confliction within the airspace above response operations, most particularly near the offshore source control efforts.

Shoreline Cleanup Assessment Technique and Shoreline Cleanup Operations. Shoreline Cleanup Assessment Technique (SCAT) is the method for determining the most appropriate shoreline cleanup techniques weighing many variables for any given shoreline segment. These variables included amount of oil, type of shoreline, wildlife habitat, types and numbers of species present, archeological or historic properties concerns, etc. The teams consisted of representatives from the Coast Guard, NOAA, Fish and Wildlife Service (FWS) Section 7, National Park Service Section 106 Archeologists, other natural resource trustees, and state representatives. They ensured appropriate stakeholder review during the assessment process. Tribal liaisons and local government representatives participated whenever possible. SCAT experienced two significant challenges during the response: the amount of shoreline impacted, and the duration of the spill. SCAT was divided into three stages. Stage I covered the period while oil still flowed from the well. The primary focus was initial assessment to determine the scope of impact and review for re-oiling. Stage II focused on initial cleanup of bulk oil impacts. Stage III addressed the

entire shoreline in the fall 2010 after oil flow stopped and after initial cleanup efforts were well under way. Scale created many challenges for SCAT. First, simply because of the amount of shoreline involved, there was significant demand for appropriately trained team members. Second, the breadth of impacted area led to significant challenges. Garnering consensus across five states on best management practices, shoreline treatment recommendations, and recommendations for no further treatment, which was complex. There were also significant logistics challenges to surveying all of the impacted shoreline. Many areas were remote. Some could only be accessed at certain points in the tide cycle. Some unique SCAT methods were also used. Because of the concerns about oil impacts to beaches used by the public, identification of tar mats just off shore was important as a means of identifying beach areas that needed to be closely watched for recurring tar balls. Snorkel SCAT used swimmers in these near shore locations to identify submerged tar mats and thus target shoreline cleanup resources.

Actual shoreline cleanup was a long, arduous process. The cleanup methods and concerns of the public were very different, depending on the type of shoreline. There were two predominant types of shoreline impacted by the oil, sandy beaches and marshes. Beach cleanup involved work crews sifting sand, removing tar balls, and digging out tar mats. Mechanical cleanup devices such as the Sand Shark, a mechanical digger and sifter that scooped sand, sifted tar balls through screens of different sizes, and put clean sand back on the beach, were also used. In beach areas used by the public, the biggest cleanup concern was to remove as much oil as possible in order to encourage the public to return to the beaches. On beach land managed by federal trustee agencies the concern was more to ensure cleanup did not damage sensitive habitat.

Marshes posed different cleanup problems. Some marsh areas were heavily oiled. But many cleanup techniques posed significant risk of killing marsh grasses and thus accelerating shoreline erosion. Several minimally invasive techniques, such as swabbing with sorbents or low pressure flushing, were tried. But in certain areas, the environmentally prudent recommendation was “no further treatment” and to leave an oiled marsh alone.

Alternative Technologies. During the response more than 3,900 proposals for means of stopping the spill

or cleaning up the oil were presented to the FOSC, NIC, the RP and state leaders. The NIC assembled the Interagency Technology Assessment Program to evaluate these proposals. Ninety-six percent of the proposals were evaluated. The *A Whale*, a 1,100-foot cargo ship, serves as an example of the challenges posed by the process. The *A Whale* owners modified the ship in an attempt to convert it into a giant weir skimmer. They hired a publicist to help generate interest in their proposal. Despite several modifications and attempts to skim oil offshore with government engineers on board to witness the evolution, the concept proved ineffective.

Concurrent Response and Natural Resource Damage Assessment. Federal and state natural resource trustees and wildlife agencies played an important role in the spill response. These personnel aided the FOSC in understanding impacts and helped ensure response actions did not cause further damage to wildlife and their habitats. These agencies were the lead agencies in the Natural Resource Damage Assessment (NRDA), the cost of which is reimbursed by the RP. In this spill the NRDA process functioned in parallel with ongoing on-water and shoreline cleanup activities that stretched the resources of trustee agencies.

Chapter 4: Health and Safety

Health and Safety was the number one strategic goal throughout this response and was reflected in:

1. Efforts made to address potential public health impacts of the spill, and
2. The remarkably low injury rate for responders across the operation.

Air testing and monitoring were done along the Gulf Coast to address concerns about the fumes from oil on the shore lines and other response activities. Waste and air toxicity testing were performed to monitor the potential impacts of in situ burns. NOAA and the Food and Drug Administration closed much of federal fisheries waters in the Gulf of Mexico during the spill out of concern that oil and dispersants might impact the suitability of fish caught in those areas for human consumption. NOAA and FDA conducted a robust seafood safety analysis program and established rigorous protocols for re-opening closed areas on a grid-by-grid basis.

At the peak, there were 47,000 people working on the response, from those drilling relief wells on ships fifty miles off-shore, to those working on skimming

and booming vessels, to work crews cleaning the shoreline. Thousands of personnel also worked to decontaminate oiled boom, vessels, and equipment. A significant safety organization staffed by federal agencies including the Occupational Safety and Health Administration, Public Health Service, Coast Guard, state, and private safety experts oversaw and examined broad aspects of worker safety. Some were not novel, such as awareness of slips, trips, and falls. These types of basic safety measures took on uncommon importance when, for example, vessels working boom and skimmers had their decks covered in oil for days at a time. Some safety measures were unusual, at least in their scale—air quality monitoring for VOCs for those working to control the well source was vitally important. The EPA worked with the State of Louisiana to increase the frequency of air sampling from the Louisiana shoreline air monitoring stations, and provided a website for citizens to be able to review for full transparency of information. Heat was a significant, overarching concern across the response. While the oil flowed from the well and for the first month after the well was capped, the heat index was frequently over 100 degrees Fahrenheit, which required careful planning to minimize heat related injuries.

Chapter 5: Planning

There were two significant aspects of planning during the course of the response, beyond the daily ICS planning necessary to run such a large response organization. Existing plans, such as the Area Contingency Plans and the Marine Transportation System Recovery (MTSR) plans, were used. As oil reached the shore, and oil continued to flow from the well, the ACPs were modified and enhanced as the response continued. One new strategic plan was the Gulf-Wide Strategy that sought to enhance and replace the One Gulf Plan. The Gulf-Wide Strategy established ICP Miami consolidating operations from ICP St. Petersburg and ICP Key West into one command center. The Strategy also established the large equipment staging sites such as Theodore, Ala., and Gonzales, La. Not all the booming strategies in existing ACPs had been tested and not all plans identified sensitive areas. Containment boom and oil skimmers were critical resources in high demand, and became areas of particular concern. Boom amounts had to be brokered between jurisdictions, each wanting as much boom and other response resources as possible. The MTSR plan was activated, and proactive communication with the industry identifying the location of

oil was carried out, along with prompt establishment of stations to decontaminate vessels. These steps ensured the spill did not cause an unnecessary disruption to the movement of commerce in the marine transportation system.

The response also triggered new plans. Acquiring critical resources such as boom, skimmers and personnel started the strategic planning process, beyond the required ICS planning cycle. Severe weather had to be accounted for, as this was critical to personnel safety during this long response. With such a large operation that had grown dramatically just as hurricane season started, the FOSC had to ensure plans for dealing with severe weather were in place. Once the well was capped, planning was required to enable the orderly transition of response operations to a focus on shoreline cleanup, and to gain acceptance of transition plans from the affected states and communities. After such a protracted spill, reduction in the size of the response required careful coordination with state and local leaders. As part of the appropriate scaling of the response, the five incident command posts were consolidated into a single incident management team. As shoreline cleanup progressed into the winter, the stand down of the Unified Area Command required detailed planning and explanation. As the SCAT process determined which shoreline segments required no further treatment for the winter months, a plan was required to continue monitoring those shorelines for signs of oil exposed by winter storms, as well as a plan of action to respond to such reports.

Development of the administrative record of an oil spill response is required by the NCP. The five command posts and multiple branches and staging areas generated more than 27 million documents. Also, because of the potential for litigation surrounding the spill, federal responders saved all electronically stored information for possible electronic discovery.

Chapter 6: Logistics

Several logistics matters were instrumental to operational success of the response. Given that BP, as RP, accepted responsibility for oil spill removal, significant logistical commitments and challenges were largely addressed by the RP with federal oversight. The FOSC and Unified Area Command (UAC) initially identified boom, skimmers, and personnel as critical resources. Due to a limited supply of the dispersant Corexit, it became a controversial resource. In addition to seeking those resources, the NIC and FOSC also received offers of assistance, many from overseas. As a result, the NIC and FOSC developed

processes for receiving and processing such offers. When assistance involved foreign flagged vessels, potential conflict arose with the Jones Act, which requires trade between U.S. ports be on U.S. flagged vessels. The requirements of the Jones Act can be waived. In the end, only seven Jones Act waivers were issued, primarily for specialized vessels working to contain oil from the well, and the Jones Act was not an impediment to the response.

Vessels of Opportunity. Several thousand Vessels of Opportunity (VOOs) and their crews were employed. These were private vessels hired by the RP to assist with the spill response. They performed duties such as placing boom, skimming oil, and on-water transportation and support services. The size of the VOO fleet required extensive coordination at both ICP Houma and ICP Mobile. Concern over equitable opportunities for work, use of commercial vessels only, and efforts to hire those from the local area to assist response efforts, made management of the VOO fleet complicated. This led to development of a VOO policy issued by the FOSC—a policy that standardized VOO usage and organizational structure, and established training and safety measures and contractual and logistical requirements. Despite these efforts, there were communications challenges with VOO, some due to language barriers and others due to the disparity of communication equipment installed in the vessels. As the response operation contracted, the generous day rates paid by the RP complicated efforts to reduce the size of the VOO fleet.

Aviation Coordination. At the height of the spill, aircraft shuttled people and supplies to the small city of vessels working to control the source, overflow skimming and in situ burn operations to direct surface assets onto concentrations of oil, applied dispersants where appropriate, surveyed shoreline impacts, and provided public affairs opportunities. All these operations put a large number of aircraft in close proximity and thus created risks. The FOSC worked with the FAA to develop a Temporary Flight Restriction (TFR) over response operations. Enforcing the TFR required visibility of aircraft in the area, to include those out near the source. Working with the UAC and the ICPs Air Operations Branch, Tyndall Air Force Base was able to provide the resources and technical expertise to improve aviation coordination over the operating area. ICP Houma and ICP Mobile established the priorities and aircraft tasking through the aircraft branch of the Operations Sections and set out in the Incident Action Plans (IAPs). By late June, the Aviation Coordination Center used the prioritization

set out in the IAPs to safely manage and prevent conflict within the airspace.

Vessel Decontamination. More than 9,000 vessels participated in the response. Some never touched oil and could quickly be released when they were no longer needed. Others spent weeks in the midst of oil. To clean vessels that came in contact with oil, the FOSC and RP set up significant vessel and equipment decontamination operating facilities across the Gulf Coast. Some smaller vessels and equipment could be pulled out of the water and pressure washed in containment pools. Larger vessels involved in oil skimming required dry docking with extensive cleaning of hulls, ballast tanks, and salt water service systems. In order to make the process efficient, the FOSC defined standards for decontamination, and employed Coast Guard marine inspectors and other trained personnel, providing a just-in-time training process to certify completion of the decontamination process.

Other logistics concerns had significant impact on response operations. Most logistics matters, including waste management and boom disposal, were handled by the RP. Sustaining government responders fell partly outside the RP's logistics arrangements. Communications and computer connectivity were limited in many areas impacted by the spill. The response operation also set up incident command posts, branches, and staging areas across five states, which required computer connectivity to operate. Communications had to be established with the thousands of vessels and hundreds of aircraft employed. The Coast Guard procured dedicated servers to fulfill its obligations to preserve electronically stored information.

The FOSC established policies for government specific logistics matters beyond communications. The RP provided lodging, transportation, food, limited medical, and command post facilities; government logistics ensured that the needs of government response personnel were taken into account. With the numbers of personnel cycling through the response, systems had to be established to track people when they checked in and methods to demobilize them. Property acquired by the government for the response had to be accounted for just as any other form of government property.

Chapter 7: Finance

When the spill began, the Oil Spill Liability Trust Fund (OSLTF) had a response expenditure cap of \$100 million per incident. Relatively soon, it

became apparent government expenditures would soon exceed that amount, and Congressional action was necessary to increase the per response cap. This was enacted and as of February 2011, the cap for the *Deepwater Horizon* response was \$700 million.

It was, however, but a small fraction of the total costs the RP has paid to date. The solvency of the RP was pivotal in sustaining the unprecedented level of response.

The RP reimbursed the OSLTF for expenditures against the fund, although that did not act as a credit against the per incident cap. An RP is also responsible for claims arising from the spill. The National Pollution Funds Center directed the RP to take required steps to advertise the ability to make claims. These advertisements notified the public that if their claim was denied or they were unsatisfied with the RP's offer, injured parties could make a claim to the National Pollution Funds Center (NPFC).

Finance personnel were assigned to the UAC, the ICPs, and the Branches. Decentralized finance sections allowed greater flexibility to the response, but complicated documenting costs. Military Interdepartmental Purchase Requests (MIPRs) and Pollution Removal Funding Authorizations (PRFAs) authorize funding from the OSLTF for federal and state agency participation in a response. The Finance Section negotiated details of the MIPRS and PRFAs during the response, including assessing agency participation when the FOSC so directed. The process of tracking the costs associated with these arrangements required great attention to detail as the daily costs for various categories of government support had to be manually entered into electronic documentation workbooks. Tracking costs associated with credit card expenditures, travel orders, and reserve orders involved development of new, detailed methods and processes to ensure accurate accounting.

Chapter 8: Natural Resources and Wildlife

Marine Mammals. There are 29 species of marine mammals and five species of sea turtles that inhabit the areas impacted by the spill. NOAA and the FWS established the marine Mammal and Sea Turtle Group within the Wildlife Branch of the Operations Section. The group coordinated its activities with existing marine mammal and sea turtle organizations of the Gulf Coast and elsewhere within the United States. Working with these organizations, protocols were developed for handling oiled animals and to

take in reports of marine mammals and sea turtles impacted by oil. In addition, the spill occurred just as the sea turtle nesting season was beginning across the shores of the northern Gulf of Mexico. In order to minimize the threat of losing many nests to oil impacts, sea turtles nests were excavated and relocated to Florida. Although initial observations found few dolphins stranded with externally visible oil, in early 2011 NOAA declared an unusual mortality event (UME) for dolphins in the northern Gulf of Mexico, and they continue to investigate the causes. The role that the spill may have played in the UME is as yet unknown

Migratory Birds. Similarly robust operations were established to respond to impacts on migratory birds. The FWS and state agencies coordinated efforts with the Audubon Society and existing networks of organizations working with migratory birds in the region. Coordination of volunteers, and ensuring volunteers had appropriate experience and training to assist with migratory birds eventually was performed by mutual agreement with the Audubon Society. Among the efforts to attempt to lessen the impacts to migratory birds, the Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) diverted funds for two existing migratory bird habitat initiatives to lease private farmland for flooding and flood appropriate public lands for migratory bird habitat. USDA sought FOSC funding to reimburse the programs for the expenses focused on the Gulf Coast. Ultimately, the FOSC determined not to provide the reimbursement from the OSLTF and the effort was later found to be ineffective in keeping migratory birds from reaching oiled shorelines.

Endangered Species. There are 26 endangered or threatened species in the Gulf of Mexico, ranging from sperm whales to the five species of sea turtles. Ensuring compliance with the Endangered Species Act for response operations involved bringing experts from NOAA, FWS, and other sources to develop and disseminate best management practices to adapt response operations, whether in situ burns or cleaning tar balls from beaches, to account for potential endangered species impacts. The work also involved providing trained spotters for skimming and in situ burn operations.

Ensuring adequate numbers of appropriately trained wildlife responders, supplying wildlife teams with necessary logistics support, and communicating wildlife related information across such an enormous organization spread across five states, proved challenging.

Section 106 Compliance. Approximately 778 archeological sites, including 113 newly discovered sites, were checked during the course of the response. There are eleven federally recognized tribes with traditional cultural properties and interests in the shorelines impacted by the *Deepwater Horizon* spill. There are also state recognized tribes with interests in the area. Historic preservation and tribal interests were folded into the response from early May, before there were shoreline impacts from the spill. Once the well was capped and the focus of response operations shifted almost exclusively to shoreline cleanup, formal consultations with historic preservation stakeholders took place in August, and the first of several government-to-government consultations took place in September.

Chapter 9: Government Personnel

Sustaining the number of people required to direct response operations for a spill of this size and long duration, proved difficult for every government agency. Agencies that regularly participate in oil spill response have a cadre of highly trained people experienced in spill response work. The response soon outgrew the number of those people in almost every agency, including the Coast Guard. This posed two interrelated challenges. The first was simply staffing the response itself, given that all the agencies that participated had other missions to fulfill. Finding personnel to support the response effort while still maintaining enough staff to enable agencies to carry out their other missions proved difficult. Second, the number of people required exceeded the number with significant training and experience in spill response. Thus these agencies, including the Coast Guard, had to develop just-in-time training methods to bring in the numbers of personnel required to oversee operations and provide them with the training necessary to perform their functions.

The Coast Guard mobilized 14 percent of its total workforce, active duty and reserve. FWS and NOAA deployed approximately 17 percent of their workforce. For contingencies such as the *Deepwater Horizon* spill, the Coast Guard relies on the Coast Guard Reserve. The Reservists can be, and were, ordered to active duty under Title 14 of the U.S. Code. While this process makes Reservists immediately available, they can only be ordered to active duty in this manner for 60 days at a time. After that period of service, unless the Reservist volunteers for further activation, they cannot be recalled for two years. Due to this

limitation, managing the availability of Reservists became a significant challenge; however, the number of Reservists who volunteered to continue to work on the DWH response under different arrangements certainly sustained the effort in a meaningful way.

Chapter 10: Communications

Common Operating Picture. One of the central challenges in communicating about the response was developing a common operating picture that all stakeholders could access. After initially being used to help with oil spill trajectory, on June 5, 2010, the NIC directed that NOAA's Environmental Response Management Application (ERMA) would be the common operating picture (COP) for the *Deepwater Horizon* response. ERMA provided the ability to use Geographic Information System tools to track every aspect of the response, ultimately growing to thousands of data layers covering a wide array of response operations. It also allowed a scaled version of the COP to be posted on the Internet as GeoPlatform.gov, where the public could view response status information.

Standard Information Reporting. As the public and government officials learned of the potential impact of the spill, requests for information about response activities added a requirement for distilled information for distribution and posting. Daily Incident Action Plans, which contained information about response operations, quickly became so large that they were not useful for conveying information to senior officials or to the public. A standard set of measurements of resources and operations was developed, which provided a repeatable set of statistical information reported out from the response organization.

Interaction with Federal and State Officials and Congressional Affairs. In April through August 2010, over sixty percent of the Congressional inquiries to the Coast Guard were related to the *Deepwater Horizon*. Seventeen Congressional hearings as well as numerous Congressional Delegation hearings were conducted during the response phase of the incident. To ensure the concerns of local elected officials were accounted for in response operations, DHS hosted a daily call-in for local elected officials, which included a FOSC situation report followed by a question and answer session. In addition, the White House hosted a daily call that included the NIC, the FOSC, and the governors of the five impacted states. The states received the same daily summary as the White House.

To improve information flow, Deputy FOSC Representatives (Deputy FOSCRs) were assigned to the governors of Alabama, Mississippi, and Florida, while the Coast Guard sent a liaison to the staff of the Louisiana government and the FOSC, already located in Louisiana, met with him frequently. FEMA deployed a Governmental Relations Team of 80 people to assist in communications with local government leaders, interested citizens, and businesses.

Interaction with Local Government and Affected Communities. Interaction between the response and government leaders did not stop with the governors. An extensive liaison network of approximately 70 officers was established to respond to the needs of local officials. Liaisons, most particularly with the parish presidents of the coastal parishes in Louisiana, improved coordination between the response and local officials. Coast Guard Liaisons were also sent to local and state emergency response operations to improve communications and understanding of response needs. These liaisons filed daily information reports that were communicated to officials in Washington.

The FOSCs and Incident Commanders also reached out to the local communities. They found that expo type meetings, consisting of booths and tables with information and subject matter experts on various issues of concern to the public and specific aspects of response operations, were effective in communicating the status and challenges of the response. This was in contrast to town hall style meetings that were emotionally charged and did not contribute to inspiring public trust.

Strategic Communications. Strategic Communications for the response began with the Coast Guard and RP using the Joint Information Center (JIC) model generally used for oil spills. Over time, however, this model became more of a hybrid of the National Response Framework's ESF-15 structure that places media, governmental, and congressional affairs in one federal entity, with a limited JIC embedded.

By June, the NIC took over primary responsibility for addressing the national media on a daily basis about actions and items of interest, while the FOSC remained responsible for dealing with local media and state and local government leaders. The NIC focused on addressing the complexities of the relief well effort and source control. The FOSC addressed oil spill response, removal, and impacts. This large, full service communications structure remained in

place until after the well was capped when media interest diminished and allowed reduction in the communications staff, along with scaling back of the rest of the response organization.

As with many other areas of the response organization, it was difficult to sustain the number of staff required with the appropriate skills to handle both traditional public affairs and community and inter-governmental relations. The willingness of other agencies to provide public affairs specialists to assist was a significant help.

Conclusion

The *Deepwater Horizon* oil spill response was ultimately successful, due to the unity of effort and perseverance of the more than 1000 organizations that contributed to this unprecedented response. The NCP was proven sound, and the Incident Command System's scalable organizational structure proved critical to multiple agencies working with the RP toward common goals under an effective construct. The division of responsibilities between the NIC and staff working at the National level, and the FOSC serving as Unified Area Commander at the regional level, was effective in managing national, regional and local demands of this first "Spill of National Significance."

The *Deepwater Horizon* incident occurred in spite of the presence of a blowout preventer. The oil spill impacted the marine environment and the lives of so many along the Gulf of Mexico. The mitigation effort to secure the well source was a three-month process (87 days), and the resulting spill response effort became extraordinarily large and complex. Based on these facts, we conclude that significant improvements need to be made in preventative technology and requirements, mitigation technology and required capabilities, and oil spill response methods and readiness.

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On April 20, 2010, 126 workers on the mobile offshore drilling unit *Deepwater Horizon* were in the process of temporarily closing the exploratory Macondo oil well. That evening, an explosion aboard the drilling unit set off a chain of events that eventually led to the sinking of the *Deepwater Horizon*. Eleven crewmembers lost their lives and others were seriously injured, as fire engulfed and ultimately destroyed the rig.

At 10 p.m. CST on April 20, watch standers at the U.S. Coast Guard District Eight command center received a report of an explosion and fire aboard the *Deepwater Horizon*, located approximately 42 miles Southeast of Venice, La. A search and rescue effort began soon after, with Coast Guard District Eight as the Search and Rescue Mission Coordinator. Concurrently, Coast Guard Marine Safety Unit Morgan City, La., began a pollution response case and marine casualty investigation. Aircraft involved in the search reported a variably colored sheen on the surface of the water, two miles long by half-mile wide.

By April 21, 115 of the 126 workers were accounted for. The Coast Guard continued to search for survivors, dispatching 28 air and surface sorties, covering approximately 5,375 square miles. At 5 p.m. CST on April 23, the Coast Guard suspended the search. Initial debriefs of the surviving crewmembers placed the 11 missing in the vicinity of the initial explosions.

The Commanding Officer of Marine Safety Unit Morgan City, La., became the first Federal On-Scene Coordinator (FOOSC) to direct the oil spill response. As the search and rescue continued, it was determined the response had the potential to eclipse all others and impact a large portion of the Gulf Coast region. Therefore, the Commandant of the Coast Guard re-assigned the FOOSC role to the Commander of Eighth Coast Guard District.

On April 22, dispersants were used for the first time.

On April 23, the FOOSC established a Unified Area Command (UAC) in Robert, La. The UAC served as headquarters for the regional response and eventually included representatives from the federal government, Alabama, Florida, Louisiana, Mississippi, and the Responsible Party (RP).

The Coast Guard Incident Command Posts (ICPs) in Houma, La., and Houston, Texas, were also established on April 23. These ICPs, along with

one in Mobile, Ala. established on April 26, 2010, would become the centers of response operations.

On April 29, the *Deepwater Horizon* incident was declared a Spill of National Significance, the first time the federal government used that designation. The declaration permitted a newly designated National Incident Commander to assume the lead role of communicating with affected parties and the public, and coordinating all federal, state, local, and international resources at the national level.

Between May 6 and May 8, the RP unsuccessfully attempted to place a large containment dome, or cofferdam, over the larger of two leaks from the broken riser at the sea floor.

On May 11, Louisiana applied to the Army Corps of Engineers for an emergency permit to construct six large, linear sand berms along Louisiana's barrier islands to guard the coastline from oil. Two weeks later, the Corps approved an emergency permit for a portion of the berms. Just over one week later, the RP began funding all six Louisiana sand berm reaches. The National Incident Commander had also authorized one of the six as a prototype oil spill response mechanism.

On May 12, the RP released a 30-second video of oil and gas streaming from the end of the broken riser.

By mid-May, the Coast Guard evolved the organizational structure for the response and along with other response agencies, began to move resources into the area from all over the country.

As oil flow rate estimates had gone from 1,000 to 5,000 barrels per day, and the RP was unable to ascertain with any certainty the conditions at the wellhead inside of the blowout preventer (BOP), the federal government became increasingly concerned with flow rate estimates. To determine the flow amount, the National Incident Command created an interagency Flow Rate Technical Group and charged it with generating a preliminary flow rate.

On May 26, the Environmental Protection Agency announced that the government instructed the RP to take immediate steps to scale back the use of dispersants. Also on May 26, the RP began a top kill, a process that involved pumping heavy drilling mud into the top of the well at high pressure. After the third unsuccessful attempt, the RP and the government agreed to discontinue the strategy.

On May 27, the Flow Rate Technical Group estimated the range of oil flow from the source

1. Situation as It Developed

between 12,000 to 19,000 barrels per day (flow rates of up to 25,000 barrels per day were also consistent with data). On May 28, the President of the United States directed federal manpower and resources responding to the spill be tripled.

On May 29, the RP announced that it would attempt to cut off the portion of the riser still attached to the top of the BOP on the sea floor and install a collection device—the top hat—that would then be connected via a new riser to the *Discoverer Enterprise*.

On June 1, 2010, Rear Admiral James Watson assumed the role of FOOSC.

On June 3, the top hat was in place and functioning at the source. By June 8, the *Discoverer Enterprise* was collecting nearly 15,000 barrels of oil per day.

On June 16, the vessel *Q4000* became operational, and was processing and burning up to 10,000 barrels of oil per day.

On July 9, the National Incident Commander authorized the RP to install a capping stack, but not to close it. The operation began the next day and by July 12, the RP had finished installing the stack. On July 15, the RP closed the stack and a well integrity test commenced.

On July 12, Rear Admiral Paul Zukunft assumed the role of FOOSC.

On August 3, the RP began a static kill—an operation that involved pumping heavy drilling mud into the well to push oil and gas back into the reservoir. The static kill succeeded and was followed with cement. On August 8, the National Incident Commander reported that the cement had been pressure tested and was holding.

In mid-September, the first relief well intercepted the Macondo well, allowing the RP to permanently seal the reservoir. On September 19, the National Incident Commander announced the Macondo well was effectively sealed.

On September 20, 2010, the ICPs in Houma, La., and Mobile, Ala., were disestablished, and operations were consolidated under the Gulf Coast Incident Management Team in New Orleans, La.

On October 1, 2010, the National Incident Command was disestablished.

The response to the *Deepwater Horizon* spill continues. As of July 15, 2010—the day the well stopped flowing—the response involved

approximately 47,000 responders, more than 6,870 vessels (including skimmers, tugs, barges, and recovery vessels), approximately 4.12 million feet of boom, 17,500 National Guard troops from Gulf Coast states, five states, multiple corporations, and untold hours of work by federal, state, and local officials, employees or contractors of the RP, and private citizens.

The *Deepwater Horizon* spill was the first Spill of National Significance (SONS) and the first to have a National Incident Command (NIC) designated. At its peak, more than 47,000 people worked on the response in total and more than 6,870 vessels were employed in response efforts. Oil from the spill directly impacted five states. Because of the size and scope of the spill, the response organization required to combat it was unique in many respects.

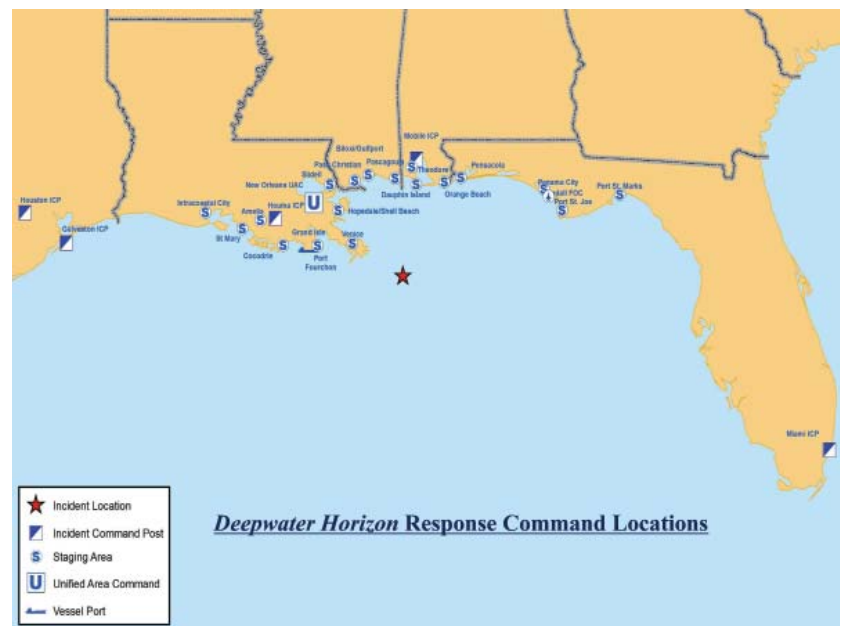
2.1 Setting the response structure of the *Deepwater Horizon* Response

- The size and scope of this incident required significant coordination of public and private resources. The command and control structure maximized the Federal On-Scene Coordinator's (FOSC) work with other federal, state, and local stakeholders to address the highest operational needs.
- One National Incident Command (NIC) was established in Washington, DC, to coordinate the 'whole of government' response to the incident.
- One Unified Area Command (UAC) was established to oversee operational activities across the entire Gulf Region.
- Five Incident Command Posts (ICPs) were established to coordinate operations with local and regional elected officials. ICPs Houma and

Mobile were the most robust and active for spill response operations.

- Branches and Staging Areas were established to coordinate the efficient and effective distribution and employment of critical resources across regional boundaries. Figure 2.1 below outlines the location of the UAC, different ICPs, and individual Branches. Branches are annotated as Staging Areas (S) only for the purposes of this graphic.

Figure 2.1:



Command Locations as of July 16, 2010

After the *Deepwater Horizon* Mobile Offshore Drilling Unit sank on April 22, 2010, the first FOSC was the Commanding Officer of the Marine Safety Unit (MSU) in Morgan City, La. The MSU Commanding Officer was assigned FOSC responsibility in the Area Contingency Plan, which was developed in accordance with the National Contingency Plan (NCP). From its outset the spill had the potential to impact several states, so the Sector Commander for Sector Mobile, whose area of operating responsibility covered Alabama, the Florida panhandle, and Mississippi, assumed the responsibilities of the FOSC for the Sector Mobile response area.

The process to make the Eighth District Commander the FOSC was not as clear-cut as the pre-designation of the Coast Guard Sector Commanders. While 40 CFR 300.120(a) clearly gave the district commander the authority to designate a FOSC, the regulations did not clearly designate that position



ROBERT, La. – Rear Admiral Mary Landry (center), the Federal On-Scene Coordinator for the *Deepwater Horizon* incident, talks with U.S. Coast Guard Commandant Admiral Thad Allen (right) before his speech to the members of the Unified Area Command. Photo courtesy of U.S. Coast Guard

2. Command and Control

as a FOSC, nor was it designated as such within the ACP. To remove any possibility for confusion, and because of the recognized potential for oil to impact several states, the Commandant of the Coast Guard designated the Eighth Coast Guard District Commander Rear Admiral Mary Landry as FOSC on April 23, 2010, without regard to district boundaries. On the same day, the newly named FOSC established the Unified Area Command (UAC) in Robert, La., and became the Unified Area Commander. The practice of having the Commandant designate a *Deepwater Horizon* Response FOSC continued until November 2010, when the

authority to designate the FOSC returned to the Eighth District Commander. Following the FOSC designation, the U.S. Department of Homeland Security Secretary Napolitano declared the *Deepwater Horizon* spill a Spill of National Significance and named Admiral Allen, then Commandant of the U.S. Coast Guard, as the National Incident Commander on May 1, 2010.

The FOSC has authority to direct response operations under Section 311(c) of the Clean Water Act. The National Incident Commander did as well, at first due to the authority of the Commandant of the Coast Guard, and after his retirement from the Coast Guard, through express delegation by the Secretary of DHS. Although the two roles had the potential for overlap, in practice a natural division of labor developed between the two. The National Incident Commander focused on unifying the government's response, particularly at the inter-departmental level, external communications, and technical issues such as source control, assessing oil flow, and containing oil from the well, and issues emanating from the response that were outside the NCP. The FOSC focused on conducting the response, addressing the concerns of state and local leaders, and oil removal and mitigation measures across affected areas. In addition, the FOSC was responsible for approving all response related expenditures from the Oil Spill Liability Trust Fund (OSLTF), and also delegated some expenditure authority to the Incident Commanders in Houma and Mobile.

The Coast Guard was also sensitive to the NCP requirement that there be only one FOSC for the spill at any time. This requirement was reflected in the organizational construct depicted in Figure 2.2 below. The construct placed the FOSC in charge of directing response operations within the UAC and designated Incident Commands (ICs) at the ICPs located in Galveston, Texas, Houma, La., Houston, Texas, Miami, Fla., and Mobile, Ala. Each ICP Commander was furthermore designated as a FOSC Representative (FOSCR) with authorities specifically assigned. This designation was consistent with the NCP, and the Coast Guard delegation of authority in 33 CFR 1.01-85.

The National Oil and Hazardous Substances Pollution Contingency Plan, or NCP, is the federal government's blueprint for responding to both oil spills and hazardous substance releases. Specifically, the NCP establishes the National Response System, a multi-tiered and coordinated national response strategy. Key components of the National Response System include the National Response Team (NRT), Regional Response Teams (RRTs) located throughout the country based on Environmental Protection Agency (EPA) Regions, Area Committees usually based on Coast Guard Captain of the Port zones for coastal areas, the FOSC, UAC, and the National Incident Commander.

Congress first established the NCP in 1968 after the 37 million gallon *Torrey Canyon* tanker spill off the coast of England. The Federal Water Quality Act of 1970, which became the Clean Water Act in 1972, required the President to publish a NCP. Although a version of the NCP was in place at the time of the *Exxon Valdez* spill, Congress responded to that spill by passing the Oil Pollution Act of 1990 (OPA 90), which directed the President to expand the NCP. The authority to expand the NCP was later delegated to EPA, which implemented this mandate with amendments to the NCP promulgated in 1994.

The 1994 amendments to the NCP focused on expanding federal authority to coordinate effective communication and deployment of equipment. Specifically, the amendments prescribed additional responsibilities for the FOSC and strengthened their ability to direct the on-scene response. The amendments also called for the creation of Area Committees and Area Contingency Plans under the leadership of the FOSC. To ensure that contingency plans would result in companies and responders undertaking more realistic preparation for future



GULF OF MEXICO – Department of Homeland Security Secretary Janet Napolitano and Environmental Protection Agency Administrator Lisa Jackson receive a brief from Rear Admiral Mary Landry, Federal On-Scene Coordinator for the *Deepwater Horizon* incident, as they conduct an aerial survey of the Gulf Coast. Photo courtesy of U.S. Coast Guard

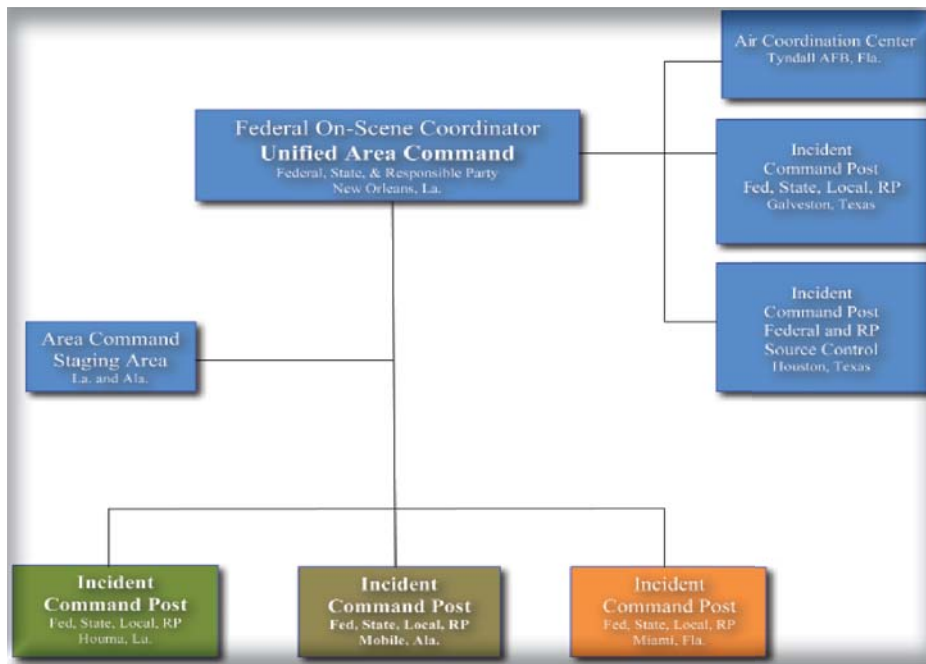


Figure 2.2:
Unified Area Command

spills than they had for the *Exxon Valdez* disaster, the 1994 amendments required contingency plans to consider a worst-case discharge scenario.

The Role of the Responsible Party under the Oil Pollution Act of 1990

Under the OPA 90 framework, a responsible party (RP) is strictly and jointly liable for removal costs and certain damages in connection with a discharge of oil, or a substantial threat of a discharge of oil, into or upon the navigable waters, adjoining shorelines, or the exclusive economic zone of the United States.

The NCP directs that the RP play a role in the response. One of the principles of the unified command structure directed by the NCP is that the RP must be included in order to “achieve an effective and efficient response.”

The NCP provides that “cleanup responsibility for an oil discharge immediately falls on the responsible party,” and notes, “in a large percentage of oil discharges, the RP shall conduct the cleanup.” Though the NCP directs the FOSC to “monitor or direct all federal, state, local, and private removal actions,” the FOSC may “allow the responsible party to voluntarily and promptly perform removal actions” if the FOSC determines that having the responsible party perform such actions will “ensure an effective and immediate removal of the discharge.” In this situation, the FOSC supervises the RP’s actions. The NCP expresses a preference for setting up the response in this manner— “[w]here practicable,

continuing efforts should be made to encourage response by responsible parties.” In a spill that “results in a substantial threat to the public health or welfare of the United States ... the [FOSC] must direct all response efforts.”

To accomplish its purpose the NCP gave the FOSC and the FOSC’s representatives a number of authorities. The response must be a unified effort, coordinated with other federal agencies, state government, local government, any applicable tribal government, and private parties such as the RP as well as land and facility owners impacted by the spill. The FOSC can authorize expenditures from the OSLTF to pay for federal and state expenses stemming from the response. If there is no RP, or the RP proves unable or unwilling to fund cleanup efforts, the FOSC can take over the spill and fund all response efforts from the OSLTF. The FOSC can issue administrative orders to the RP directing specific response actions be taken. And while required to work within a unified command, the NCP gives the FOSC the final say in the response to an oil spill.

For the *Deepwater Horizon* spill, BP accepted its responsibility as an RP under OPA 90 and the NCP to respond to the oil spill. Even though the RP participated in the UAC structure at every level of the response, the FOSC and the FOSC’s representatives directed RP actions. This was done daily in the form of Incident Action Plans (IAPs) and also in the form of NIC and FOSC directives to the RP.

2. Command and Control



ROBERT, La. – U.S. Coast Guard Commandant Admiral Thad Allen meets with Rear Admiral Mary Landry and other local, state, and federal members participating in the Unified Area Command. Photo Courtesy of U.S. Coast Guard

2.2 National Incident Command

The *Deepwater Horizon* oil spill was the first incident in U.S. history to be declared a Spill of National Significance, and the first to designate a National Incident Commander. After being named the National Incident Commander by the DHS Secretary following the SONS declaration, Admiral Allen established an NIC in Washington, DC, to coordinate the entire government response to the incident.

The National Incident Commander issued his own report on October 1, 2010. From the perspective of the FOSC, the National Incident Commander performed the duties as defined in 40 CFR 300.323, which states:

The National Incident Commander will assume the role of the FOSC in communicating with affected parties and the public, and coordinating federal, state, local, and international resources at the national level. This strategic coordination will involve, as appropriate, the NRT, RRT, the Governor(s) of affected state(s), and the mayor(s) or other chief executive(s) of local government(s).

The Coast Guard further described the National Incident Commander's responsibilities in a SONS response contained in the draft Commandant Instruction: Spills of National Significance

Response Management System. These responsibilities expand on the NCP guidelines to include leading national level communications and developing strategic objectives, coordinating inter-agency issues, coordinating federal, state, local, and international resources, and overseeing UAC activities for effective response.

As the National Incident Commander, Admiral Allen followed the doctrine outlined in the NCP and assumed the responsibilities for addressing and coordinating national-level issues. At the same time, Homeland Security Presidential Directive-5 (HSPD-5), signed in 2003, establishes the framework for the federal government's response to national disasters requiring interagency coordination. Under this directive, the Secretary of Homeland Security is designated as the Principal Federal Official for domestic incident management. *Deepwater Horizon*, as the first Spill of National Significance, presented the first occasion to consider how the NCP structure for addressing a SONS would function with the HSPD-5 overarching framework for managing a national disaster. Early in the response, it was determined that the NCP would be executed, and that the National Incident Commander would carry out his role under the NCP. This would take place within an overarching HSPD-5 framework in which the Secretary, as the PFO designated by the President, maintained overarching responsibility for coordinating the whole-of-government response, particularly at the Cabinet level.

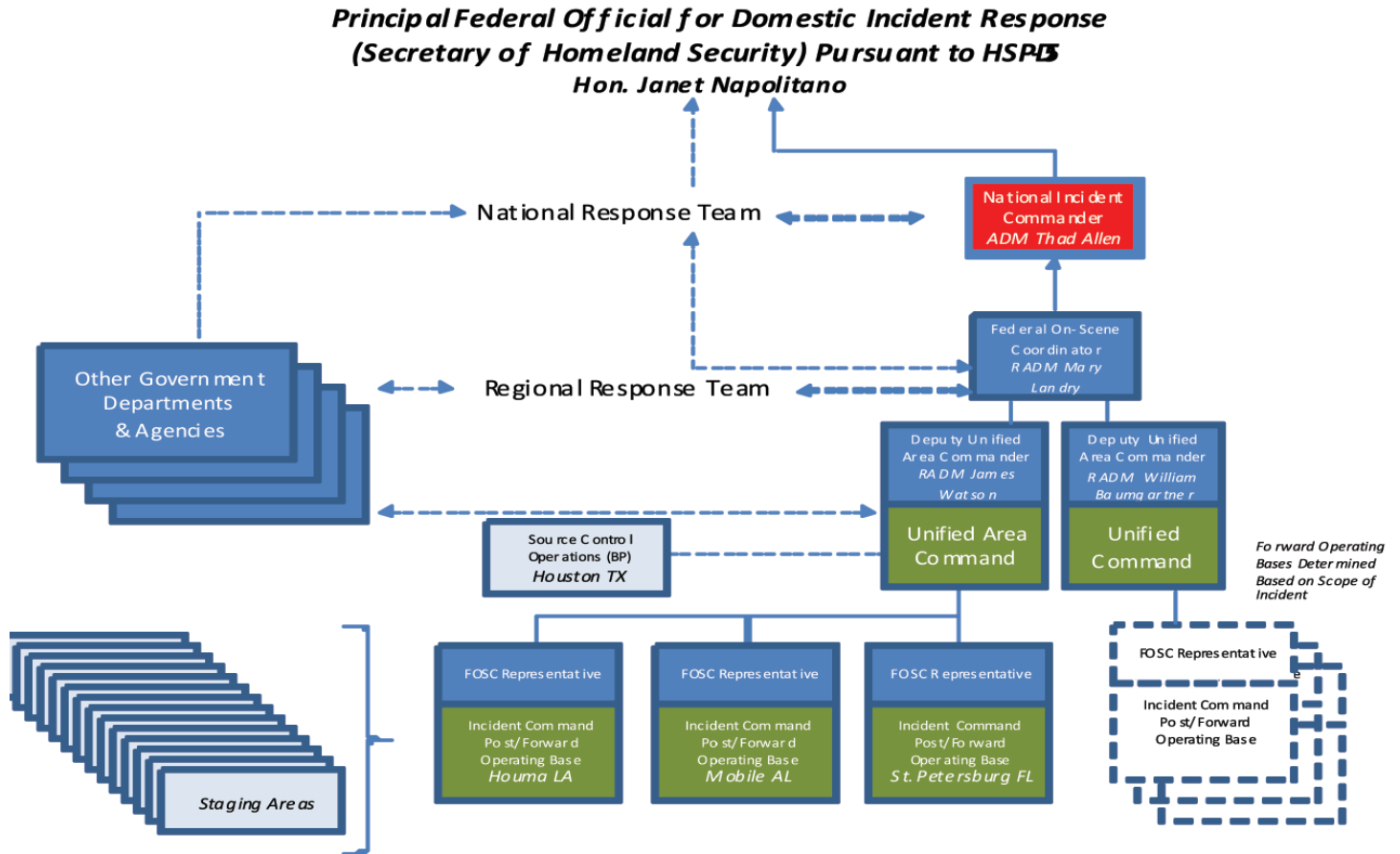
Spill of National Significance

The Spill of National Significance operational doctrine was tested in the exercise environment, but while it developed over multiple SONS exercises, the doctrine also continued to evolve during the course of this response. The NIC's role was strategic and operational, and extended beyond traditional spill response actions to include, for example, resolution of public health and seafood safety concerns, and adjudication of claims. In some cases, the National Incident Commander engaged in operational decision-making, working directly with the FOSC, state and local elected officials, and the RP.

Although this was the first declared SONS event and use of a National Incident Commander, previous experience was gained through regular SONS exercises conducted since the post-*Exxon Valdez* rewrite of the NCP. The experience was essential



Figure 2.3: U.S. Government Response



to the effectiveness of the entire response organization. The Coast Guard and government agencies held a SONS exercise in New England in March 2010. The planning for that exercise did much to define the processes to establish a NIC staff and implement the entire response organization for a SONS event, which included a UAC. Senior DHS officials participated in the SONS exercise. The Assistant Secretary for Intergovernmental Affairs led the DHS contingent at the drill, and was a key advisor to the NIC in working with state and local officials during the *Deepwater Horizon* response. In addition, many of the key planners and participants in the SONS 2010 exercise became part of the *Deepwater Horizon* NIC or UAC staff. Thus, while formal doctrine for SONS events was still under development, there was extensive, and recent, experience with the details of a large scale SONS response.

An exercise environment, however, is not the same as a bona fide Spill of National Significance. Actual establishment of a National Incident Commander was unprecedented. The exercise process

did not take into account that the federal governance structure for oil spill response, the NCP, was not familiar to the impacted communities. Because of repeated national disasters and emergency declarations, these communities were accustomed to a state-centric response organization under the Stafford Act.

The SONS designation and the appointment of a National Incident Commander still had many beneficial impacts. The SONS designation assisted with the ability to secure equipment, people, and other resources from throughout the federal government to participate in the response. The National Incident Commander designation emphasized the importance of the national and government effort to respond to this spill.

The NCP states that with a SONS declaration, the National Incident Commander “will assume the role of the On-Scene Coordinator (OSC) in communicating with affected parties and the public, and coordinating federal, state, local, and international resources at the national level.” The NCP did not address all of the key issues that came

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ROBERT, La. – U.S. Coast Guard Commandant Admiral Thad Allen speaks with local, state, and federal members at the Unified Area Command during an all-hands meeting. Photo courtesy of U.S. Coast Guard

up in the response. The National Incident Commander, interacting with cabinet level officials, had to adjudicate some of these issues. An example was seafood sampling to ensure the safety of Gulf of Mexico seafood. The National Incident Commander role proved very effective in covering the considerable public relations duties to include explaining the response efforts to the public. As the single, named leader of the federal government's efforts to respond to the spill, the National Incident Commander minimized duplication of effort by giving external stakeholders, including the national media, one individual to address all issues associated with the spill. This aspect of the National Incident Commander role also helped with public concerns regarding who was in charge of the response.

The National Incident Commander directed the RP to take a number of actions. In day-to-day coordination and decision-making, the FOSC issued requirements. The RP complied with direction from both sources. Because the roles of the National Incident Commander and FOSC allowed for the possibility of overlapping direction, daily coordination among the FOSC, the National Incident Commander, and NIC staff occurred through conference calls and prior to daily meetings, governor's calls, press events, and at other times of significant decisionmaking.

NIC Interagency Solutions Group

The National Incident Commander developed a number of groups that tackled different aspects of the response and policy coordination tasks. Of these groups, one with significant impact on

the FOSC was the Interagency Solutions Group (IASG) that evolved to fill the role of the NRT. When the *Deepwater Horizon* sank on April 22, 2010, Admiral Allen requested a meeting of the NRT as the Commandant. His intent was to employ this long-standing interagency coordinating body in support of the deepening crises and potential for a catastrophic oil release.

The NRT is comprised of 15 federal agencies responsible for developing, de-conflicting, and reconciling intergovernmental policy issues that surface during an oil spill response. During the response, the the Secretary of Homeland Security exercised oversight over the NRT in accordance with guidance developed in the early stages of the response effort, and the Deputy Secretary of Homeland Security presided over NRT meetings and conference calls. When a spill involves a substantial threat to public health and welfare, the NRT may be activated as an emergency response team. The primary role of the NRT is to monitor the response actions and provide counsel and recommendations to the NIC to assist in the response. During activation, the NRT may support RRTs—the regional interagency bodies—with recommended actions to combat the spill, requests of other Federal, state, tribal, and local governments or private agencies to provide resources, and coordination of the supply of equipment, personnel, or technical advice. During the *Deepwater Horizon* incident, the NRT held nearly 50 separate meetings and briefings to coordinate national efforts for the incident.

The primary challenge to the role of the NRT was that, in order to carry out its roles, interagency coordination needed to occur at the Departmental level. This was significantly above the level at which the NRT typically operated and was not the level articulated in the NCP. Direct engagement by Cabinet-level officials from the outset of this response redirected the NRT to the role of support to intra-Cabinet communications and briefings.

To provide the originally intended functions of the NRT, the Coast Guard created a new organization named the Interagency Solutions Group (IASG) within the NIC. The IASG essentially assumed the doctrinal responsibilities of the NRT, and proved adept in promoting interagency unity of effort.

The IASG became a self-contained interagency body, with decision-making authority, capable of resolving time-sensitive policy issues. The group

had representatives from 20 federal agencies and Departments. At the height of the response, there were 25 to 35 experts present each day in the IASG spaces. The rest of the 122 IASG members worked remotely from their own agency locations or on the Gulf Coast at the various command posts or other facilities. Nearly all recommendations that emerged from the IASG were the result of group consensus.

During the course of the response, the IASG teams:

- Finalized flow rate calculations for the Macondo well,
- Published an oil budget model to address the fate of the oil,
- Reviewed physical countermeasure proposals for consideration by the FOSC,
- Reviewed 24 proposals, valued at \$500 million, in proposed emergency restoration initiatives; these were of concern to the NIC and other agencies but fell outside the scope of FOSC responsibilities,
- Reviewed more than 3,900 proposals to leverage innovative oil spill response technologies,
- Provided weekly outreach to over 600 environmentally focused non-governmental organizations to explain ongoing response activities and address caller concerns.
- Integrated the federal government response to local and regional government and non-government entities in 21 of the most impacted counties and parishes along the Gulf of Mexico,
- Developed seafood safety protocols regarding closed fisheries, and
- Reviewed an extensive subsurface oil detection program to identify recoverable oil.

In an effort to manage the constantly changing scope of work, the IASG formed teams into the following seven areas of emphasis:

1. Countermeasures and Alternative Technologies;
2. Community Engagement;
3. Flow Rate and Sub-sea Analysis;
4. Economic Solutions;
5. Environmental, Archeological, and Cultural Protection Strategies;
6. Integrated Services; and
7. Public Health and Worker Safety.

2.3 Unified Area Command

On April 23, 2010, the UAC was established in Robert, La., with the FOSC assigned as the Unified Area Commander. The UAC's principal focus was directing, supporting, and assisting the ICPs, and coordinating with the RP and each affected state. The FOSC, RP, and state representatives worked together to fill operational resource requests and address state-by-state concerns with the ongoing operation. The FOSC met regularly with key stakeholders, including the governors of each Gulf Coast state, and established critical lines of communication to remove obstacles. Daily conference calls with the impacted states' governors facilitated open and continuous dialogue.

The key role of the UAC was to standardize practices across the response and broker resources, particularly boom, skimmers, and personnel. There was some early confusion outside the UAC and the Coast Guard as to who from the Coast Guard was actually in charge of the response, and who had operational and tactical control of assets in the response. Within the Coast Guard, the question of who was in charge was less ambiguous: the Staging Areas worked for the Branches and the Branches worked for the FOSCR assigned to the ICP, who then worked for the FOSC and UAC. The scope of the FOSCR role and the connection with the FOSC evolved to reflect the growing size and complexity of the response.

The FOSC established a daily battle rhythm for interaction with the response organization and stakeholders early on and these practices continued throughout the response. A snapshot of the daily battle rhythm from key points during the response is included in Figure 2.4 below. The Unified Area Commander and Incident Commands held daily conference calls at 7:00 a.m. and 5:30 p.m. Participating in these discussions were the FOSC, FOSCRs, RP, State On-Scene Coordinators' (SOSC) Representatives or other state representatives, and other senior federal representatives at the UAC and ICPs. The NIC staff was invited to listen to obtain a current operational picture. Safety was the first issue discussed every meeting. Forecasted weather and critical situations on the sea floor that could impact source control were also discussed.

Meetings included a review of strategic objectives and critical spill response resources. Resources were reviewed to evolve business metrics for

2. Command and Control

Table 2.1: Battle Rhythm

Deepwater Horizon/Mississippi Canyon 252/BP (UAC)—all times are Central Standard Time				
	Battle Rhythm: Monday, May 24, 2010	Battle Rhythm: Tuesday, June 15, 2010	Battle Rhythm: Thursday, July 8, 2010	Battle Rhythm: Thursday, September 9, 2010
Time	Meeting	Meeting	Meeting	Meeting
6:00 AM	Operations Brief	Shift Change		
6:30 AM			NIC Senior Leader Call	
7:00 AM			Area Command/Incident Command Brief	NIC Senior Leader Call
7:30 AM			Area Command/Unified Command Brief	Area Command/Unified Command Brief (Tuesday)
7:45 AM	Incident Command/Unified Command Objectives			
8:00 AM			DHS Secretary call	DHS Secretary call (M-W-F)
8:00 AM			DOI and DOE call	
8:05 AM			Daily Coordination Call	Governor's/NIC Conference Call (Thursday)
8:15 AM			Daily Governor's/NIC Conference Call	
9:00 AM	Command and General Staff Meeting	Command and General Staff Meeting		
9:45 AM	ICP Briefing	ICP Briefing		
10:00 AM	Boom Task Force	Boom Task Force	NRT Conference Call (Tuesday & Friday)	
11:00 AM	Pre Tactics - How to meet next periods objectives	Pre Tactics - How to meet next periods objectives		
12:00 PM	Joint Operations Brief			
01:00 PM	Tactics Meeting - Finalize strategy to meet objectives			
01:45 PM	Planning Section Alignment			
02:00 PM		Tactics Meeting - Finalize strategy to meet objectives		
03:00 PM		Planning Section Alignment - Strategic		
03:30 PM		Branch Planners Meeting		
04:30 PM	Planning Meeting	Planning Meeting		
05:30 PM	Shift Change		Area Command/Incident Command Brief	
06:00 PM	Operations Brief	Shift Change & Shift Change Brief	PPLO Call	
08:00 PM		Data Integration Meeting		
09:30 PM		Planning Section Alignment - Strategic		
010:20 PM	Data Integration Meeting			
011:00 PM	Situation Status			
3:30 AM	Command and General Staff Meeting	Command and General Staff Meeting		
5:30 AM	Shift Change			

tracking the effectiveness of the response. Metrics were a way of measuring accomplishments and progress, and were designed to motivate responders who were putting forth an extraordinary effort in the response. The ultimate goal was to follow the Best Response Model doctrine outlined in the OSC Crisis Management Course, which was comprehensive in its approach to spill response.

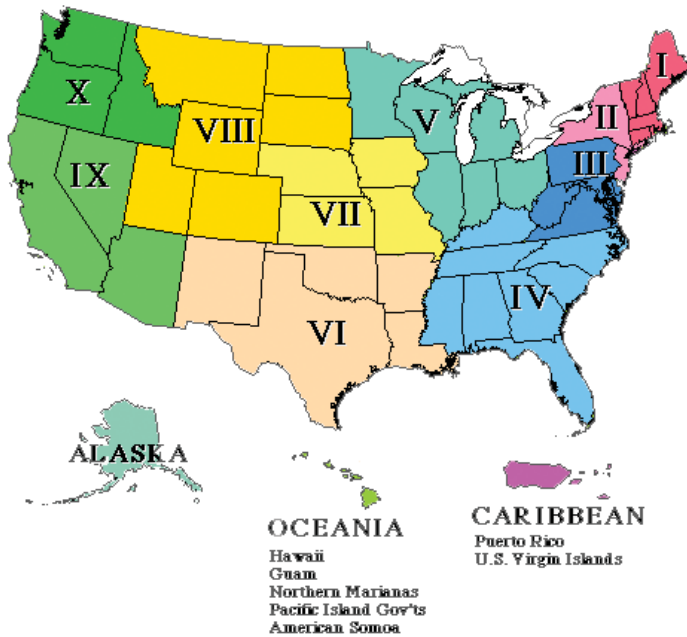
In order to inform, communicate, and establish strategies to improve the response effort, the UAC began regular deep-dives into numerous topics including safety, shoreline cleanup, decontamination, and waste management. These meetings were

conducted in conjunction with the daily ICP brief and kept UAC decision makers on current operations, enabling them to direct the response and adjust priorities more effectively. The deep-dives were also utilized in strategic planning.

Regional Response Team Involvement at the Unified Area Command

The *Deepwater Horizon* spill affected the RRTs for Region IV and Region VI—RRT IV includes the states of Alabama, Florida, and Mississippi, and RRT VI, the states of Louisiana and Texas.

Under 40 CFR 300.115, RRTs are responsible for

Figure 2.4: Regional Response Team (RRT)**RRT Areas**

regional planning and coordination of preparedness and response action. The RRT membership includes representatives from each of the 15 NRT agencies, as well as regional representatives from the affected states and tribal governments where appropriate. The EPA and Coast Guard co-chair the RRTs, among other responder stakeholders. There are ten RRTs in the United States. The EPA, affected states, and natural resource trustees on the RRT have specific dispersant and chemical countermeasures decision authority for both pre-authorization plans and incident-specific decisions per 40 CFR 300.910.

During the *Deepwater Horizon* response, RRT VI was closely involved with the FOSC and Unified Area Commander. The RRT advised the UAC regarding in situ burning, chemical dispersants, response techniques, and agency participation.

There were 26 incident-specific RRT VI meetings via teleconference between the start of the incident on April 20, and December. During the early weeks of the spill, RRT VI held incident-specific calls regularly. Topics of discussion included agency participation, use of in situ burns, use of dispersants and surface washing agents and solidifiers, and bioremediation techniques, such as those suggested in the Louisiana marshes and discussed below. RRT IV teleconferences were less frequent,

largely because there were no plans to use dispersants or in situ burning in RRT IV areas. RRT IV engagement generally involved coordination, situational awareness, and the potential for alternate spill response technologies.

Once the sub-sea well was closed, the frequency of RRT calls diminished. With offshore response techniques no longer an issue, the remaining calls focused on dispersants and surface washing agents to issues associated with beach cleanup and bioremediation techniques.

Although both RRTs worked to carry out their assigned role, there were several notable challenges to their efforts. At times, senior officials engaged directly with the FOSC on tactical topics without working through the NIC or RRT. Another RRT challenge involved the states and waste removal. The states—Alabama, Florida, Louisiana, and Mississippi—were already delegated the authority to enforce the Resource Conservation and Recovery Act and coordinate waste management and activities. These responsibilities were clearly outlined in the Area Contingency Plans, and had been approved by FOSCs and District Commanders each year for the previous ten years. The Mobile and Houma ICPs had approved those plans in conjunction with the affected states and EPA personnel on-scene. Separately, however, EPA drafted a waste management directive and requested that the FOSC issue it to the RP.

Natural Resource Trustees Involvement at the Unified Area Command

Designated Natural Resource Trustees include federal, state, Indian Tribes, or foreign officials who act on behalf of their jurisdiction in the interests of the natural resources, per the NCP, 40 CFR 300.600, and other statutory authorities such as OPA 90, FWPCA, National Marine Sanctuaries Act (16 U.S.C. 1431 et seq.), Park System Resource Protection Act (16 U.S.C. 19 JJ), and applicable state laws. During spill response, natural resource trustees advise the FOSC on means to minimize natural resource injuries; assess natural resource damages that do occur and the public's lost use of damaged natural resources; and to obtain compensation from the RP to (i) restore injured natural resources to baseline conditions and (ii) to account for interim losses of natural resources and services that occur from the date of the incident until recovery. Such advisors worked in the UAC and ICPs throughout the response. The Natural Resource

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NEW ORLEANS – Rear Admiral Paul Zukunft, the Federal On-Scene Coordinator for the Deepwater Horizon response, speaks to governmental members of federally recognized Native American tribes during a government-to-government consultation. Photo courtesy of U.S. Coast Guard



Damage Assessment (NRDA) process, overseen by the Trustees, began shortly after the spill with separately focused teams from trustee agencies. NRDA members were independent of the FOSC response activities, and had segregated spaces provided in the UAC.

Tribal involvement at the Unified Area Command

Executive Order 13175, Consultation and Coordination with Indian Tribes, requires an accountable process to ensure meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications. The U.S. Government has additional unique legal relationships with Indian Tribes as set forth in the Constitution, executive orders, treaties, statutes, and court decisions. Government-to-government relations with recognized Indian Tribes (as defined in 40 CFR 300.5) were guided not only by 40 CFR 300.180, but also by the Programmatic Agreement for the Protection of Historic Properties During Federal Emergency Response. The FOSC coordinated tribal input into response activities, as outlined in Chapter 8, early in the response, and initiated regular government-to-government consultations with the eleven federally recognized tribes with traditional cultural properties in

impacted areas over the course of the response.

FOSC Key Points: State Integration into Unified Command

The NCP contemplates a robust role for states in the unified command structure. In the *Deepwater Horizon* response some states essentially did not embrace their role, by either not participating in the unified command, or by not empowering their representatives to make decisions. Because of the high visibility and broad impact of any major spill, it is to be expected that more of state government than the oil spill response specialists will have to be involved. The NCP needs to anticipate such needs and find a way to still integrate state participation in the unified command construct.

2.4 Incident Command Posts

The command staff at both ICP Mobile and Houma did not know the exact size or potential for the spill, but assumed an uncontrolled major ongoing release. Therefore, the UAC planned for a 24-hour, seven-day-a-week, fully staffed ICS organization for an unknown duration. The Coast Guard and the RP began to mobilize personnel immediately. Coast Guard personnel from MSU Morgan City, MSU Houma, Sector Mobile, and a core of RP employees staffed the initial ICS Section Chief and Deputy Section Chief positions as the ICS organizations grew.

Due to proximity to the incident, the operational tempo, the complexity of response and communications challenges, the FOSCRs on occasion had to make decisions and exercise initiatives and authorities traditionally outside those typical of a FOSCR. While normally unnecessary for lesser spills, the ability of the FOSCRs to make these decisions reflected both the trust the UAC had in them and the span of control issues engendered by the size of the response operation.



HOUMA, La. – U.S. Coast Guard Captain Roger Laferriere, the Incident Command Post Houma Incident Commander, speaks to the public at an open house event. Photo courtesy of U.S. Coast Guard

ICP Houma Command Structure

The ICP Houma command staff included the FOSCR and five Deputies. The assignment of Deputies became useful in dividing the substantial tasking originating from the spill, stakeholders, the media, and the chain of command. The Coast Guard assumed responsibilities for external activities such as distinguished visitors, media interviews, consultations with parish presidents, and visiting the field to ensure operations occurred in accordance with the Incident Action Plan (IAP). Senior ranking Coast Guard Deputies assumed responsibilities for ensuring internal operations. One deputy oversaw the Incident Management Team processes for the FOSCR and was designated as a FOSCR by the FOOSC. The Deputy was responsible for attending all ICP regularly occurring meetings including the planning process meetings, making decisions based on the UAC objectives, and helping ensure that the ICP activities would not be negatively impacted by the physical absence of the FOSCR. In addition, a Coast Guard Deputy for External Affairs—and initially a Coast Guard Deputy for Coast Guard Resources—was designated. This latter position was only temporary until the Coast Guard forces began to flow predictably into the field. Later in the response, the Coast Guard appointed a Coast Guard Deputy for Operations to assume the operational quality control check duties of the FOSCR. The RP provided representatives to ICP Houma, who were actively involved in day-to-day ICP operations and planning.

ICP Mobile Command Structure

Approximately one week into the spill response, it became clear the response organization would have to grow to include ICPs in other geographic locations along the Gulf Coast. The span of control, state and local jurisdictional lines, and response demands did not allow for a single organization out of ICP Houma to manage all aspects of the response.

ICP Mobile was established on April 26, 2010, and was initially staffed with Sector Mobile personnel. ICP Mobile grew exponentially in the following days as the UAC dispatched a number of key RP and contractor personnel from Houma to Mobile. The increase in personnel served to reinforce ICP

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THEODORE, Ala. – U.S. Coast Guard Captain Steven Poulin, the Incident Command Post Mobile, Incident Commander, conducts a media interview at the Theodore Staging Area. Photo courtesy of U.S. Coast Guard

Mobile as oil trajectories projected an increasing threat to the coastlines of Alabama, the Florida panhandle, and Mississippi.

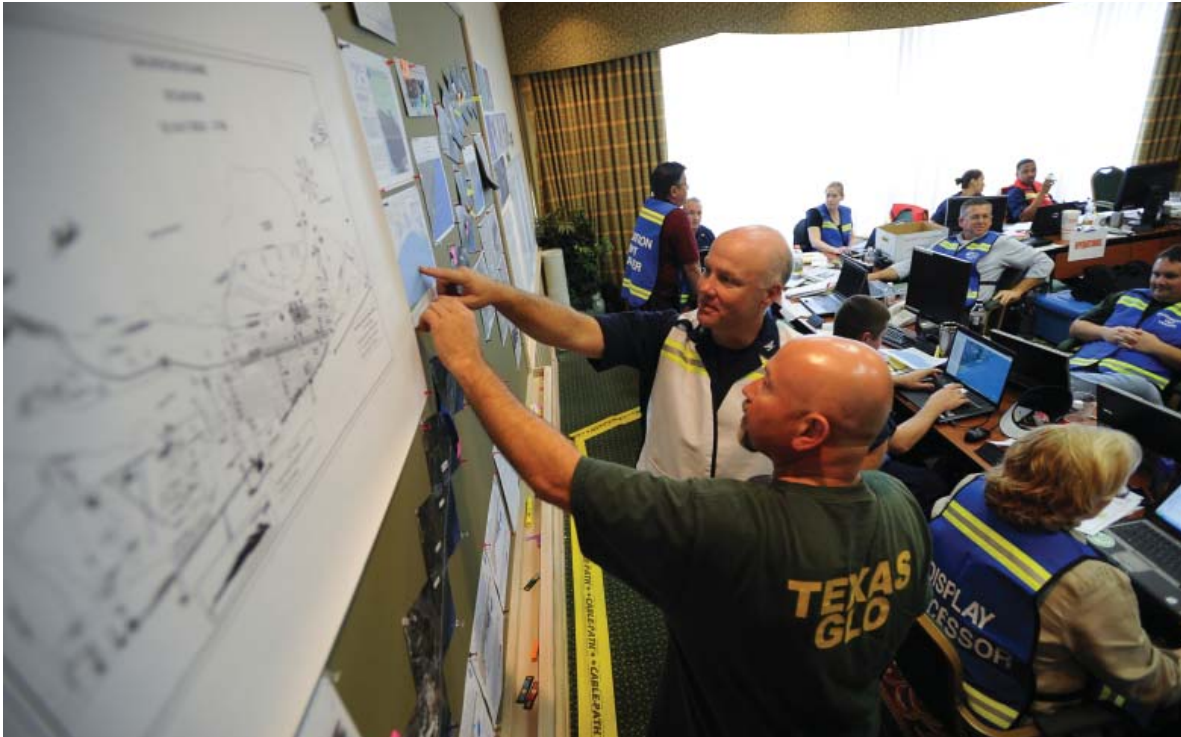
The Coast Guard Sector Commander for Mobile was named the FOSCR of ICP Mobile. The FOSCR expended considerable effort, significantly assisted by existing relationships with the three states in his area of responsibility, to encourage Alabama, Florida, and Mississippi to join a single command post for their region centralized in Mobile rather than a command post in each state. Preserving the unity of command for the three states was essential. The unity helped ensure response agility in the interconnected and integrated waterways in the area, allowed for the shifting of resources throughout



a single Coast Guard Sector boundary (especially offshore and near-shore skimmers), and avoided trifurcating Captain of the Port responsibilities. With some significant organizational adjustments that improved local ownership and involvement in tactical planning, ICP Mobile retained responsibility for the directing response in the three-state area until efforts were consolidated into the Gulf Coast Incident Management Team (GC-IMT) on September 20, 2011.

The ICP Mobile FOSCR created Deputy Federal On-Scene Coordinator (Deputy FOSCR) positions to respond to the large operational response area. One Coast Guard Deputy remained at ICP Mobile to direct overall response operations. Other Deputies were designated as available to assist with daily ICP functioning. A senior Coast Guard officer, designated as the Chief of Staff for ICP Mobile, managed Coast Guard personnel and overall information flow. Three additional Coast Guard deputies, along with RP deputy counterparts, forward deployed to Alabama, Florida, and Mississippi, in June 2010. Each was deployed with a small Incident Management Team to direct tactical planning and tactical operations. The Deputies worked directly with the staffs of the Alabama, Florida, and Mississippi governors, and provided a direct link to the FOSCR. These Deputies worked for the ICP Mobile FOSCR. As such, ICP Mobile set the daily response priorities and objectives and developed the Incident Action Plan with input from the Branches. Deputies managed resources and logistics, and coordinated overall response operations and outreach, including strategic and public communications. The state deputies were authorized to conduct tactical planning and direct tactical operations through the Branches. The Deputies also performed local outreach to execute the IAP with respect to inshore skimming, booming, beach cleanup, and Vessels of Opportunity (VOO). ICP Mobile retained operational and tactical control of offshore and near-shore skimming because the task forces routinely worked across state boundaries and skimmers were mixed to provide optimum results.

PENSACOLA, Fla. – Vice Adm. Robert C. Parker (center), Atlantic Area Commander, Rear Adm. Mary Landry (right), and the Coast Guard Atlantic and Pacific Area Command Master Chiefs (left) listen to a briefing at the Bayou Chico Staging Area, Fla. Photo courtesy of U.S. Coast Guard



GALVESTON, Texas – Coast Guard Captain Marcus Woodring, Federal On-Scene Coordinator Representative for the Texas portion of the Deepwater Horizon oil spill response, and Rob Hadley, a response officer for the Texas General Land Office, review maps of potential oil slicks off the Texas coast. Photo courtesy of U.S. Coast Guard

ICP Houston

While the ICPs in Mobile and Houma took shape, the FOSC and FOSCR determined that a technical group currently working in Houston would be organized into an ICP under ICP Houma. At the beginning of the response, Coast Guard members deployed to Houston. ICP Houma implemented a virtual UAC by establishing a video teleconference link with the ICP in Houston. The two ICPs developed separate response plans (known as Incident Action Plans) because of their geographic separation and the differences in the nature of the work conducted at the two ICPs. Over the next several days, the ICS organization in both Houma and Houston filled out and these commands established regular meeting schedules and mechanisms for information and document exchange. Under the new design, ICP Houston would focus on well intervention and source control, while the ICPs in Houma and Mobile would focus on response.

Five ICPs were eventually created. ICPs coordinated operations with local and regional elected officials. ICP Houston coordinated source control activities at the wellhead, engineering discussions, and the potential courses of action to secure the source. Houston, Texas, also led source control planning and operations, including sub-surface dispersant operations, and reported directly to the

UAC. ICP Houma managed offshore response operations surrounding the wellhead, near-shore, and shoreline Louisiana response operations. The ICP in Mobile, Ala., managed offshore, near-shore, and shoreline response operations for Alabama, the Florida panhandle, and Mississippi. The ICP in Miami, Fla., managed near-shore and shoreline response operations the West Coast of Florida, although no oil reached the ICP Miami area. The ICP in Galveston, Texas, managed similar operations for the State of Texas, although a minimal number of tar balls reached the state.

PENSACOLA, Fla. – Vice Admiral Robert C. Parker, Atlantic Area Commander, and Rear Admiral Mary Landry are briefed at the Florida Emergency Management Mobile Command Post at the Bayou Chico Staging Area. Photo courtesy of U.S. Coast Guard



2. Command and Control

The size and complexity of the spill response presented many organizational challenges. As individual field elements of the response organization were working intensely, it was very difficult to maintain situational awareness across the entire response. Maintaining unity of effort across such a large organization spread and geographic area was difficult. The ICPs held daily all hands meetings. At these meetings there was continuous focus on safety, unity of effort, and discussion about the importance of each aspect of the response organization to the success of the overall response effort.

Federal Agency involvement at the Incident Command Posts

Federal agency representatives held positions at the ICPs and were actively involved in planning and executing the ICS planning process. A few supporting agencies developed their own ICS organizations outside the UAC. An example is the tactics meeting and incident action plan (IAP) preparation. The tactics meeting for developing the IAP for the *Deepwater Horizon* response required significant investment in time and energy. Some of the supporting agencies found the process too burdensome and time consuming, and decided to conduct their own tactics meetings and develop their own IAPs. Because their plans were more limited, involved fewer stakeholders, and could be completed more quickly, they decided to go outside the UAC process. Initially they did so without consulting the ICP.

By creating their own IAPs, the agencies had to have their own planning and operations sections. Agencies were also bringing in or purchasing their own resources while existing resources were available; this led to duplication of effort. Eventually, the Coast Guard brought these agencies into a single unified command under the single IAP, in part because this was a condition of funding via Pollution Removal Funding Authorizations.

At ICP Mobile, the EPA and National Park Service (NPS) participated as On-Scene Coordinators. This varied from the traditional ICS structure, but was based on existing relationships with regional EPA and NPS staffs. The FOSCR recognized NPS as a significant landholder in the Sector Mobile AOR, thus it was important to have them participate in the incident command.

State involvement at the Incident Command Posts

The NCP provided that response operations at the state and local levels would require active state involvement at all levels of the organization. The SOSOC represented the state's interests in response operations. This is especially the case regarding specific state and local government interests, strategic communications, and community outreach activities. During the *Deepwater Horizon* response, each state governor designated a state office and representative to represent the state at the ICP and UAC levels. This lead state response official was responsible for coordinating and communicating with all other state agencies. State agency representatives did not have decision-making authority for all response-related matters as required by the NCP. When necessary, those representatives would defer to an authority outside the ICPs and UAC. This caused delays in obtaining state concurrence. This also supported public perception that the Coast Guard and the RP were too close and were leaving out the states.

Some problems arose because state and local government officials outside the NCP structure were unfamiliar with the OPA 90 and applying the NCP doctrine to a major oil spill. This was not necessarily true of state agencies regularly involved in spill planning, exercises, and response. However, because of the scope of the spill, agencies that did not regularly work on spill responses and were generally unfamiliar with NCP response guidelines, participated significantly.

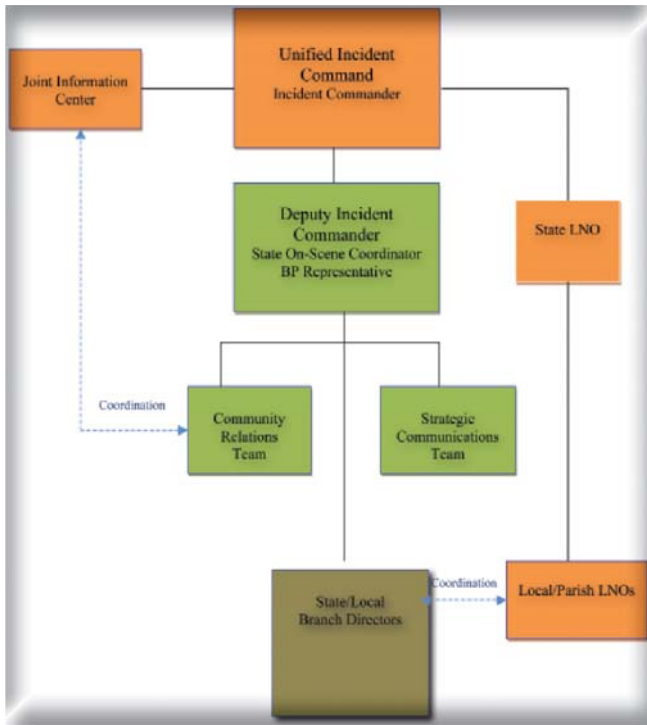
Integration of Local Emergency Entities at the Incident Command Posts

Continuous engagement of parish president's and the Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) into the ICP Houma unified command structure was necessary to ensure local cooperation and coordination.

NEW ORLEANS, La. – Rear Admiral Zukunft briefs a few parish presidents on the flight plan for a trip to the Deepwater Horizon spill site on a HC-144 Ocean Sentry. Photo courtesy of U.S. Coast Guard



Figure 2.5: Unified Incident Command Structure



As more oil impacted the shoreline, the people and government of Louisiana became frustrated. This became evident in the first meetings with GOHSEP representatives and parish presidents. The response organization, from the NIC level to the Branch level, took actions to integrate parish leadership and local emergency response organizations into the response effort. The more closely local government was integrated into the rest of the unified response organization, the more effective and efficient local participation became.

The National Incident Commander implemented the Parish President Liaison Officer (PPLO) Program, which assigned Coast Guard Liaison Officers (LNOs) to parish presidents, governors, and some mayors whose jurisdictions were the most impacted. A Coast Guard member, who was designated as a FOSC Deputy for External Affairs, supervised the LNOs and worked directly for ICP Houma. This member had direct access to the UAC and the authority to make decisions in the field to address a major crisis within each jurisdiction.

ICP Houma installed WEB Emergency Operations Center (WEB EOC), an emergency communications program used by GOHSEP, to ensure

connectivity with all Louisiana EOCs. A portable GOHSEP Command Post stationed in Houma facilitated the program. This improved communications between the Houma ICP and the parish presidents. Reports of new oil sightings were communicated via WEB EOC and allowed the Houma ICP to react quickly and work in unison with parish emergency response forces. The FOSC held weekly meetings with parish presidents and GOHSEP representatives. LNOs were also placed within the GOHSEP EOCs to ensure ICP Houma addressed local needs.

As ICP Mobile was established, the Coast Guard assigned LNOs to the EOCs for the states and some of the larger counties in Alabama, Florida, and Mississippi. Alabama also established a forward EOC in Mobile. Synergy among the state, EOC, and county LNOs improved the span of control. The LNOs provided situational awareness to county emergency managers and responded to queries from local elected officials. As Branches expanded to accommodate local involvement, and the Deputy FOSCRs directed the tactical response through the Branches, the integration of the LNOs within the Branches correspondingly improved.

2.5 Branches and Staging Areas

The decision to have one UAC and one FOSC rather than multiple area commands for the Gulf Coast area had down-stream effects. One significant impact was Branch level organization and tasking.

Typically, Branches at the ICS organizational level have functional responsibility for major segments of incident operation. The Branch level is situated organizationally between sections and groups in the Operations Section, and between sections and units in the Logistics Section. For examples, the Air Operations Branch under the Operations Section and the Supply Branch under the Logistics Section are types of functional-oriented Branches designed under ICS. Early in May 2010, the Coast Guard recognized that the ICS organizations operating at the parish level in Louisiana were operating as Incident Management Teams (IMTs). IMTs are part of the incident command system and manage the logistical, fiscal, planning, operational, safety, and community issues related to the incident. As the response organization under ICP Mobile grew, the same issue arose in the individual states.

2. Command and Control



SOUTHPORT, Fla. – The Supervisor of Coast Guard Marine Safety Detachment Panama City and the Chief of Emergency Services in Bay County, Fla., answer questions during a press conference at the Bay County Emergency Operations Center. Photo courtesy of the U.S. Coast Guard

The Coast Guard designated parish and county operations as Branches (or forward operating bases) in Alabama, Florida, Louisiana, and Mississippi. This brought the Coast Guard closer to the front lines of the response without sacrificing operational unity and control or creating demands beyond available personnel resources. It also provided more interaction at the local level. The ICS system is designed to expand and contract as required to manage a response. The use of a large, IMT style Branch structure represented a new level of organizational expansion for the ICS system, which had not been applied in previous responses. Over time, the Coast Guard staffed the Branches to accomplish all ICS functions including planning, operations, and logistics.

ICP Houma Branch Structure

There was debate as to whether to establish ICPs in each of the likely-affected parishes, complete with a FOSCR and Deputy FOSCRs with a full ICS organization. Due to the demands for a consistent and accurate information flow and the established ICS organization and supply chain, ICP Houma determined that Branches would report to the Operations Section of ICP Houma. Another consideration was that the federal agencies, the RP, and state did not have enough people with requisite ICS training to be able to staff nine ICPs, particularly in logistics and finance. Retaining the Incident Commander position in Houma also insulated the Branch Directors from some of the political pressures involved with dealing with local government officials.

When establishing the Branch structure, the Coast Guard and the RP invited county and parish officials to participate in the process. The level of county or parish involvement was unique to each Branch and this early involvement was essential to the overall operational success. For example, before the Branch in Grand Isle, La. (Jefferson Parish) was established, the local and regional governmental officials operated from a command post vehicle separate from the command post established by the Coast Guard and RP. This made the integration of activities difficult. To improve coordination, a larger command post space was established and all groups were integrated to create one response organization. Similarly, the Branch in Port Fourchon (Lafourche Parish) was well integrated with the Unified Command Branch organization. These integrated Branches proved highly effective, and local officials' satisfaction with their input and knowledge of response operations was highest in those locations.

Oil began to affect the Louisiana shoreline first; resources soon flowed into staging areas along the Louisiana coast. It became apparent that ICP Houma would not be able to maintain effective command and operational control of all deployed personnel and resources from its location. The Coast Guard soon established Branches within each of the state parishes to maintain effective command and control and ensure the adequacy of response and information flow into ICP Houma. Very early the FOSCR authorized these Branches to engage in tactical planning, which greatly



GRAND ISLE, La. – The Coast Guard Branch Director in Grand Isle gives an operational brief to a group of international observers. Photo courtesy of the U.S. Coast Guard



LAFOURCHE PARISH, La. – Capt. Roger Laferriere (second from right), the Incident Command Post Houma Incident Commander, discusses an oil trajectory chart with two Coast Guard parish president liaison officers and a Coast Guard Branch chief. Photo courtesy of U.S. Coast Guard

increased the effectiveness of the individual Branches and alleviated span of control problems for the FOSCR charged with leading such large organizations remotely.

The Branches in Louisiana reported to the Deputy Operations Section Chief for ICP Houma. Each Branch under ICP Houma was assigned a Branch Director. Branch Directors had their own deputy and support staff required to meet the objectives established by the ICP and UAC. The Branch Director’s primary focus included managing the onshore, inland, and VOO operations.

ICP Mobile Branch Structure

As it became clear that oil would impact ICP Mobile’s response area, planning and establishment of similar county-based Branches began. Mobile Branches worked through the planning, operational direction, and resource processes of ICP Mobile. The designation and location of Branches was driven by geography and potential for oil impacts. Branches were centrally coordinated through ICP Mobile—although as the size of the response organization grew, the branches gained responsibility for tactical planning and direction, consistent with the IAP developed by ICP Mobile. Logistics and resourcing at the Mobile Branches was largely coordinated through ICP Mobile. In some instances, ICP Mobile consolidated several counties under a single Branch that reported to a Deputy FOSCR for each respective state at the ICP. Larger counties had a Branch to themselves.

Because of the remoteness of the barrier islands and the challenges of VOO coordination within Mississippi, the Coast Guard established a separate Branch for VOO command and control in Mississippi with the Mississippi National Guard.

At both ICP Houma and Mobile, the coordination between the geographically separated Branches, staging areas, and ICP was less than optimal. The solution was to physically co-locate the federal, state, and RP commands assigned to a specific Branch. The co-location consisted of a single Branch command post that could accommodate all command personnel and associated functions. Co-location allowed relationships to develop among key individuals, developing a credible team dynamic while building trust through direct interaction. Open and transparent communication was essential to integration and the success of the response.

As an example, the Plaquemines Parish Branch followed the unified command structure, with the Coast Guard as the Branch Director and the RP as the Deputy Branch Director. This proved highly effective in the management of a response structure that ultimately grew to 2,800 people in July. The state was represented at ICP Houma, and periodically provided a Louisiana Department of Environment (LADEP) representative to Plaquemines Parish during which time they would attend the Branch operational planning meetings. The Branch had steady representation from Louisiana Fish and Wildlife representatives, who represented the interests of the State Wildlife Refuge. An Emergency

MOBILE, Ala. – Capt Steve Poulin, Incident Command Post Mobile Incident Commander, briefs Secretary Napolitano on clean up operations during an overflight. Photo courtesy of U.S. Coast Guard



2. Command and Control

THEODORE, Ala. – A Coast Guard Gulf Strike Team member explains skimming and booming operations to a reporter during a press briefing at the Theodore Staging Area. Photo courtesy of U.S. Coast Guard



Operations Center Manager traveled from Belle Chase and attended meetings at least once a week, participated in the Tactics and Planning Meetings, and signed the IAP in person or by facsimile for each operational period. The UAC also held a weekly briefing for the parish president, during which they provided detailed updates and offered field tours by air and boat of spill cleanup activities, progress, and long-term strategy. These efforts enabled closer coordination with the parish. The Branch also had several members of the Louisiana

Army National Guard serving in the Branch. These members successfully kept lines open between the Branch and the governor's office and greatly enhanced information sharing.

Two Area Command Staging Areas in Gonzalez, La., and Theodore, Ala., were established to coordinate the efficient and effective distribution of critical resources across regional boundaries. Protective boom and skimmers were delivered to these areas and then redistributed to those areas most affected by the oil. This arrangement allowed on-scene responders to focus on removing oil. Establishment of additional local staging areas allowed for timely reallocation of regional resources based on the oil spill's trajectory. Additional details are provided in Chapter 6 of this report.

ICP Houma and Mobile also established temporary staging areas where personnel and equipment waited for tactical assignment. This proved effective in ensuring balanced resource distribution across the parishes and counties, as well as between states. These temporary, initial staging areas were established within each impacted parish and at suitable locations at the county level, close to impacted shoreline throughout the coastline.



VENICE, La. – U.S. Coast Guard Commandant Admiral Thad Allen (left) listens in on a conference along with Plaquemines Parish, La., officials. Photo courtesy of U.S. Coast Guard

Thirteen individual sections under the operations heading focused on the most distinct, and challenging operational issues for this response. Unlike most oil spills, which are usually nearly instantaneous events at or near the water's surface, the source of the oil for the *Deepwater Horizon* spill was the *Mississippi Canyon 252* Macondo well, at a depth of 5,000 feet, that spilled continuously for 87 days.

Because of the depth and duration of the spill and size of the area impacted, operations were constrained by certain critical resources: deep water operating equipment, skimmers, boom, trained personnel, and beach cleaning equipment. These resources were essential in responding to the spill, but the duration and size of the event magnified concerns and competing demands for these resources across multiple states. The scope of the impacted area also created the need for an expansive response organization that included branches, forward operating bases, and staging areas, with some branches becoming response organizations larger than the entire organization used for other sizable spills.

Response operations took place in four zones: at the source of the spill, offshore, near shore, and in shore. At the source the drilling rigs and remotely

operated vehicles necessary for deep water drilling were the only means of accessing the well. Offshore, the response focused on removal of the oil. Key to these operations were large skimmers and in situ burn task forces. The skimmers, storage for the oil recovered by the skimmers, and fire boom were critical resources. When oil could not be removed through these means, aerial application of dispersants was used. Near shore operations focused on skimming and the use of boom to protect sensitive areas; later, they focused on cleaning as much of the shoreline as possible. Obtaining enough boom was a central concern of near shore operations. In shore operations used barriers such as Hesco Baskets to minimize shoreline impact. Once oil reached the shore, the long, arduous, labor intensive process of shoreline cleanup began. After the well was capped shoreline cleanup became the focus of continued response operations.

3.1 Source Control

Securing the source of the oil for the *Deepwater Horizon* spill was challenging and complex. As sub-sea drilling systems are not an area of Coast Guard cognizance and expertise, the Federal On-Scene Coordinator (FOSC) was unfamiliar with the technology and capabilities of the deepwater



PORT FOURCHON, La. – A team of welders fabricates a portion of the subsea oil recovery system chamber. The chamber will be one of the largest ever built and will be used in an attempt to contain the subsea flow of oil. Photo courtesy of U.S. Coast Guard



GULF OF MEXICO –The damaged blowout preventer and the lower marine riser package were removed and placed aboard the Q4000. Photo courtesy of U.S. Coast Guard

GULF OF MEXICO – A small pollution containment chamber, known as a “top hat” was used in an attempt to contain an oil spill caused by the Deepwater Horizon explosion. Photo courtesy of U.S. Coast Guard



drilling industry. Neither the Coast Guard nor any other federal agency had experience with a massive deep water spill. Ultimately, source control had to be achieved through the Responsible Party (RP), whose employees were not accustomed to extensive government input to their deepwater operations, nor the federal oversight of multiple agencies unfamiliar with working together in a large response organization. The source control effort was a whole of government and whole of industry response. The Department of Energy, Department of Interior, U.S. Geological Survey, and Coast Guard participated extensively in these efforts. Other oil companies, including Shell and Exxon-Mobil, assisted with source control strategy.

Overview of Source Control Activities (Situation)

Source control was a multifaceted effort that started immediately after the spill and continued until the relief well from the *Development Driller III* intersected the Macondo well on September 19, 2010. Initial activities focused on activation of the seven separate closing devices on the blowout preventer stack, or BOP stack, which includes the Lower Marine Riser Package (LMRP). As it became clear that the initial efforts to activate the BOP stack had been unsuccessful and that there were two separate leaks from the riser, the FOSC and RP began to consider other source control options.

Multiple courses of action were simultaneously considered and acted upon. Relief wells are a commonly used method for stopping a blowout and the after consultation with the FOSC the RP mobilized two rigs to drill separate relief wells within days of the explosion. The RP recognized that it would take at least 100 days to drill a relief well, so began working with Coast Guard and BOEMRE personnel on containment options. These options included adapting shallow-water technology to the deep-water environment or designing entirely new devices. Multiple teams with government and industry personnel were established at the RP’s Houston headquarters to develop concurrently different ways

to either stop the flow of oil or collect it at its source. Each team focused on a discrete effort, such as collecting oil from the riser or stopping flow through a top-kill procedure.

Although early attempts failed—in part because of lack of knowledge of the accurate pressure levels at the wellhead—it was recognized that actuating the BOP stack remained the best chance to shut the well quickly or at least slow the flow of oil. A number of organizational and engineering challenges complicated efforts to actuate the BOP stack. Problems arose from the differences between the piping and wiring diagrams for the BOP and the actual installation, as well as from the need to make special tools so the Remotely Operated Vehicles (ROVs) could deliver hydraulic pressure. The RP ceased trying to use the BOP stack rams and shears to stop the flow of oil on May 5.



GULF OF MEXICO – The mobile offshore drilling unit *Development Driller III* (near) prepared to drill a relief well at the Deepwater Horizon site, as the MODU Q4000 held position directly over the damaged blowout preventer while making preparations for a “junk shot” or a “top kill.” The drillship *Discover Enterprise* (far) continued to capture oil from the ruptured riser. Photo courtesy of U.S. Coast Guard

Three early containment options were developed and deployed during the month of May with limited success. The RP unsuccessfully tried to install a large containment dome, or cofferdam, over the larger of the two leaks in the broken riser on May 7, 2010. This effort was unsuccessful primarily due to the formation of hydrates while moving the device into position. A smaller device, called the Riser Insertion Tube Tool (RITT), was successfully inserted into the end of the broken riser on May 16, 2010, and carried oil and gas up to the *Discoverer Enterprise* on the surface. The RITT remained in place until May 25, 2010, and collected approximately 22,000 barrels of oil.

On May 26, 2010, after the National Incident Commander and FOOSC had reviewed plans, the RP removed the RITT and attempted a top kill operation. A top kill, also known as momentum or dynamic kill, involves pumping heavy drilling mud at high pressure and volumetric flow rates into the top of the well through the kill and choke lines in an attempt to push the hydrocarbons back into the reservoir. In conjunction with top kill, after realizing its limited potential for success, the RP attempted to reduce outflow and build back pressure through a junk shot. The term junk shot refers to bridging material, such as pieces of tire rubber and golf balls, which ideally block the flow path for the hydrocarbons and further impede the flow. After three unsuccessful attempts on consecutive days, the RP ended top kill attempts on May 29, 2010.

The next phase of source control involved collection of oil from the well near the seafloor. On June 1, 2010, the RP began cutting the riser from the top of the BOP stack, and by June 3, the top hat was in place and siphoning hydrocarbons to the surface. By June 8, the *Discoverer Enterprise* was collecting nearly 15,000 barrels per day (BPD) of oil through this device. A second connection was made between the Helix *Q4000* and the choke line on June 16. Rather than collecting oil, the *Q4000* used special equipment to process and burn up to 10,000 BPD of oil. The final collection device connected the kill line on the BOP stack to the Helix *Producer* through a freestanding riser. The system became operational on July 12, 2010, and collected oil for two days before the well was capped. These efforts, and several others that were planned but not executed, were continuously being refined to increase redundancy and reduce disconnection time in the event of a hurricane.

On July 10, 2010, the RP started work to install a capping stack, which was essentially a smaller version of a BOP designed to connect to the top of the BOP stack with a tight fitting seal. After two days of complicated activity, the capping stack was installed without incident. With the approval of the National Incident Commander, the RP shut the stack on July 15, 2010, and began a well integrity test (designed for a maximum of 48 hours), marking the first time in 87 days that no oil flowed into the Gulf of Mexico. Government scientists expressed some initial concern that keeping the stack shut could cause subterranean leakage resulting in the broach of the seabed. Despite these concerns, the test continued for 24 hours, and extended in 24-hour

increments with constant monitoring, using a variety of sensors and other means. By July 24, 2010, though the response had confidence in the integrity of the well, it continued monitoring.

With the capping stack in place, the RP raised the possibility of killing the well before completing the additional relief wells through a procedure called a static kill or bullhead kill. Like the top kill, the static kill involved pumping heavy drilling mud into the well in an effort to push the hydrocarbons back into the reservoir and establish a column of drilling mud. After successfully completing the preliminary tests on August 3, 2010, and with the approval of the National Incident Commander and the FOOSC who approved operational procedures, the RP began the operation and achieved hydrostatic control of the well. The following day, the RP cemented the well and successfully pressure-tested the cement.

While the relief well neared completion, the RP opted to remove the damaged *Deepwater Horizon* BOP stack and replace it with a fully functioning and recently tested BOP stack from the *Development Driller II* to facilitate well abandonment procedures after relief well intersection. Finally, on September 19, the relief well drilled by the *Development Driller III* intersected the Macondo well at 18,000 feet below the surface, plugging the hole with cement, and marking the official sealing, closing, well kill, plug and abandonment of the well.

Response Organization in Houston

After notification of the *Deepwater Horizon* incident, the Coast Guard activated an Incident Command Post (ICP) in Houston, Texas, to deal with source control. This ICP was separate but integral to the ICPs in Houma and Mobile set up to deal with the response. An Incident Management Team (IMT), following the Incident Command System (ICS) set up the ICP in Houston.



GULF OF MEXICO – The crew of Blue Dolphin and the HOS Centerline pump mud through lines to the Q4000 and down to the temporary cap and into the well for a static kill, as the DD II crew continues to drill a relief well in the background. Photo courtesy of the U.S. Coast Guard

GULF OF MEXICO – Roughnecks maneuver a section of drill collar into position on the drilling floor of Development Driller III, which drilled the relief well and pumped the cement to seal the Macondo well. Photo courtesy of the U.S. Coast Guard

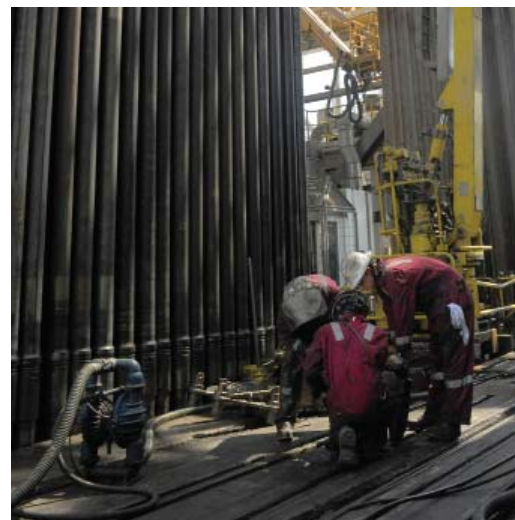
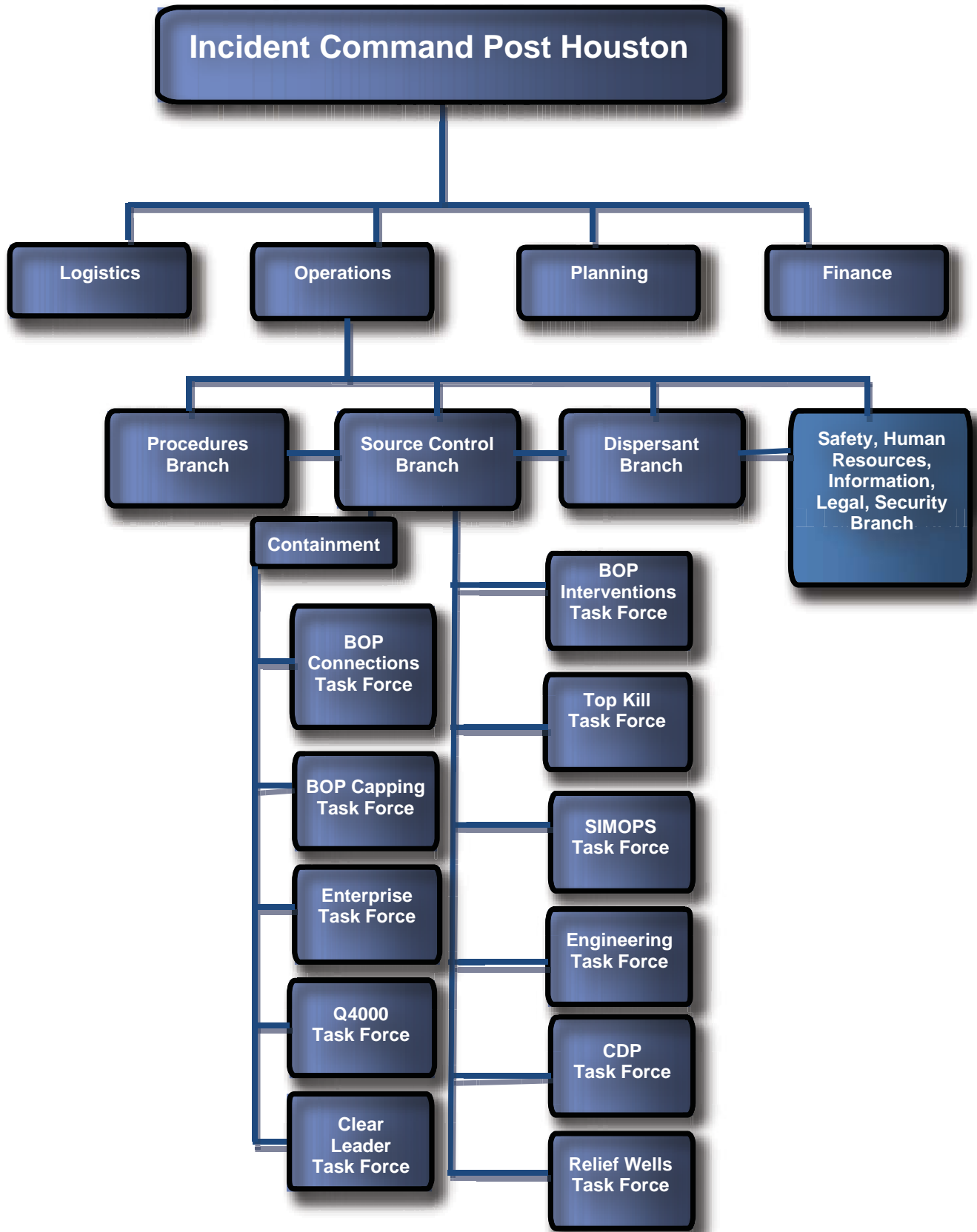


Figure 3.1: Organizational Chart Task Forces



At first, the Operations Section included containment activities such as relief wells, BOP intervention, capping, etc. Later, an Operations Section was created specifically for Source Control and assumed operation of containment activities. Containment activities were then further subdivided into logical work-specific activities in the form of Task Forces, as described in the NIMS ICS. Initially, individual Task Forces were set up for relief wells, BOP intervention and sub-sea containment, ROV operations, and survey operations. Marine operations were originally within the Logistics Section, but later moved to the Source Control Branch, which coordinated overall simultaneous source control operations.

Task Forces formed, delivered, and deactivated as needed. For example, the BOP Intervention team formed with the goal of actuating the BOP to shut in the well. This team later changed its focus to providing access to the BOP and repairing the control pods. Upon achieving those goals, the team assumed a monitoring role. Similarly, teams formed to address the several containment options, including top hats, hot taps, capping stacks, and collection or processing. By early June, the organization chart was as shown in Figure 3.1.

The work process generally followed the planning as described in the NIMS ICS. Task Forces would provide regular and frequent status reports and plans to the Incident Management Team for Source Control and Operations. These plans were also included in the Incident Action Plan (IAP) process. Task Forces were operational 24 hours a day, with most of the operational procedures development occurring during the evening.

Containment Task Forces conducted their work applying the following principles:

1. To avoid solutions that might result in a worse situation,
2. That time was of essence,
3. That reaching a solution would require redundancy and contingency, and
4. That resources would be provided as needed to staff the teams and to develop solutions.

As a result, teams worked simultaneously on short-term (e.g., top hats) and longer-term (e.g., Containment and Disposal Projects) solutions. As the Task Forces developed options, both the Incident Command and the RP Senior Management reviewed and selected options, and made priority determinations for review and approval by the National

Incident Commander and FOSC. Task Forces then engineered and fabricated selected options as required, while concurrently developing operational procedures and identifying and managing hazards. Once completed, ICP Houston and the Unified Area Command (UAC) approved the operational procedures. Task Forces interfaced with Coast Guard, the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE, formerly Minerals Management Service), and Science Team personnel during solution development, hazard identification, and management sessions. Incident Command also interfaced frequently with Coast Guard, BOEMRE, and Science Team to focus on activity prioritization and procedure approvals.

Of note, engineering review incorporated lessons learned during this process. For example, the cofferdam execution provided the lessons used to develop the top hat and Riser Insertion Tube Tool. Before deploying the first top hat, the engineering phase of subsequent top hats incorporated lessons from the initial fabrication. Examples of contingency and redundancy included top hats constructed as a contingency to RITTs, as several were designed and built specifically for contingency and redundancy. Similarly, the latch cap and valve manifold for the capping stack were developed as a contingency for the transition spool and 3-ram stack, and two latch caps were developed for redundancy purposes.

Source Control Oversight (Action and Resources)

Multiple federal entities conducted oversight of decisions and operational procedures to stop the flow of oil from the stricken Macondo well. Entities accomplished this through informal coordination both within and outside of the Incident Command System. The primary participants at ICP Houston included the Coast Guard, BOEMRE, the Science Team, and the National Incident Commander's representative. Other agencies had a more limited presence at the ICP, including U.S. Navy Supervisor of Salvage and Diving (SUPSALV), and National Oceanic and Atmospheric Administration (NOAA).

Coast Guard oversight in Houston began immediately, with Outer Continental Shelf (OCS) inspectors from MSU Morgan City arriving on April 21, 2010, to act as liaisons while the *Deepwater Horizon* was on fire. As the situation evolved, staffing expanded slightly to include incident management expertise from the Gulf Strike Team, engineering

expertise from the Marine Safety Center, and OCS inspectors. This enabled Coast Guard personnel to provide oversight of both incident management and source control development (i.e., design and vessel issues). The Coast Guard solidified the staffing model in mid-May 2010, and it generally remained consistent throughout the response, with the numbers decreasing toward the end.

This Coast Guard contingent served several primary functions. It was responsible for providing situational awareness and updates to the NIC and UAC, and participated in daily teleconference Cabinet Secretary Briefings with the Department of the Interior (DOI) and the Department of Energy. It also served as the senior federal representative at ICP Houston, while providing expertise and oversight to the RP's engineering work groups during their development of concepts, procedures, and equipment to contain the source. The contingent also conducted initial review of source control procedures and plans, coordinated inspection schedules, and lent expertise at meetings to identify hazards, regulatory issues, and scheduling conflicts with planned procedures.

Initially, the Coast Guard personnel at ICP Houston were under the supervision of ICP Houma, but still participated in twice daily UAC briefings with their RP counterparts. In early May 2010, ICP Houston's reporting chain changed to the UAC. By mid-June, the Houston ICP reported to both the NIC and the UAC for source control issues but continued to participate in the twice-daily UAC briefings. Additionally, a daily report describing source control developments and technical oversight activities was provided to the UAC, the Marine Safety Center, and a number of other entities in Coast Guard Headquarters and LANTAREA.

On May 22, 2010, the National Incident Commander dispatched a senior officer to serve as his direct representative in Houston and provide high-level liaison with senior RP management, the Science Team, and high-level officials from the DOI and the Department of Energy. This position was instrumental throughout (i.e., until relief well intersection). Although overseen by a Coast Guard captain at all times, both the flag officer and captain had significant technical engineering expertise and they worked together to provide a continuous presence in Houston, Texas. On July 25, 2010, another Coast Guard senior officer served as the National Incident Commander's representative

and provided relief to the originally assigned flag officer. For the remainder of the incident, they worked together to provide a continuous presence in Houston. However, both remained engaged with source control oversight even when not in Houston, in order to ensure continuity.

BOEMRE served as the primary source of government oversight and expertise on sub-sea source control operations. As with Coast Guard personnel, BOEMRE participated on a number of the RP's work groups to develop source control options and mitigate risks. BOEMRE also conducted a detailed review of source control plans before sending them to UAC for review and approval. BOEMRE had four to five employees in Houston overseeing the RP. BOEMRE did not participate in the ICS structure at ICP Houston, but was fully integrated with the UAC in New Orleans.

Under the direction of the Energy Secretary, the Department of Energy assembled a scientific oversight team to monitor the progress and critically review the RP's efforts to contain and secure the source of the leak from the Macondo well. The team consisted of more than 200 scientists, engineers, and other experts from the National Laboratories, U.S. Geological Service (USGS), other government agencies, and major oil companies. Additionally, the team included a small group of the nation's top scientists who served as advisors to the National Incident Commander.

The team, established during the week of April 26, 2010, remained engaged throughout the response. A core group of up to 20 personnel stationed on the ground in Houston provided the needed interaction and coordination with the RP. This core group actively maintained connectivity to the remainder of the team, as well as select industry experts, to bring the appropriate disciplines to bear on individual issues.

On July 14, 2010, the NIC asked NOAA to assist with monitoring the wellhead. The NOAA ship *Pisces* sailed from Pascagoula, Miss., to be on scene with some of NOAA's top acousticians. The vessel was equipped for acoustic monitoring at several kilohertz (18, 36, 48, 96, and 128). These vessels were imaging for sound associated with gas or oil leaks in the ocean floor, which would indicate a potential formation leak. A request came a few days later for an additional support vessel, and NOAA provided the ship *Gordon Gunter*. *Gordon Gunter* had a similar range of acoustics, but did not have



GRAND ISLE, La. – NOAA personnel on a commercial vessel receive a briefing on the Conductivity-Temperature-Depth (CTD) equipment via radio from scientists onboard the NOAA vessel PISCES. Photo courtesy of the U.S. Coast Guard

a dynamic positioning system. Therefore, the *Pisces* worked near the wellhead, and the *Gordon Gunter* farther out, near faults that USGS identified as possible vent locations. After about a week, the Secretary of Energy's team decided one acoustic vessel was sufficient for acoustics monitoring, and the *Gordon Gunter* went off scene. The *Henry Bigelow* relieved the *Pisces*

in early August. When not specifically conducting acoustic sampling, both the *Pisces* and *Henry Bigelow* conducted water sampling near the wellhead. These ships spent 81 sea days on scene. NOAA streamed data collected in real time to University of New Hampshire (UNH), where the UNH team processed the data 24 hours a day, 7 days a week.

The Secretary of Energy and senior agency representatives on the team personally participated in daily briefings with the RP's executives and provided real time recommendations on the efficacy of the proposed mitigation measures to the National Incident Commander.

Operational Procedure Processing

All sub-sea activities conducted by the RP were agreed to in writing through detailed procedures describing the operation to be performed around the wellhead. BOEMRE and Coast Guard personnel in Houston participated in the development and drafting process to help identify and mitigate hazards. Once they finalized the procedures, senior engineers in Houston signed off and forwarded them to the UAC in Louisiana. The senior BOEMRE representative in the UAC would again review and approve the procedures before the Unified Area Commander gave the final permission to proceed. This sign-off process remained in place throughout the containment effort until permanent well kill. After that point, the RP still had to work with BOEMRE to approve procedures related to plug and abandon the well, a typical oil field activity covered by BOEMRE regulations. As the well was no longer a threat for further release of oil, FOSC participation in those operational procedures was not required.

Source Control Challenges

The Incident Management Team in Houston followed ICS processes, but the overall coordination with the NIC representative, BOEMRE, the Science Team, and other federal agencies present in Houston was informal and outside the ICS planning cycle. The skill sets and perspectives of all the federal entities were essential to successful oversight.

Particularly early in the response, there was a lack of transparency by the RP on source control. Initially, senior RP management in Houston made major decisions outside the ICS. Early on, the Coast Guard Incident Commanders raised this concern with the RP and were subsequently included in the daily meetings with the senior managers. However, it remained apparent that key strategic and tactical planning occurred behind closed doors by RP personnel without government participation in the formulation of those plans. This changed in late May 2010 when the NIC representative vigorously insisted on participating in an internal RP meeting to assess the failed top kill, establishing a new paradigm. From that point forward, the government played a significant role in overarching source control planning and assessment. Ultimately, the NIC asserted authority and ordered specific source control actions through issuance of NIC directives.

Although Coast Guard inspectors and engineers were not well versed in the nuances of sub-sea engineering, they did offer critical thinking, operations and engineering skills to the review process. The RP and industry personnel valued their participation on design and in the hazard operations and hazard identification teams. Even with these contributions, there was a large amount of work. As the operation progressed, it was clear that the pool of Coast Guard personnel with the requisite skill sets was small. Equally clear was the necessity to establish a rotation scheme to sustain the participation of those with the technical background to assess RP proposals at ICP Houston.

This was the first major spill in the United States in deep water that required securing a well blowout in order to stop the flow of oil. Securing the well



GULF OF MEXICO – Transocean's Development Driller II continues to dig a relief well in an effort to stop the flow of oil into the water from the Deepwater Horizon incident. Photo courtesy of U.S. Coast Guard

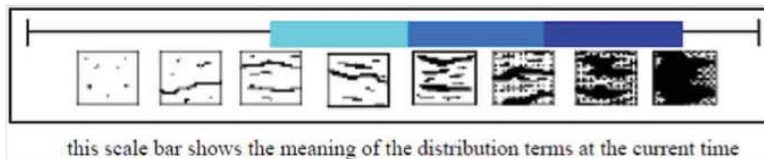
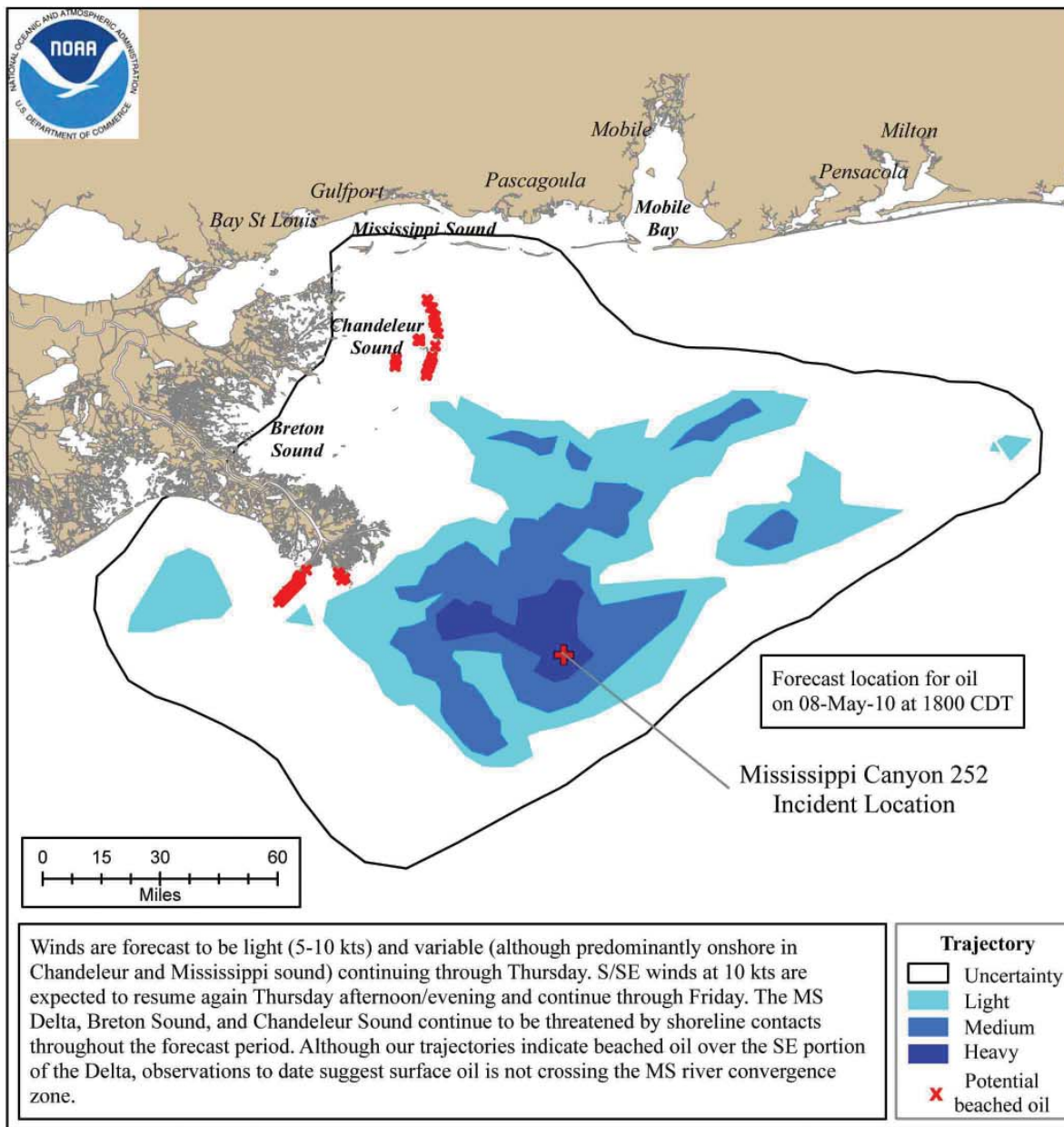
Trajectory Forecast Mississippi Canyon 252

NOAA/NOS/OR&R

Estimate for: 1800 CDT, Saturday, 5/08/10

Date Prepared: 2000 CDT, Wednesday, 5/05/10

This forecast is based on the NWS spot forecast from Wednesday, May 5 PM. Currents were obtained from the NOAA Gulf of Mexico, Texas A&M/TGLO, and NAVO/NRL models and HFR measurements. The model was initialized from early morning satellite imagery analysis provided by NOAA/NESDIS and Wednesday overflight observations. The leading edge may contain tarballs that are not readily observable from the imagery (hence not included in the model initialization).



Next Forecast:
May 6th PM

was a major technical challenge. The RP initially had the technical expertise to identify the means of controlling the source and developed plans, with the oversight of BOEMRE and the Coast Guard. This resulted in an evolving series of attempts to stop the oil flow, culminating with the successful final capping stack, static kill, and bottom kill through a relief well. From beyond Houston, the perception of the attempts may have appeared as if each was thought of after the previous effort failed. In reality, multiple options were constantly under development and revision.

Oil Trajectory and Amount

Beginning April 21, 2010, the modeling team at NOAA's Office of Response and Restoration began generating daily trajectories for the *Deepwater Horizon* oil spill and continued for 107 days.

Background

Cumulative trajectory maps were produced early in the *Deepwater Horizon* spill response. One map displayed the surface location of spilled oil for several consecutive days, as well as a forecast for the following day. As the area of water affected by the spill grew larger, the forecast aspect of these maps became more important than the day-to-day changes in surface oil. Consequently subsequent trajectory products only included forecasts.

Forecasts for 24, 48, and 72 hours were produced for surface oil in the near-shore area to support daily response planning. The production of the forecasts continued until no recoverable oil was seen in over-flights of the area for three weeks.

In mid-May, when a tail of oil entered the northern part of the Loop Current, it created a potential pathway for oil to be transported to the Florida Keys, Cuba, or the Bahamas. With this change in the scale of the trajectory forecasts, the Office of Response and Restoration began to produce forecasts for two regions, near-shore and offshore. The offshore forecasts also supported daily response planning, and predicted surface oil impact by the Loop Current system for the next 24, 48, and 72 hours.

In mid-July, Office of Response and Restoration began to produce maps to provide daily updates of the location of the Loop Current and its major eddies, and the location of floating oil relative to the Loop Current system. After more than a month of daily mapping, over-flights and satellite

analyses eventually showed no recoverable oil in this area; these findings indicated a diminished Loop Current threat. Weeks later, when recoverable oil was no longer observed in over-flights or satellite analyses, the offshore forecasts were phased out.

In addition to surface oil trajectory forecasts, NOAA provided guidance on expected movement of subsurface oil from mid-May through mid-September. The UAC Subsurface Monitoring Unit (SMU) used subsurface forecasts as a tool to direct vessels in sampling. The daily sampling information, including fluorometry, dissolved oxygen, and analytical chemistry, provided usable data on the subsurface oil during the incident.

Oil Spill Trajectory in Detail

The *Deepwater Horizon* oil spill posed multiple challenges for trajectory modeling and stretched NOAA's capacity to generate timely, accurate, and useful products to the response. Over the course of the spill, NOAA prepared more than 400 trajectory products. They developed multiple new products to address the need for subsurface and long-term forecasts, and to help improve user and public understanding.

NOAA provided the first trajectory forecast to the FOSC on the morning of April 21, 2010. This trajectory focused solely on the 700,000 gallons of diesel aboard the burning *Deepwater Horizon* rig. The first trajectory assumed a continuous release starting at 10:00 a.m. Central daylight time on April 20. NOAA later prepared additional trajectory products with different oil release scenarios. Scenarios included diesel oil spilling from the rig at different times over several days, and a trajectory for a potential continuous release of crude oil from the well. Based on observations from over-flights, the trajectories produced on April 22 and the morning of April 23 assumed no further release from the well or rig. However, on the afternoon of April 23, a Coast Guard and NOAA over-flight confirmed significant amounts of oil near the well and observed surfacing oil. All subsequent trajectory forecasts assumed a continuous release from the well.

NOAA developed four different types of trajectory forecasts used in operations throughout the response effort. They produced a daily Loop Current analysis to address the potential threat of oil transport toward the Florida Straits. A fifth type

Table 3.1: Trajectory Analyses

Type	Frequency	Dates	Distribution
Surface Oil Forecast	Daily	April 21 – August 23	Within commands, then public after 26 April, 2010
Shoreline Oiling Outlook	Daily	April 27 – August 23	Within commands only
Statistical Long Term Outlook	Irregular	First results: May 2 First IC presentation: May 10 Press Release: July 2	Initially within commands, public on July 2
Subsurface Plume Forecast	Irregular, then daily	First forecast: May 15 Forecast based on climatology: May 30 Daily: September 7 – September 24	Used for guidance of vessels as part of SMU
Loop Current Analysis	Irregular, then daily	First analysis: May 5 Daily: May 17– July 22	Generally within commands only

of trajectory forecast was also investigated. The fifth trajectory was a 45-day outlook based on NOAA Climate Center wind forecasts and NOAA generated ocean forecasts. This trajectory yielded results inconsistent with observed oil movement and thus was not introduced to the response. Table 3.1 summarizes the types of trajectory analyses used, the periods required to generate products, and the distribution of the results.

The surface oil forecasts occurred twice a day from April 23 to May 19, 2010, once daily after then until August 13, then every few days until the final forecast on August 23. From May 18 to June 17, the surface forecast split into a near-shore and offshore forecast. Lack of observable sheens in the offshore area and the clear separation of the Loop Current resulted in discontinuation of the offshore forecasts on June 18. This indicated a reduced likelihood of oil transported to the Florida Straits. Trajectory forecasts from August 3 through the final forecast produced August 23 indicated no recoverable surface oil.

The Comprehensive Deepwater Oil and Gas model (CDOG) and the SINTEF (a Norwegian research organization) Deepblow model produced the initial subsurface plume forecasts. The subsequent daily subsurface plume forecast identified potential locations of oxygen depression at depth.

NOAA contacted a third party for additional subsurface plume modeling, but that modeling was unsuccessful.

Producing reliable surface trajectory forecasts required a significant number of supporting data sources. In particular, observations of oil distribution and forecasts of winds and currents were critical. Oceanographers in NOAA’s Office of Response and Restoration compiled all available observational data, evaluated six hydrodynamic forecast models, and loaded relevant information into the General NOAA Operational Model Environment to carry out the daily trajectory forecasting. Not all data were of the same quality, nor were all data sources prepared to provide operational support at the beginning of the spill. However, over time the quality and availability of data and information became more robust and reliable.

In addition, Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE) oceanographers provided NOAA with data used for oil trajectory and shoreline threat probability modeling. They collected urgently needed information and modified and extended research studies already underway at the time of the spill. The *Lophelia II* expedition, Loop Current monitoring, socioeconomic studies, and other studies provided data to help evaluate the impacts of the spill.

The Loop Current

Early in the response, NOAA recognized the threat of oil entering the Loop Current and potentially affecting shorelines beyond the northern Gulf of Mexico. There was particularly strong concern this transport pathway could rapidly bring oil to southern Florida. Therefore, when scientists observed oil entering the northern edge of the Loop Current, a separate offshore trajectory tracked this oil. The oil in the offshore area consisted of very widely scattered light sheens with vessel-observed tar balls in the northern section on June 8 and again on June 15. The modeling team attempted to convey this was significantly less oil than was present in the northern Gulf by changing the pattern of the oil distribution, and by using labeling to associate this with widely scattered sheens. However, when users separated the assumptions and labeling from the trajectory shape files, this information was lost.

By late May, it became clear the northern extent of the Loop Current was unstable. After several conversations with scientists who had spent decades observing the Loop Current, there was no consensus on whether the northern intrusion would permanently detach. However, by mid-June it appeared to have formed a permanent separation. The statistical analyses conducted in early May considered all scenarios, most of which estimated the Loop Current would extend into the central or northern Gulf. NOAA SSCs briefed the results of these statistical analyses to the NIC, FOSSC and FOSSCRs. However due to a protracted OMB clearance process, the public release of the document did not occur until early July; after the Loop Current no longer provided an oil transport pathway to the Florida Straits. This delayed public release caused confusion for the public.

Oil Trajectory Challenges Encountered

Trajectory forecasting development and execution encountered several challenges. Communicating forecasting results was the first. The broad public distribution of trajectory forecast products generated for the *Deepwater Horizon* oil spill was unprecedented. In general, the UAC used trajectory forecast products as one piece of information to determine resource allocation. During the *Deepwater Horizon* response, significant public interest resulted in the availability of surface trajectories to a very wide and diverse audience. Until oil began

stranding on the shorelines, the trajectory product was one of the few visuals available to media. The trajectory modeling team was unprepared for this widespread use. Details on the assumptions and uncertainties were often difficult to explain to the public and media, and occasionally resulted in confusion. The forecasts showed areas of

varying probability that oil would be found, not an actual depiction of the location of oil, and even within the areas shown by the forecast, the maps were never intended to imply that the entire surface area of the water would be covered by oil. In particular, the FOSSC had to explain jumps in the heavy, medium, and light contours on the surface trajectories, which required describing the complex modeling processes that could lead to such a jump. This potentially eroded public confidence in the forecasts. Because of uncertainties in the release rate and weathering processes, associating concentrations or volumes with the shoreline impacts was generally not possible, but at times the lack of volume estimates caused others to question the forecasts. The modeling team was not prepared to manage the expectations arising from such a diverse audience.

Significant observational efforts determined the surface and subsurface extent of the oil. During the early stages of the spill, determining who collected what data in what formats, and how to access it, was challenging. As the spill progressed, the access and quality of data improved significantly.

The Size of the Oil Spill

Estimating the size of oil spills has historically been a contentious, uncertain, and politically charged process. The *Deepwater Horizon* spill was no exception. Determining flow rates and overall mass balance was especially difficult in the *Deepwater Horizon* spill as there were no proven techniques for estimating flow under conditions found at the well-head. Over time, the RP developed peer-reviewed estimates of the spill release, but the substantial discrepancies between the preliminary estimates created a great deal of public distrust. Several other challenges complicated these efforts.



ST. PETERSBURG, Fla. – Captain Tim Close, Commander of U.S. Coast Guard Sector St. Petersburg, discusses a NOAA oil spill trajectory with the media. Photo courtesy of U.S. Coast Guard



GULF OF MEXICO – Video acquired by a remotely operated vehicle is monitored and recorded. The video display shows a small pollution containment chamber, known as the “top hat” being lowered into the Gulf of Mexico. Photo courtesy of U.S. Coast Guard

The response was regarded as a worst-case spill, despite quantification difficulties. The protracted campaign necessary to deal with the 87-day spill required significant and sustained levels of resources, including skimmers, fire boom, dispersants, boats, and personnel. The estimates as to spill size did not drive the amount of resources brought to the spill. The oil spill response plan for the well included a worst-case discharge of approximately 250,000 barrels per day. The RP’s initial estimates were far below that, but the spill was always handled by the FOOSC as a worst-case discharge.

Researchers had not experienced an unbounded source and timeline of this extent before. Typically, ship or tank-based spills have a clear upper bound in the form of the total capacity of the ship or tank, and releases are generally over in a matter of hours. The depth of the *Deepwater Horizon* leak source and its multiple leak points, without geometrically simple openings, also contributed to difficulty in understanding the extent of damage to the well and riser pipe. Additionally, the poorly known gas-liquid mixture coming from what was an exploratory well fluctuated over time. The available information on the leaks was of poor quality and not readily available to experts working in spill volume estimation. Visual estimation was difficult because of uncertainties in the fate and behavior of the oil and gas mixture as it travelled to the surface. As the well was not yet producing, there was also uncertainty over reservoir conditions and a lack of prior production rates to bound the problem.

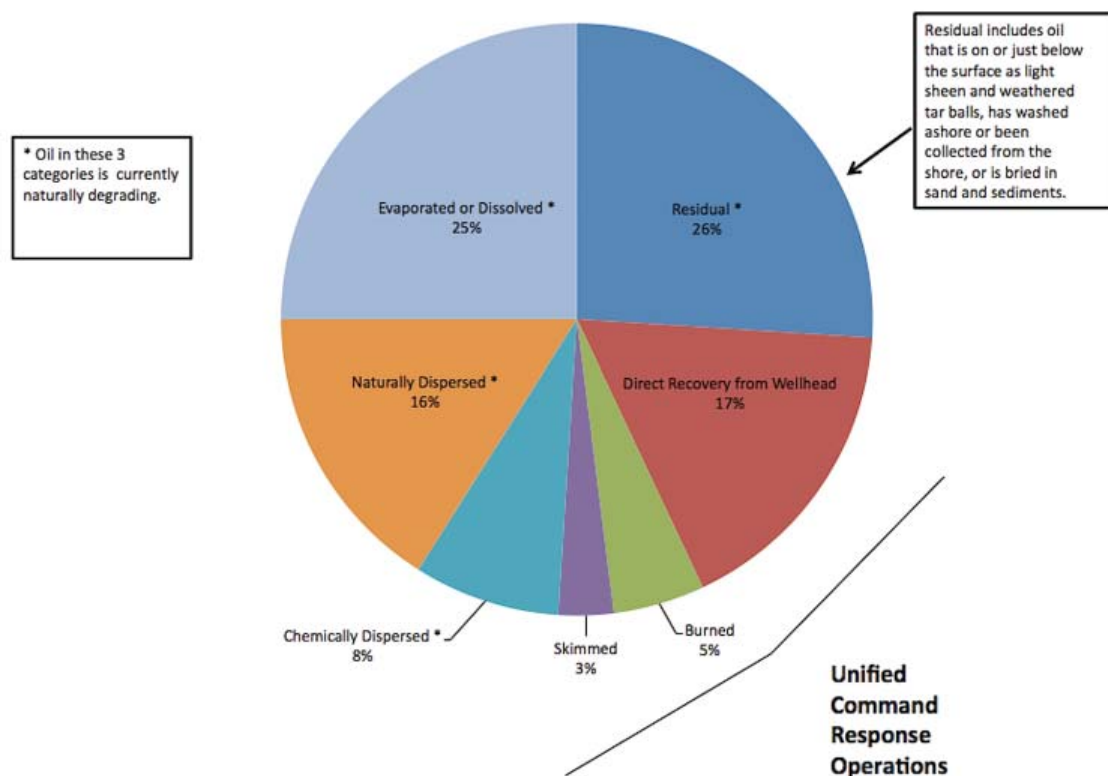
The initial response efforts focused on fire fighting, search and rescue of the crew, and the potential fate of the 700,000 gallons of diesel aboard the *Deepwater Horizon* rig. Early reports did not indicate the well was leaking. However, remotely operated vehicles (ROVs) diving near the wellhead as early as April 22 found hydrocarbons escaping from kinks in the toppled riser pipe. At this time, the RP was reporting a release rate of 1,000 barrels per day (BPD). Over the next several days other leaks were discovered as the ROVs continued to explore the wreckage and attempt to activate rams on the blow out preventer (BOP). At the surface, efforts began to shift from search and rescue to pollution

reconnaissance. Trained aerial observers quickly realized the spill was much larger than the 1,000 BPD estimate. When Coast Guard requested a more accurate estimate, NOAA reported on April 28 the spill was at least 5,000 BPD based on over-flights and satellite views. Five thousand BPD became the official estimate. After the May 12, 2010 public release of videos showing the plume of hydrocarbons escaping from the damaged riser in the deep sea, many academic scientists insisted the flow rate was much higher than 5,000 BPD. On May 14, the NIC asked its Interagency Solutions Group (IASG) to provide scientifically based information on the discharge rate of oil from the well. On May 16, the RP placed the Riser Insertion Tube Tool (RITT), a snorkel-type device, in the broken riser end to capture some of the escaping oil. The sustained rate of this partial capture yielded 8,000 BPD, and only captured a fraction of the oil.

In response, the NIC IASG chartered the Flow Rate Technical Group (FRTG) on May 19, 2010. Experts from many scientific disciplines were brought together to perform the FRTG’s two primary functions:

1. As soon as possible, generate a preliminary estimate of the flow rate, and
2. Within approximately two months, use multiple, peer-reviewed methodologies to generate a final estimate of flow rate and volume of oil released.

Several methods employed contained individual strengths and limitations. One technique, called mass balance, relied only on observations available on the ocean surface, and yielded a flow rate of 13,000 to 22,000 BPD early in the incident. Two techniques, video and acoustic, used observations from ROVs of the oil plume as it exited the well a mile deep. These techniques yielded consistent flow rates of 25,000 to 60,000 barrels per day. An in-place hydrocarbon sample not only improved those flow estimates, but also independently combined with surface collection data to yield a flow rate of 46,000 to 63,000 barrels per day. The final approach, reservoir and well modeling, did not need new observations, but instead relied on industry proprietary data. This included seismic data on the reservoir structure and properties, well logs, and others. This approach produced the largest range and number of uncertain parameters in estimated flow rates, from less than 30,000 to more than 100,000 BPD.

Figure 3.2: Deepwater Horizon Oil Budget (August 4, 2010)

The most definitive information came from data collected after installation of the capping stack on July 12. This structure ultimately stopped oil flowing into the Gulf. Pressure measurements were recorded as the choke valve closed to yield the most precise and accurate estimation of flow: 53,000 BPD just prior to shut in. The teams assigned an uncertainty on that value of ± 10 percent based on their collective experience and judgment. They then combined the final flow rate with a well-calibrated simulation for the rate of depletion of the reservoir to produce an estimate of the flow rate as a function of time throughout the incident. The net result was a flow rate estimate that decreased over the 87 days from an initial 62,000 to a final 53,000 BPD. This put the total amount released at 4.9 million barrels of oil, before accounting for containment. The estimated uncertainty on these flow estimate values was also approximately ± 10 percent.

The Fate of the Oil

Part of the National Incident Command Inter-agency Solutions Group, the Oil Budget Calculator Science and Engineering Team, developed a scientifically valid tool that could be used to

calculate the fate of the oil discharged from the Macondo well. That is to say, how much was dispersed, mechanically recovered (through skimming, sorbents, etc.), evaporated, dissolved, or burned.

3.2 Dispersant Use and Monitoring

Oil on the surface posed an immediate threat to marine life that live and spawn in the open ocean or live and breathe at the interface of the ocean and atmosphere, such as marine mammals and sea turtles. Unrecovered oil on the ocean's surface was a known threat to marine fisheries and estuarine communities near-shore. The decision to use dispersants required a robust assessment of net environmental benefits and monitoring activities at the wellhead, in the benthos, water column, water surface, and along the shoreline. Despite political concerns and public misperceptions, those assessments and monitoring protocols generally supported continued application of dispersants aerially, on the surface, and sub-sea at the wellhead throughout the incident.

The FOSC and emergency responders clearly understood dispersants do not remove the threat



KEY WEST, Fla. – A staff member from the Florida Department of Environmental Protection demonstrates how the Neuston net is one of the mechanisms being used to monitor for oil from the Deepwater Horizon oil spill. Photo courtesy of U.S. Coast Guard

of oil pollution from the marine environment. Rather, dispersants provide a mechanism to alter the nature of the spilled oil's fate, transport, and potential effects. Natural dispersion was occurring at the surface by physical wave action. A trade-off analysis determined the appropriateness of disper-

sant use. This analysis studied if a particular mitigation strategy would generate a lesser potential for long-term environmental impact relative to conventional response options. Ideally, the best response options would stop the flow of oil, or contain and remove the oil at the source.

Prior to the *Deepwater Horizon* incident, dispersants were used to combat oil spills in the Gulf of Mexico (GOM) as a response tool to mitigate the effects from offshore oil spills on environmentally sensitive coastal habitats. Regional Response Team (RRT) VI developed a pre-approval plan for dispersants using the tools listed in 40 CFR 300.910, Subpart J, FOSC Dispersant Pre-Approval Guidelines and Checklist (2001), Special Monitoring for Applied Response Technologies V. Operationally, the FOSC followed this pre-approval plan during this incident on a daily basis. The FOSCs assigned to the Eighth Coast Guard District were familiar with this tool and were well-versed in its use for spills in the GOM Coastal Zone. In addition, all RRT VI and many National Response Team (NRT) members received briefings on the past uses of dispersants and were aware of the trade-offs associated with the application of dispersants. NOAA and DOI consulted on the use of dispersants in the GOM and the Endangered Species Act (ESA) in 1995.

RRT VI FOSC Dispersant Pre-approval Guidelines and Checklist provided for meaningful, environmentally beneficial, and effective dispersant operation. Both historically and during the response, the programmed checklist approach allowed the FOSC to arrive quickly at a logical go or no-go decision. This allowed dispersant operations to begin in a timely manner to maximize its effectiveness as a countermeasure. The parties requesting approval for use of a dispersant system underwent evaluation criteria for approval for use. In addition to the checklist, parties had to demonstrate the following to the satisfaction of the FOSC:

- That the application system was specifically designed for its intended purpose, and if not specifically designed for dispersant use, had been used previously and deemed to be effective and appropriate; also that it would be used again in a similar manner or by some other specific means, deemed to be effective and appropriate under the circumstances,
- That the design and operation of the application system could reasonably be expected to apply the chemical dispersant in a manner consistent with the dispersant manufacturer's recommendation, especially with regard to dosage rates, and concentrations, and
- That the operation would be supervised or coordinated by personnel with experience, knowledge, specific training, or recognized competence with chemical dispersants and the type of system used.

The effectiveness of dispersants generally decreases as spilled oil weathers. It is therefore best to apply dispersants when the oil is freshest. The pre-approved dispersant area in the GOM includes offshore waters from the ten-meter isobaths and three nautical miles (nm)—whichever is farthest from the shore—to 200 nm offshore, encompassing the Exclusive Economic Zone boundary. This zone extends from the Texas-Mexico border and continues through the states of Texas and Louisiana to the boundary between federal Regions IV and VI. The requirement for dispersant product selection was that the dispersant must be included on the NCP (National Contingency Plan) Product Schedule and considered appropriate by the FOSC for existing environmental and physical conditions. The EPA product schedule listed and approved both COREXIT 9527A and 9500A for use. The *Deepwater Horizon* response effort used both. After responders exhausted the supply of 9527A, the operation used 9500A throughout. In accordance with RRT VI guidelines, the *Deepwater Horizon* RP submitted its first request to use aerial dispersants to the FOSC at Morgan City, La. The FOSC preauthorized its use at approximately 1 p.m. on April 22, 2010, and the RRT received notification a few hours later. Although there was an active search for the survivors of the MODU *Deepwater Horizon*, the FOSC, in concert with the Search and Rescue effort at the Eighth Coast Guard District, approved aerial dispersant use. There were no active searches in the target area,

Figure 3.3. Diagram of the Aerial Dispersant Operations Group Structure

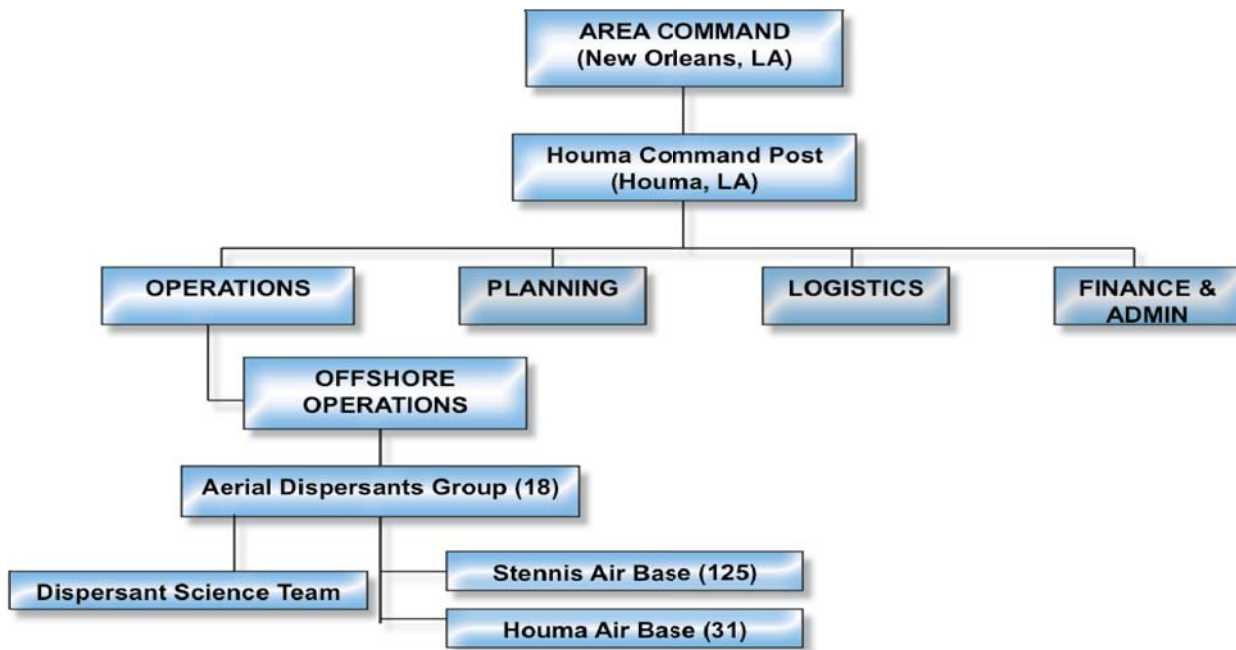


Figure 3.4: Worldwide Dispersant Resource sources for Deepwater Horizon spill

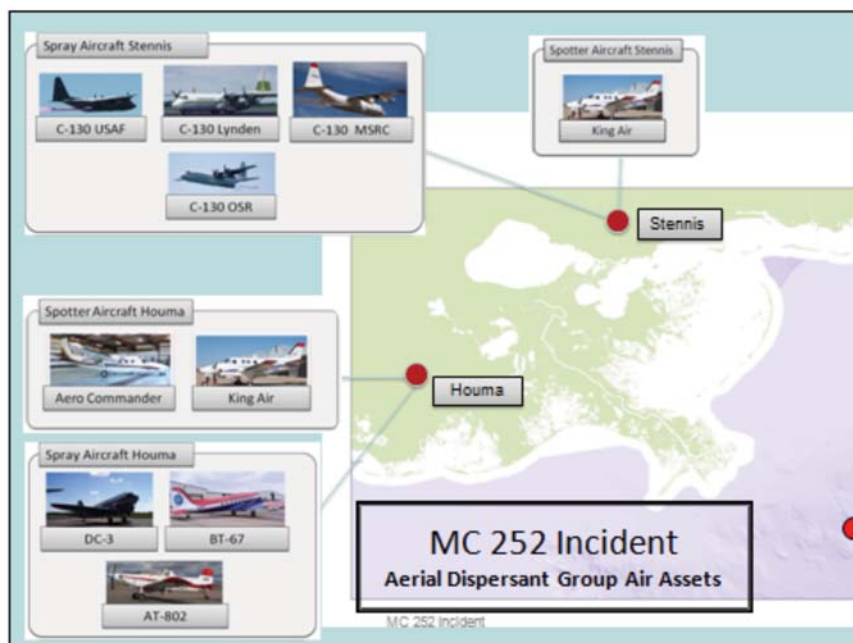


Figure 3.5: Aerial Dispersant Group Assets



HOUMA, La. – The crew of a Basler BT-67 fixed wing aircraft release oil dispersant over an oil slick off the coast of Louisiana. Photo courtesy of U.S. Coast Guard.

and sufficient safety controls were in place (e.g., spotter aircraft with embarked observers) in the event the Search and Rescue Mission Coordinator detected any survivors. The first aerial application began at 1700, using 1,880 gallons of COREXIT 9527. From aerial observations of the treated slick, the application was effective by employment of Tier I Special Monitoring of Applied Response Technologies (SMART) monitoring. The RRT received notification within the 24-hour period via email on April 22, 2010.

Aerial Application

Aerial dispersant operations were coordinated through the aerial dispersant operations group located at the ICP in Houma, La. Initially, the operations were small, but expanded within one week to a large and comprehensive operation. The operations consisted of searching for slicks appropriate for dispersant application. This was done late in the day prior to the next day's application. On the day of the operation, the slick target would be reacquired. Communication was made back to the ICP for launching dispersant planes. The group consisted of a spray aircraft and spotter aircraft and sometimes on-water SMART Tier II fluorometry boats. The spotter plane guided the spray plane over

the slick. After the spray operation, SMART boats would move in to conduct effectiveness monitoring if necessary.

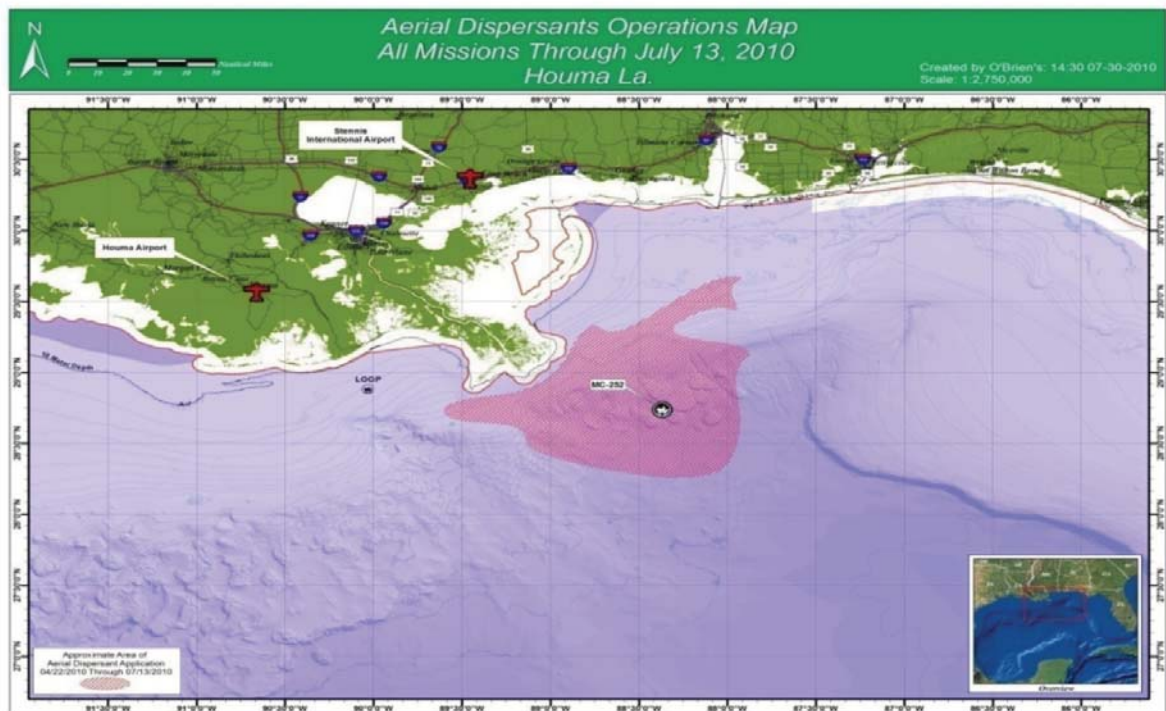
The aerial application bases of operations were situated in the Stennis Space Center Airport in Mississippi and Houma-Terrebonne Airport, Houma, La. The *Deepwater Horizon* response deployed the largest mobilization of aerial dispersant assets and expertise from around the world.

Several types of aircraft conducted the operations, as noted in Figure 3.5.

During the *Deepwater Horizon* response, ninety-eight percent of the total volume aerially sprayed occurred more than 10 nm offshore. The closest area to land sprayed was just outside three nm from shore, in order to reduce the impact of several slicks from reaching Grand Isle and the Chandeleur Islands. There was no dispersant spraying over any land areas. Dispersants' effectiveness decrease dramatically within hours of the oil being released. Thus dispersant application near shore would have been ineffective, as the oil would then have been on the surface for days.

The shaded area on Figure 3.6 shows boundaries of dispersant operations and does not suggest that the entire area was sprayed with dispersants. Each single, discrete operation applied dispersants to a confined and particular target area or slick. Aerial dispersant spraying operations could occur during daylight hours only. Responders made every

Figure 3.6:
Perimeter of All
Aerial Dispersant
Operations



reasonable effort to make the first dispersant application as soon as possible after the oil reached the surface, in order to achieve intended results.

As the *Deepwater Horizon* response was an ongoing major spill each day, the pre-designated FOSC in Morgan City approved dispersant operations daily. Later, the FOSC Representative (FOSCR) at ICP Houma and the FOSC at the UAC approved those operations jointly. After May 27, 2010, daily consultation with the EPA, via a senior representative at the UAC, was part of the required process as well. Throughout the response, limitations on aerial dispersant operations were as follows:

- Wind criteria for aircraft was less than 35 knots, however the RRT 6 *guidance* plan specified 25 knots; the increase in wind speed limit was only allowed when the aircraft could correct for spray drift.
- A 1,500 foot cloud ceiling was required, with 4 nm visibility for aerial applications to commence.
- No spray areas were permitted within 5 nm of the source, 2 nm of any vessel, 3 nm from shore, or where the water depth was less than 33 feet.
- Additional guidelines were in place for NOAA observers to ensure no dispersant operations within 3 nm of visible marine life.
- Each spray system was designed and built specifically for each aircraft.
- Dispersant application rate was 5 gallons per acre, applying a film of approximately 0.0002 inch at an altitude of approximately 50 to 75 feet, at a speed of approximately 150 knots.
- All spray systems were flight-tested at 300 to 500 micron droplet size at a swath width of approximately 60 to 150 feet.
- Candidate slicks had to be continuous to avoid over spraying.

Aerial application of dispersants continued until sub-surface dispersant testing on April 30, 2010 temporarily halted all use of dispersants. The Deputy Area Commander and the NOAA Scientific Support Coordinator (SSC) in Robert, La., requested an operational pause to review procedures, ensure training of oil target spotters, and ensure documentation of the monitoring data was submitted. After a two-day testing period, the operations continued. Operations resumed, and spotter plane assessments continued daily until aerial dispersant operations

were limited upon receipt of the Dispersant Monitoring and Assessment Directive, Addendum 3 of May 26, 2010. This directive limited the use of surface dispersants to rare and unusual circumstances.

From initial application of dispersant on April 22 to May 26, responders used aerial dispersants 28 of 35 days, with an average application of 24,386 gallons.

On May 26, the FOSC issued further instruction to the RP via written directive to reduce the amount of dispersants used. After negotiations with the EPA representative from Region VI and the EPA NRT chair, the FOSC agreed that:

1. The RP would endeavor to reduce the dispersant loading in the Gulf of Mexico by 75 percent, and
2. The RP would eliminate the use of surface dispersants entirely, unless issued a written exception approved the FOSC. This directive limited the use of surface dispersants to rare and unusual circumstances.

Between May 27 and July 19, aerial dispersants were used 33 of 54 days (61 percent), with an average application of 8,892 gallons, a 24 percent reduction in days used and a 64 percent reduction in the amount of dispersant applied as compared to the previous period of application from April 22 to May 26.

Data from the Environmental Unit, established at the UAC in Robert, La., to assist the FOSC with environmental issues, showed a strong correlation between decreased dispersant use and increased shoreline oiling during the period of reduced application.

Sub-sea Dispersant Operations and Sub-Sea Monitoring

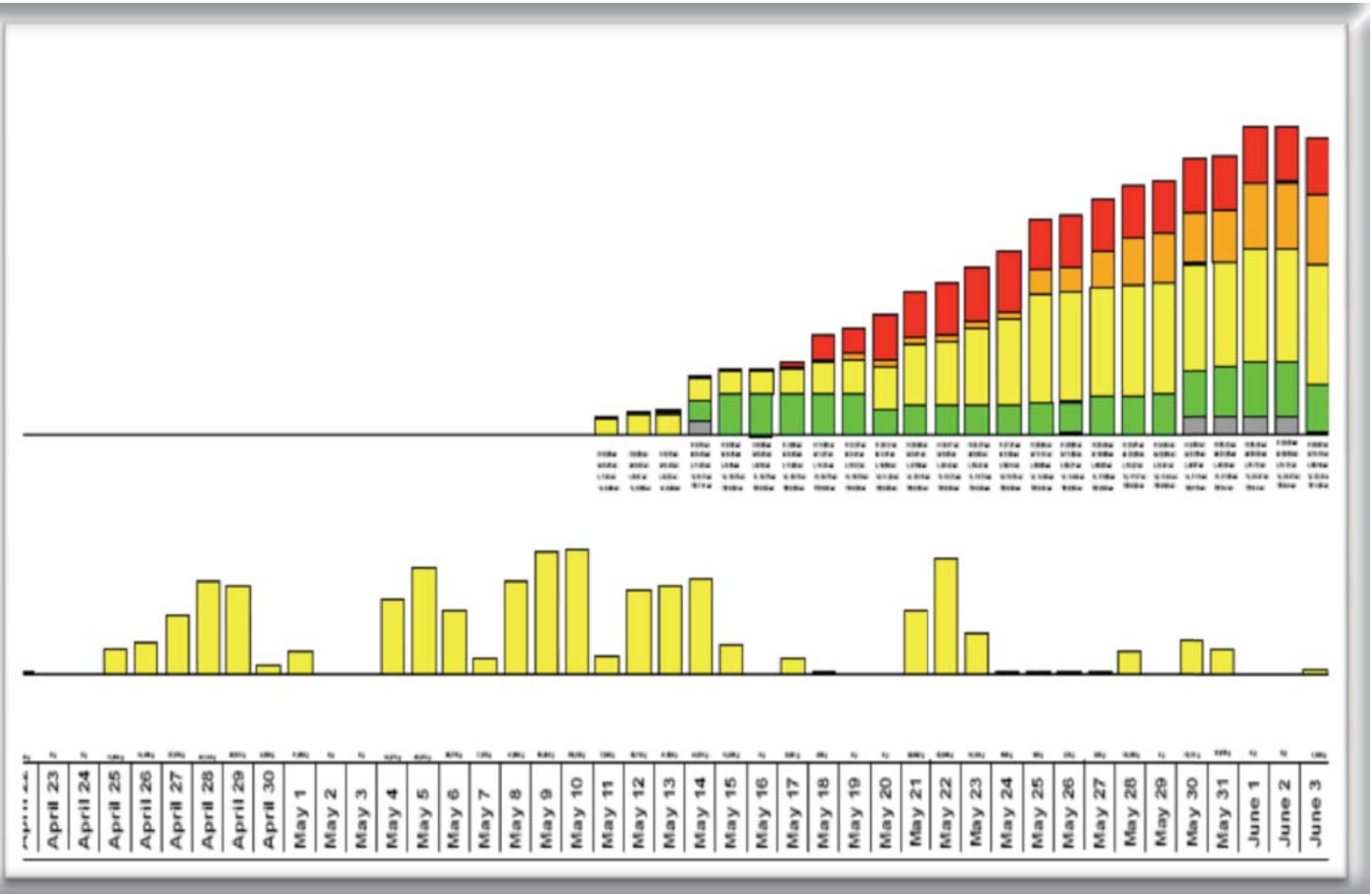
Feasibility Testing

Prior to *Deepwater Horizon*, the concept of sub-sea dispersant application had only been tested experimentally in shallow water, less than six times anywhere in the world. In late April 2010, the RP presented the UAC with the novel concept of applying dispersants directly at the source to mitigate oil in the offshore environment. At this point in the response,

KILN, Miss. – A team of U.S. Air Force aerial spray aircraft maintainers from the 910th Aircraft Maintenance Squadron at Youngstown-Warren Air Reserve Station, Ohio, move a chemical pump into position in order to refill a chemical dispersing C-130 aircraft at Stennis International Airport. Photo courtesy of U.S. Air Force



Figure 3.7: Shoreline impact Graph – Top graph shows cumulative shoreline impact, the bottom graph depicts aerial dispersant use.



hopes of a quick intervention and well shut-in had faded. Sub-sea dispersant injection at the source provided two major advantages over aerial application—greater efficiency, and lack of daylight restrictions. The proposed method required less dispersant to oil dose ratios. The FOSC immediately forwarded this plan to the RRT VI for consideration. The plan consisted of a test application at the BOP stack leak, using a coiled tubing supply line from the merchant vessel *Skandi Neptune*, to inject 3,000 gallons of Corexit 9500A at 5,000 feet below the sea surface, using a remotely operated vehicle. During Test 1, one ROV held the injection wand into the plume and injected 9 gallons per minute of dispersants, while a second ROV collected samples and took video of the operation. During this test, the RP used 2,151 gallons of dispersant.

Test No. 1 resulted in a confirmation that dispersant could be injected into the plume at the source

without complication. It also provided qualitative observations of SONAR images taken before and after the dispersant injection, indicating that the density of the plume at depth was diminished. Overall results were difficult to interpret given the unique application of the technology, which was not calibrated. During Test No. 1, samples of the plume prior to and during dispersant application were not collected. Observers could not perform aerial observations of the test dispersed plume at the surface due to weather and visibility problems.

In addition, the captured video of the operation did not demonstrate the effectiveness of the oil dispersion. Observers requested a subsequent test with criteria for monitoring and sampling, which the RRT authorized on May 1, 2010.

The RRT approved a second test that included taking four samples at various depths. The RP did not apply aerial dispersants during the sub-surface test. The aerial observation of the spill

area did document oil on the surface before and after the sub-sea dispersant application at depth. The second test used 13,000 gallons of dispersant. The RP collected samples of the non-dispersed oil and the dispersant and oil mixture at depth. Of the four samples, two were fouled and were not collected. The remaining samples had a very small amount of oil and water. Weather conditions offshore hampered aerial observation. Test No.2 proceeded without aerial observation, and intermittent pumping continued until May 3. Aerial over flights resumed on May 4 and 5, but were inconclusive, highlighting the need for additional data. Because of the sampling problem and the lack of aerial visual assessment, EPA requested a meeting with the Environmental Unit located at Robert, La. The meeting was to obtain consensus on the way forward with respect to sub-sea dispersant use.

NOAA and Coast Guard representatives met with EPA representatives on May 7 to discuss the sub-sea dispersant operation. The discussion encompassed concerns, hindrances to the tests, and the monitoring plan.

Both operational tests were conducted during periods of bad weather that hampered the injection of the dispersant at depth and visual monitoring of the results. In addition, there were several delays due to mechanical failures of the wand used to apply the dispersants, and the availability of ROVs to conduct the test. The second test included the injection of 13,000 gallons of dispersant and lasted several hours longer than anticipated. Again, monitoring of the test visually or by SMART was not possible due to adverse weather—all of which contributed to concerns about whether to proceed with sub-sea dispersant application.

The agencies also discussed sub-sea dispersant operations monitoring plan. The parties agreed to work together to ensure that the sub-sea dispersant operation was effective and that robust toxicity testing took place. Additionally, the EPA and Coast Guard issued the RP a directive to construct and establish a monitoring plan for any further application of sub-sea dispersants. EPA, NOAA, and Environment Canada scientists continuously monitored the area in accordance with the dispersant directive, to ensure dissolved oxygen and toxicity tests remained within the defined parameters established by the EPA and NOAA.

The Dispersant Use Directive and the Decision to Approve Sub-sea Dispersant Application

On May 9, 2010, the FOSC and EPA outlined the initial monitoring requirements for sub-sea use of dispersants and signed their first directive. It paralleled the development of an adaptive monitoring process created within the Environmental Unit, and principally with EPA and NOAA. The directive included requirements for monitoring oceanographic data such as temperature and oxygen concentration, detection of dispersed oil concentration using a fluorometer system, collection of water samples at depth to assess oil concentrations, and biological assessment to rapidly screen observed dispersed oil toxicity. Oil concentration assessments also included tests for volatile organics, such as mono-aromatic hydrocarbons, and semi-volatile organics such as polycyclic aromatic hydrocarbons (PAHs).

On May 10, 2010 a third sub-sea dispersant test was requested and approved after a monitoring plan and shutdown criteria were developed by the RP in concert with the Environmental Unit at the UAC. Test No. 3 included use of a monitoring vessel on site during the test augmented with staff members from NOAA, EPA, and Environment Canada. The test collected samples for evaluation on board ship as well as laboratory analysis. The test demonstrated oil dispersion at depth.

On May 14, 2010, the RP submitted a plan to continue to use sub-sea dispersants. Because of the tests, EPA, Coast Guard, DOI, and NOAA gained concurrence through the RRT VI on May 15. With the consensus of the NRT, the FOSC proceeded with the use of sub-sea dispersants. On May 15, the FOSC approved the RP's plan and issued an addendum to the first dispersant directive requiring additional dispersant monitoring. A total of 771,000 gallons of Corexit 9500A were injected sub-sea during the response.

Implementing the Decision to Use Sub-sea Dispersants

During the evolution of sub-sea dispersant use, the UAC established an Environmental Unit in Robert, La., to assist the FOSC. It quickly grew to include a wide range of federal, state, and industry scientists and representatives to coordinate elements of the sub-sea dispersant discussion. The Bureau of Ocean Energy Management, Regulation, and Enforcement provided data based on

environmental impact studies and reports generated as part of the exploration and permitting process. The NOAA SSC was a member of the Environmental Unit, a leader for these activities, and functioned as a direct environmental consultant to the FOSC.

The Operations Section coordinated the primary responsibility for all sub-sea dispersant implementation and engineering development. The Environmental Unit initially focused on assessing the environmental trade-offs and providing the FOSC with guidance. By default, and given the expertise assembled, the Environmental Unit directly coordinated much of the operational monitoring for sub-sea dispersant use and evaluation. Based on NOAA recommendations, ICP Houma established a separate Sub-surface Monitoring Unit (SMU). However, the two groups maintained strong links throughout the response. EPA was an active participant in all discussions relative to the use of dispersants, and a member of both the Environmental Unit and the SMU. By the end of the summer, the combination

of these activities characterized the *Deepwater Horizon* response Sub-surface Monitoring Program.

The Environmental Unit also collaborated with the Operations Section and Source Control on sub-sea dispersant issues in an effort to assess effectiveness and proof of action, especially

during the initial trials and sub-sea dispersant tests. If the application of dispersants at the source were not successful or did not result in observable reduction of oil reaching the surface, then the continued trade-off discussions and evaluations were moot. The data gained from the proof-of-concept testing provided valuable information and initial confirmation as to how the dispersants physically changed the transport of the oil. These were important elements in assessing overall trade-off risks and providing the FOSC and the RRT with the best information to proceed with a final discussion about the merits of sub-sea dispersant use.

Command and control of sub-sea application assets for sub-sea dispersants use was accomplished from ICP Houston under the direction of source control via an Offshore Supply Vessel (OSV). When sub-sea application was authorized, an order was issued

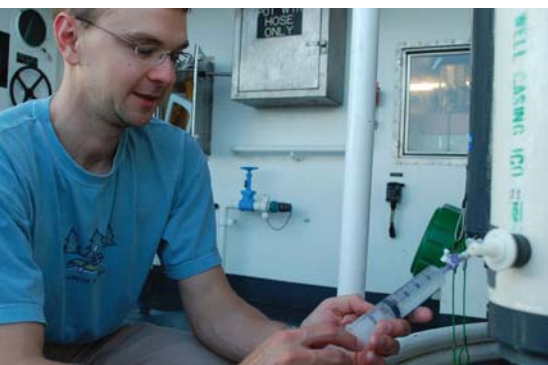
from the FOSC directly to the RP source control representative at the UAC and then to Houston. This information was then passed on to the OSV to begin and cease operations. The RP delivered dispersants either via portable tanks by an OSV on site, or by placing dispersants into integrated tanks on board the vessel. Port Fourchon, La. served as the base for monitoring vessels. When monitoring vessels arrived at the site, they always had an EPA or NOAA representative on board for data quality control purposes.

Impact Assessments and Considerations for Sub-sea Dispersant Application

Possible impacts and benefits to endangered species were included in the evaluation process. The only listed Gulf species known to swim at great depths is the sperm whale in search of giant squid. The Environmental Unit therefore placed particular focus on threats to sperm whales. Discussions included the effects on whales diving through dispersed oil in deep water or consuming squid that may have been exposed to deep water dispersed oil plumes. It was determined that risks to these animals were greatest at the surface, not in deep water.

Trade-off evaluations from an environmental perspective continued throughout the response with new information collected by the monitoring program. Understanding the transport, or movement, of dispersed oil was important in assessing the effects of dispersed oil originating 5,000 feet below the water's surface. The deep waters of *Mississippi Canyon 252* were very much a separate body of water when compared to the surface above. Much less information was readily available to assess possible effects of dispersants and oil in the deep.

The Gulf of Mexico is like two seas, one above the other, and each with its unique currents and ecosystems. The currents, water movement, and physical mixing mechanisms are different between the upper and deep sea. This is also true for temperatures, pressures, ecosystems, and marine life that inhabit the deep-water world. Unlike the warm, well lighted, mixed surface layer between zero to 700 feet, the deep sea is cold and dark, with mixing occurring only where currents intensify due to sub-sea terrain features. A density interface exists between the surface and deep sea. Scientists expected that interface to prevent movement of a dispersed oil plume above this depth, except at locations of upwelling that were much closer to the continental shelf than the wellhead.



The Chief Scientist on the NOAA research vessel PISCES works as part of the Unified Area Command's Subsurface Monitoring Unit. The PISCES completed a 10-day mission in the northern Gulf as part of the Deepwater Horizon response. Photo courtesy of NOAA

Natural oil seeps and methane vents are known processes of the deep-water world. The presence of natural seeps, and the understanding the deep sea had adapted to those oil releases, were factors in environmental trade-off discussions.

Initial trade-off discussions required extrapolation and hypotheses based on the use of dispersants in mixed systems, such as the surface waters in the open and previous laboratory and wave tank studies. These studies were not intended to assess deep-water conditions. There had been only one deep-water controlled release study, which took place off the Norwegian coast and did not include dispersants. The environmental trade-off discussion at the UAC did not have the benefit of examining impacts of dispersant use during deep-water spills. The Norway experiment provided information regarding spill models for deep-water blow-outs; thus the study offered a foundation for the initial transport discussion.

The Environmental Unit contacted the scientists directly involved with the Norway experiment to assist in the *Deepwater Horizon* response. Use of sub-sea dispersants required actual observation monitoring to lessen uncertainties. The entire process was managed by a strategy that continuously looped observations and new information directly into the continued decision-making process. Scientists incorporated the terms ‘adaptive management’ and ‘adaptive monitoring’ as requirements for sub-sea dispersant use. Sub-sea dispersant data collected underwent continual evaluation in relation to the trade-off justifications for approval and continued support by the FOOSC. Monitoring was adapted to new concerns identified by responders and stakeholders, and to better data collection methods.

Implementation of Addendum 3 to Reduce Dispersant Application

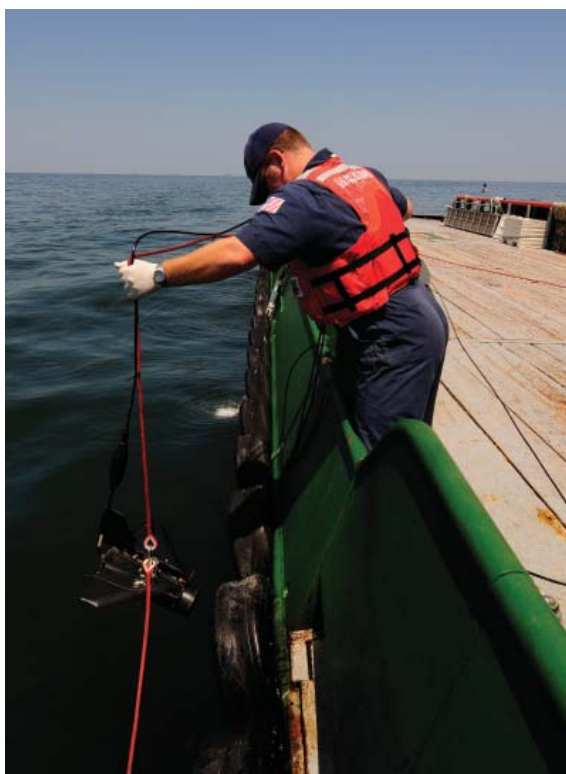
As noted above, on May 26, 2010 the FOOSC and EPA jointly issued Addendum 3 to the May 9 Dispersant Use Directive. This addendum significantly impacted aerial, surface, and sub-sea dispersant operations for the remainder of the response. Addendum 3 was specifically aimed at reducing the amount of dispersants used, and was intended to focus RP efforts on the use of other available response methods, including booming, skimming, and in situ burning, rather than dispersants alone. Addendum 3 placed dispersants in a category for use as a last resort. The directive required the RP

to request an exemption from its general prohibition on dispersant use in order to use dispersants. Addendum 3 achieved the desired effect: the RP focused on all response options and the amount and frequency of dispersant use dropped (see Figure 3.6).

After May 26, the FOOSC, in consultation with RRT VI, was empowered to consider granting exemptions from the dispersant use restrictions imposed by Addendum 3 for two reasons. First, the FOOSC and RRT VI could permit sub-sea and vessel surface application of dispersants based on a documented need to control Volatile Organic Compounds in the vicinity of the vessels working to control the source at the well site. Second, the FOOSC and RRT VI could grant an exemption to allow aerial dispersant application based on a FOOSC assessment that, given weather conditions and response resources available, aerial application was the only means to address a significant accumulation of oil on the surface before the oil moved into more highly sensitive environments.

The directive also outlined data collection and documentation requirements that the RP was required to meet for sub-sea dispersant use and approval.

Two elements of the directive were go or no-go indicators, and required daily evaluation for approval of continued dispersant use. The first



GULF OF MEXICO – A U.S. Coast Guard Petty Officer lowers a fluorometer into the Gulf of Mexico. The instrument collects water samples and data to help determine the effectiveness of dispersants in breaking down the oil. Photo courtesy of U.S. Coast Guard

element measured oxygen concentration, which could not drop to a hypoxic level, or below two milligrams per liter. The rotifer assay, the second element, could not show significant toxicity relative to background. The intent of the test was to provide a qualitative indicator to the scientists evaluating the field data (80 percent rotifer survival rate). These elements did not fail the criteria at any time during the monitoring. The application of a direct toxicity assay on living organisms provided the FOSC with another source of field data regarding potential threats. For sub-sea monitoring, a standardized rotifer test was used. The test exposed microscopic invertebrates (rotifers) that are sensitive to chemical hazards, to water collected from the dispersed plume. Rotifer survival rates were then compared to those exposed to background water versus impacted water.

Surface Application of Dispersant After Addendum 3

After adopting Addendum 3 and until the source was secured, the RP was compelled to request the use of surface dispersants due to health and safety concerns of personnel working on board vessels drilling relief wells, and the work that was continuing on the LMRP at the source. Each of these working vessels contained monitors and alarms to stop work when volatile organic compound readings reached above the threshold limit value of benzene (five parts per million (ppm)). Benzene is a known carcinogen. When vessels were close to the source control applied dispersants, the reduction in VOCs was significant. Based on data received from ICP Houston, readings were at times well above 200 ppm.

High levels of VOCs were more than a respiratory hazard, they were also a significant fire hazard. The events that drove increases in VOCs were not simply a result of oil flowing from the well. Even when RRT VI allowed sub-sea dispersants, weather, specifically lightning strikes in the area of the small city of vessels tethered to the well, required cessation of on-deck activities, including those necessary to operate the sub-sea dispersant applicator. Thus, a thunderstorm near the well site could lead to a dramatic increase in VOCs on the surface soon after the storm passed. As a result, in accordance with Addendum 3, the FOSC routinely allowed the RP to use surface dispersants to control VOCs at the source, in order to protect the health

and safety of workers. EPA conducted air monitoring that confirmed that the use of dispersants had lowered VOC levels.

Aerial Application of Dispersant After Addendum 3

ICP Houma implemented a decision flow process to request the surface application of dispersants only when a slick moved beyond the recovery capacity of skimmers and in situ burn task forces, or when skimmers and in situ burn task forces could not operate due to weather conditions, making shoreline impact of highly sensitive environmental areas inevitable. Dispersing the oil in deeper Gulf of Mexico waters, which are rich with oil-eating bacteria, was determined to be preferable to risking shoreline impact in sensitive environmental areas such as pelican nesting sites.

Additional Activities of Note Related to Dispersant Operations

Conducting such deep-water oceanographic assessments and monitoring a mile below the ocean surface required highly sophisticated equipment. It also required vessels capable of properly deploying sensor packages and water sampling equipment. Highly trained scientists and technicians were sought to conduct monitoring, maintain equipment, and interpret data collected. The RP selected the merchant vessel *Brooks McCall*, and adapted it as the sampling platform for the initial oceanographic monitoring cruise. Federal employees and contractors integrated with RP scientists and technicians to ensure the process fully incorporated federal oversight and validated all data.

In late May 2010, LSU assembled an external workshop to evaluate the known information and initial monitoring data. With its findings, the workshop would provide the FOSC additional guidance on the role of dispersants specific to the *Deepwater Horizon* response. There was consensus from the LSU meeting that, up to that point, the use of dispersants and the effects of dispersed oil into the water column had generally been less environmentally harmful than allowing the oil to migrate on the surface into the sensitive wetlands and near-shore coastal habitats.

The LSU workshop confirmed that oxygen, a key monitoring criterion, needed continual monitoring. Oxygen is required for microbes to degrade oil and

for most marine life to survive via respiration. Scientists initially believed there was sufficient oxygen in these waters. However, the demand on oxygen caused by degradation of dispersed oil at depth was unknown. Biodegradation is slower at cold temperatures, potentially reducing oxygen availability in the deep-water ecosystem. Therefore, what may take days in warm surface water may take weeks, months, or longer in deep cold water. The deep Gulf contains microbes that have the ability to degrade oil, as observed in seep communities. The concern was the possibility of overloading the deep-sea system and dropping oxygen concentrations to levels that created a dead zone like those which naturally occur off the Mississippi Delta. The monitoring and sampling protocols in place throughout the response helped document that these potential risks and concerns would not materialize.

Trade-off discussions throughout the response also included the impact of additional carbon loading. This concern arose from the additional methane entering into the deep-sea system. The deep-sea food web depends on organic carbon that drifts down from the upper sea and surface. This suggested the ecosystem could accommodate and process oil droplets once the oil toxic compounds dissolved out of the oil droplets or degraded. However, larger PAHs that might have persisted for long periods in the colder water environment could adversely affect very early life stages of fish. No mechanism was in place to assess this during operational monitoring. Input from the scientific community, damage assessment process, and long-term studies would be required to fill data gaps. Oil in the sea was an environmental threat, dispersed or not. The goal of the response was to manage the response strategy to reduce the overall impact of the spill.

The FOSC concluded, based on the continued review of guidance, that the potential environmental benefits in this spill justified sub-sea dispersant use within the parameters established. This determination came in part because the long-term environmental impacts to the near-shore and estuarine environments were well known, and other response options were limited at this stage of the response.

Monitoring for Effects

The FOSC continually enhanced the monitoring process of the response, which included the number of vessels deployed and addressed new and broadening questions (such as the presence and fate of any additional oil in the offshore environment that might be subject to a removal action). On August 3, 2010, the National Incident Commander issued a directive requiring that *Deepwater Horizon* monitoring and assessment activities be broadened to assess any residual oil pollution that would require removal. This implementation plan required enhanced sampling in three spatial domains, including:

1. Near-shore: from the marshes and beaches to 3 nm offshore,
2. Offshore: from 3 nm to the shelf break, or the 200 meter depth contour, and
3. Deep water: from 200 meter to 2000 meter water depth.

The wellhead was in 5,000 feet of water. Monitoring results and trajectory models for the deepwater layer, where oil and residual oil contamination had previously been detected, guided sampling in deep waters. The directive required enhanced sediment sampling, particularly on the continental shelf and in deep environments. The directive also required the FOSC to expand interactions with the academic community.

To fulfill this requirement, NOAA hosted a series of three listening sessions with the academic community during late August and early September. Each session focused on the sub-surface monitoring plan and collected feedback from the community to ensure the plan did not miss any essential pieces. Many academic vessels on scene participated in the daily mission guidance calls. Engaging the academic community through real-time maximized vessel time and sample location. Some academic vessels accommodated a NRDA sampler, or data processor, which allowed real-time data collected to be added to the sub-surface monitoring data. NOAA also enlisted numerous academics as the Chief Scientists on cruises. The communication allowed for collaboration between the needs of UAC and the ongoing research. The



GRAND ISLE, La. – NOAA personnel collect water and sediment samples off the coast of Grand Isle State Park in the Gulf of Mexico to test for oil and dispersant levels. Photo courtesy of U.S. Coast Guard

SMU, in coordination with NOAA and National Science Foundation, employed an academic liaison at the UAC.

As a result, the UAC extended and focused monitoring activities to address the specific elements of the directive. The directive in many ways defined and validated activities that had already been expanding in the monitoring program. Eleven ships were directly or indirectly under the FOSC's coordination and control as part of the Sub-surface Monitoring Program, including three NOAA research vessels. In addition, seven university vessels conducted cruises and research associated with the oil spill and coordinated with the submerged monitoring unit (SMU).

The degree to which monitoring was conducted at the direction of the FOSC in the Gulf of Mexico waters was unprecedented. It provided actionable information and documentation to assess and determine the location, fate, transport of oil, and dispersants. The FOSC also instituted a multi-agency Operational Science Advisory Team (OSAT I) at the UAC. The mission of OSAT I was to provide assessment and analysis of the data collected by the Sub-surface Monitoring Program and to inform the FOSC for the need to conduct any additional monitoring or response actions. During the course of the response, over 17,000 samples collected underwent environmental review by OSAT I per the monitoring requirements defined in the May 9 and August 3, 2010 directives. The last samples collected as part of the Sub-surface Monitoring Program occurred on October 23, 2010, nearly two and a half months after the leak had been stopped.

Oceanographers from NOAA provided data they used for oil trajectory and shoreline threat probability modeling. Besides collecting urgently needed information, BOEMRE modified and extended research studies already under way at the time of the spill. The *Lophelia II* expedition, Loop Current monitoring, socioeconomic studies, and others provided data to help evaluate the impacts of the spill.

Challenges to Dispersant Use

Dispersants are monitored by using the SMART protocol, which measures dispersant effectiveness, not its effects. Before the *Deepwater Horizon* spill, Self-Monitoring, Analysis, and Reporting Technology (SMART) had been effective, and dispersant

use research revealed little or no harmful effect to the environment in the numerous cases where it had been deployed in the United States. Because of the unprecedented volume of dispersants applied to this spill, the SMART protocol was amended to include effects monitoring. The amount of data generated by normal SMART procedures and the new requirement for effects monitoring was enormous, and quickly generated a significant data management requirement. In addition, effects monitoring is not real-time, so there was significant delay in data availability. There was also disagreement on proper monitoring and interpretation of the data. This lack of supporting data fueled uncertainty on the effects to the environment.

End of Dispersant Use

The well was capped on July 15, 2010. The last use of dispersants took place on July 19. The last sighting of recoverable oil offshore was observed August 1. The volume and duration of dispersant use during this response were unprecedented and included surface and sub-sea applications. The amount used caused public concern and led to the reduction in the frequency and amount of dispersant. However, dispersants were an effective response tool, and prevented millions of gallons of oil from impacting the sensitive shorelines of the GOM states. This response tool made it possible to continue source control efforts by the vessels operating at the well site, and were used when other response options were not suitable.



GULF OF MEXICO-Dark clouds of smoke and fire emerge during a controlled burn in the Gulf of Mexico. Photo courtesy of U.S. Navy

3.3 In Situ Burn Operations

Due to the enormity of the release, initial skimming assets were not sufficient to contain and collect the surface oil. On April 26, 2010, the use of in situ burning in the response was proposed. As part of its laboratory analysis, NOAA tested the combustibility of MC 252 oil, to ensure it was amenable to burning activities and to determine on what scale this technique could be applied. Between April 28 and July 19, 2010, the Controlled In Situ Burn (CISB) Group under the Offshore Operations Branch of ICP Houma conducted 411 burns, removing five percent of the 4.9 million barrels of discharged oil. Burn Task Forces conducted burns within the specified and approved CISB Burn Area, typically within three to eight miles of the *Mississippi Canyon 252* oil spill source.

RRT Region VI published an In Situ Burn Operations Plan in 1994. The plan specified how to determine when to conduct in situ burns, how to conduct them, interaction with other response activities, the ignition process, and residue cleanup procedures. The plan also required safety and health monitoring, operational monitoring, effectiveness monitoring, and guidelines for use of the Vessels of Opportunity (VOO). The One Gulf Plan and ACPs referenced the RRT Plans. In order to fulfill the criteria of the RRT VI Pre-Authorization for in situ burning, the NOAA SSC helped implement the SMART in situ burning monitoring protocols for the first test burns. Coast Guard Strike Team personnel deployed with in situ burning monitoring equipment to an offshore platform approximately 13 miles southwest of the planned burn site. This was the closest location where non-responding personnel were located. SMART in situ burning monitoring protocols are designed to protect the general population and response workers from smoke particulates. SMART sampling revealed no detectable particulates in work zones and population centers.

Additionally, NOAA worked with the National Atmospheric Release Advisory Center (NARAC) to model potential plume releases from in situ burns. It was determined that the offshore location (a great distance from any populated areas) and atmospheric conditions would not pose a problem to the general population from particulates from the burns. SMART monitoring was not required for further burns.

Overview of Operations

In late April 2010, in accordance with the existing in situ burn plans, the OSC determined in situ burning was a viable response method for several reasons. First, weather and sea-state did not allow continuous skimming and the response needed alternatives to these methods. Second, skimmers and dispersants could not completely remove the oil releasing from the well. Finally, the OSC determined in situ burning was a safe and effective way to remove large volumes of oil from the ocean surface, based on in situ burn data from previous spills.

Over the course of the CISB Group's operations, the team grew from five people to a 264-person group. At the peak of operations, the CISB Group had three task forces, utilizing 43 vessels and two twin-engine aircraft. Each task force had a three-vessel ignition team, two task force vessels, one supply vessel, a safety team, and five two-vessel fire boom teams. The fire boom team vessels were VOO from the Houma. Coast Guard personnel, technical advisors, oil spill contractors, commercial fishermen, NOAA, and EPA representatives staffed the CISB Group.

Personnel in each task force underwent training prior to engaging in situ burning operations. The training was a combination of four hours classroom and 12 hours on-water instruction. Some of the teams had underway practice days as well.

VENICE, La. – An igniter package is being placed in oil contained by fire boom in the Gulf of Mexico in order to ignite an in situ burn near the Deepwater Horizon oil spill site. Photo courtesy of U.S. Air Force



Offshore Vessel Fleet

Two spotter planes provided continuous air observation for offshore in situ burning operations. To facilitate identification and communications with the spotters, the fire boom teams color-coded vessels using different colored tarps suspended over the back deck of the boats. In addition, the CISB Group used the Automatic Identification System (AIS) to identify the offshore burn vessels from the air and confirm their positions.

Safety and air monitoring personnel manned the lead boat (one of two) for each fire boom team, which included fishing vessels. With the exception of adverse weather days, the in situ burning Task Forces and all support vessels

were available on location by daybreak each day. Throughout each burn day, spotter aircraft guided fire boom teams to the heaviest concentrations of oil. Using two King Air fixed wing spotter planes flying two sorties each, the in situ burning Technical Advisors, Spotters, and Documenters were able to stay on location for approximately two and one-half hours before returning to Houma Airport for fuel. To get more spotting time coverage, the team attempted to fly soon after sunrise and late in the evening. The CISB Group learned from these efforts that the angle of the sunlight determined the effectiveness of spotting and thus flights early in the morning and late in the day proved not as useful.

Simultaneous Operations

The Offshore Operations Branch of ICP Houma managed an integrated response using mechanical skimming, aerial dispersants, and controlled in situ burning to address approximately 16 percent of the total oil discharged from the Macondo Well. They safely managed high-risk operations to optimize oil removal for more than 40 to 50 miles offshore. In addition, the Operations Branch protected source control efforts at the well site using zone defense and a command and control vessel, merchant vessel *Seacor Lee*, to help coordinate removal operations.

The in situ burning task forces had to perform operations simultaneously with both the mechanical

skimming teams and the dispersant group. The CISB Group originally used a burn box to place a boundary around the burn operations in accordance with the RRT in situ burning plan. Over time, the burn box was replaced by a burn circle. This allowed CISB Task Forces to cover greater areas because their turning radius conformed better to a circular rather than a box pattern.

Once on station, spotters circled the area observing oil concentrations and vectoring fire teams to the oil. A log of events (times of arrival and departure for the spotter aircraft, times of ignition, durations of burn, etc.) was contained in the ICS 214 forms recorded for each burn day. Operations moved through heavy patches or long streamers of oil (without deflection), and then ignited the oil once a sufficient amount of oil was contained within the fire boom. By late July 2010, the oil was more weathered and igniting became more challenging.

Wildlife Monitoring

Burning effectively removed large amounts of oil, approximately 265,450 barrels, from the sea surface, but had potential trade-offs with air quality and wildlife, most particularly turtles. Beginning July 5, 2010 trained and qualified protected species observers were placed within each in situ burning task force to monitor for any sea turtles present within the fire boom area prior to ignition. The observers did not spot turtles in or near fire boom during the period of time when they were deployed on the burn vessels.

Safety and Smoke Plumes

Attention to safety was always paramount. There were no injuries or illnesses resulting from the burning operations. Vessels downwind from the plume easily removed themselves from paths of exposure. The SMART monitoring results indicated no health impacts to the burn group members. There were some readings generated by the fire boom pumps used to water-cool the fire boom. This was easily remedied by moving the pumps from the front of the vessel to the rear.

The Coast Guard directed air sampling for dioxin, a known carcinogen by-product of burning operations. With the assistance of the Environmental Protection Agency, extensive sampling was performed. Results indicated no dioxin threat to workers and GOM residents.



GULF OF MEXICO – Two fishing vessels drag an oil boom after trapped oil is set ablaze in the Gulf of Mexico as part of a controlled burn to aid in preventing the spread of oil. Photo courtesy of U.S. Navy



GULF OF MEXICO – A controlled burn in the Gulf of Mexico is monitored by members of industry and Coast Guard Gulf Strike Team personnel. Photo courtesy of U.S. Navy

In the course of the 411 burns at sea, responders only intentionally extinguished two. The first occurred with the longest burn of 11 hours and 48 minutes. Although continuing to catch oil and feed it into the fire boom, crews began to show signs of fatigue. They intentionally extinguished the fire by increasing towing speed, which caused the oil to wash over or entrain under the boom. This thinned out the oil, which caused the fire to extinguish.

The second occurred when a very large area fire spilled out of the containment boom, and continued to grow in size and intensity while moving across the three-mile buffer zone around the source control efforts. The crews of the source control vessels were concerned that the fire was encroaching on the three-mile buffer between the source control vessels and this particular burn. While the CISB determined the burn was still within safe parameters, the crews extinguished the fire. This took approximately 90 seconds to accomplish.

Mega Volume Burns

The CISB had their best burns on June 18, 2010. A total of 16 different burns were conducted with an estimated 50,000 to 70,000 barrels of oil consumed. The seas were unusually calm, which provided optimal conditions for burning. Some burns extended outside the fire boom containment, but were allowed to continue to burn because they did not spread significantly.

Burns were sustained by using aircraft to direct Task Forces into streamers of oil that could feed the fire. There was concern that the fire could travel up the boom toward the towing vessels. Careful monitoring

and regulation of towing speeds ensured the fire stayed well within the towed boom configurations. Because of the condition of the oil (weathered and emulsified), feeding of oil into an existing burn was safe and effective. The fire remained within the fire boom and downstream of the towed boom configuration. The CISB was able to burn some emulsified oil, which by itself is not burnable, by towing existing oil fires into emulsified oil patches.

The CISB expansion to two task forces with five fire boom teams each required 10,000 feet of fire boom available at all times. To accomplish this, CISB received boom from South America, Alaska, and Algeria. One boom design with continuous inflation chambers sank several times during operations and was therefore determined to be unusable and potentially a safety risk. The three main types of fire boom, water-cooled, stainless float, and ceramic, all lasted well beyond expected service life. The most destructive action related to the boom occurred when crews attempted to remove a used boom from the water, as the stresses of a crane lifting usually resulted in damaging a boom beyond repair. Early burns revealed that in most cases, fire boom lasted longer than expected, even though fires destroyed between 400 and 500 feet daily.

This was the largest in situ burn operation in U.S. history. The burns conducted during this operation dramatically exceeded any previously documented in duration and in magnitude.

Burn Volume Calculation

Controlled In Situ Burn Summary volume calculations for each burn included a minimum and maximum estimate. The minimum volume estimate was based on the lower of any multiple air and

GULF OF MEXICO – Vessels of Opportunity pull oil into a fire boom in a controlled burn with a second controlled burn visible in the distance. Photo courtesy of U.S. Coast Guard





GULF OF MEXICO – Oil is collected in skimming boom attached to the U.S. Coast Guard Cutter Elm operating approximately 21 miles off the coast of Perdido Key, Fla. Photo courtesy of U.S. Coast Guard

surface estimates of burn size, the duration of burn, and a burn rate of 0.05 gallons per minute (gpm) per square foot—the rate commonly associated with the controlled burning of crude oil that is 25 percent to 40 percent emulsified. The maximum volume estimate was based upon the higher estimates of burn area, the duration of burn for each of those areas, and a burn rate

of 0.07 gpm per square foot—the rate commonly associated with the burning of oil that is 10 percent to 20 percent emulsified.

3.4 Skimming

During the *Deepwater Horizon* response, skimming was a key measure taken to contain, capture,



recover, and remove oil from the environment. Skimming operations covered a wide geographic area. Hence, skimmers were a critical resource that required strategic management to ensure sufficient capability was available at the right time, in the right place, and with the right support to achieve the best effects. Skimmers were employed in three types of geographic zones offshore, near-shore, and beach, bays, and marshes. Skimmers were also placed inshore, in protected waters.

Figure 3.8: Geographic skimming areas

The UAC through the ICPs employed a layered approach to oil containment and recovery. The most effective response method was containment of the leak at the wellhead and the recovery and flaring of the captured oil and gas. Beyond this, the team employed a combination of sub-surface dispersant use, in situ burning, targeted surface

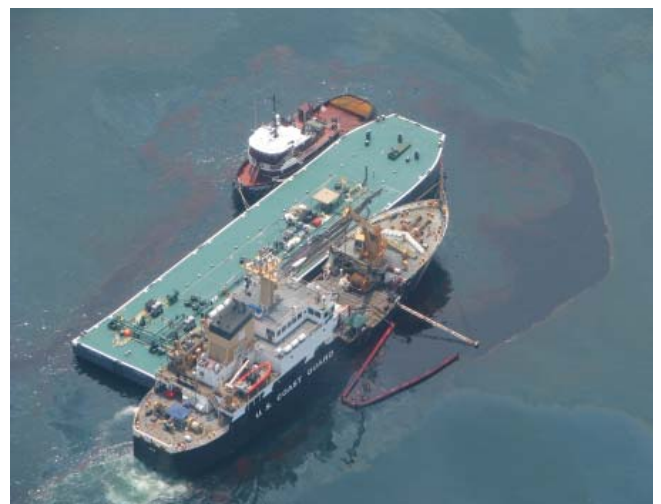
dispersant application, and skimming to minimize shoreline impacts. The recovery operation of last resort was shoreline cleanup.

A skimmer is defined as any mechanical device specifically designed for the removal of oil (or oil and water mixture) from the surface of water without altering its physical or chemical characteristics. A skimmer's performance is measured by the rate at which the machine recovers pure oil from an oily environment, the recovery efficiency (relation between recovered oil and recovered fluids), the throughput efficiency, and the relation between recovered oil and encountered oil. A skimmer's performance is affected by:

- The type of oil,
- The condition or maturity of the oil,
- Oil viscosity,
- The oil slick thickness, the presence of debris (e.g., driftwood, seaweed), and
- The environmental conditions including wind, wave, current, and the current air and sea temperatures.

Although skimmer effectiveness could vary dramatically based on all of these factors, given the indeterminate nature of the *Deepwater Horizon* spill, aggressive skimming was a key component of the success of this response.

There were several vessels and vessel systems used to skim free floating oil offshore. These included Oil Spill Response Vessels, Coast Guard Buoy Tenders equipped with Spilled Oil Recovery



GULF OF MEXICO – The Coast Guard Cutter Oak skims thick brown oil off the coast of Alabama. Photo courtesy of U.S. Coast Guard



MOBILE BAY, Ala. – A Vessel of Opportunity sets up its equipment as it prepares for oil-skimming activities in the Gulf of Mexico. Photo courtesy of U.S. Coast Guard

Systems (SORS), vessels equipped with Vessel of Opportunity Skimming System (VOSS), and fishing vessels equipped with boom and skimmers as part of the VOO fleet. OSRVs are designed and built specifically to recover spilled oil. These vessels have temporary storage for recovered oil and have the ability to separate oil and water aboard ship using oil-water separation systems. To sustain cleanup operations, most OSRVs transfer recovered oil onto other vessels or barges. VOSS are self-contained systems that include booms, skimmers, pumps, and temporary storage devices that are placed on vessels of sufficient size to deploy the equipment safely. SORS equipment includes boom, pumps, skimmers, and storage that are part of a Coast Guard Buoy Tender equipment package, available for use when needed and put away when not in use. Finally, commercial fishing vessels from the VOO fleet were reconfigured to carry boom and skimmers instead of nets. One of the biggest issues faced by the offshore skimming group was the offload of oil and oily water from temporary storage devices. The oil became very viscous, making the offload slow and difficult, and until a good method to offload the devices was found, this affected the ability to keep all assets skimming. It was important to understand the effect weathering and skimming had on the physical characteristics of the oil to determine the best temporary storage devices and ways to offload them in a safe and rapid manner.

By the end of April 2010, the UAC established a structured offshore branch comprised of 26 vessels capable of working in deep water, seven dedicated tugboats, and three offshore oil storage barges, which could collectively support and sustain long-term skimming operations near the source. From

early June through mid-July, the number of skimmers fighting oil in the Gulf increased to 593 and the UAC increased skimming and beach cleanup activities, and prepared to move to 24-hour cleanup and skimming operations.

Offshore

The offshore zone encompassed the area immediately above the source where fresh oil first emerged at the surface and outward to where the slick became broken and discontinuous. The extent of this area varied with wind, current, and wave conditions. The types of vessels sourced to this area were at least 50 feet long and equipped with high volume skimming capabilities, temporary storage, and crew accommodations to remain underway for an extended period. OSRVs and VOO Skimming Systems used in the offshore zone were large and required a lot of sea room to operate. The vessels' advancing speeds averaged one knot due to the limitations of towing boom in dynamic offshore waters. Some skimming systems were able to attain three to five knots due to their unique design and affinity for the type of oil spilled.

In the offshore zone, vessels typically encountered fresh oil, which then manifested in large, continuous brown oil slicks, some of which became emulsified. The offshore environment provided the best opportunity for skimming oil where it was abundant, fresh, and far from shore. This was the first line of defense for surface oil recovery. Given favorable skimming conditions—generally seas below six-foot swells and two-foot choppy waves—the number of skimmers in the offshore zone could be increased and directed to the heaviest concentrations of oil with aerial support to optimize recovery.

On April 28, 2010, Marine Safety Unit Morgan City requested immediate assistance from U.S. Navy Supervisor of Salvage and Diving (SUPSALV). SUPSALV equipment began arriving in theatre on April 29th, and SUPSALV continued to fill requirements offshore, near-shore and on shore until there was no oil their skimmers could recover in those zones.



HOUMA, La. – A sweeping arm skimming system fitted on a commercial vessel collects oil in the Gulf of Mexico. Photo courtesy of U.S. Coast Guard



GULF OF MEXICO – The Seacor Lee served as one of the command and control centers for the offshore Deepwater Horizon oil spill response. Photo courtesy of U.S. Coast Guard.

By late June, the *Seacor Lee*, a 280-foot Offshore Supply Vessel (OSV), became the command and control vessel for the offshore skimming fleet. The fleet consisted of twelve offshore skimming vessels and numerous small independent one- and two-vessel operators. The RP retained an emergency response management company to provide services via the offshore branch.

The *Seacor Lee* was large, stable work platform. The bridge was large enough to provide a separate work area for response workers and not interfere with the *Seacor Lee* vessel crew. The vessel had satellite Internet connectivity and wireless local area network. The RP contractor also provided four individuals as communications technicians who stood watch on the communications stack twenty-four hours a day. Almost all communication was VHF Marine Band radios and mobile phones using the oil field offshore networks. Email to those vessels was also available.



GULF OF MEXICO – Crew members from U.S. Coast Guard Cutter Harry Claiborne remove an oil covered boom that was part of a Vessel of Opportunity Skimming System. Photo courtesy of the U.S. Navy

Communication with response vessels only using VHF became a problem when they had to operate at distances greater than twelve miles from *Seacor Lee*—this included many of the smaller assets. The offshore fleet had to rely on relaying messages through several other vessels; this resulted in inefficient communications and misinterpreted instructions. The sheer volume of traffic on the VHF radio frequencies made communication difficult and garbled.

Roll call of all vessels was conducted at 7:00 a.m. when vessel assignments were relayed. The representative based assignment decisions on the information available from the aviation assets, observations taken from vessels operating in the area, and the guidance provided by the UAC. Wind

direction, sea state, and the movement of the oil due to tides and currents were important factors in the positioning of assets each day. The size and capability of each vessel was also a factor. Another dynamic was the on board storage and processing capability of the vessel. As the oil aged and became more viscous, the number of assets capable of removing that oil became limited. Removing oily water mixture from vessels and returning them to service was time consuming.

New skimming equipment, including the *Big Gulp* weir skimmer, was deployed offshore. Weir skimmers collect oil floating on the water surface via weir technology, a mechanical wall whose top edge is placed at the oil water interface to allow the oil to be separated by the water. Once collected, the oil transferred from the weir central sink by gravity or by pump to storage tanks. The *Big Gulp* was a converted barge that acted as a large-capacity skimmer. A tugboat guided the barge-turned-skimmer into a patch of oil, often near the spill site. Oil entered the skimmer through a big opening in the bow of the barge, gathering against a bulkhead and finally spilling over into a holding tank. From there, oil was pumped into two holding tanks, where gravity separated the oil from the heavier water. Crewmembers opened a valve, sending clean water back into the Gulf, while capturing a mix that was 98 percent oil. Similar barges worked in shallow waters and were called *Little Gulps*.

The Coast Guard owns and maintains pre-positioned VOSS equipment suites throughout the country at three spill response strike teams and at strategic sites within each Coast Guard District. The Coast Guard utilized the equipment suites in support of the response. There are 22 cleanup systems located nationwide to ensure a rapid first response to an oil or chemical spill.

Each Coast Guard VOSS consists of two of the following:

- Outrigger assembly with lifting davit,
- Sweep boom to collect the oil, DESMI 250 floating weir skimmer with diesel-driven hydraulic prime mover and control stand and air compressor to recover the oil,
- Submersible 6-inch off-loading pump, or
- Portable inflatable barges (26,000 gallons) to store the oil.

A *Whale* arrived in the Gulf of Mexico on June

30. *A Whale*, a 1,115-foot long supertanker, was retrofitted and converted into a skimmer in Portugal to assist in the *Deepwater Horizon* response. The vessel went through an extensive operational review by a multi agency team under the supervision of the Coast Guard. After an extended trial period during which the supertanker-skimming vessel was given an opportunity to demonstrate its capability to remove oil in open seas of the Gulf of Mexico, the FOSC announced on July 16 that it would not be deployed as a part of the *Deepwater Horizon* oil spill response. (See more detailed discussion in



GULF OF MEXICO - The converted tank ship *A Whale* conducts a test of its oil skimming capabilities on open water as part of the *Deepwater Horizon* response. Photo courtesy of U.S. Coast Guard

Alternative Technologies section of testing of *A Whale*.)

The crew boats available to the offshore skimming group were strained by the number of crew changes and vessel transfers conducted. These boats were older vessels—built in the 1970s—and generally were 75 to 90 feet long. They proved

too small and unstable to provide safe crossing between vessels. This made personnel transfers between vessels challenging and resulted in several aborted transfers for safety reasons. Some smaller vessels and assist boats were also older and not outfitted to sustain operations.

Near-shore Zone

The near-shore zone encompassed the geographic area just off the coast and out three miles where surface oil manifested itself in smaller, widely spread patches. The types of vessels sourced to this area were typically less than 50 feet long. Agile skimming platforms were more effective in this area because the vessels could quickly move between patches of oil. The vessels in the near-shore zone were equipped with weir skimmers or other types of skimmers appropriate for the oil encountered.

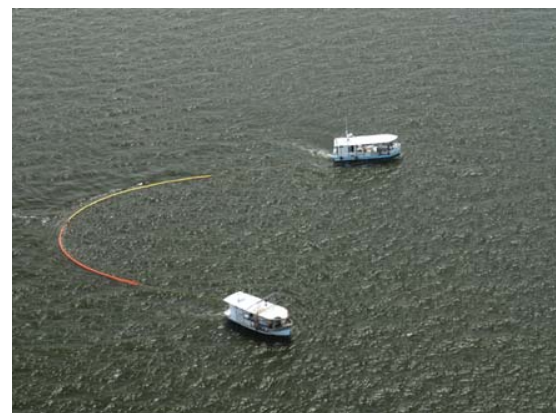
In the near-shore zone, oil manifested itself in a variety of ways, from bands of emulsion to racks of semi-solid tar balls and mats that combined with debris in bands. Response parties organized near-shore skimming operations into task forces that operated within branches along the impacted coastal

areas. In addition, the Coast Guard stationed the task forces in gaps between barrier islands to skim oil before it entered sounds where it could impact environmentally sensitive areas. Aerial observations provided directional targeting to maximize oil recovery.

In the early stages of the *Deepwater Horizon* incident, near-shore and inland Oil Spill Response Organizations (OSROs) mobilized extensive resources. Resources cascading into the Gulf region supplemented the robust OSRO network already in the region from all areas of the country. The majority of skimming assets owned by the OSRO community are designed for near-shore and inland environments. During the *Deepwater Horizon* response, much of the oil that reached the near-shore environment co-mingled with debris or was tar-like and difficult or impossible to skim. As such, many of the skimmers mobilized to the offshore sites were ineffective in removing this material. To retrieve oil, manual methods such as nets, pool skimmers, and absorbents were more effective for work in this environment.

By June, SUPSALV deployed 18 Marco Class V skimmers to conduct near-shore skimming operations in Pensacola, Fla., Panama City, Fla., Gulfport, Miss., Ship Island, Miss., Bayou LaBatre, Ala., Slidell, La., and Venice, La. Skimmers such as the Marco skimmers proved effective because the viscosity of the oil particularly suits the belt skimmers, and that the mobile skimming system could work both close inshore and offshore.

Nearshore and inshore skimming operations led to the design and use of the *Little Gulp*. The efficient design of the *Big Gulp* skimmer for offshore served as the template for design of *Little Gulp* skimmers. Used primarily in shallow water environs, like the *Big Gulp*, *Little Gulp* skimmers employed a barge design that transported oily water on board, and then separated the oil from water.



GRAND ISLE, La. - Two Vessels of Opportunity converted to oil skimmers conduct skimming operations in the waters near Grand Isle, La. Photo courtesy of U.S. Air Force

RIGOLETS, La. - A fishing vessel equipped with skimmers makes its way up and down the Rigolets as a precautionary measure to capture any stray tar balls. Photo courtesy of U.S. Coast Guard





HOPEDALE, La. – A concrete pumper has been converted into a shallow water skimmer and marsh washing system used to remove oil from the shoreline. Photo courtesy of U.S. Coast Guard

Beach, Bays, and Marshes

The beach, bays, and marshes zone encompassed a wide range of shoreline types in the inshore environment where water and land meet. This was the most diverse skimming operating area due to the varied combinations of shoreline type, accessibility, oil type, and sensitivity of the environment involved.

This zone sourced a variety of skimmer types, including vacuum, brush, oil mop, disc, drum, belt, and weir skimmers. The skimmers deployed from land or small vessels and barges in inaccessible areas.

Oil in this area occurred in a wide range of conditions, including highly weathered mousse and pockets of black oil, tar balls, and mats of weathered oil and sheens. Local conditions determined the method skimming equipment deployed to remove recoverable oil.

3.5 Shoreline Protection (Boom, Berms, Hesco)

Across the Gulf Coast, the current ACPs and other spill response plans were reviewed to determine if they contained incorrect or obsolete information. As a result, the UAC and ICP Houma worked with federal, state, and local stakeholders, including environmental subject matter experts to draft, approve, and implement the Unified Command Contingency Plan (UCCP).

They developed the UCCP during the spill to correct inconsistent or obsolete information contained in the current ACP, State Contingency Plan, and

Geographic Response Plans (GRP). The current plans contained inaccurate reflections of the land topography and the locations of critical resources because of recent hurricanes and storms in the region. In the UCCP, the UAC and ICP developed a tiered approach for the planning of and strategic use of boom quantities and its placement at the local level. The tiered approach as outlined in the UCCP included Tier 1–ACP, Tier 2–State Oil Spill Contingency Plan, and Tier 3–UCCP. The State On-Scene Coordinator (SOSC), the FOSC, the Responsible Party Incident Commander (RPIC), as well as eight of the 11 parishes along the Louisiana shoreline approved, signed, and implemented the final UCCP document.

The UAC utilized the UCCP as a tool for boom allocations across the area parishes and counties, as agreed upon by all parties at the time. The UAC also designated boom as a critical resource. The UCCP acted as a priority mechanism for boom placement at the branch level, once the UAC designated containment boom as a critical resource nationally.

The Coast Guard based booming planning strategies that took into account local currents, wind, sea states, and shoreline types throughout the response area. The overall shoreline protection strategy included skimming, mechanical oil removal, burning, applying dispersants near the source, detecting and skimming oil not contained or removed by other means at the source, and placing boom near-shore in attempt to keep oil from entering inland water passes. Skimming vessels deployed in a staggered formation from offshore to inshore waters, and air assets guided them to specific response locations. Shallow-draft skimming vessels removed oil that passed through protective barriers and reached inland waters. ACPs and the UCCP required that boom deploy with the purpose of shielding environmentally and politically sensitive areas and beaches. For the oil that reached beaches, work crews removed the oil using hand tools and beach cleaning equipment.

For shoreline protection, responders employed multiple near-shore booming tactics. Deflection boom was deployed near shorelines to deflect oil onto pooling areas and allow recovery from land. The deflection approach was utilized appropriately for higher current areas. Containment boom surrounded the collection areas created by the deflection boom. Once responders corralled the oil into a collection

area surrounded by containment boom, skimming vessels or portable skimmers—also known as vacuums—removed the product. Responders used isolation boom, also known as barrier or protection boom, in areas of high environmental sensitivity with very low or no current, such as within inland estuaries. They deployed it just off a shoreline or marsh area in an attempt to keep oil from reaching the sensitive areas. Responders took extra care not to disturb the environment when deploying boom into these areas. Most of this type of boom was never deployed unless the potential for oil contamination was identified in the area. Instead, responders staged the boom and made it ready for deployment if needed.

Across the response area in an effort to plug the potential gaps in the shoreline protection efforts, ICP Houma began utilizing ocean booming tactics and techniques in an attempt to ensure free-floating oil would not impact environmentally sensitive areas. The UAC's Critical Resources Unit, ICP Houma, together with individual states sourced, delivered, and implemented various types of shoreline protection strategies, such as the use of rigid pipe boom (deflection boom) and flexible boom placed between pilings and barges.

Upon completion across six Louisiana parishes and multiple counties in Alabama and Florida, more than 2,000 pilings were installed to hold rigid pipe boom and flexible boom to protect inlets, beaches, and marshes. Despite lighting and other visible markings, this strategy posed risks to boaters and kayakers operating near the pilings and fixed boom sections. Ultimately, the high currents in the passes, the lack of buoyancy in the weathered oil, and periodic heavy weather in the operational area defeated this type of protective barrier.

In contrast, some Florida counties used the strategy that followed the doctrine presented in the Coast Guard Research and Development Report entitled "Oil Spill Response in Fast Currents: A Field Guide" (CG-D-01-02). The swift water booming strategy was much less expensive and required no pilings or other permanent construction to operate. Responders staged deflection boom in a format that took advantage of the natural current and tidal flow to deflect the product into containment areas lined for removal. This booming strategy is illustrated in Figure 3.9.

Responders deployed large amounts of protection and deflection boom throughout the response

area. The protection strategy for St. Joseph Bay in Florida called for boom across the entire opening of the bay with several smaller sections of deflection boom positioned near the shipping piers for collection, and a final layer of protection boom stretched along the inner shoreline. Responders deployed most of this boom, but soon discovered that the boom did not protect from oil inundation but rather blocked the opening to the bay, and thus was impractical. Through the Mobile ICP, the UAC was able to revise the protection plan for St. Joseph Bay. The new plan employed VOO to tow collection boom with skimmers to collect any product reported in the area.

A final type of boom utilized throughout the response was snare boom. Instead of being a traditional protection or deflection type of boom, snare boom works by collecting oily residue much like a



common household mop. Snares are composed of multiple small oleophilic fibrous strands extending from a central point in a ball or pom-pom shape. The individual snares were then combined in continuous lines to form snare boom. The lengths of boom were then deployed along shorelines, marshlands, or in the water to absorb oily product. Snare boom is different from sentinel snares. Sentinel snares are crab trap-like devices that sit on the sea bottom tethered to a floating line. Attached to line at set intervals are pom-pom snares intended to mark the presence of oil. Sentinel snares were utilized in the water column as part of the sub-sea sampling and monitoring programs to help indicate the presence or absence of sub-sea oil.

JEFFERSON PARISH, La. –
A vessel places containment boom along Barataria Bay to prevent oil from coming ashore. Photo courtesy of U.S. Coast Guard

Figure 3.9: Swift water booming strategy eventually adopted for East Pass.



In addition to Piling Projects and boom strategies, the ICP utilized Tiger Dam to plug gaps onshore where boom could not be used to protect certain environmentally sensitive areas. Tiger Dam is a heavy, thick water boom consisting of three layers of water-filled tubes utilized to mitigate the extent of oil impacting shorelines. Tiger Dam protected shorelines in several locations throughout Louisiana, such as seven miles at the Southwest Pass and a seven-mile stretch near Grand Isle.

Once the assigned boom was deployed to the satisfaction of the ICP Operations Section and other vested parties, boats and crews spent time inspecting, tending, and replacing boom as needed. Air crews conducted daily over flights to survey the deployed boom. Results of the surveys were routed daily to the field for Operations personnel to conduct boom removal, replacement, and repair as

necessary. The use of aircraft significantly reduced the response time to tend or remove misplaced boom. After the wellhead was capped, operations focused on boom removal. Removal took several weeks, despite the many resources devoted to the tasks, including barges and cranes for boom storage. As part of the Florida boom removal process, the RP established a boom decontamination station in Port St. Joe, Fla. to clean non-oiled boom. Once clean, responders shipped the boom to an airfield in Tallahassee, where it was stored until it could be returned to its owner. The RP established other similar boom cleaning stations and storage facilities throughout the response area, such as the boom decontamination and storage facility in Prichard, Ala.

Mobile Bay Booming

ICP Mobile faced the task of protecting over 500 separate environmentally sensitive sites that had been pre-designated in the Area Contingency Plan (ACP). These sites were located across several hundred miles of coastline along Mississippi (94 sites), Alabama (113 sites), and the Florida panhandle (300 sites). As the response evolved, additional locations were identified and added to the lists as part of the ACP 2.0 process. Highly diverse and sensitive ecosystems and resources were at stake throughout the coastal region.

GRAND ISLE, La. – A section of rigid pipe boom, which is more resistant to rough seas, is deployed in the waters near Grand Isle to help contain oil from the Deepwater Horizon spill. Photo courtesy of U.S. Air Force





DAUPHIN ISLAND, Ala. – An oil spill worker posts stanchions to ensure that the snare booms remain along the shoreline. Photo courtesy of BP

In the Florida Panhandle Coastal Areas, these consisted of approximately:

- 80 Bird species, 6 of which are threatened or endangered,
- 4 Reptile species, all of which are threatened or endangered,
- 4 Mammal species, all of which are threatened or endangered,
- 9 Shellfish species,
- 25 Sensitive Human Use or Wildlife Refuge and Management areas/resources, and
- 7 barrier islands of concern, 4 Gulf islands National Seashore Management Areas.

In the Alabama Coastal Areas, these consisted of approximately:

- 112 Bird species, 13 threatened or endangered,
- 113 Fish species, 2 threatened or endangered,
- 16 Invertebrate species,
- 4 Mammal species, 3 threatened or endangered,
- 11 Reptile species, 10 threatened or endangered,
- 19 Sensitive Human Use or Wildlife Refuge and Management areas/resources, and
- 1 barrier island of concern.

In the Mississippi Coastal Areas, these consisted of approximately:

- 71 Bird species, 6 threatened or endangered,
- 78 Fish species, 1 threatened or endangered,
- 9 Shellfish species,

- 4 Reptile species,
- 7 Mammal species, and
- 4 barrier islands of concern, which are all Gulf Islands National Seashore management areas.

In May ICP Mobile signed a Decision Memo that laid out the final booming strategies developed jointly by the U. S. Coast Guard, the states of Mississippi, Alabama and Florida, the U. S. National Park Service, and the EPA. Although the boom was already in the process of being deployed throughout the region, this memo refined and defined the strategies. Through this document and its accompanying boom maps, the ICP Mobile and the relevant stakeholders formally agreed to the overarching strategy and the amount of boom needed to meet the basic requirements of the ACP. It was understood by all parties that the strategies would likely be modified depending on operational needs, environmental conditions, the intensity of oiling, and the availability of hard boom, but the strategies served as a well defined and agreed upon baseline.

Under the strategies, all priority environmental sites within the states of Mississippi and Alabama were boomed. A two tiered booming system was deployed in Florida, with Tier One sites boomed first. Tier One sites were defined as select environmentally sensitive sites listed in the ACP, as well as entrances to inlets that contained multiple environmentally sensitive sites. If there were multiple sites within the same inlet, it was acceptable to boom the entrance to the inlet. Tier Two sites were environmentally sensitive sites contained within those inlets. This strategy ensured that sensitive sites identified in the ACP would be initially protected by at least one layer of hard boom.

To accomplish this deployment, ICP Mobile split its AOR into three geographic Branches—one each for Mississippi, Alabama, and Florida.

The Mississippi Branch was divided into 10 Divisions:

Region	Number of Divisions	Initial Hard Boom Requirement
Hancock County	1	50,500 ft
Harrison County	5	139,950 ft
Jackson County	4	211,300 ft

The Alabama Branch was divided into seven Divisions:

Region	Number of Divisions	Initial Hard Boom Requirement
Mobile County	4	277,250 ft
Baldwin County	3	133,750 ft

The Florida Branch was divided into 21 Divisions:

Region	Number of Divisions	Initial Hard Boom Requirement
Escambia County	3	131,400 ft
Okaloosa County	2	12,900 ft
Walton County	2	15,300 ft
Bay County	3	42,800 ft
Gulf County	3	56,300 ft
Franklin County	4	115,900 ft
Wakulla County	2	30,600 ft
Jefferson County	1	4,400 ft
Taylor County	1	2,300 ft

Total hard boom required to accomplish this initial booming strategy was estimated to be approximately 1.2 million linear feet. This provided a single layer of hard boom to protect the specified sites. These numbers grew substantially, however, and by July 17th, 2010, over 1.6 million linear feet of hard boom had been deployed along with another 500 thousand feet of absorbent boom. The increases in numbers were attributable to double and triple booming of some environmentally sensitive sites, the redesigning of strategies at some sites to better protect those locations, the addition of sites in Hancock County, Miss, and the subsequent booming of Tier Two sites in Florida.

In addition, ICP Mobile established a “Skunk Works” team tasked with developing innovative boom deployment strategies to cover large areas containing multiple sensitive sites. The most noteworthy of these attempts was what became known as the Mobile Bay Solution. Mobile Bay has three main access points from the Gulf of Mexico. From west to east there is the Gulf Intracoastal Waterway access under the Dauphin Island Bridge, the mouth of Mobile Bay, and finally Perdido Pass. If

oil could be prevented from entering those three access points, the entire Bay would be protected.

The Intracoastal Waterway, as it passes under the Dauphin Island Bridge, allows Gulf water to enter Mobile Bay from the Mississippi Sound and Katrina Cut. Hard boom was deployed at this location, but the currents flowing through the area were substantial and reduced its effectiveness. In addition, the Gulf Intracoastal Waterway is a major thoroughfare for commercial traffic. As a result the boom was pre-positioned so that the waterway could be closed off when the threat of oil was imminent.

The mouth of Mobile Bay presented unique challenges as it was a major artery for commercial deep draft vessels and the currents through it were swift. A lock system was developed using ocean boom. All vessels would be required to pass through this boom-lock system. The outer gate of the lock system was located south of the bay’s entrance and the inner gate was located north of the bay entrance. The boom that made up the southern portion of the lock extended from the tip of Pelican Island to Fort Morgan, Ala. The northern lock reached from Dauphin Island to Fort Morgan, Ala. Inbound vessels were required to enter a gate installed in the southern lock, be examined for oil contamination, and exit into Mobile Bay through the gate in the northern lock. The Coast Guard Cutter *Saginaw* drove pilings to attach the ocean boom while several contracted vessels deployed the boom.

Unfortunately, this lock system did not work. The currents were so swift in the area that they exerted forces on the boom that snapped multiple pilings. In addition to problems with entrainment, the currents also tore off boom fittings, anchor points, and caused other damage despite the fact that heavy-duty ocean boom was used.

As an alternative, ocean boom was deployed in the form of in a series of open chevrons south of the Mobile Bay entrance. The goal of this system was to deflect the oil away from the entrance. Despite multiple attempts and redesigns, this system did not work either. The force of the currents caused the boom to act like a sail. The boom dragged several thousands of pounds of anchors across the seabed and could not be kept on station. The boom also suffered significant physical damage from the forces that the currents applied to it. Lastly, and most importantly, there are pipelines that run

ashore from offshore platforms along the seabed in that area. The risk of dragging an anchor across one or more of those pipelines and damaging them was too great.

Perdido Pass was protected by ocean boom laid out in a chevron pattern similar to that discussed above for Mobile Bay. This design did not work at Perdido Pass either. Currents and wave action kept damaging it and shifting its position. An alternate system was designed and installed inside of the pass. This system involved a long run of ocean boom that extended along the entire length of the pass in a deflection pattern. A gate was installed in it to allow recreational vessels to enter and depart the pass. This system, while showing initial signs of success, failed in the end due to the swift currents in the pass.

Louisiana

In some locations where boom was not deployed, Louisiana parishes took it upon themselves to employ and stage barges across local waterways and entrances to bays in an attempt to prevent oil and tar balls from entering the area. Responders considered the barges an additional protection measure to preserve the water quality in Lake Pontchartrain, for instance, which environmental groups such as the Basin Foundation had spent decades restoring. These floating barriers stretched across the Rigolets and Chef Menteur Pass, the deep waterways that connect Lake Pontchartrain and Lake Borgne in the Orleans and St. Tammany Parish areas. The line of barges across the Rigolets included a small opening at the end to allow for boat traffic, but it could be closed should oil threaten. The barges proved ineffective on July 5, 2010, when tar balls reported at the Rigolets entrance to Lake Pontchartrain and had washed ashore as far west as Treasure Island subdivision in Slidell.

Responders utilized Hesco Baskets to plug other additional gaps along the Louisiana shoreline. Hesco Baskets were primarily used along the northern edge of Grand Isle in Jefferson Parish and Cameron Parish. These baskets are constructed of wire-mesh with fabric containers, which are then filled with sand. The sand-filled baskets were supposed to serve as a barrier to help prevent oily product from washing past the barrier installation and further onto protected beaches.

As a result of the Deepwater Horizon Oil Spill, the State of Louisiana requested the RP be held responsible to build over 100 miles of sand berm along the Louisiana coastline in order to catch oil and protect the estuaries and marshes. The original request included 15 sections of berm (W1-W15) west of the Mississippi River and four sections (E1-E-4) east of the Mississippi River. The berm construction proposals and the approved permit covered state owned lands and waters west of the Mississippi River and the federal and Department of Interior lands, along with the Chandeleur Islands, which are part of the U.S. Fish and Wildlife Agency's Breton National Wildlife Refuge.

These berms did require a permit from the ACOE. After a series of meetings, the Louisiana Office of Coastal Protection and Restoration (OCPR) submitted a permit request to the ACOE to build a berm over 100 miles long that would require over 96 million cubic yards of material. OCPR estimated completion of the entire berm to take 6 to 9 months with an estimated cost of \$250 million.

Many agencies, including the Department of the Interior, Fish and Wildlife Service (FWS), Coastal Scientists with the U.S. Geological Survey, and other stakeholders voiced concerns. These concerns covered a broad range of topics, including the feasibility of the project, the constructability of the berms, the potential for environment impact, and the potential damage to the National Wildlife Refuge islands and aquatic habitat that could result from the dredging operations.

In particular, damage to the National Wildlife Refuge islands and aquatic habitat caused by dredging was a concern voiced by the Department of the Interior (DOI). The state's original request identified dredge areas closest to the barrier islands



RIGOLETS CHANNEL, La. – Barges are affixed together in a long line to act as a massive boom in an effort to keep tar balls from making their way into Lake Pontchartrain. Photo courtesy of U.S. Coast Guard

both on the seaward and inland sides of the islands. Dredging would remove sand that could be used for future, planned barrier island restoration projects and could accelerate erosion and loss of the islands. Coastal scientists with U.S. Geological Survey showed that taking sand for the berm from the originally identified dredging locations would have negative impacts on the islands. They identified two alternative sand borrow sites that would not negatively impact the island. The decision by the FWS not to oppose the project was based on the best available science using studies conducted by the U.S. Geological Survey (USGS Scientific Investigations Report 2009-5252: Sand Resources, Regional Geology, and Coastal Processes of the Chandeleur Islands Coastal System: An Evaluation of the Breton National Wildlife Refuge). The FWS felt the project would not protect the coast as the state implied, but that as long as the project did not negatively impact the refuge and other resources, FWS would not oppose the project.

The use of sand berms as an oil spill response tactic was untested. It was unclear if the berms would prove beneficial in reducing the impacts of the oil, taking into consideration the long duration of construction versus the rapid movement of oil. The time, effort, and funding that were required to construct the temporary berm barrier brought into question the projects' feasibility in comparison to other spill response techniques under consideration or being employed over the response area.

To construct the berms, a large amount of dredging equipment needed to be available in a short period of time. The dredging had to produce a large quantity of materials such as sand to construct the berms within the proposed specifications. Given the proximity to hurricane season, the oil and gas pipelines in the area, the presence

of protected animal migration and nesting areas within the proposed dredging sites, and the potential for impact to the existing coastal Gulf restoration plans, it was unclear if the project would be able to be constructed on schedule. An added complexity was the resulting land and berms would be both private and federal (USFWS Refuge) lands.

Instead of waiting for approval, parish and state officials in Louisiana announced on national media they would begin the berm project utilizing local moneys without federal approval. In response, a section of Louisiana's barrier island project proposal was approved for implementation by the ACOE. Under this permit, but without coordination with NIC and the UAC, ACOE authorized Louisiana to construct the barrier islands at its own expense. ACOE allowed this as long as construction met their terms and conditions and Louisiana obtained all other required permits. If Louisiana opted to move forward with the project, they would be required to address all potential costs and environmental impacts.

On May 27, 2010, the ACOE offered an emergency permit to the state of Louisiana for portions of their barrier island plan. The permit was issued under Emergency Permit NOD-20, with special conditions, authorizing the state to proceed with six reaches, E3 and E4 to the east of the Mississippi River, and W8, W9, W10, and W11 to the west. The six sections included 49 miles instead of the 100+ miles requested. The plans called for the berm to be 320 feet wide at the base 20 wide at the crown and six feet elevation. The sand borrow areas were predicted to be between 500 and 10,500 feet wide and 30-50 feet deep. On June 3, Louisiana accepted the permit and conditions. The permit issued was for only 49 miles and the six sections of berm to be completed. The NIC and RP approved funding in the amount of \$360 million dollars.

In September 2010, the FOOSC notified Louisiana that although no oil had been seen on the berms in several months and the amount found early in the response was small, the ACOE permit would allow construction of the berms to continue and thus the project could continue until it was complete or the state expended the entire \$360 million. There were two instances where the National Guard visited the berm under directions of the state to collect tar balls. These two instances were the only records

MISSISSIPPI DELTA – An Army National Guard UH-60 Blackhawk helicopter crew transports sandbags over the Mississippi Delta in an effort to shore up the state's coastline as the oil spill approaches. Photo courtesy of U.S. Coast Guard



of oil landing on, or oil requiring removal from the eastern berm. To complete some of the berms, the most economical sources of fill were borrow areas under the jurisdiction of BOEMRE. After NOAA and the USFWS expressed concern over the number of turtle takes that had occurred already in the berm construction operation and other possible endangered species and essential fish habitat impacts of using the borrow areas, BOEMRE declined to allow the state to use them. This required bringing fill from farther away, driving up the overall costs, and thus reducing the amount of berms that could be built for the original \$360 million.

In September, the Fish and Wildlife Service requested the state to consider moving the berm closer to the Chandeleur islands. On November 3, ACOE approved the state's request to modify the emergency permit. A few days later, they realigned the berm construction closer to the Chandeleur Islands. The alignment would build the berm in shallower water, thereby reducing costs while providing more benefit to the islands.

Smaller berm projects were also developed to protect sensitive habitats in Alabama. At Bon Secour National Wildlife Refuge near Gulf Shores, Alabama, work began in early May to protect Little Lagoon, an 8-mile wide estuary that provides nursery habitat for juvenile fish, shrimp, crabs, octopus, and other marine life. Refuge personnel constructed this berm across a pass that was formed between the Gulf of Mexico and Little Lagoon when Hurricane Ivan made landfall in 2004. Berms were also constructed in front of storm blowout areas to protect the dune ecosystem on the refuge, which provides habitat for endangered species such as the Alabama beach mouse and nesting sea turtles.

The shoreline protection tactics, techniques, and procedures utilized by the Operations Sections, and within individual states across the response area ensured a layered defense beyond sub-sea dispersant, skimming at the source, in situ burning, aerial dispersant use, and VOOs skimming. All those measures helped minimize the environmental impacts of oiling along the Gulf Coast. The protection plans and actions were made possible through cooperation between federal, state, and local officials, the RP, and environmental experts. These plans and actions minimized not only the threat, but also the actual impact of oil in the marshes and on the beaches.

3.6 Search and Respond Standards and Quick Reaction Forces

In June 2010, it became apparent that the response organization needed to react more nimbly to reports of oil. The decision to apply Search and Respond standards, use dedicated resources, and build Quick Response Forces stemmed from this continuing challenge.

Search and Respond Standards

The ICP Mobile and ICP Houma FOSCRs developed a system to react quickly to oil reports. The proposed solution employed Coast Guard Search and Rescue Standards. These included launching within 30 minutes and arriving on-scene within two hours. The Coast Guard assigned this mission to deployed Coast Guard Marine Safety and Security Teams (MSSTs) in Louisiana and other response resources operating throughout the areas of responsibility.

Usually, the MSSTs did not participate in oil spill response. The MSSTs received a qualified Coast Guard oil spill responder with prior training and experience in quantifying and qualifying observed oil. This was critical, as the information relayed back informed the decisions of ICP Houma on how to prioritize response efforts. If new oil observations reported larger volumes, a threat to sensitive areas, natural resources, or health and human safety, the branch resources responded to the new site.

This concept took the form of a Standard Operating Procedure (SOP) done in concert with a team of Louisiana National Guardsmen and ICP stakeholders. This group was instrumental in facilitating working meetings, capturing ideas, concepts, and goals, and then working them into draft standard operating procedures that could be easily and quickly finalized.

Quick Reaction Forces

Although the Search and Respond standards (SARES) quickly proved their usefulness, branches

had difficulty relying on shifting assignment of resources—such shifts could be cumbersome and time consuming. Moving resources engaged in one site cleanup to another site required withdrawal of gear, often long transit distances, and fully equipped supplies and logistics needed for cleanup. SARES development led quickly to planning for a light, mobile force that sat in reserve for instances where an area observed by a SARES team needed urgent action that could not wait on branch resources. Also, once response resources were at a branch, they became difficult to move from that area due to concerns of local officials. Similarly, placing standby resources at a branch for contingencies was difficult as oil continued to bear down on the shorelines.

Starting with the ground rule that branch level service personnel could not transition out of service at the branch level, planners employed another Coast Guard concept: a self-contained strike team able to support a 72-hour deployment to a site regardless of location—including berthing, food, water, PPE, skimmers, and boom. To avoid confusion with the term strike team, the term Quick Reaction Force (QRF) was adopted. This name corresponded with the FOSC's expectations and avoided any confusion with the Coast Guard's National Strike Force (NSF) teams. The QRF abbreviation also was generally consistent with ICS terminology, as they were essentially a task force. Initially, the Coast Guard assembled only one QRF, operated out of Houma. The basic unit was a contracted OSRO, complemented by Coast Guard members with NSF experience and a direct tie into the Operations Section at ICP Houma. Prior to initial deployment, the QRF engaged in mock operations to ensure this capability was openly communicated and that responders could meet the standards set.

Based on the success of the first QRF, the Coast Guard created others in Grangeville, Slidell, and Joint Air Station New Orleans. As time went on, the efficiency and effectiveness of these teams improved and they were a highly sought resource by the branches and provided invaluable assistance.

Over time, the SARES and QRFs proved the response organization could act quickly to reports of oil, and local leaders and members of the public expressed fewer concerns. Responders developed a thorough knowledge of where the accumulations

of oil in the Louisiana marshes were most severe. This steadily improved the planning for response force placements.

Containment boom was deemed a critical resource. Allowing the QRFs to stockpile a modest supply in the rear proved successful. Once responders provided boom to a local staging area, it was difficult to move, even if operations needed it elsewhere. As the response continued and the QRFs matured, the success of the QRFs eliminated concerns regarding boom assignment as response times continued to improve.

Overall, the SARES and QRFs dramatically improved perceptions about the responsiveness of cleanup efforts in Louisiana. After the QRFs were built, drilled, expanded, and deployed, the ability to take the next step and respond to the triaged sites, essentially eliminated concerns about the timeliness of response. SARES and QRFs demonstrated innovative, adaptive thinking, developed and executed with precision in a short period.

3.7 National Guard and Department of Defense Support

During the *Deepwater Horizon* response, the National Guard and Department of Defense (DOD) were exceptional partners across a wide range of response activities. More than 1,530 National Guard members were involved in response efforts. From May 12, when DOD authorized the use of National Guard assets, throughout the response, National Guard aviation crews flew over 3,600 hours, hauled 8,000 tons of cargo, equipment, and supplies, and carried over 6,500 passengers. In addition, National Guard personnel positioned sandbags, conducted evacuations, and provided air operations, public affairs, chaplain, communication, and transportation services.

Command and Control of National Guard and Department of Defense Assets

The FOSC recognized that National Guard personnel would serve as a critical force multiplier in the response. However, it was unclear how to activate and employ National Guard and other DOD resources. The Department of Defense had no mechanism to accept funding from the *Deepwater Horizon* RP. Thus, funding for any DOD support had

to be accomplished through the Oil Spill Liability Trust Fund. DOD also wanted funding in advance, rather than through the usual practice of providing an invoice to the FOSC and the National Pollution Funds Center for payment of services rendered in accordance with a Request for Assistance. A funding solution was developed through the Secretary of Defense.

An additional hurdle to accessing DOD assets was FOSC coordination of domestic DOD support. Domestic coordination of DD resources is usually the responsibility of NORTHCOM. Coordinating permission for use of the National Guard and other DOD assets involved senior DOD personnel, the Joint Staff, NORTHCOM, and the National Guard Bureau. This was a complicated, time-consuming process. In the end, outside the National Guard, there was limited DOD involvement. The U.S. Navy Supervisor of Diving and Salvage, an organization that regularly participates in oil spills, was present in force. Transportation Command arranged for C17 support to transport resources to the Gulf Coast. DOD also provided some planners and Public Affairs specialists.

Obtaining National Guard support was complex as well. Competing interests and concerns existed over National Guard activation under United States Code Title 10, which is federally controlled and funded, versus United States Code Title 32 activation, which is state controlled and federally funded. State active duty is also available to recall National Guard members and it is state controlled and funded. Ultimately, on May 10, DOD recalled National Guard members to active duty under Title 32.



GRAND TERRE EAST, La. – Louisiana National Guardsmen with the 2225th Multi-Role Bridge Company support beach cleanup operations by facilitating the transport of heavy machinery to the barrier islands that were affected by the oil spill. Photo courtesy of the U.S. Coast Guard

National Guard personnel were under state control, but utilized in support of a federal oil spill response mission guided by the NCP. Although funded by the FOSC, the National Guard primarily performed missions directed by the states, frequently without involvement of the Unified Area Command or Incident Command Posts. The NCP addresses state and local participation in a response. According to the NCP, the designated lead state agency is responsible for determining

the lead state response official (a member of the UAC) and communicating with any other state agencies (including National Guard). In the *Deepwater Horizon* response, affected states designated senior members to represent state equities at the UAC and ICPs.

GULF OF MEXICO – A flight engineer with Florida National Guard's Detachment 1, Company H, 171st Aviation, is part of the air support, which flies along the coast to locate oil and expedite the efforts of skimming and booming along affected area. Photo courtesy of U.S. Army



While each state was represented at the ICPs, state representatives did not coordinate National Guard resources for their respective states. Soon, military Liaison Officers (LNOs) represented the Coast Guard Incident Commander at the ICPs. The primary duty of the Military LNO was to coordinate National Guard and DOD activities in support of the *Deepwater Horizon* response. The LNOs provided technical and subject matter expertise regarding state processes and resources available to assist the Coast Guard. Military and agency LNOs were embedded in the ICPs to provide face-to-face coordination and to include agency LNOs in the incident planning cycle.

A challenge for both military and agency LNOs was to wed the *Deepwater Horizon* command and control structure with the existing National Guard command and control structure. Under the NCP, a unified command directs and coordinates the actions of all resources toward common objectives. The ICS management structure supports the unified effort and decision-making.

Demobilization of National Guard Forces

Every mission assigned to these assets stays operational until the ICP Incident Commander specifically requested the National Guard to demobilize the capability. The process of demobilization can take up to 10 weeks.

3.8 Shoreline Assessment, Cleanup, Shoreline Cleanup Assessment Technique

The Shoreline Cleanup Assessment Technique (SCAT) program in response to the *Deepwater Horizon* incident addressed two key challenges—the size of the affected area and the long duration of the response. In addition to these challenges, other issues included the potential for re-oiling before the successful capping of the well and carrying out final cleanup in progressive stages. The areas impacted by the oil spill expanded between Galveston, Texas and Franklin County, Fla.

The SCAT program started in April 2010 and was completed at some point after April 2011. The UAC established two ICPs and the SCAT program was managed consistently across all states, from Houma, La., and Mobile, Ala. One of the most unique challenges characterizing the first few months of the response was oiling and subsequent recontamination

of the shoreline from an uncontrolled, continuous flowing pollution source located beneath 5,000 of water in the Gulf of Mexico. This data, along with natural resources information, was used to develop cleanup priorities, identify site-specific or temporal constraints, and understand and approve the proposed cleanup plan. Using Shoreline Treatment Recommendation (STR) forms, teams implemented initial shoreline cleanup operations for designated shoreline segments. To ensure consistency, improve communications, and effectively coordinate the treatment recommendations with the numerous Operations Branches across the full geographic area of the response, new SCAT Operations Liaison Teams were created at all ICPs. These teams ensured accurate documentation of all findings. For example, the *Deepwater Horizon* Shoreline Inspection Report (SIR) forms were updated with annotations for the following indications: “No Oil Observed,” or where no treatment was recommended at that stage, “No Further Treatment.” This close engagement between the UAC leadership and the local Branches continued throughout all subsequent stages of the shoreline assessment.



JEFFERSON PARISH, La. – A U.S. Coast Guard Petty Officer observes the state of an oil-impacted beach, taking note of the water, sand, and debris during a shoreline assessment on Grand Terre Island. Photo courtesy of U.S. Coast Guard

Following the well control, when the threat of re-oiling substantially reduced, Stage III operations began, which initiated the final stage of the response. This was carried out in several phases to achieve clearly defined goals of cleaning, protection, monitoring, resurvey, and further cleaning as necessary. Stage III commenced with an area-wide re-survey in fall 2010. Treatment recommendations were then generated to reduce oiling levels to lowest practical levels based primarily on Net Environmental Benefit principles. When these levels were achieved, the next phase (Stage III.2) involved monitoring and maintenance to assess natural attenuation of any oil residues within individual segments.

A spring 2011 SCAT survey (Stage 4) is generating further STRs for further treatment where deemed necessary, for remaining oiled shorelines to achieve agreed Stage 4 No Further Treatment (NFT) guidelines. The final step involves inspection by the UAC SCAT teams with the landowner or manager, or resource trustee or manager for each shoreline segment to confirm sufficient treatment has been completed.

U.S. Geological Survey Site Sampling

Even before the deployment of Shoreline Cleanup Assessment Technique teams, the USGS Science Centers in Texas, Louisiana, Mississippi, Alabama, and Florida began pre-landfall sampling of water and bottom material at 70 sites in priority areas of the northern Gulf of Mexico. Areas specifically sampled were the coastal wetlands and DOI lands at highest risk for oil contamination, including wetlands, shorelines, and barrier islands, which could suffer environmental damage if oil from the *Deepwater Horizon* spill came ashore. The pre-landfall assessment occurred from May 7 through July 2, 2010.

The purpose of the pre-landfall assessment was to define pre-existing or baseline conditions in the physical, chemical, biological, and microbiological quality of the near-shore environment. The USGS independently collected data to develop a perspective on pre-landfall conditions for future comparison to post-landfall samples from the same locations. The pre-landfall assessment is very valuable from a scientific perspective as this information provides a baseline to facilitate comparison of samples taken after-the-fact of the spills impact. It was hoped that these data would have a high degree of transfer value and be informative for



ST. MARY'S POINT, La. – A Shoreline Cleanup Assessment Technique team leader from the University of New Orleans checks impacted shoreline as part of the Deepwater Horizon response. Photo courtesy of the U.S. Coast Guard

response and recovery purposes.

All samples were collected, processed, and shipped under chain of custody according to methods listed in the USGS *National Field Manual for the Collection of Water-Quality Data* (NFM) (<http://pubs.water.usgs.gov/twri9A/>) as well as other USGS standard operating procedures. By using a standard, documented set of protocols encompassing the entire data-collection process, the integrity, consistency, and comparability of the data from site-to-site and among sites is ensured.

The post-landfall assessment sampling was undertaken from October 5 through 17, and focused specifically on a subset of 48 of the 70 pre-landfall sites in a manner consistent with the pre-landfall assessment. Data collection and analysis activities included sampling water and bottom material for the physical, chemical, biological, and microbiological quality of the near-shore environment. These studies were undertaken after shoreline arrival of petroleum-associated product on beach, barrier islands, and wetland environments of the Gulf of Mexico coastal states.

All post-landfall assessment samples were collected, processed, and shipped in the same manner as the pre-landfall samples. In addition, the USGS wrote and published an addendum to the USGS NFM *National Field Manual for the Collection of Water-Quality Data* (NFM), <http://pubs.water.usgs.gov/twri9A/>

usgs.gov/twri9A/, which provides the basis for the post-landfall USGS sampling protocols. The USGS also found it necessary to develop a method for the analysis of dispersant components in the Corexit product used in the oil spill response, as none previously existed at the time of sampling (although EPA also developed a method).

Shoreline Cleanup Assessment Technique

The objective of SCAT and subsequent shoreline cleanup operations was to accelerate the physical removal and natural weathering of stranded oil. These operations facilitated the return of the ecosystem to pre-spill conditions as soon as practical, using environmental best management practices. The essential elements of SCAT methodology are mobility, surgical deployment, and speed.

Traditionally, SCAT is a survey process used by response agencies to document shoreline oiling. The technique employs a systematic approach to assess and develop cleanup treatment recommendations, as well as constraints for cleanup operations. The magnitude of the *Deepwater Horizon* oil spill pushed SCAT well beyond its traditional usage; fortunately, SCAT has intrinsic flexibility and operates as a continuous process from just prior to impact until final restoration begins. In most oil spills, the response is centered on a one time, single spill with a set quantity of product, in a somewhat stable environment. *Deepwater Horizon* exceeded all traditional parameters.

The initial focus of SCAT activities was to help establish oil trajectory models. SCAT Teams then divided the shoreline within the response area into geographic segments based on a combination of factors such as physical features, distance, and natural barriers. Early in the response, the former Mobile Sector Planning Section developed and implemented a Natural Resource

Adviser (NRA) program. Personnel from various private sector environmental contracting firms were hired, trained, and deployed to all operational divisions. The NRA program became an important interface between the Planning Section, Operations Section, and OSRO contractors deployed in the field. Volunteers were also trained and deployed as Wildlife Observers to ensure sensitive species, such as turtles and nesting migratory birds, were not affected by oil removal operations. The NRAs ensured that the staging of equipment utilized in oil removal operations did not impact dune and marsh habitats. Agency representatives from the FWS and National Park Service (NPS) were also embedded as liaisons, as discussed in Chapter 5 of this report, Planning.

A SCAT process was implemented for the *Deepwater Horizon* response and teams of trained observers were deployed to survey affected coastal habitats to document the shoreline oiling conditions and the presence of sensitive and cultural resources. At a minimum, a SCAT team is typically comprised of three positions representing the responsible parties, the federal trustees, and the state trustees. There are additional slots available for land managers and owners, and archaeologists as necessary.

Shoreline Treatment Recommendations (STRs) were developed in collaboration with the Coast



ST. PETERSBURG, Fla. – A U.S. Coast Guard Petty Officer discusses oil identification procedures with fellow team members during a Shoreline Cleanup Assessment Technique team training scenario held at North Shore Beach near downtown St. Petersburg. Photo courtesy of U.S. Coast Guard

Guard, NOAA National Marine Fisheries Service (NMFS), Fish and Wildlife Service (FWS) Section 7, and Section 106 Archeologists. Other natural resource trustees, and state representatives such as Alabama Division of Emergency Management (ADEM), Florida Department of Environmental Protections (FDEP), Louisiana Department of Environmental Quality (LDEQ), and Mississippi Department of Environmental Quality (MDEQ) also participated. Furthermore, cleanup operations required compliance with the protection policies of the Endangered Species Act, the National Historic Preservation Act, and the Archaeological Resources Protection Act. See Chapter 8, Natural Resources and Wildlife, for more information.

Throughout the summer of 2010, the SCAT teams were physically located within each state's operational branch and were managed from two ICPs. All operations for Louisiana spill response were located at ICP Houma, whereas ICP Mobile managed spill response for and was the reporting hub for Alabama, Florida, and Mississippi. A SCAT Liaison was embedded into each branch and the ICPs to facilitate communications between SCAT operations, and the ICPs.

The SCAT Management Teams established Core Groups at each ICP to maximize stakeholder involvement, address special concerns for natural, cultural, and amenity areas, and to promote a unified approach to the cleanup process. Each SCAT Core Group adopted appropriate and effective cleanup strategies by developing a Stage III SCAT Shoreline Treatment Implementation Framework. The strategies outlined the stages of cleanup and survey and verification methodologies. In addition, the strategies implemented a standardized Net Environmental Benefit Analysis (NEBA) to ensure further damage was not caused by the cleanup techniques, and developed NFT guidelines. To support the Core Groups, three Technical Working Groups (TWG) were assembled to conduct detailed evaluations of cleanup techniques and environmental response considerations for three specific shoreline types: sand beaches, marshes and mangroves, and man-made shorelines. The Core Groups, in conjunction with the three TWGs, provided cleanup options and recommended technologies. The options addressed the environmental impacts to the shoreline, critical habitat, endangered species, and cultural concerns for both natural and nourished shorelines that ranged from lightly stained to heavily oiled.

The options included the following:

- Natural attenuation, which referred to processes such as evaporation, wave action, flushing by tidal movements, rainfall flushing, and degradation by microbial and photo-oxidation,
- Grooming,
- Manual removal of oil, oiled sediment, and debris,
- Mechanical Beach Cleaning Machines (sifters),
- Sediment relocation,
- Sediment tilling and mixing,
- Sand treatment (M-I SWACO),
- Raking and cutting vegetation,
- Low pressure, ambient temperature flushing,
- Use of sorbents, and
- Vacuuming.

Methods not utilized included in situ burning, chemical cleaning agents, nutrient enrichment, and solidifiers.

The physical location of the spill presented logistical, tactical, and training challenges as many areas could only be reached by boat, skiff, or helicopter. This was especially true in Louisiana. For example, tide cycles periodically restricted shoreline survey work as certain stretches of shoreline segments were rendered inaccessible to foot traffic or inundated areas impacted by oil. Storm events and periods of high wind and wave action often resulted in the burial or redistribution of stranded oil, requiring additional SCAT surveys and more intrusive survey methods such as auguring, and a combination of plowing and sifting for oil buried within sand berms.

For *Deepwater Horizon*, SCAT teams employed a three-stage plan; Stages I and II were implemented prior to the source being secured, and Stage III commenced after the source was secured. For Stage I, the plan emphasized the on-water recovery of floating oil slicks in near-shore waters. At Stage II,



FORT PICKENS, Fla. – Members of a Snorkel Shoreline Cleanup Assessment Technique team find and record evidence of oil below the water's surface at Fort Pickens. Photo courtesy of U.S. Coast Guard

the plan required initial cleaning of bulk oil from inter-tidal areas until the oil source was secured. For Stage III, SCAT focused on oil removal from specific habitats and the determination of No Further Treatment (NFT) status. SCAT teams combined data collected from land and waterborne field surveys, aerial reconnaissance, and reports of oil sightings from outside sources to project floating oil slicks and bulk shoreline oiling. That information was updated daily in standard forms and mapping products, and was used to prioritize offshore and near-shore cleanup, as well as document which shoreline segments would likely be impacted first and worst.

Initial STRs were drafted to cover each division in support of Stage I and II bulk oil collection and cleanup. These products prescribed appropriate techniques used to address bulk surface oiling only. Branch directors were advised to focus on the largest concentrations of oil using best management practices for surface oil recovery, site access, and resource conservation. Supplemental information on endangered species and the preservation of sensitive archaeological, cultural, and historical objects and sites was also included. Data was also recorded for shoreline segments where no oil had been observed and no bulk cleanup conducted. Those areas received Shoreline Segment Inspection Reports (SIRs) recommending only natural attenuation with NFT in 2010 (NFT-2010) and were forwarded for Incident Command and UAC review. Shoreline segments placed in NFT-2010 status were subject to periodic monitoring pending

a comprehensive resurvey of all affected areas in spring 2011. Tables 2 and 3, provided by the FWS, outline the guidelines that must be met before an area transitioned into the NFT phase of cleanup.

Commencement of Stage III roughly corresponded with permanent well kill and no further observation of waterborne oil slicks. Stage III STRs (STR-3s) were drafted for groups of shoreline segments that required detailed cleanup measures well beyond the scope of bulk cleanup. Stage III STRs often prescribed treatment below the beach surface and addressed sub-surface oil buried under layers of sand due to wave and tidal action. The total number of segments for the *Deepwater Horizon* impacted area was in the thousands; however, segments could be grouped depending on several factors including terrain and the method of cleanup utilized, and sometimes by landowner and managers or state boundaries. As part of the shoreline surveys, SCAT would note observations of stranded boom to assist the Stranded Boom Removal Team.

After the shoreline surveys were completed, SCAT teams interacted with local officials and the Operations Section to identify the appropriate cleanup methods for the contaminated zones. The SCAT teams then returned to Houma to develop the formal STR. SCAT also assisted in drafting STRs to provide guidance for the specific task of Stranded Boom Removal (STR-126). This collaboration allowed for a faster approval process.

Table 3.2: NFT Guidelines for Sand Shorelines

Oiling Group	Cleanup Methods Recommended	Surface Oil	Subsurface Oil
Oiled Residential and Amenity Beaches	Mechanical (sifting); Manual removal; Tilling; Sediment relocation	No visible oil above background levels	No visible oil above background levels
Oiled Non-Residential Beaches	Mechanical (grooming-sifting); Manual removal; Sediment tilling and mixing; Natural recovery	< 1% visible surface oil and oiled debris; and no SRBs >5cm (2 inches)	No sub-surface oil exceeding 1-3 cm in thickness and patchy (10-50%) distribution that is greater than Oil Residue
Other Oiled Beaches in Special Management Areas (state and federal wildlife refuges, parks, wilderness areas, which may also have a mix of oiling conditions)	Mechanical (grooming-sifting); Manual removal; Sediment relocation; Natural recovery	< 1% surface oil and oiled debris; no SRBs >2.5cm (1 inch)	Subject to direction of Special Area Managers: No sub-surface oil exceeding 3 cm in thickness and more than patchy (10-50%) distribution that is greater than Oil Residue

Table 3.3: NFT Guidelines for Coastal Marshes and Mangroves

Cleanup Methods Recommended	NFT Guidelines
Low-pressure, ambient-temperature flushing	No flushable oil on the vegetation or soils
Use of sorbents (on water)	No release of sheens that can affect sensitive resources
Manual removal Use of sorbents (on substrate) Vacuum	No thick or pooled oil at the edges of, the marsh, or the beach and shell berm, and over wash areas No thick or pooled oil in the marsh interior, including isolated oiling patches within the marsh
Vegetation cutting	No pooled oil inside dense Roseau cane be accessed by other means
Natural recovery	For all other oiling conditions

The STR approval process involved routing through approximately nine different agencies, including USFWS and NMFS Section 7 (Endangered Species Act review), Section 106 (Historic and Cultural Properties review), NOAA, Environmental Unit Leader, Land Managers, local officials, the state, and the FOSC. In addition to approving the STR, Section 7 required attachment of Applicable Best Management Practices (BMP) Checklists to the STR. The checklists indicated which BMPs were applicable to protect the endangered and threatened species, and critical habitats located in those segments contained in that particular STR. Per the BMPs, Section 7 consulted on the appropriate number of Natural Resource Advisors and Resource Advisors (READs) required to ensure SCAT and the Operations Section were in compliance with implementing the BMPs in the field. Early in the Stage III process, the State of Mississippi made the choice to take over the grooming of its mainland amenity beaches in preparation for spring 2011.

Due to the complexity of the response and the number of stakeholders involved, it was difficult to achieve timely consensus or full UAC endorsement of STRs, the Stage III Framework, and other SCAT plans. The combined framework for Alabama, Florida, and Mississippi was fully endorsed. Louisiana officials had concerns. SCAT members and the UAC Governmental Affairs Director met with Louisiana local and state officials to review and explain the Stage III Framework. On December 20, the Louisiana framework was approved.

The federal trustee role and position on an official SCAT Team may be filled by any of a number of federal entities including Department of the Interior, NPS, NOAA, or the Coast Guard.

Prior to February 2011, only seven of the more than 40 Coast Guard members involved with SCAT

activities worked 25 or more days on SCAT teams; NOAA contractors primarily filled the federal representative position.

SCAT will continue for much of 2011. Coast Guard Reserve Marine Science Technicians will move into 14 federal representative slots on the spring re-survey SCAT teams, which began February 2011. A 7-14 day overlap with NOAA will provide training. This is the first survey of nearly all segments in the *Deepwater Horizon* area of impact since May 2010; therefore, it will be a comprehensive examination of the aggregate impact of the entire oil spill. Table 3.4, provided by the FWS, outlines the total shoreline oiling estimates by state as of January 26, 2011.

Over the course of the response, the scale of the SCAT operations contributed to technological innovations. SCAT teams employed electronic data loggers, such as TRIMBLE units, which also served as handheld GPS devices. These electronic logs improved efficiency by reducing fieldwork note taking and report preparation time, and allowed SCAT data to be fed directly into the Common Operating Picture platform and database provided by NOAA through ERMA and GIS. This allowed the incident commander to have near real-time situation awareness of SCAT progress.



GRAND ISLE, La. – A U.S. Coast Guard Shoreline Cleanup Assessment Technique team member observes workers and heavy equipment removing oiled sand and tar balls during beach cleanup operations. Photo courtesy of U.S. Coast Guard

Shoreline Clean Up Operations

The SCAT process defined where the oil was, in what quantity, and assessed cleanup techniques that were appropriate for the shoreline habitat. Following from approved shoreline treatment recommendations were actual shoreline cleanup operations. Most of the impacted shoreline was either sandy beach or salt marshes. The two types of areas required very different shoreline cleanup methods.

In general, cleanup of oiled marsh required recognition that the marsh vegetation was very easily damaged and thus people and machinery could not be placed on the marsh. There were two broad categories of sandy beaches: those owned by federal trustees such as the National Park Service, and FWS, and public “amenity beaches” used for swimming and recreation. The federally owned beaches were, for the most part, sensitive habitats that required careful planning to avoid damage, although the cleanup techniques available could be more invasive than for marshes. Amenity beaches demanded extensive cleaning in order to address public concerns about coming in contact with oil while using the beaches.

Beaches

Beaches were impacted in Louisiana, Mississippi, Alabama, and Florida. Florida and Alabama in particular had beaches in areas frequented by tourists, and thus cleaning beaches was a high priority in those communities because of concern of the impact oiled beaches would have on tourism, a mainstay of those local economies. Public beaches were also impacted in Louisiana and Mississippi. Although in general not as sensitive an ecosystem as marshes, sensitive beach areas, many of which belonged to the National Parks Service or U.S. Fish and Wildlife Service, were also impacted, mostly in Mississippi, Alabama, and Florida. Mississippi was uniquely challenging because much of the

beach impact areas were on barrier islands several miles offshore with little to no public access. The deployment of equipment and manpower to the barrier islands, especially in high winds and seas across Mississippi, proved complex, and delayed more timely response.

Beach cleanup is a time consuming, labor intensive process. SCAT identified oil impacts to beaches in three areas:

- Subtidal, below mean low water,
- Intertidal, between low and high tide, and
- Supratidal, above high tide to dunes.

In subtidal areas, cleanup techniques were limited. Where tar mats could be identified in shallow enough water to permit responders to reach them safely, response crews waded into the water with modified scoops and dug out the mats, scoop by scoop, collected the materials, and packaged them for disposal. Where the tar mats became too deep for wading, the only effective technique was to map the areas where the mats were known to be and then regularly visit the intertidal areas near the submerged mats to recover tar balls. Some limited attempts were made to scoop the tar mats by mechanical means in areas where the mats were close enough to be reached by a backhoe bucket arm, but often the sand proved an unstable foundation to support the equipment and most tar mats were beyond mechanical reach.

In intertidal areas, a variety of techniques were used. When oil was still arriving at the shoreline, sorbent boom of various kinds was placed on beaches and then regularly tended. Workers manually removed oil from the surface of the intertidal sand with shovels and rakes. Once oil stopped reaching the beaches, efforts were made to clean the intertidal areas as thoroughly as possible. By this point, most of the oil was in the form of tar balls in the intertidal areas. This required scooping sand and sifting through

Table 3.4: Shoreline Oiling Estimates as of January 26, 2011

State	Total Miles Miss., Ala., Fla. Shoreline Habitat Surveyed	Heavy	Moderate	Light	Very Light	Trace (<1%)	No Oil Observed
La.	3147.4	27.3	50.4	82.1	108.4	40.2	2839
Miss.	295.7	0.3	1.3	26.3	4.9	55.0	208.0
Ala.	266.9	0.3		15.1	1.2	43.1	207.1
Fla.	516.1	0.4		8.7		83.0	423.9

screens of various sizes to remove the tar balls from the sand. Work crews did this with shovels, rakes and hand sifters. Several types of commercial beach machines were used with modified screen separators. As these beach machines were constructed to remove trash and debris, some modification proved infeasible. In all, these machines were used only for surface sand cleaning. Furthermore, at above 75 degrees Fahrenheit the tar balls on the beach tended to liquefy. Although visibility was reduced during darkness, the beach machines were most effective during nighttime operations when cooler temperatures congealed the oil. Later a mechanical cleaner, known as the Sand Shark, was employed. This scooped sand to a uniform depth that could be modified, sifted the sand, collected the tar balls, and then deposited the sifted sand back onto the beach. After initial tests with the Sand Shark, the RP moved to acquire more of these machines to speed the beach cleaning process, particularly in public “amenity” beaches where tolerance for any form of oil being present was low.

In the supratidal areas, the major concerns were tar mats pushed beyond the intertidal area by storm and tidal activity. These mats could be submerged under a significant depth of sand, and later re-exposed by storm action or wind. However, these areas were also frequently near vegetation critical to beach ecosystems; this meant that cleanup had to be more cautious to avoid damage. Removal of the supratidal mats usually had to be done by work crews working with shovels who would dig down to the mat, sift the sand as they dug, and then dig out the mat by the shovelful.

Beaches belonging to the federal trustees required more careful treatment. These areas were generally more environmentally sensitive, and not used nearly as much for tourism. As a result, the trustee agencies had to balance the need for removal of as much oil as possible against the impact to the ecosystems on those beaches. Digging in search of buried tar mats, and for the removal of tar balls, was limited to a depth of six inches in these areas. Mechanical cleaning equipment was also not used; recovery was done almost entirely by work crews using rakes, shovels and hand sifters.

Heat and Beach Cleaning

During the summer of 2010, the heat had a major impact on beach cleaning operations. The workers removing oil were in exposed areas. With a heat index that regularly rose above 100 degrees Fahrenheit, workers needed to limit their exposure to the oil; and with the labor intensive, physically demanding nature of the work, it became necessary to provide beach workers a place to get out of the sun and heat and keep them hydrated for their own safety. As recounted in Chapter 4, this meant limiting the amount of time workers could actually work between rest periods out of the sun. It also led ICP Mobile, in particular, to adopt night operations where possible, as this allowed work crews to spend more time removing oil from the beaches because the heat related risks were significantly reduced at night.



PASS CHRISTIAN, Miss. – Beach cleanup crews rest during oil recovery operations on Ship Island due to the oppressive summer heat. Photo courtesy of the U.S. Coast Guard

Operational Science Advisory Team II Report on Remaining Oil on Beaches

After the well was capped, the entire impacted shoreline was evaluated by the SCAT process. This process continued past the end of hurricane season and into the winter. The FOSC requested that trustee agencies develop an assessment of the impact of oil on sandy beaches to help determine when to stop cleanup operations. This report was delivered to the FOSC in February 2011. It characterized the impact of oil that remained in the beach areas after cleanup operations. The report examined what oil remained on the beaches, and noted the fact that there was oil present from sources other than the *Deepwater Horizon* spill. It contained specific review of impact of the estimated remaining oil on sandy beaches to human health, sea turtles, water birds, terrestrial animals, and aquatic invertebrates and fish. The report used four locations, Grand Isle,



VENICE, La. – Response workers clean up tar balls that washed up along the beach. Photo courtesy of U.S. Coast Guard

Louisiana, Petit Bois Island, Mississippi, Bon Secour, Alabama, and Fort Pickens, Florida as case studies for in-depth analysis.

The report's analysis indicated that the environmental effects of the remaining oil after cleanup were relatively minor, particularly given the pre-spill background exposure to oil, and that continued cleanup to attempt to remove any trace of oil would increase the risk of negative impact to habitats and associated resources.

Marshes

Table 3.5 lists potential cleanup techniques for oiled marsh developed by the National Response Team.

The methods used most during the course of the response were vacuuming, sorbent boom, and absorbent peat when the oil was fresh and coming into shore in the marshes. As erosion of the existing marshes in coastal Louisiana is a significant concern, and oiling sufficiently severe to kill marsh grasses would accelerate erosion, finding ways to prevent oil from killing the marsh vegetation was a high priority. One of the techniques tried at the recommendation of several agencies was use of bagasse, the fibrous residue from sugar cane processing, which was readily available in Louisiana. This method proved difficult to deploy and then recover, however. Small, carefully targeted barriers constructed in appropriate locations did shield

some particularly sensitive areas from heavy oiling. Still, there were some marsh areas that were heavily impacted. Areas of Barataria Bay and Bay Jimmy were the most heavily oiled marsh areas.

In an effort to identify techniques to remove oil from heavily impacted areas, a pilot project was conducted in Bay Jimmy. The project tested a range of cleanup techniques in small plots of heavily oiled marsh in an attempt to identify which technique would prove most effective. Techniques used in the plots included burning, raking, low pressure flushing, vacuuming, and hand application of sorbents. None proved dramatically effective or clearly more effective than natural attenuation, particularly when balanced against the risk of further damage being caused by the cleanup technique itself.

Because of the remote location of marshes, there were many challenges involved with these operations. First, during the summer, heat was a significant concern, as was the threat of severe weather (such as thunderstorms) to those responding from shallow draft boats. Second, logistics to continue operations in these areas were complex. Getting supplies to these areas involved lengthy transits. In order to keep people on scene for longer periods of time jack up boats and flotels were used to house workers near the impacted sites. Third, response operations generated waste that then had to be transported considerable distances just to get to a point where it could be collected and moved to an appropriate disposal facility in order so that response operations could continue. Sorbent boom had to be promptly recovered and removed to avoid risk of further damage to marsh grasses. Vacuuming and skimming generated oily waste that required on site storage, and then transportation for disposal. And finally, great care had to be taken to avoid damaging marsh further through actions to remove the oil, or just from contact with responders.



BAYOU LA BATRE, Ala. – Cleanup workers push an airboat back into the water which is loaded with bags of oily debris found in the marshes on Coffee Island. Photo courtesy of the U.S. Coast Guard

Table 3.5: Potential oil spill response methods for marshes.

Response Method	Oiling Condition	Advantages	Disadvantages
Natural Recovery (allow the oil to degrade in place or be removed by tidal and wave action)	Lightly or very lightly oiled marshes	Minimal impact, avoids physical disturbance from cleanup actions; studies have shown rapid recovery.	Potential oiling of birds or wildlife using the marsh during the time it takes the oil to be removed.
Vacuuming/ Skimming (mostly conducted from boats, in conjunction with flushing to increase recovery rates)	Moderately or heavily oiled marshes	Removes large quantities of oil from the marsh; bulk oil removal will speed natural recovery of remaining oil.	Difficult to bring equipment into marsh without causing some impacts such as crushing of vegetation; impacts may be considerable if not conducted properly. Only very shallow-drafted vessels would be able to access some marsh areas. Collected oil and water must be transported and stored (small oil/water separators would reduce volume of oil to be treated).
Low-pressure Flushing (with water comparable to marsh type, or near water source)	Moderately or heavily oiled marshes	Can assist in oil removal by herding oil to collection points (used with vacuuming/skimming); lifts oil off sediment surface (when marsh is not flooded).	Pressure must be carefully controlled to prevent eroding the marsh soils (erosion would expose vulnerable rhizomes). Must be carefully monitored; can cause physical impacts during placement of hoses and pumps. Can be difficult to achieve without removing above-ground vegetation. Can be difficult to flush oil in desired seaward direction without penetrating into marsh, but foot traffic on oiled marsh greatly compromises recovery prospects. May wash away loose soils exposing roots and making them susceptible to further oiling in tidal areas.
Manual Removal (by hand or mechanized equipment)	Moderately or heavily oiled marshes	Can be best way to access pooled oil in the marsh interior, using boardwalks to minimize soil disturbance.	Can result in significant damages to the marsh, including soil compaction; Very slow, with challenging logistics for waste management.
Natural Sorbent Materials (Technique A) A) Shredded sorbents applied to oiled marsh shorelines (including bagasse, hay, rice hulls, and cotton lint)	Potentially all oiling conditions. Materials can be applied both independently and in coordination with other remediation methods.	Shoreline application of sorbents in strips (2 inches deep by 4-6 feet wide) can prevent further penetration of oil into the interior portions of marsh areas. Low impact on marsh vegetation and soils, as sorbents are applied from shallow-draft boats with blowers onto oiled shoreline areas. Natural materials absorb oil off vegetation and from contaminated soil. Sorbents provide substrate for in situ microbes to attenuate oil, speeding rate of oil degradation. Sorbent materials will also biodegrade quickly. Reduces risk of residual oil to wildlife from both contact with oiled vegetation and released sheens. Available in large quantities at low cost in the Gulf Coast region.	Recovery of loose sorbents is not likely, so use is not appropriate in areas with lots of free-floating bulk oil. Loose materials may be eroded by wave and tidal action from marsh fringe, where the oil is most likely to strand. Limited prior use and wide-scale application or information on effectiveness. Heavily oiled material could be more persistent. Loose natural sorbents may contain residual pesticides and should be tested.
Natural Sorbent Materials (Technique B) B) Shredded sorbents applied to unoiled marsh shorelines at imminent risk of oiling (including bagasse, hay, rice hulls, and cotton lint)	Pretreatment of unoiled marsh shorelines in imminent danger of oiling	Pretreatment prior to oiling may prevent damage to shoreline vegetation and soils. Shoreline application of sorbents in strips (2 inches deep by 4-6 feet wide) can prevent further penetration of oil into the interior portions of marsh areas. Applied with minimal physical disturbance (by blower from shallow-draft boats). Sorbents provide substrate for natural microbes to attenuate oil, speeding the rate of oil degradation. Sorbent materials will also biodegrade quickly. Reduces risk of residual oil to wildlife from both contact with oiled vegetation and released sheens. Available in large quantities at low cost in the Gulf Coast region.	Loose materials may be eroded by wave and tidal action from marsh fringe, where the oil is most likely to strand. Limited prior use and wide-scale application or information on effectiveness. If removed after oiling, increases the total amount of material to be removed. Oiled material will be transported to other areas. Heavily oiled material could be more persistent. Oiled materials that disperse into open water may sink. Loose natural sorbents may contain residual pesticides and should be tested.

Note: This NRT table provides a list of potential response activities to be taken in an oiled marsh. This list is not to be construed as approval by the NRT, but rather to show potential activities that can be considered by the Incident Command.

3.9 Alternative Technologies

Federal Agency Response Research and Development Funding

The OPA 90 establishes an Interagency Coordinating Committee on Oil Pollution Research to “coordinate a comprehensive program of oil pollution research, technology development, and demonstration among the Federal agencies, in cooperation and coordination with industry, universities, research institutions, State governments, and other nations, as appropriate, and . . . foster cost-effective research mechanisms, including the joint funding of research.” The Coast Guard chairs the committee, which includes representatives from fourteen federal agencies. The Committee produced the first Oil Pollution Research and Technology Plan in 1992, and a second plan and the most updated plan in 1997.

Coast Guard Oil Spill Research

The Coast Guard conducts oil spill research through its Research and Development Center in Groton, Connecticut. Coast Guard’s budget for oil spill research was \$5.6 million in 1993, held constant at \$3.5 million from 1998 through 2004, and was \$500,000 per year between 2007 and 2010. The Coast Guard allocated its research and development budget to four main areas: spill response planning and management, spill detection and surveillance, vessel salvage and on-board containment, and spilled oil cleanup and countermeasures.

Assessment of Alternative Response Technology at the Unified Area Command and Incident Command Posts

The Alternative Response Technology Evaluation System (ARTES) teams reviewed over 10,000 submissions for ideas for the cleanup operations. Despite their tremendous accomplishments, they were quite understaffed. ARTES has existed since 1993 and has been effective in addressing ideas submitted during past oil spill responses. The Coast Guard Research and Development Center staff provided the key positions for the ARTES team.

Interagency Alternative Technology Assessment Program

On May 10, 2010, the National Incident Command established the Interagency Technology Assessment Program (IATAP). The NIC established IATAP to allow government-led evaluation of the thousands of offers of innovative response technologies from both domestic and international entities. This was made possible by means of a Broad Agency Announcement (BAA) for vendors to submit proposals. Proposals were evaluated based upon overall scientific and technical merit, feasibility, the availability of the proposed solution, and a rough order of magnitude cost. As of September 2, the IATAP received approximately 3,900 submissions, 96 percent of which underwent evaluation and adjudication. Proposals that had the potential to assist in the response were forwarded to the Critical Resources Unit at the UAC for possible implementation.

A Whale: An Example

Not all innovative technologies tested during the response were successful. Some were tried after they caught press and public attention. When such applications proved ineffective, considerable time and effort were required to explain why these tools were not used further. *A Whale* is an example of this phenomenon.

In May, an owner proposed the modification of the 1,100 foot, “very large ore and oil carrier,” *A Whale*, to make it the world’s largest weir skimmer. Weir skimmers function by allowing the thin surface layer of oil to pass over the top of the weir while the water is held back. Efficiency is determined by how accurately this oil layer is “sliced” to produce a high oil-to-water recovery ratio. *A Whale*’s design theorized that the ship’s huge capacity and ability to separate oil from water would make up in volume what it lacked in finesse (in terms of efficient oil/water intake ratio).

A team of specialists representing naval architecture (for ship strength and stability concerns), spill response technology, and ship operations reviewed the proposal and concluded that the design theory could not overcome the sea conditions and the low oil encounter rate the ship would experience on the Gulf of Mexico. (“Encounter rate” is the amount of



GULF OF MEXICO – The Coast Guard Cutter *Resolute* steams alongside *A Whale*, which is a tanker converted into an oil skimmer. Photo courtesy of the U.S. Coast Guard

oil presented to the skimmer and is determined by oil thickness, sweep width and speed of advance.) Due to the thin layer of oil surfacing in the Gulf, encounter rates were low and required very efficient booming operations. Sea conditions, even swells as low as one to two feet, would cause far more water to be taken in than oil. Ship stability and structural loads were also a concern. Based on the expert review, the offer was declined.

The owner of *A Whale* proceeded to modify the ship in Europe, again made an offer to assist (this time directly to the government through the IATAP process), set sail for the US east coast, and hired a publicist “to help negotiate with federal regulators and to create public pressure in favor of *A Whale*.” (Roanoke Times, June 26, 2010.) When *A Whale* arrived in the Gulf of Mexico, the owner, FOSC, and RP agreed to a proof-of-concept test in the vicinity of the spill site where the other “large” skimmers were operating. (“Large” is relative: at 208 feet, the oil skimming ships owned by MSRC were dwarfed by *A Whale*.)

In early July, the initial design was tested. The design incorporated large slits near the bow to act as a weir for oil and water intake. The slits led into a chamber intended to break up thick, heavy oil into a form that would flow more easily. The inboard bulkhead of the chamber, opposite the weir, had a series of pipes that could be opened to allow oil and water to enter the cargo tanks to begin separation. Because more water entered the chamber past the weir than could flow through the

pipes leading into the cargo tank, water also flowed back out of the weir as the trough of a swell passed. The turbulence created around the intake by this constant in and out flow of water created a barrier to oil floating on the surface (see photo below).

After two days of testing, including the use of a boom to increase the encounter rate, *A Whale* collected virtually no oil. It was evident that the barrier created by the turbulence prevented oil from entering the weir. The owner requested, and the FOSC approved, an extension of time in which to modify *A Whale*’s design to one in which the side openings would be directly piped into the cargo system. The new design was tested in mid-July. It resolved the turbulence problem, but the intake efficiency was very low, even in “calm” seas in which the opening was alternatively submerged and “high and dry” as the crest and trough of a swell passed. After a full day of testing, no oil was found in the main cargo tank and only residue found in an intervening wing tank. Based on the testing, the FOSC concluded that *A Whale* was ineffective in the conditions found on the Gulf—thin, patchy oil in a slight to moderate sea state.



GULF OF MEXICO—The *A WHALE*, a cargo ship converted to a weir skimmer, discharges water while undergoing proof of concept testing

3.10 Concurrent Emergency Response and Natural Resource Damage Assessment

A major goal of OPA 90 is to make the environment and public whole for injury to or loss of natural resources and services due to a discharge or substantial threat of a discharge of oil (referred to as an incident). This goal is achieved through returning injured natural resources and services to the condition in which they would have been if the incident had not occurred, otherwise referred to as baseline conditions. It is also achieved through compensating for interim losses from the date of the incident until recovery of such natural resources and services through the restoration, rehabilitation, replacement, or acquisition of equivalent natural resources and services.

The Natural Resource Damage Assessment (NRDA) process in the OPA90 regulations includes three phases: Preassessment, Restoration Planning, and Restoration Implementation.

The purpose of the Preassessment Phase is to determine if the trustees have the jurisdiction to pursue restoration under OPA 90 and, if so, whether it is appropriate. In the case of *Deepwater Horizon*, the

trustees did determine that they had the jurisdiction to pursue restoration. The preliminary assessment phase began when the trustees were notified of the incident by response agencies. Once notified of the incident, trustees first determined the threshold criteria that provided their authority to initiate the NRDA process. Based on early available information, trustees made a preliminary determination that natural resources or services had likely been injured. Through coordination with response agencies, trustees next determined whether response actions were expected to adequately address injuries resulting from the spill.

Restoration Planning evaluates potential injuries to natural resources and services, and uses that information to determine the need for and scale of restoration actions. The Restoration Planning Phase has two basic components, injury assessment and restoration selection.

Injury assessment determines the nature, degree, and extent of any injuries to natural resources and services. This information is necessary to provide a technical basis for evaluating the need for, type of, and scale of restoration actions. Under the OPA 90 regulations, injury is defined as an observable or measurable adverse change in a natural resource or impairment of a natural resource service.

COCODRIE, La. – Absorbent boom, which helps reduce the amount of oil reaching the marshes, lies in the marshes near Cocodrie. Photo courtesy of the U.S. Coast Guard



In considering both natural resources and services, trustees are addressing the physical and biological environment, and the relationship of people with that environment.

NOAA's Damage Assessment Remediation and Restoration Program (DARRP) acts on behalf of the public as a trustee to manage, protect, and restore coastal and marine resources. Public lands, waters, and living resources are held in trust for the benefit of all people and future generations. Stewardship of the nation's natural resources is shared among several federal agencies, states, and tribal trustees.

When possible, NOAA works cooperatively with the parties responsible for the injury. By working with the RP and co-trustees to collect data, conduct assessments, and identify restoration projects, NOAA avoids lengthy litigation and achieves restoration of injured resources more efficiently.

The scope of the Natural Resource Damage Assessment will include impacts to fish, shellfish, marine mammals, turtles, birds, and other sensitive resources, as well as their habitats, including wetlands, beaches, mudflats, bottom sediments, corals, and the water column. The trustees will assess any lost human uses of these resources, for example, fishing, hunting, and beach recreational closures. The trustees will also determine the efficacy of evaluating impacts from the response, including burning, and dispersant use at the surface and at depth.

NOAA's DARRP is coordinating this effort with natural resource trustees in five states (La., Miss., Ala., Tx., and Fla.), the Department of Interior FWS and National Park Service (NPS), and the RP. Multiple agencies from each state are engaged. DoD is also a trustee in this case due to impacted property, though they do not actively participate.

Natural resource trustee agencies (including NOAA, DOI, state agencies, and Tribal Governments) are responsible for trust resources as designated by the National Contingency Plan (40 CFR 300.600).

The DOI trust resources include migratory birds, anadromous fish, endangered species, marine mammals, federally owned minerals, and certain federally managed water resources. DOI is also a trustee for natural resources for which an Indian tribe would otherwise act as trustee. In those cases the United States acts on behalf of the Indian tribe. State trust resources include wetlands, surface



waters, ground waters, air, soil, wildlife, aquatic life, and the habitats on which they depend

The work that is being conducted under the Pre Assessment Phase of the NRDA is being carried out cooperatively with RP. This means that the trustees are jointly meeting with RP to discuss NRDA actions, and that RP is integrated into several NRDA Technical Working Groups (TWGs) that have been formed to investigate potential injuries to particular resource groups or habitats.

The focus of the TWGs is to assemble a variety of existing data on resources, their habitats, and their human uses, and to collect baseline, or pre-spill, data wherever possible. Information about impacts on these resources and their uses is also being assembled. NOAA is providing scientific and technical expertise and information management to many parts of the overall NRDA effort.

Trustees are required to demonstrate causality between the release—or substantial threat of a release—of oil, and injured resources, lost services, or lost human use of those resources and services. This requires linking the release of oil, its fate, and transport in the environment, exposure of natural resources to the oil, and its effects on the biota and human uses. Determining the amount of injury and appropriate restoration also requires consideration of the condition of the natural resources and human uses if the spill had not occurred, i.e., baseline conditions.

GRAND ISLE, La. – Laughing gulls congregate in the marshes near Bay Jimmy. These marshes are home to many species of birds including brown pelicans, egrets, roseate spoonbills, and stilts. Photo courtesy of the U.S. Coast Guard

Trustees seek to restore injured resources and services to baseline and to compensate the public for interim losses, i.e., the time it takes the resources to recover. Over the course of the NRDA process, the trustees assess the nature and extent of the injuries, develop a restoration plan, seek compensation from the RP for damage assessment and restoration costs, oversee or implement the restoration plan, and conduct and oversee monitoring to ensure restoration has occurred. Liability for natural resource damages is in addition to liability for cleanup.

During an oil spill, response and NRDA activities may be occurring simultaneously. It is sometimes assumed that these two processes exist independently of each other and that the data collected to guide the response operations are different from the data gathered for NRDA. However, a review of OPA 90 and guidance documents indicates that these activities are intended to work in a cooperative, holistic manner. Typically, trustees work in the environmental unit under the ICS, providing data such as resources at risk. However, they may also be trying to gather ephemeral data necessary to support a NRDA and looking for opportunities for emergency restoration projects that may mitigate further injury or help the injured resource recover more quickly.

Trustees have a somewhat different job from that of the oil spill-response personnel. Responders, such as the SCAT teams, do not generally have time to do detailed scientific studies. Their interest is in reducing the impact of the spill and cleaning it. The trustees, on the other hand, need to assess the extent of the injuries and may use data gathered from SCAT to determine oiled habitats requiring further assessment. The assessment can be used to determine the extent of the impacts and scale of restoration necessary to compensate the public for the lost resources.

Funds eventually recovered through the NRDA process are used to restore injured resources, or the RP may implement restoration projects with trustee oversight. Much of the evidence of these injuries is ephemeral and will gradually be removed by cleanup and natural processes, therefore the trustees need to be on scene to collect the injury data immediately following an incident. In addition to assessing damage for long-term restoration, the trustees may be able to identify emergency restoration actions that will reduce the impacts from spills, thus assisting the responders.

However, OPA 90 makes it clear that NRDA does not and should not trump response actions. If emergency restoration actions are proposed to occur during the active response phase, which may impede the response, these regulations ensure that the OSC is the final word on whether this emergency restoration should be undertaken. If response actions are still under way, trustees must coordinate with the OSC to ensure emergency restoration actions will not interfere with or duplicate ongoing response actions. The OPA 90 regulations also prescribe that trustees make an effort to coordinate emergency restoration actions with the RP. Typically, there is a formal invitation from the trustees to the RP for a cooperative assessment, but this usually occurs after the response phase ends or is nearly ended. However, coordination between the trustees and RP usually begins soon after the trustee and RP representatives arrive on scene.

OPA 90 also provides guidance on how ephemeral data should be collected and treated during an ongoing response. The regulations state that trustees may conduct data collections that are reasonably related to Preassessment Phase activities. However, data collection must be coordinated with response actions such that collection of the data does not interfere with response actions. Trustees may collect and analyze ephemeral data; and information needed to design or implement anticipated injury assessment procedures. Examples of ephemeral data include:

- Surface water or soil likely to contain oil, where those samples may be necessary for identification and for measurement of concentrations,
- Samples that may be lost because of factors such as dilution, movement, decomposition, or leaching,
- A source sample, vital for fingerprinting that can be used to calibrate and verify model results,
- Counts of dead or visibly injured organisms because of factors such as decomposition, scavenging, or water movement, and
- Scavenging experiments that may need to be performed to understand how quickly dead and injured wildlife may have been removed from the area.

The Incident Management Handbook (IMH) is another good resource to determine how NRDA activities relate to response activities. It prescribes responsibilities to parties that act in the response planning, logistics, and operations, as well as the command staff. For example, it states that the Liaison Officer should coordinate response resource needs for NRDA activities with the OSC during oil and hazmat responses.

The IMH also states that the Lead Administrative Trustee (LAT) is responsible for coordinating NRDA needs and activities of the trustee team. NRDA activities generally do not occur within the structure, processes, and control of the ICS. However, particularly in the early phases of a spill response, many NRDA activities overlap with the environmental assessment performed for the sake of spill response. Therefore, the trustees should remain coordinated with the spill response

organization through the Liaison Officer. The trustees then may need to work directly with the unified command, Planning Section, Operations Section, and, if working on the spill, the NOAA Scientific Support Coordinator to resolve any problems or address areas of overlap. This includes close coordination with the Liaison Officer for obtaining timely information on the spill and injuries to natural resources. The trustees should seek the OSC's cooperation in acquiring response-related samples or results of sample analyses applicable to NRDA. Furthermore, they should obtain necessary safety clearances for access to sampling sites. It is worth noting that often NOAA's SSC and not the Liaison Officer becomes the conduit between the trustees and the OSC. This often occurs because the SSC has more knowledge of the NRDA process than most Liaison Officers.



CHAUVIN, La. – A shrimp boat captain sets his rig to pull in his catch after trawling on Robinson Canal during the third day of commercial fishing season. Photo courtesy of U.S. Coast Guard

3.11 FOSC Key Points

Response and Restoration, Removal, and Damage Assessment

It is difficult to explain the differences and distinctions between oil spill response, performed under the FOSC's supervision, and Natural Resource Damage Assessment (NRDA), performed separately under the oversight of natural resource trustees agencies. Particularly in large spills, the National Incident Commander or FOSC acts as a single spokesperson for government involvement with the response. While NRDA frequently begins before response activity stops, it may continue for years. The FOSC does not participate in NRDA, but this lack of participation is confusing to officials and the public. A process is needed to pre-identify a lead spokesman for NRDA activities during major spills to work alongside the FOSC, to explain the full scope of activities.

Ineffective Boom Deployment

In hindsight, extensive petroleum-based containment boom was deployed in unmanageable areas, and then retrieved and disposed of as waste. Tending such long expanses of containment boom along the vast Gulf of Mexico shorelines while subject to tide, current and sea conditions, was not possible. Environmentally sensitive areas (ESAs) where containment boom was appropriate were not shown in plans, tested, or identified well. FWS noted that this resulted in oil getting to the wrong (protected) side of the boom and then being held there adjacent to the ESA. Explaining the nuances of entrainment and permeability of containment and deflection booms proved difficult. Most of the booming was counter-productive, but became viewed as necessary as oil approached the shore from 50 miles at sea.

The aggressive safety program throughout the entire *Deepwater Horizon* response proved effective. Lightning strikes and other severe weather (in addition to heat) were also a problem. Considering the size of the operation, the heat index, and the nature of the duties performed—from source control efforts, skimming, burning, dispersant application, beach cleanup, to decontamination of thousands of vessels—the injury rate was extraordinarily low. Safety was a focus of the entire response organization. All personnel associated with the response kept personnel safety as a daily focus and immediately addressed any lapses. For several weeks, there were thousands of vessels and hundreds of aircraft working to respond to the spill. Some of the activities were very hazardous, such as in situ burning. Yet the number of injuries was exceptionally low. *Deepwater Horizon* response safety exemplified an all-hands-on-deck approach, with a genuine focus on the safety of its team members.

During the *Deepwater Horizon* response, the federal government and the Responsible Party (RP) took action to prevent injuries, illnesses, and exposure to hazardous substances among response personnel and the public. Additionally, actions were taken to ensure the safety of seafood from areas of the Gulf of Mexico affected by the oil spill, to monitor the potential health impacts of the oil spill in the short and long term, and to facilitate access to care to those impacted by the spill. To achieve these objectives, the Federal On-Scene Coordinator (FOSC) worked with the RP, U.S. Department of Health and Human Services (HHS), the U.S. Department of the Interior, U.S. Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA), Centers for Disease Control and Prevention's National Institute for Occupational Safety and Health (NIOSH), and multiple state level health and safety agencies.

4.1 Public Health and Safety

Under the National Contingency Plan, in those instances where a possible public health emergency exists, the FOSC and RP may notify HHS. Throughout response actions, the FOSC may call upon an HHS representative for assistance in determining public health threats and call upon OSHA and HHS for assistance on worker health and safety issues.

From the time of the announcement of the *Deepwater Horizon* explosion and fire, HHS Assistant Secretary for Preparedness and Response's Regional Emergency Coordinators in Region VI (which includes Louisiana and Texas) and Region IV (which includes the rest of the Gulf States) were in close communication with the ICPs. HHS Liaison Officers were deployed to the UAC, to the ICPs in Houma, La., and Mobile, Ala., and to the National Incident Command in Washington, D.C.

Due to the concern about public exposure, the RP and EPA under the UAC began and continued an air-monitoring program onshore to determine any hazardous exposures.

The air-monitoring program had several facets.

There were stationary air-monitoring locations. EPA used its Trace Atmospheric Gas Analyzer bus and Airborne Spectral Photometric Environmental Collection Technology aircraft to monitor air quality levels. The air monitoring did not indicate harmful exposure levels.

Incident Commanders worked with experts in the field to present information to the public about their safety concerns. Information about air quality testing, dispersant use, seafood safety, and cleanup efforts was disseminated in a wide variety of ways, including interviews with the press, meetings with local officials, and expo type meetings with affected communities to disseminate information on efforts to ensure public health.

Although not covered in the National Contingency Plan, the combined effects of the spill on a population that had only five years earlier endured Hurricane Katrina raised concerns about impacts on the mental health of the people living near oil-impacted areas. The National Incident Commander worked with state and federal agencies and the RP to fund and establish mental health centers.

The process of fisheries closures and their subsequent reopening was largely driven by concerns over public health.



GRAND ISLE, La. – An Environmental Protection Agency contractor makes notations in log book as an air sampling instrument is replaced after a 24-hour cycle. Photo courtesy of EPA

Fisheries Closures

The NOAA Fisheries Service prohibited fishing in certain federally controlled areas of the Gulf of Mexico as part of the *Deepwater Horizon* response effort. This was a precautionary measure taken in early May 2010 to ensure public health and assure consumer confidence in Gulf seafood. NOAA updated the closed areas often.

The area closures prohibited commercial and recreational fishing, including catch

and release; however, transit through the area was allowed. To give ample time to comply with changes, National Marine Fisheries Service announced daily changes at noon, Eastern Time; closures became effective at 6 p.m. that day.

NOAA's Fisheries Service closed areas in anticipation of oil impacts based on trajectory forecast analyses produced by the NOAA Office of Response and Restoration. NOAA has the legislative authority to close and open federal waters for seafood harvesting, while the states have the authority to close and open waters under their jurisdiction. The models projected oil movement over 24, 48, and 72 hour periods. Weather, satellite imagery, ocean buoy data, and ocean currents informed the computer models, and over-flights verified the model trajectory and confirmed the actual extent of the oil

The first closure in early May covered about three percent, or 6,817 square miles, of Gulf federal fisheries waters. As oil continued to spill from the wellhead, the fisheries closure area grew in size. The peak of area closure occurred on June 2, 2010, with 37 percent, or 88,522 square miles, of Gulf waters closed for fishing. Altogether there were 33 closures in the Gulf of Mexico federal fisheries waters.

NOAA announced the first reopening of 26,388 square miles of federal

waters on July 22, 2010. There were 23 modifications to the closed area prior to the first reopening.

There have been 12 reopenings in total, with the most recent occurring on Feb 2 2011. An area covering 1,041 square miles immediately surrounding the Deepwater Horizon wellhead remains closed to all commercial and recreational fishing. [Update: As of April 19, 2011 there have been 13 reopenings. All of the Federal waters closed to fishing due to the Deepwater Horizon oil spill have been reopened.]

Seafood Safety Sampling

There are two ways oil can be determined to cause seafood to be unfit for consumption. The first is through the presence of certain levels of chemicals known as Polycyclic Aromatic Hydrocarbons (PAHs), some of which are carcinogenic. Oil is composed of many chemicals, but the PAHs are of the greatest concern. These can be harmful if consumed in sufficient amounts over a prolonged period of time. The second way is if seafood smells of a petroleum product (taint). The law considers a product tainted with petroleum to be adulterated, and its sale as food prohibited. Petroleum



ST. PETERSBURG, Fla. – Biologists sort through and identify baseline samples at the Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute in St. Petersburg, Fla. Photo courtesy of U.S. Coast Guard

SHELL ISLAND BAY COUNTY, Fla. – Coast Guard Rear Admiral Paul Zukunft looks at shrimp while checking them for signs of oil aboard a 41-foot shrimp boat. Photo courtesy of U.S. Coast Guard



PASCAGOULA, Miss. – Steven Wilson, the chief quality officer for NOAA's Seafood Inspection Program, demonstrates sensory analysis of a sample of shrimp at NOAA's National Seafood Inspection Laboratory in Pascagoula, Miss. Photo courtesy of NOAA.

taint itself is not necessarily harmful, and may be present even when PAHs are below harmful levels. NOAA developed sampling analyses to test for taint and PAHs through sensory and chemical testing. During the response to the spill, a test for the dispersant Corexit was also developed. Certain water areas were already reopened prior to its development; therefore analysis of archived samples for those reopened areas was performed. After the dispersant test was developed, both this test and the Polycyclic Aromatic Hydrocarbon (PAH) chemical test analyzed all samples for reopening areas.

Sampling for seafood safety began April 28, 2010. The initial survey design used a selection of random stations in pre-oil spill near-shore waters along the Alabama, Florida, Louisiana, and Mississippi coasts. In early May 2010, a more formal survey design was developed and implemented due to the increased size of the closed fishing area. The closed area was separated into grids, extending out from the state-federal boundary (three miles offshore in Alabama, Louisiana, and Mississippi, and nine miles offshore on the western Florida coast). Grids stretched to the outer boundary of the closed area.

Figure 4.1 illustrates these grids, relative to the July 22, 2010, closure boundary.

Figure 4.2 displays the breakdown of the closed area into four separate broad zones. Each zone is

based on the extent of cumulative oil inundation from the initial leaking of the *Deepwater Horizon* well. The zones helped determine the level of sampling in each grid, based on the amount of oil inundation within each.

Figure 4.2 describes these zones as areas A, B, C, and D. Area A included the closed fishing area off the western Florida shelf. It experienced minimal to no oil inundation. Area B included the closed fishing area south of the Macondo wellhead to Area A. It experienced moderate oil inundation. Area C included the state-federal boundary to the *Deepwater Horizon* wellhead, which experienced heavy oil inundation. An additional area, Area D, encompassed the perimeter of the closed area to ensure the closed fishing area was effective.

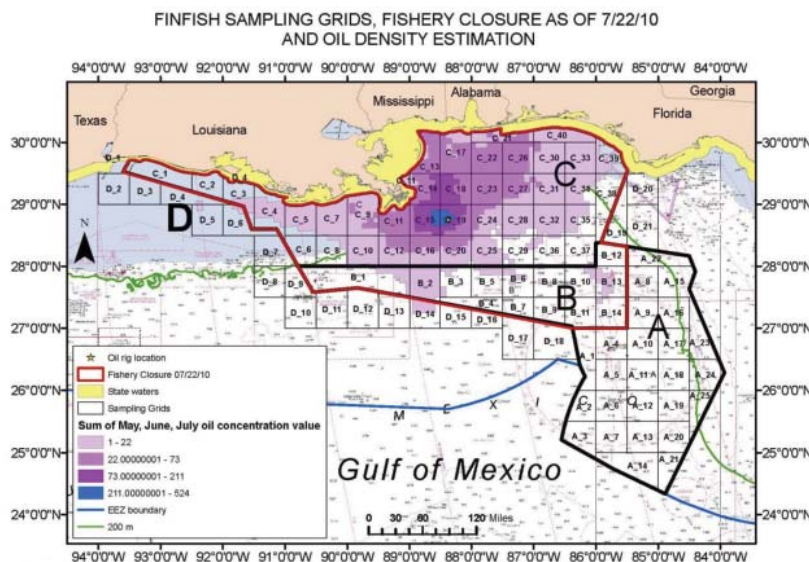


Figure 4.1: Sampling design of the closed fishing area based on 30 nautical miles by 30 nautical miles grids

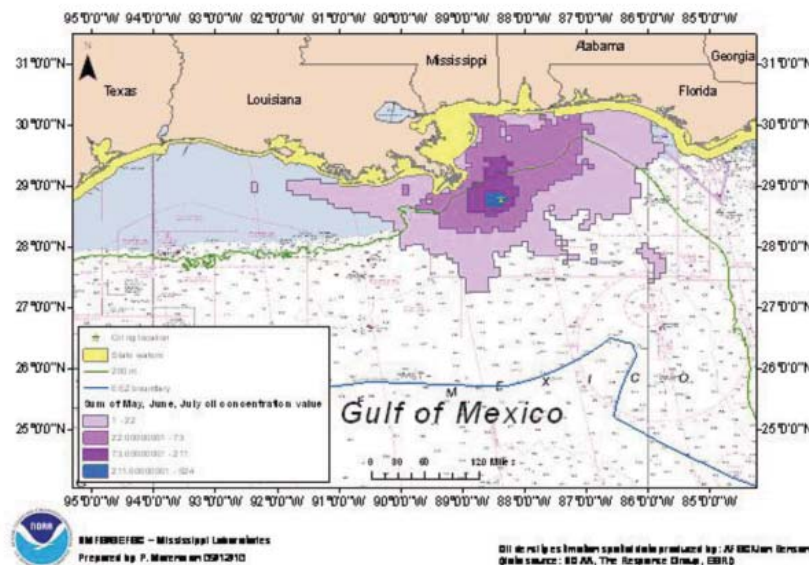


Figure 4.2: Map of cumulative oil inundation from the *Deepwater Horizon* wellhead

NOAA MISSISSIPPI LABORATORIES Prepared by P. MURPHY on 09/12/10 Oil spill response sampling data produced by: JF BUCKNER, DENISE GIBBS source: NOAA, The Response Group, EBRD

Cumulative oil inundation data from the initial leaking *Deepwater Horizon* wellhead determined the intensity of sampling within each grid. Grids exhibiting heavy cumulative oil inundation received more sampling. NOAA measured the intensity of sampling as the minimum number of stations successfully sampled per grid. This then related to the target sample size. Oil inundation dictated the number of successful sampling stations. With the exception of pelagic longline sampling, random selection of the vessels determined the stations.

Four classifications of sampling occurred throughout the response, including:

1. Surveillance sampling: perimeter, closed area, or reopened area,
2. Reopening sampling,
3. Enforcement sampling, and
4. Dockside sampling.

On April 28, 2010, NOAA initiated perimeter surveillance sampling to attain the maximum extent of the closed fishing area. The perimeter surveillance samples provided a baseline of pre-oil conditions for comparison of specimens analyzed for chemical analysis. The closed area surveillance

sampling encompassed specimen collection within the closed areas. These samples underwent both sensory and chemical analysis, and the area was monitored prior to reopening. Reopened area surveillance sampling took place one week after reopening, and continued through two seven-day sampling periods, separated in time by at least a week. These samples also underwent sensory and chemical analysis for both PAHs and dispersant, and assured the continued safety of seafood from these areas. As of February 2011, this type of sampling was ongoing, and would continue through the end of May 2011.

To conduct reopening sampling, response personnel collected specimens within each grid in the closed area to test for PAHs and dispersants and to conduct sensory analyses. These samples provided the foundation for the reopening of closed grids. All specimens collected within the closed fishing area had to pass both sensory and chemical analysis before an area could be reopened. If any sample failed the sensory analysis then the area failed. If a sample passed the sensory analysis but then failed the subsequent chemical analysis, the area would also fail and could not reopen. NOAA later resampled and retested failed areas. Law enforcement officials sometimes seized catch from illegal fishing within the closed area. These specimens were transported by proper chain of custody to the National Marine Fisheries Service (NMFS) National Seafood Inspection Laboratory for analysis and further investigation. Major ports in Alabama, Florida, Louisiana, and Mississippi implemented dockside sampling. Southeast Fisheries Science Center (SEFSC) port samplers acquired these samples and transported them by chain of custody to the National Seafood Inspection Laboratory for processing and analysis. These samples helped to minimize the risk of tainted seafood reaching the market.

NOAA developed a list of key species based on importance to commercial and recreational fishing, prevalence, and ecosystem function. Sampling collection targeted these species; however, species collected varied by area depending on habitat type, depth, and other factors. Near-shore waters were sampled for both finfish and shrimp specimens. Sampling in waters greater than 600 feet deep focused on pelagic species, such as tunas, mackerels, and royal red shrimp. Hard-bottom sampling areas focused on species such as snapper and



GULF OF MEXICO – NOAA administrator Dr. Jane Lubchenco joins NOAA fisheries researchers to conduct a trawl survey of the coast of Pascagoula, Miss., to obtain samples of fish and invertebrates for biological testing at the NOAA-FDA Seafood Inspection Laboratory. Photo courtesy of NOAA.

grouper. Species such as sardines and anchovy are included in the list of specimens to represent prey trophic levels. Sampling of near-shore areas, which included waters less than 600 feet deep, included trawl, bandit, vertical longline, bottom longline, or a combination of these fishing gears. Even with only one or two stations chosen for pelagic longline sampling, one set of longline gear could almost completely sample a grid of 30 nautical miles by 30 nautical miles. Trolling hook and line sampling supplemented sampling in many areas, as it is the main type of recreational fishing gear. NOAA standardized the sampling gear and gear used on fishery independent surveys to be consistent with commercial and recreational fishing.

Several types of vessels conducted sampling, including NOAA ships, SEFSC small vessels, commercial trawlers, commercial bottom longline vessels, commercial pelagic longline vessels, and for-hire vessels. SEFSC identified and provided sampling stations and standard sampling protocols to all vessels. All sampling vessels carried one or more scientific staff responsible to ensure the chain of custody of all specimens, as well as to measure and weighing the catch.

NOAA, FDA and States' Reopening Protocol

In order to ensure consumer safety and market credibility, there needed to be an agreed-to protocol executed by the federal agencies and states to reopen areas to fishing. After the closures were instituted, NOAA, U.S. Food and Drug Administration (FDA), and EPA, in conjunction with the state health and fisheries commissioners, developed procedures for reopening sampling and testing areas. FDA oversaw the state reopening process while NOAA, in conjunction with FDA, handled federal waters. An important element in keeping seafood safe during the response was ensuring its harvest from areas that did not present a chemical or biological hazard. The reopening process started once an area was oil free for 72 hours.

Computer modeling projections and daily overflights provided the basis for area closure decisions and subsequent closure expansions. If confirmed through water quality sampling, aerial surveillance, or satellite imagery that a harvest area had never been exposed to oil, it was reopened without first testing seafood samples.



The second, more common type of reopening was that of areas previously exposed to oil. The first criterion for this type of reopening was that the water was free of oil. Free of oil does not include free from a sheen resulting from light oil. The presence of light oil as sheen was, and is, a regular occurrence in the Gulf of Mexico. Once the oil had dissipated, NOAA would send a sampling plan to the FDA for approval. These plans outlined the sampling of areas designated for reopening. After the FDA accepted the sampling plan, NOAA began sample analysis. For a closed area to reopen, samples taken from the area had to pass both sensory examination and chemical analysis. The FDA and the Office of Management and Budget then reviewed and accepted a reopening package for the closed area.

For sensory analysis, a seafood sample consisted of the edible portion of the species being tested. A panel consisting of seven expert sensory assessors evaluated each sample in both a raw and cooked state. Consideration for reopening from a sensory standpoint required that a minimum of 70 percent of the expert assessors found no detectable petroleum or dispersant odor or flavor from each sample. If any sample failed, that collection site remained closed. If all samples from a collection site passed the sensory criteria, additional samples underwent chemical analysis to determine if harmful levels of PAHs were present, and if the levels of PAHs in the seafood samples did not pose a

PASCAGOULA, Miss. – NOAA's leader for the Deepwater Horizon oil spill seafood safety testing program is interviewed at the NOAA Fisheries Mississippi lab in Pascagoula, Miss. Photo courtesy of NOAA

health concern, the site was eligible for reopening. All contiguous sites had to pass both sensory and chemical testing for an area to reopen.

Seafood Safety and Sampling Protocols

The overall sampling protocols implemented were consistent with protocols used by the SEFSC to conduct fishery-independent surveys under the Southeast Area Monitoring and Assessment Program. Each type of sampling conducted underwent specific protocols for seafood safety sampling.

Any time samplers encountered oil in a grid, protocol required notation of the characteristics and extent of oiling. Oil encountered before a sampling operation began canceled sampling at that station; the vessel would move to another station within the grid. The Pascagoula lab received and further evaluated reports of oil. If the oiling was more than a transient sheen, then sampling in the grid terminated and the grid was not included in an area considered for reopening.

Observers received station locations to guide the vessel captains to randomly selected stations within assigned grids. NOAA provided a list containing all species required for collection for seafood safety analyses. Each day the observer or biologist provided a daily update to include the sampling location, the grid fished, and the type and number of fish caught. All specimens maintained market quality through commercial methods of ice packing. Sampling trips were typically three to four days in length to ensure specimens were in market quality condition. Market quality condition meant fish were suitable for human consumption.

NOAA followed specific preservation protocols for sensory analysis. These protocols required thorough wrapping of

fish and invertebrates in foil, dull side to the specimen. Spines could not protrude through the foil, and each sample required an interior tag. After foiling, specimens were placed in plastic bags labeled with the vessel-cruise-station code. Chemical analyses also followed preservation protocols. Gallon bags with inside and outside labels stored the requested quantities of small fish or invertebrates, one species per bag. Larger fish were wrapped in foil. Alternatively, if the fish were very large, they were iced and then sub-sampled at the National Seafood Inspection Laboratory (NSIL).

All data collected throughout the Deepwater Horizon oil spill followed standard chain of custody protocols. The Field Party Chief initially filled out the chain of custody form. Any time samples were transferred to a new person or a new location, the chain of custody form was signed by the person



GRAND ISLE, La. – Contract workers set a net into the water that is designed to test sediment for oil and other pollutants in shrimping areas near Grand Isle, La. Photo courtesy of U.S. Coast Guard

releasing the samples and the person receiving the samples. If sub-sampling was required, a sub-sample chain of custody form was completed and remained with each sub-sample.

Continued Post Reopening Monitoring of Seafood

NOAA will continue post-reopening surveillance sampling. The current Pollution Removal Funding Authorization allows for seafood sampling of reopened areas within the federally closed area boundaries of the Gulf of Mexico.

The FDA already operates a mandatory safety program for all fish and fishery products. As part of the program, the FDA issued a letter reminding fish and fishery product processors of FDA's regulations and policy concerning the food safety hazard of environmental chemical contaminants. The letter emphasized the importance of verifying the fish they were processing had not come from closed waters. FDA increased its inspections of Gulf Coast seafood processors to ensure compliance with their regulations. FDA also implemented a risk-based surveillance-sampling program to target oysters, crabs, and shrimp; these species retain contaminants longer than finfish. Sampling activities by FDA were designed to complement the dockside monitoring of finfish already in place by NOAA.

NOAA's continued presence in the Gulf is designed to ensure the public that Gulf seafood is safe to eat. Several of the Gulf States have also requested funding from the RP to perform enhanced seafood surveillance and marketing campaigns to restore the public's confidence in the safety of Gulf seafood.

4.2 Response Personnel Health and Safety

Oil spill workers faced many risks and hazards during the response to the *Deepwater Horizon* oil spill. Depending on their jobs, these workers faced hazards from heat, falls, drowning, fatigue, loud noise, sharp objects, as well as bites from insects, snakes, and other wild species native to the Gulf Coast. Some workers were exposed to crude oil, oil constituents and byproducts, cleaning products, and other chemicals used in the cleanup process.

Indirect hazards faced by workers included food borne illness, food contamination, and human



illnesses such as influenza and the common cold. Psychological and social threats to response workers included stress, anxiety, and tension caused by long deployments away from home and normal work, and the long hours.

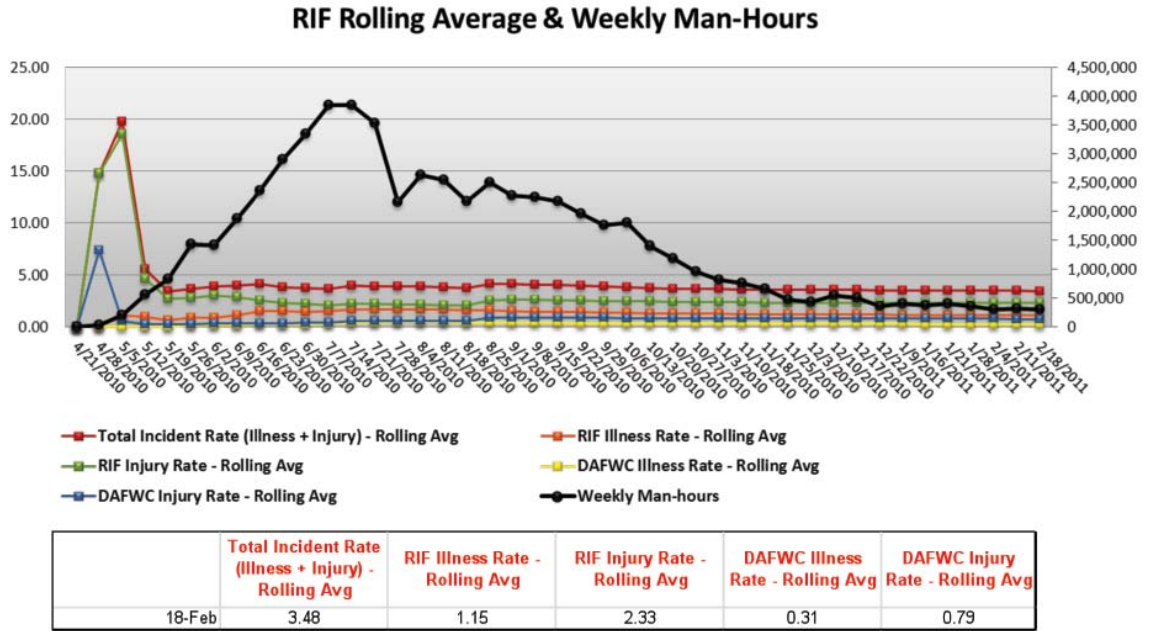
Figure 4.3 on the next page outlines the number of injuries and illnesses documented by the UAC. The information is broken down by the number of reports, dates throughout the response period, and average work-hours recorded.

Heat and Safety

Heat stress caused the majority of worker casualties (less than 5 percent of deployed personnel) while non-heat related injuries resulted in the minority of casualties reported (less than one percent of deployed personnel). At the height of the summer, responders who wore protective clothing while working on the beach could only work ten minutes at a time and then had to rest for up to forty minutes in order to avoid heat related injuries. The Coast Guard required rest and rehydration periods in an effort to prevent these injuries. This gave the impression to those outside the response

NEW ORLEANS – Cleanup crews don personal protective equipment before removing oil from marshes affected by the *Deepwater Horizon* oil spill near Venice, La. Photo courtesy of U.S. Coast Guard

Figure 4.3: Incident Data – Response-to-Date



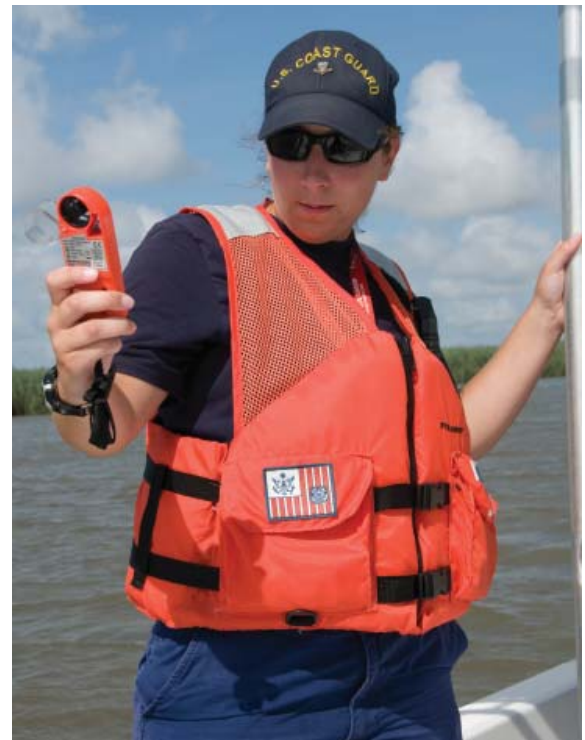
and unfamiliar with the reasons for the rest and rehydration periods that the responders were not working diligently. Despite the negative publicity associated with enforced heat-related breaks, the FOSC refused to compromise on safety practices. They did, however, respond to concerns about the speed of cleanup actions. As it was too hot to work for extended periods during the day, under direction from the FOSC, large numbers of beach cleanup crews shifted to night work shifts, when heat was less of a problem. This carried its own set of challenges—it required infrastructure such as lighting, increased some safety hazards due to lack of light, and changed the nature of wildlife risks.

Safety Organization

Under the National Contingency Plan, worker health and safety are paramount concerns and the FOSC and RP are responsible for addressing these issues. Additionally, all response actions must comply with OSHA training and safety requirements.

Under the FOSC, safety and environmental health

professionals ensured that the RP and the entire response organization properly addressed the safety of all responders. Coast Guard safety and environmental health staff served as a conduit between the RP, and the safety and health staff of other federal, state, and local agencies. Coast



VENICE, La. – A U.S. Coast Guard safety observer measures the heat index on a pocket weather tracker to determine if it is safe to work in the severe heat along the Mississippi River Delta. Photo courtesy of U.S. Coast Guard



VENICE, La. – A U.S. Coast Guard chief petty officer, assigned as a safety observer, inspects an anchored shrimping vessel near Venice, La. Photo courtesy of U.S. Coast Guard

Guard safety and environmental staff filled UAC staff positions, Incident Command Post (ICP) staff positions, and deployed to field operations.

In the Incident Command System (ICS), the Safety Officer works as a support officer for the Incident Commander (in this instance, the FOSC). The Safety Officer's function is to develop and recommend measures for assuring personnel safety, and to monitor, and anticipate hazardous and unsafe situations. The Safety Officer's major responsibilities were to identify hazardous situations associated with the incident, review and approve the Medical Plan, and develop the Site Safety Plan.

The RP hired safety and industrial health staff to support the needs of response workers, including Coast Guard responders. Experts in the fields of toxicology, public safety, drinking water quality, and environmental health were hired. RP industrial hygiene and safety personnel deployed to worksites to conduct site assessments including physical, chemical, and biological threats, and to act as safety field observers.

The UAC employed other government agencies such as OSHA to monitor the health and safety hazards facing workers involved in the oil spill response. OSHA personnel were deployed to the Gulf the week of April 26, 2010, and deployed

to 17 locations in Alabama, Florida, Louisiana, and Mississippi, and served as a critical component of the ICPs in Houma and Mobile. In coordination with the Coast Guard, OSHA staff also boarded near-shore vessels engaged in booming and skimming operations. Additionally OSHA staff observed offshore in situ burning operations and were stationed on offshore vessels for longer periods.

Monitoring Chemical Exposures

The potential health effects from inhaling chemicals such as oil, weathered oil, oil dispersants, cleaning agents, and other substances were an ongoing concern. Health and safety personnel continued monitoring chemical levels while assessing all materials and characterizing their health effects. Aside from workers on ships directly adjacent to the spill source who were exposed to fresh oil, most of the cleanup workers were exposed to weathered oil, where the more toxic volatile substances had evaporated.

To ensure that workers were not exposed to dangerous levels of toxic chemicals, real-time air monitoring, area air sampling, grab sampling, and personal air monitoring were conducted primarily with organic vapor monitoring badges

and real-time air monitors, such as multi-gas and photo-ionization detectors. Professional safety and health personnel from both independent contractors and the RP reviewed all data.

Agencies involved in the response cooperated to reach practical solutions to safety concerns. For vessels working offshore in the proximity of dispersant application, safety staff characterized the area and the ambient air of workers closest to the dispersant operations. Through air and water monitoring, safety personnel determined the area was clear for workers to continue operations without respirators. Safety associated with the Volatile Organic Compounds (VOCs) at the surface in vicinity of the well as addressed by sub-sea and surface dispersant applications, as discussed in Chapter 3.

At the outset of the response, significant attention was paid to potential respiratory hazards such as benzene, posed by the evaporation of the hydrocarbons on the surface of the water, and potential toxins released by the burning of natural gas and surface oil at the well site. From the beginning of the response, the RP utilized site safety plans for operations. As part of site safety plans, workers at the spill source used respiratory protection equipment. By May 7, 2010, the UAC released the *Mississippi Canyon 252* Offshore Air Monitoring Plan for Source Control and Skimming Operations, a detailed plan that outlined required monitoring equipment, frequency of measurements, and exposure limits for all response personnel. From the commencement of response operations, industrial hygienists and safety professionals were embedded with response personnel to ensure proper measurements and monitoring were being conducted. At no point during the skimming

GULF OF MEXICO –
A contractor monitors the air quality at the *Deepwater Horizon* site to ensure safety of the workers. Photo courtesy of U.S. Coast Guard



GRAND GOSIER ISLANDS, La. – An Environmental Protection Agency contractor conducts surface water sampling near Grand Gosier Islands, La. Photo courtesy of EPA

operations did gas readings exceed the Permissible Lower Exposure Limits for any of the identified toxins. Nevertheless, the vapor coming from the top of the portable tanks, combined with the extreme heat, accelerated the fatigue of personnel during pumping and offloading operations. On several occasions, personnel on top of the tanks had to be rotated early or moved to a cooling area because of the combined effects of the heat and fumes.

The principal hazards at work sites were slips, trips, falls, heat stress, sun exposure, fatigue, and motor vehicle accidents. Dermal exposure to the oil products and other chemicals also posed a threat throughout the spill recovery operation. Even minimal exposure to the oil products could result in an uncomfortable skin rash. The only way to prevent dermal exposure was through the consistent wearing of personal protective equipment (PPE) suited to the operations being conducted.

Safety personnel documented specific personal exposures in the post-deployment *Deepwater Horizon* Health-Related Inventory and Reporting Tool. This input was compiled and documented in Industrial Hygiene reports. Mishaps were captured by supervisors and reported to respective ICPs for investigation and documentation.

Protecting Workers from Exposures

Safety staff monitored worker safety and health protections, including providing required PPE, for all workers involved in the cleanup.

One of the responsibilities of Safety and Environmental Health personnel is to determine which type of PPE is needed, who has to wear it, and what

training and medical qualifications are required to use the PPE. Safety and Environmental Health personnel must also ensure that PPE requirements are known and understood by workers, the correct number, sizes, and types of PPE are ordered, and the PPE is staged in areas where the workers can access it.

Early in response efforts, the RP ordered PPE and established numerous staging areas to deliver the material to the field in a timely manner. Safety plans were drafted and included descriptions of what PPE personnel should wear when conducting specific operations. Personnel were instructed to pick up their PPE at the Staging Areas, and to inform their supervisors if the PPE they needed was not available. A majority of the PPE used was procured and staged by the RP. All responders accessed the PPE at the Staging Areas close to field operations.

Aviation Safety

One of the most high-risk operations of the *Deepwater Horizon* response was air traffic over the vicinity of the spill. There were a number of aviation safety issues that necessitated the FOSC's attention and closer coordination of aviation safety and operations.

The Federal Aviation Administration (FAA) could provide a flight restriction, but no air traffic radar was available offshore that could guarantee the efficacy of a flight restriction. The FOSC was able to secure the services of the Customs and Border Protection Air Intercept Radar aircraft to provide the air traffic control radar. The Air Force provided skilled controllers. Eventually, the size of the operation grew so large that centralized airspace management operations and airspace confliction prevention services were consolidated to the 601st Air and Space Operations Center located at Tyndall Air Force Base in Panama City, Fla.

Aviation operations utilized numerous air assets from the Coast Guard, as well as federal, state, and local agencies, and private companies to support *Deepwater Horizon* response operations. To support the *Deepwater Horizon* response, the Coast Guard employed Coast Guard Air Station Flight Safety Officers, who were well versed in the safety needs of pilots and air crews. Flight surgeons were employed to ensure flight crews and pilots were medically qualified to fly. Pilots deployed from their home units to assist with the response. Aviation safety and operations are discussed in further depth in Chapter 6 of this report, Logistics.



PORT FOURCHON, La. – Workers contracted by BP, and under the direction of the U.S. Coast Guard, don personal protective gear before deploying to the beach to clean up oil. Photo courtesy of U.S. Coast Guard

Coast Guard Cutter Safety

Coast Guard Sea Going Buoy Tenders were assigned to the oil spill to provide skimming resources using pre-established Spilled Oil Recovery Systems (SORS) and Vessel of Opportunity Skimming Systems (VOSS).

Crewmembers were provided just-in-time training in Emergency Response, First Responder Operations Level prior to deployment in the field. In addition to training, safety personnel ensured crewmembers were outfitted with PPE, which included hand-held real time multi-gas meters to evaluate the air for volatile organic compounds. When operations occurred, crews named a specific person as the safety observer on deck. Additionally, Coast Guard Safety personnel at ICP Houma worked with the RP to develop an air-monitoring plan for the cutters.

Temperatures on deck often reached 100 degrees Fahrenheit or higher. Tyvek suits were effective at preventing dermal exposure to oil, but they accelerated heat stress and fatigue. In addition to constant hydration and plenty of sunscreen, other solutions had to be found to reduce the effects of heat stress. Perspiration wicking clothing was ordered for personnel to wear under the Tyvek. In addition, water fans were set up under canopies on the buoy deck to provide a cool zone. Canopies were placed in various spots on the buoy deck, forecandle, and on the flying bridge to mitigate sun exposure.

GULF OF MEXICO – A Coast Guard petty officer grabs hold of a shipmate to help him from slipping on the oil covered deck of the U.S. Coast Guard Cutter Harry Claiborne. The crew is preparing to remove a Vessel of Opportunity Skimming System following collection of oil from the Gulf. Photo courtesy of U.S. Coast Guard



Personnel working on deck were generally limited to one to two hours of work before a recovery period was required due to heat and fatigue. Guidance was provided for heat exposure limits, including the use of a log system to monitor times and ambient temperatures. Although it was possible to skim and pump oil from sunrise to sunset, the cumulative effects of the pace of operations were



GULF OF MEXICO – A Coast Guard seaman is covered in oil after bringing a Vessel of Opportunity Skimming System on board the U.S. Coast Guard Cutter Harry Claiborne. Photo courtesy of U.S. Coast Guard

felt within a matter of days. Taking advantage of days when oil was not found or the weather was not conducive to skimming was critical to allowing the crew to rest and properly hydrate.

FOSC Key Points: Safety

The agencies charged with oversight of both worker and public safety, and those in command positions, from the federal and state governments, as well as the RP, made safety a priority. Considering the size of the response, the amount of oil released, the geographic scope of the area where response operations took place, and the time of year, the safety record of the entire response operation reflected an effective and persistent safety program. The efforts and commitment to ensure the safety of those who worked on the spill, and that of the public, is one of the single most notable accomplishments of the *Deepwater Horizon* response.

Given the immense geographic scope, maritime operations from the well site to 50 miles offshore skimming, to near-shore, aviation operations and land based cleanup, decontamination, and waste management—and the vast mixture of people thrown together ad hoc—the *Deepwater Horizon* response produced an exceptional safety record.

During the *Deepwater Horizon* response, the Unified Area Command (UAC) and the Incident Command Posts (ICPs) established robust Planning Sections in accordance with Incident Command System (ICS) doctrine. Each Planning Section collected, evaluated, and disseminated information about the situation, including developments during the incident and the status of resources. The UAC used this information to understand the current situation, predict the probable course of incident events, and prepare alternative strategies for the incident.

The UAC Planning Section prepared the Area Command Operating Guide to provide the ICPs with direction from the Federal On-Scene Coordinator (FOSC) and Area Command regarding response priorities and objectives. Using this guidance, the ICP Planning Sections prepared Incident Action Plans (IAP) for each operational period. The IAP contained objectives reflecting the overall incident strategy and specific tactical actions for the next operational period of the incident. IAPs ensured the command staff and responders worked in concert toward the same goals set for that operational period. They did this by providing all incident supervisory personnel with specific tactical direction for actions regarding the operational period identified in the plan. Additionally, IAPs supplied a coherent means of communicating the overall incident objectives for both operational and support activities.

Each Planning Section had access to established oil spill response contingency plans, such as Area Contingency Plans (ACP) and the One Gulf Plan. Responders also used established all-hazard compatible Marine Transportation System (MTS) recovery plans, tailored for each operating area. The MTS recovery plans were originally created in response to the September 11, 2001, attacks but, like much planning doctrine in the past decade, they represented an all-hazards approach to port recovery.

Planning Sections also developed incident-specific plans. The National Oceanographic and Atmospheric Administration (NOAA) members of the UAC Planning Section supported the FOSC by mapping the extent of the spill and developing oil trajectory forecasts. Planners at the UAC and ICPs developed severe weather (hurricane) plans and considered the implications of concurrent activation of the National Contingency Plan and the Stafford Act in the event of severe weather.

Beyond planning for the next operational period, incident planners also engaged in long-term, strategic planning. Finally, Planning Section leaders ensured the preservation of incident information.

5.1 Existing Plans: Area Contingency Plans

Under the National Oil and Hazardous Substances Pollution Contingency Plan, or NCP, the Coast Guard is responsible for developing procedures to address oil discharges and releases of hazardous substances, pollutants, or contaminants. The Coast Guard also coordinates planning, preparedness, and response activities with other agencies. The Oil Pollution Act of 1990 (OPA 90) established a contingency planning continuum that included local, regional, and national level planning for oil spills. The NCP created the national policy for oil spill response, followed by Regional Contingency Plans that align with standard federal regions, while local contingency plans provide for detailed planning at the Coast Guard Sector level.

For the Gulf Coast area, ACPs provided some identification and prioritization of sensitive areas where boom would be deployed in the event of an oil spill and in some cases identified the quantity of boom needed for these areas. Strategies for deploying boom under a variety of conditions were generally not developed in anticipation of this incident. The surface use of dispersants and in situ burning was pre-approved in the ACPs, but sub-sea application of dispersants was not anticipated in ACPs or part of the dispersant pre-approval.

ST. PETERSBURG, Fla. – A Coast Guard Deputy Incident Commander for the [Deepwater Horizon](#) oil spill response in St. Petersburg, addresses members of the public during a Hernando County Port Authority meeting in Hernando Beach, Fla. Photo courtesy of U.S. Coast Guard



MOBILE, Ala. – Government and private sector assets come together at the Mobile Incident Command Post to plan and coordinate oil recovery efforts from the Deepwater Horizon oil spill in the Gulf of Mexico. Photo courtesy of U.S. Navy



In July 2009, Texas General Land Office offered to assist all Gulf Coast FOSCs by developing a single compact disc (CD) that held Gulf-specific response guidance. The information contained on the CD became known as the One Gulf Plan. The One Gulf Plan was not a regional contingency plan—rather, it was a collection of ACPs. The One Gulf Plan detailed information about state organization structures and pre-approved zones for dispersant use, and contained checklists for use during an oil spill response. The One Gulf Plan CD linked Geographic Response Plans (GRPs), which were considered ACPs for each FOSC area of responsibility (AOR).

At the onset of the *Deepwater Horizon* response, Operations and Planning Sections personnel accessed the local sections of the ACPs, including the One Gulf Plan and Geographic Response Plans, for their assigned areas. In some cases, marshes, barrier islands, and land masses had eroded, moved, or geographically shifted to regions where endangered nesting or sturgeon transit areas were located. Often, up-to-date depictions of these land masses were no longer available. Planners, particularly for the Louisiana ACPs, therefore relied on input from local fish and game personnel and fishermen who daily surveyed impacted areas to identify the actual resources at risk. This situation

created a high demand for critical resources because the contingency plan required booming of Tier 1 areas (high priority protection locations), even though some high priority areas had shifted. This required adjudication as to which areas should be deemed high priority.

Due in part to geography, the ACP for the Sector Mobile AOR was prone to the same challenges as the Louisiana plans. It became the primary playbook guiding response actions in the ICP Mobile AOR, which was the same as the Sector Mobile AOR. The Sector Mobile ACP was effective, in that it was previously digitized for ease of reference and had a prioritized list of sensitive sites throughout the AOR. However, the plan did not detail booming strategies, response equipment requirements, and response protocols. A major complication was that none of the existing ACPs contemplated continuous coastal impacts from an uncontrolled well release offshore. The worst-case discharge scenarios presumed either the complete loss of product from a vessel or an on-shore facility.

The Sector Mobile ACP was a collaborative effort, developed with the consensus of the affected states and local communities; however, those who participated in its development were primarily those involved in pollution and emergency response.

The ACP did not have prior visibility with state or local elected leaders. Faced with a spill of this size these officials required re-examination of the plan and ICP Mobile negotiated the ACP 2.0 strategies with the states as the response evolved.

In addition to needing to rework the ACPs due to concerns regarding their delineation of sensitive areas and booming strategies, activating every contingency plan on the Gulf Coast at once created instant competition for limited resources, and set in motion many political challenges. Nevertheless, the UAC tried for weeks to execute that strategy. A UAC team produced a Unified Command Contingency Plan (UCCP) that relied on the observed and projected behavior of the surface oil in combination with known stockpiles and delivery times of protection and removal resources for all near-shore and shoreline boundaries throughout the Gulf. The UAC was immediately able to execute this plan in Florida and Texas, states that had not yet fully activated their contingency plans. However, the plan was more difficult to implement in Alabama, Louisiana, and Mississippi. Nevertheless, elements of the plan such as the Critical Resources Unit (CRU), the large capacity staging sites, information sharing, and critical resource prioritization methodologies proved very helpful in meeting the concerns of the affected states and local communities.

In a sense, the UCCP was a regional plan for Louisiana negotiated in the midst of the response, and area plans were renegotiated at the ICPs and approved by UAC, area, and national commands. The UCCP addressed the decision not to designate sensitive areas in the existing ACPs; instead it designated all of the potentially impacted Louisiana shoreline as sensitive and called for shoreline protection measures in all those areas. ACP-Plus, or ACP 2.0 took the existing Sector Mobile ACPs and factored the size of the spill, economic impacts, social, and political concerns, and broadened the response strategies beyond environmental protection. ACP 2.0 included the booming of miles of sand beach and bays that were typically not boomed. These two revised plans placed a requirement on the Coast Guard CRU and the RP's Procurement Supply Chain Management system to acquire five million feet of boom from the worldwide market in order to provide the resources required to execute the modified plans. This amount turned out to be significantly less than what communities along the Gulf of Mexico

expected. With the inexorable movement of oil toward the shore, state and local officials insisted that actions needed to be taken to protect shoreline, including both sensitive habitats and economically important shorelines. Officials wanted to use boom as a last line of defense for the shore, and cover as much of the shore as possible. Additionally, the need to demonstrate proactive efforts by placing boom became more important than the effectiveness of the boom itself as a tool in actually preventing oil from coming ashore. As a result, the limitations of boom as a response tool became secondary to the demand for any kind of barriers to stop the progress of the oil.

ACP 2.0 and the UCCP were constructed in an attempt to ensure the affected states would agree to a specific level of boom based on their input for booming strategies. In the normal boom strategy development process, amounts required are validated by actually field testing the plans in the water during drills and other exercises. As plans were negotiated during the actual response, boom amounts and protection strategies could not be validated by responders before being deployed, resulting in operations receiving more boom than was needed. And thus not all boom was deployed. At the same time, unused boom was perceived by state and local officials as a wasted opportunity to protect shorelines, and was frequently judged as a sign of inefficiency in response operations.



GRAND ISLE, La. – Workers place absorbent boom around Mangrove Island which is a sensitive nesting area for Brown Pelicans. Photo courtesy of U.S. Coast Guard

5.2 Existing Plans: The Maritime Transportation System Recovery Plans

Marine Transportation System (MTS) recovery plans, tailored for port, have been promulgated by Coast Guard Sectors in consultation with stakeholders to address transportation disruptions. A Marine Transportation System Recovery Unit (MTSRU) is established for incidents in the Planning Section at each ICP that have the potential to significantly disrupt the MTS.

The initial fire and explosion aboard the Mobile Offshore Drilling Unit *Deepwater Horizon*, 42 miles from Venice, La., had localized effects and no impacts to the MTS. However, the subsequent discharge of crude oil from the Macondo well created the potential for geographically widespread disruptive effects on the MTS along the Gulf Coast and its associated cargo flow routes.

Although the threat was persistent throughout the incident, the MTS recovery effort was primarily precautionary, as no significant disruptions of marine transportation occurred. It is key to note there was a significant concern within the shipping industry about surface and subsurface oil (i.e., seawater intake issues), and a number of vessels

self-rerouted to avoid spill areas. In one instance, one company issued a precautionary divert order to its whole fleet of tankers. Through Coast Guard MTSRU informational intervention, the company decided not to divert its ships before a disruption occurred.

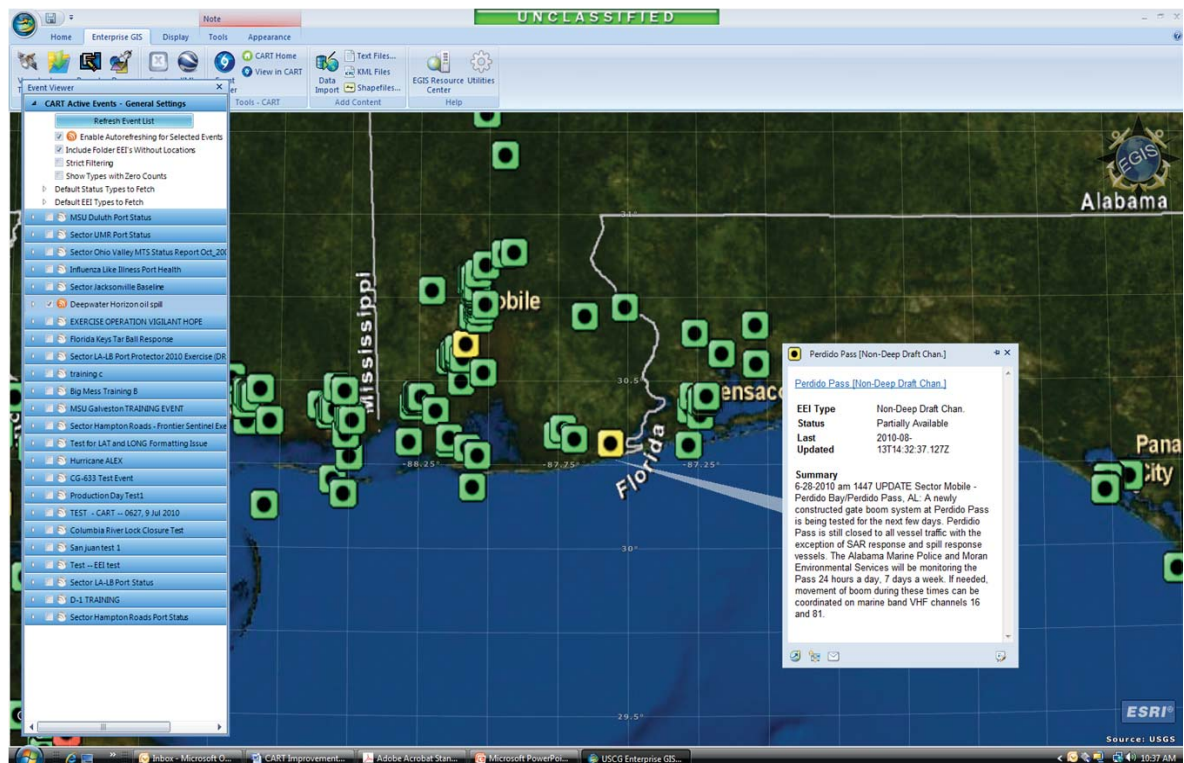
5.3 Organizational Structure

UAC MTSRU

UAC MTSRU functioned from April 27, 2010, to August 4, 2010. Once the scale of the oil spill and the potential threat to shipping became apparent, the Coast Guard implemented the MTS recovery function at the field level.

The UAC MTSRU published Commercial Protocols, which detailed how they communicated with industry and the UAC's key strategic points: keeping all ports open throughout the incident, tracking the status of decontamination stations, and cleaning and decontamination activities. Additionally, the UAC maintained direct contact with the Louisiana Offshore Oil Port (LOOP) to coordinate information about the status of the LOOP, and with port authorities throughout the incident area.

Figure 5.1:
E-GIS E-GIS
Representation
of Command
Assessment
of Readiness
and
Training (CART)
Event Data



ICP Houma MTSRU

An MTSRU established at ICP Houma for the Marine Safety Unit (MSU) Morgan City AOR functioned from April 27, 2010, until June 11, 2010.

The unit maintained situational awareness of ICP booming activity, response strategies, and efforts to minimize marine traffic and disruptions. It also coordinated the Southwest Pass contingency anchorage in the event vessels were required to wait for decontamination.

ICP Houma directed the RP to set up a decontamination station for inbound and outbound vessels in Southwest Pass and the Boothville Anchorage areas of the Lower Mississippi River. This was accomplished in cooperation with the Bar Pilots. Very little contamination was observed on vessels entering the river, and vessels leaving the Mississippi River were not required to utilize the Southwest Pass decontamination station.

This decontamination station moved as necessary to stay out of the oil, and the Coast Guard published its location with Marine Safety Information Bulletins (MSIBs).

ICP Mobile MTSRU

The MTSRU at ICP Mobile functioned from April 28, 2010, through December 27, 2010. During the first two days of operation, the MTSRU established and participated in daily industry, government, and Coast Guard Eighth District conference calls to gain situational awareness and to seek a unified MTSRU strategy across impacted zones. The MTSRU also updated the Common Assessment Reporting Tool event data file twice daily for the ICP Mobile AOR. Data entries included booming activities, waterway restrictions, and location of decontamination sites.

Within the first 24 hours after activation, MTSRU Mobile was tasked to develop a plan of action to assess and decontaminate vessels transiting through oiled waters. Within 72 hours of activation, the MTSRU developed a Vessel Self-Assessment procedure and reporting sheet, a facility impacts data sheet, an initial draft decontamination plan, and a third-party review process.

The MTSRU coordinated with the Sector Mobile vessel arrivals desk and commercial vessel operations, Pensacola Harbor Master, Mobile Harbor



Master, and Pascagoula Harbor Master to ensure that transiting vessels submitted comprehensive data, and to provide a common vessel transit picture.

The Coast Guard sent information to local industry on a daily basis by email. The emails provided the latest NOAA spill trajectories, the most recent vessel and facility reporting sheets, the latest Marine Safety Information Bulletin (MSIB), and the vessel decontamination processes. A contingency Vessel Trafficking Management plan was also prepared, but was not required to be implemented.

National Level Support and Outreach

Coast Guard Headquarters and the Commander of the Atlantic Area monitored MTSRU recovery activities. On May 1, 2010, the NIC and Coast Guard Headquarters MTSRU prepared and disseminated an informational alert (via email) to Carrier and Trade Support Groups. These groups conducted a live test of the communications protocols and procedures and the Coast Guard's Alert Warning System (AWS) on May 3, 2010. Stakeholders were apprised daily of MTS status and contingency arrangements for decontamination of shipping. Various organizations including Intertanko, World Chamber of Shipping (WCS) and BIMCO of the Carrier Support Group further distributed the executive summary information to their domestic and international members.

GULF OF MEXICO – Researchers monitor the effects of the Deepwater Horizon spill from NOAA aircraft overflying the impacted area. Photo courtesy of U.S. Coast Guard

MTS Recovery Data

Although an actual transportation disruption did not develop, there was significant demand for MTS status information. The prototype CART was successfully used to support documentation and reporting of MTS status. CART was originally developed by Coast Guard Atlantic Area as a software application to support the identification and documentation of Essential Elements of Information (EEI), and automated status reporting. EEI data and status information were entered at the field level and were immediately accessible to the MTSRU staff at all levels. An automated report generation capability acted as the principal resource for sharing MTS recovery status information with the NIC Situation Unit, Homeland Infrastructure Threat and Risk Analysis, Maritime Administration, and the Northern Command. The report also informed strategic-level policy outreach with national-level stakeholders. Participating associations redistributed status reports to their constituents worldwide, which restored confidence in general operating conditions in affected ports.

5.4 Plans Developed During the Response: Severe Weather Plan and Planning for Concurrent Activation of the National Contingency Plans and Stafford Act

Each year, an average of eleven tropical storms develop over the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico. Official hurricane season begins June 1st and ends November 30th; however, a severe weather event can occur at any time.

During the 2010 hurricane season, NOAA projected an active to extremely active hurricane season for the Atlantic Basin. According to a seasonal outlook issued May 27, 2010, there was a 70 percent chance of 14 to 23 named storms (top winds of 39 mph or higher) including eight to 14 hurricanes (top winds of 74 mph or higher). Three to seven were slated as major hurricanes (Category 3, 4 or 5, with winds of at least 111 mph). As of September 24, 2010, 12 named storms had occurred, three of which passed through the Gulf of Mexico. Five of the six storms that reached hurricane status became major hurricanes.

The *Deepwater Horizon* operating area was subject to both Atlantic tropical weather systems and locally

generated storm systems that originated within the Gulf of Mexico. Storms from either source could impact the UAC AOR with high winds and seas, storm surge, and heavy rainfall.

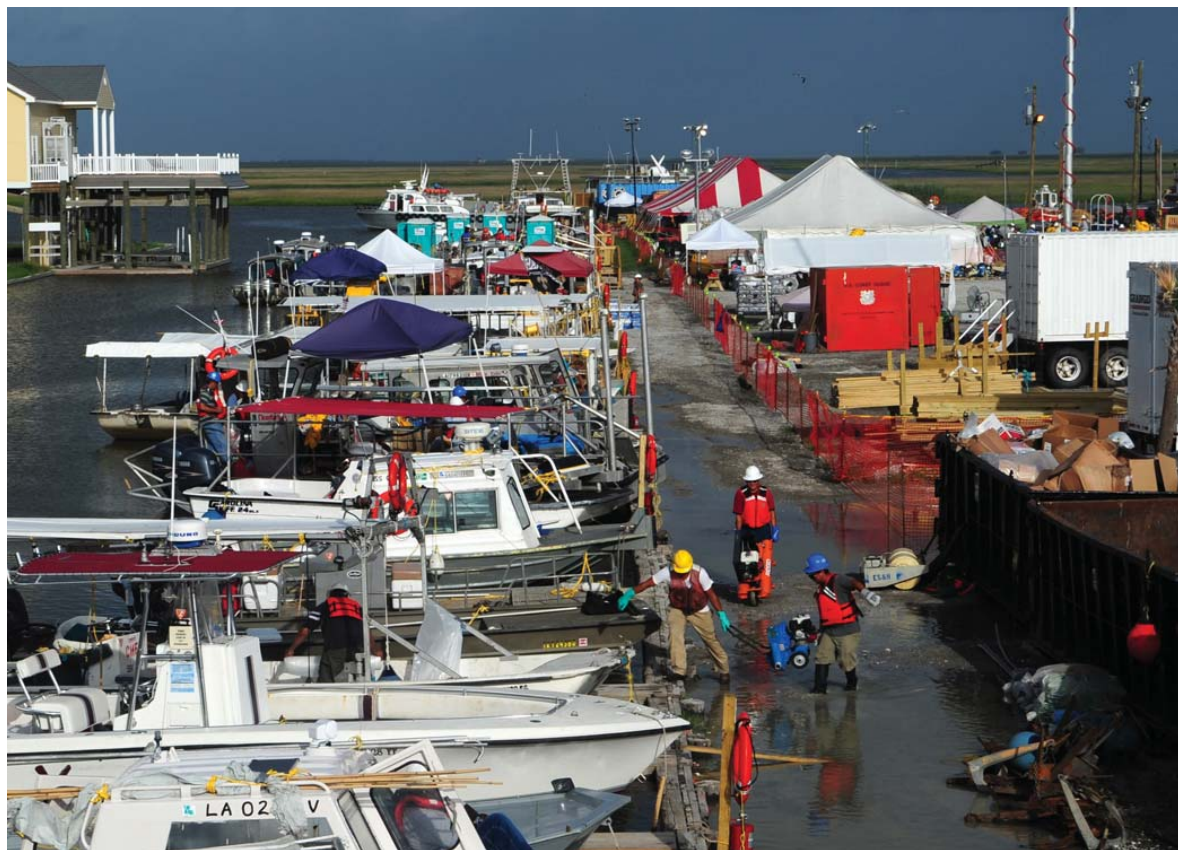
The National Incident Commander and the UAC were concerned that severe weather would interrupt *Deepwater Horizon* spill response operations.

If this happened, the dynamically positioned relief-drilling rig would need to suspend drilling, disengage, and move off station to prevent damage to the vessel, riser, and drill pipe. Relief well drilling efforts would cease until it was safe to resume drilling operations. All support vessels and equipment used in the surface and sub-sea intervention efforts would likely need to be withdrawn to evade severe weather, which would result in all response operations temporarily coming to a standstill. Even when the impact of a severe weather event did not cause additional damage to vessels and well-control equipment, the pre-storm and post-storm downtime, and resumption efforts could take a week or more. Further, severe weather could potentially push floating oil inland and deeply ashore into sensitive areas. When a storm surge retreated, the oil could remain, potentially contaminating wildlife habitat, as well as public and private property.

As the *Deepwater Horizon* response would likely extend through the entire 2010 hurricane season, the NIC directed the development of severe weather response plans.

Concurrent Activation of the National Contingency Plan and the Stafford Act

The strength of the NCP is that it directs coordination among federal, state, local, and tribal stakeholders and the oil spill industry in oil spill preparedness and response. Responders are predominately drawn from federal, state, and local environmental management communities, the RPs' contracted Oil Spill Removal Organizations (OSROs), other RP contractors, and RP personnel. Other state and local emergency response personnel are invited to provide support as needed or called upon by the FOSC. While the National Response Framework (NRF) also relies on federal, state, local, and tribal coordination, it is designed to support state and locally led emergency response to natural disasters and other catastrophic events. Pollution response under the NCP is a federally funded effort, while the Stafford Act is based on federal assistance to state and local



COCODRIE, La. – Response workers assemble by their boats and wait to see in heavy weather results in the cancellation of oil cleanup operations for the day. Photo courtesy of U.S. Coast Guard

governments. State and local governments did not understand the difference and had no idea about what an RP was or what its role should be. Although the NRF incorporates the NCP by reference under Emergency Support Function 10, the two governance structures are inherently different and the NRF does not explicitly address the role of the RP.

The role of the federal government is different in an NCP response compared to an NRF response. In the latter, the federal government supports state and local activities. In an NCP response, the federal government acts as the first responder.

State and local government emergency response officials apply the bottom-up response constructs defined within the Stafford Act and the NRF. Under these constructs, the state and local governments direct the emergency response, and the federal government assumes a supporting role. Funding and resources are predominantly an intergovernmental responsibility—as opposed to those of a private sector responsible party under the NCP.

This response would have been even more complicated had a severe weather event resulted in a major emergency or disaster declaration under the Robert T. Stafford Disaster Relief and Emergency

Assistance Act (the Stafford Act), discussed in detail below. When severe weather strikes, the primary event (wind, rain, flooding) leaves a path of destruction to public utilities and infrastructure, homes, businesses, and crops, and people suffer injuries or loss of life. Secondary impacts are related to the direct impacts, such as public utilities and infrastructure shutdowns (sewer, water, electricity, air quality, trash, and telecommunication), as well as longer-term impacts associated with economic and environmental impacts. In addition, the more severe the impacts sustained, the higher the recovery costs and the longer the recovery time. To combat these multiple-order impacts, the President of the United States may issue a disaster declaration under the Stafford Act. The Stafford Act authorizes federal agencies to provide assistance to states overwhelmed by a disaster. By order, the President delegates to the Federal Emergency Management Agency (FEMA) the responsibility for taking actions and assisting the affected communities.

The Planning Section at the UAC considered that if severe weather, such as a hurricane, were to hit the Gulf Coast, it could deposit oil or oily debris from the *Deepwater Horizon* well inland. The resulting response would have to include two individual

responses, depending on the size of the spill—one following the NCP and the other following the NRF. The Planning Section considered numerous issues, including who would be in charge of removing the debris, who would pay for its removal (RP or Disaster Relief Fund), how to determine if the oil was *Deepwater Horizon* oil, and how the Stafford Act and NRF response would be coordinated.

Funding for NCP related incidents is provided under the Oil Spill Liability Trust Fund (OSLTF) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Fund, and is sourced by an oil tax. Generally, the use of the OSLTF and CERCLA Fund should be avoided during Stafford Act declarations where the pollution event has been caused by the disaster or emergency. However, funding for pollution incidents commenced prior to a Stafford Act declaration, or from sources not potentially impacted by the disaster, is completed using the applicable pollution fund. This segregation of responsibilities and funding sources is significant, and decision-makers need to be clearly advised to avoid substantial legal implications for both the RP and the federal government.

The UAC Severe Weather Contingency Plan (SWCP), discussed in detail below, kept those actions as separate as possible. The SWCP noted FEMA would administer the funding necessary for disaster response efforts, exclusive of *Deepwater Horizon* efforts, in accordance with the Stafford Act. FEMA could also establish a Joint Field Office (JFO) to serve as a central coordination point for incident oversight, direction, and assistance regarding weather and disaster related response and recovery actions.

Continuous coordination among the UAC, ICPs, and the FEMA Regional Response Coordination Center (RRCC) would ensure that oil cleanup costs after a severe weather incident were properly charged to either the RP or the OSLTF, depending on whether the oil was determined to be from the *Deepwater Horizon* source. A *Deepwater Horizon* liaison officer would be embedded in the RRCC to facilitate coordination at the regional level.

Development of Severe Weather Contingency Plans

The UAC developed a broad SWCP incorporating strategic, operational, and tactical planning for the *Deepwater Horizon* response. This comprehensive plan guided response operations and focused on

the safety of all response personnel during the transition from, and return to, surface and shore based cleanup operations and subsurface source control operations. The UAC SWCP incorporated plans from each ICP. These independent plans aligned with other federal, state, and local government emergency plans, and were harmonized with the severe weather plans of Coast Guard Districts Seven and Eight.

The SWCP identified key decision points based on NOAA National Weather Service storm behavior prediction models. These scientific models predicted storm behavior at approximately 120 hours prior to anticipated sustained gale force winds. This 120-hour warning initiated a series of decision points at 24-hour intervals for each affected area of operation that was forecast to be impacted, and began the potential demobilization of response operations.

As with many aspects of the *Deepwater Horizon* response, developing an SWCP required many actions and policies to address the breadth and scope of this Spill of National Significance.

Developing a Severe Weather Planning Capability

On May 28, 2010, the UAC created a separate Strategic Planning Team under the Planning Section at the UAC and at each ICP, to address issues identified as ones that would stretch beyond the normal 24-hour planning cycle. Several strategic issues were identified, but most pressing was entry into the high-risk hurricane season for the region.

The first Strategic Planning Teams consisted of one or two Coast Guard personnel who were soon augmented by contractor support at the ICP level, along with a team of Department of Defense (DOD) strategic planners at the UAC level. In order to write a comprehensive SWCP, especially at the ICP level, many more personnel were required. Significant contractor support was needed, as was daily support by state and local planning personnel, to ensure alignment with state and local hurricane plans.

The DOD planning support element was dispatched directly by the NIC. Initially brought in to develop unconstrained strategic courses of action for the response effort, they focused on SWCP development. DOD expertise was used to validate early draft SWCPs and to visit field operations sites to expose logistical gaps in the plans. Ultimately, DOD personnel observations were used to identify

problem areas for severe weather response planning and areas where improvements could be made in the plans.

To build a plan of this nature would normally take two years, but with the oil spill organization (National Incident Management System (NIMS) and ICS) already in place under one unified command, most stakeholders and planning processes were already participating in the response. It was straightforward under these circumstances to coordinate between the different levels of government. The stakeholders' staffs had already been centrally located and committed to the response. The Strategic Planning Staff collaborated with the immediately available state and local emergency management agencies, FEMA, and DOD.

Existing SWCPs were reviewed and continuously improved. Normally, severe weather plans are reviewed and improved on an annual basis. However, because of hurricane season and exponential growth in the overall response organization, review and improvement of SWCP was done approximately every 10 days for the first two months of hurricane season. These regular adjustments to the guiding UAC SWCP created some gaps between the UAC guidance plan and the ICP SWCPs.

Severe Weather Operations Center (SWOC)

For the same reasons a Strategic Weather Planning Team needed to be established to look beyond the daily 24-hour planning cycle, a strategic weather monitoring capability was needed to look beyond the next 24-hour operational period and focus attention to the 7 to 10 day (long-range) severe weather forecast. The Severe Weather Operations Center (SWOC) was set up as the primary clearinghouse for severe weather information throughout the *Deepwater Horizon* AOR. The SWOC's four main responsibilities were:

- Production of a common weather picture,
- Decision logs and status regarding severe weather at each location,
- Continuity of operations even during periods of relocation, and
- Maintenance of links with key stakeholders through Liaison Officers and local Emergency Operation Centers (EOCs).

Residents of the Gulf Coast were well informed on hurricane procedures. They were familiar with the two hurricane conditions established by the

National Weather Service (NWS): Hurricane Watch and Hurricane Warning. These official notices serve the vast majority of residents, state and local governments, companies, and other agencies by providing advanced notification of an approaching hurricane. However, the Severe Weather Planning Team had a vast operating area, unique local conditions, and complex water and land operations to consider. For the purposes of creating an actionable SWCP, the NWS Hurricane Conditions were insufficient to account for necessary severe weather planning and actions.

Accountability Requirements

The UAC envisioned that the response organization would maintain accountability of assigned personnel and critical resources. To appreciate the complexity of the Severe Weather Contingency Plan tasking from June 1 to August 1, 2010, the response organization grew as shown below:

Table 5.1: Growth in Response

Maintaining accountability of all *Deepwater Horizon* personnel and critical resources through the demobilizing of responders and response equip-

Date	People	Offshore Vessels	Boom (feet)	Vessels of Opportunity (VOO)	Aircraft
June 1, 2010	16,887	1,231	1,949,795	unknown	57
July 5, 2010	45,037	6,505	3,177,830	3,185	113
August 1, 2010	30,075	3,684	3,646,640	1,590	96

ment would be a considerable challenge under hurricane conditions.

Different stakeholder communities (government, private sector, volunteer groups) working on the response ranged from having no heavy weather procedure in place to having well-established procedures, or something in between. To alter existing plans, particularly those of the private sector, was not desirable. Thus, the *Deepwater Horizon* plan allowed some flexibility to accommodate the many stakeholders who had existing plans, and attempted to coordinate with those plans. In general, the existing plans established categories of personnel (government, contractors, volunteers, etc.), who would be released from the response or kept as essential, and a verification process for tracking individuals. The tracking process was centralized

through a Houston call center (30 desks manned to receive and track responder tracking information). DOD personnel who specialized in tracking personnel significantly contributed to this effort.

A revised UAC SWCP used categories of essential personnel and non-essential personnel. New terms were created to describe personnel status in the event of severe weather. The response organization would transport and account for all retained personnel. Released personnel would be returned to their point of origin and their parent agency, organization, or company in advance of severe weather. A designated representative of that agency or company would account for their personnel, and report that condition to the response organization.

Personnel Accountability Unit (PAU)

The Severe Weather Contingency Plan provided a Personnel Accountability Unit (PAU) at a BP facility in Houston, Texas, that was co-located with the Houston Call Center (HCC). When activated, the PAU was charged with tracking the status of *Deepwater Horizon* personnel during a severe weather incident. The PAU was capable of keeping track of retained personnel, as well as receiving reports from those representing released personnel. The PAU established a telephone number for response personnel to call and receive updated information if work forces needed to be reassembled in the event of a severe weather incident. The PAU also had a Standard Messaging Service (SMS) that could send text-to-voice messages to distribute information rapidly and accurately.

The UAC SWCP contained detailed scripted actions the PAU was to take for each change to severe weather conditions as a storm approached the operating area. Actions included augmenting the PAU with additional personnel, transmitting scripted text-to-voice messages, and preparing regular reports to

account for both categories of personnel back to Alternate Command Posts. With the passage of a storm, the PAU accounted for released personnel by organizational contacts until the affected UAC or ICP could manage the re-entry of released personnel.

Accountability for Boom

At the onset of severe weather contingency planning, the UAC designated containment boom as a critical resource. Boom placement was one of the most important issues in early response. Prior to altering the boom configuration or to retrieving boom in the event of severe weather, the Severe Weather Contingency Plan required the ICPs to institute a just-in-time approach to staging and deployment of boom. This philosophy was designed to minimize the quantity of staged boom requiring relocation in the event of pending severe weather. Each Incident Commander was also tasked with weighing several factors when considering the relocation of boom in preparation for a severe weather event. Those factors included but were not limited to:

- Safety risk to personnel retrieving boom,
- Type of boom,
- Oil contamination and time to decontaminate,
- Sensitivity of area protected,
- Personnel and equipment required for recovery,
- Personnel and equipment required for transport out of area,



LAFOURCHE PARISH, La. – High winds and storm tides caused a breach in the Hesco baskets in East Port Fourchon Beach, La. Photo courtesy of U.S. Coast Guard



LAFOURCHE PARISH, La. – High winds and storm tides destroyed the tiger boom deployed by the Louisiana Army National Guard 527th Engineer Battalion. Photo courtesy of U.S. Coast Guard

- Potential environmental and commercial damage if left in place, and
- Potential impacts on safe navigation.

Assessing deployed boom against these criteria was situation-dependent and not completely achievable. As noted in Table 5.1, on June 1, there were 1.9 million feet of containment boom deployed throughout the response area. This grew to 3.2 million feet in July 2010, then to 3.6 million in August (not counting the 8 million feet of sorbent boom deployed by August). In reality, if the entire response organization focused only on retrieving boom, it was impossible to retrieve, decontaminate, and store three million feet of boom in the 120 hours allocated to prepare for approaching severe weather. The UAC acknowledged that the goal of boom removal was not achievable in advance of a tropical storm or hurricane, and allowed practical modification of the SWCP. Under the new construct, fire boom was classified as a priority for retrieval. Of the remaining boom types, boom deployed in the vicinity of established shipping channels was required to be removed prior to any severe weather event to allow vessels to depart port, or alternatively, seek safe harbor.

Prevention of Conflict with Local and State Governments Evacuation Plans

Southern Louisiana, and in particular Plaquemines Parish, is largely an isolated and low-lying area. For the purpose majority of vehicles must use a single two-lane road that is at, or just slightly above, sea level. Given the remoteness, limited surface egress, and tendency to flood, Plaquemines Parish has adopted a hurricane evacuation posture that far exceeds the NWS Hurricane Watch and Warning time lines. When a forecast hurricane storm path places Plaquemines Parish at a high certainty of landfall, the parish president orders a mandatory evacuation of local citizenry 72 hours prior to arrival of tropical force winds. As such, in the event of a hurricane landfall in Plaquemines Parish, all Deepwater Horizon response activities would have to stop; critical equipment secured for heavy weather or transported out of the area; small boats sailed or trailered to safe mooring or locations; and response personnel transported to safe areas (generally considered north of I-10) prior to the parish mandatory evacuation of locals citizenry, so as not to interfere with the evacuation of residents.



GULF OF MEXICO – Crews aboard vessels around the drillship *Discoverer Enterprise* continue operations to minimize the impact from the *Deepwater Horizon* oil spill. Photo courtesy of U.S. Coast Guard

Safe Shutdown of Offshore Recovery and Source Control Operations

From June 1, 2010, through August 15, 2010, there were thousands of vessels operating offshore in the Gulf of Mexico and near the Macondo well site conducting sub-sea oil recovery, surface recovery, scientific monitoring, and well drilling operations. This vast operating area, under the direction of the Incident Commanders at ICP Houma, ICP Mobile, or Source Control in Houston, employed a wide range of vessels, ranging in size from 50- to 100-foot fishing vessels towing sea boom, operating skimmers, and conducting in situ burning, to larger vessels including 835-foot drill ships and drill platforms recovering oil from the *Deepwater Horizon* riser and blow-out preventer (BOP), conducting sub-sea dispersant operations, and drilling emergency relief wells. These operations extended from the near-coastal environment to over 50 miles southwest of the Louisiana shore, and were at high risk in the event of severe weather. Given that severe weather could potentially impact any offshore surface cleanup operation or the Source Control area of operations, Incident Commanders and ship captains needed sufficient lead time to stop drilling and recovery operations, recover drilling and other critical equipment, and move a 3,000 vessel fleet (average number of vessels employed) to safe locations.

The time necessary for a coastal fishing vessel to secure from skimming, burning, or booming operations and move to a safe harbor was not well established. However, it could be estimated, based on private sector data developed over the past 30 years operating in the Gulf of Mexico. The history of offshore drilling and production operations in the Gulf of Mexico has created a tested series of Trigger Times (T-times). T-times are estimates of the time it takes to complete hurricane preparations, allowing 24 hours to physically escape the path of the storm and evacuate personnel from moored platforms.

The lengthiest of the offshore operational T-times were for vessels engaged in relief well drilling operations. These vessels would have to withdraw drilling equipment, secure the BOP and all ancillary equipment such as sub-sea Remotely Operated Vessels (ROVs), and be given enough time to evade the storm path 24 hours prior to onset of severe weather winds and seas. In most operational configurations, the T-time for the *Development Driller II*, *Development Driller III*, and *Discoverer Enterprise* were in excess of 100 hours and, in a few cases, exceeded 140 hours. Because T-times were dependent on each day's operation, daily T-times were prepared by Source Control and passed to the SWOC for situational awareness by the UAC. On average, T-times for Source Control operations stayed between 50 and 120 hours. As 120 hours was the most common high-end T-time for drilling operations, the 120-hour T-time was selected based on historical norms as the outermost action point for severe weather contingency planning purposes.

Training

With the UACs and Section Chiefs briefed on the SWCP, all response workers had to receive substantial training to be accomplished at each ICP and outlying field locations. Strategic Planning Teams were responsible for this training. The SWCP was worked into the training curriculum given to all newly reporting responders. As the manpower to support *Deepwater Horizon* response was very dynamic throughout the entire hurricane season, and given that most agency responders rotated on a 20-to-30-day cycle, including hurricane readiness training into the indoctrination training was necessary and effective.

Safety First on Reconstitution of Deepwater Horizon Operations

Work conditions can change drastically after hurricanes and other natural disasters. In the wake of a hurricane, response and recovery workers would have faced additional challenges, such as downed power lines, downed trees, and high volumes of construction debris, all while performing more familiar tasks and operations. The Severe Weather Contingency Plan recognized this risk and outlined a plan for a staged reconstitution of response activity. In executing the SWCP, the health and safety of the workforce remained the primary focus.

In accordance with the UAC and ICP SWCPs, once local authorities had given clearance for access to areas of concern, post-storm assessment teams would be assembled to access the affected areas. The Post-Storm Assessment Teams could include Shoreline Cleanup and Assessment Technique teams, Rapid Assessment Teams, and Facility Damage Assessment Teams.

The primary role of the Post-Storm Assessment Teams was to determine if a facility or area was safe for reconstitution following a storm. Due to the hazards likely to be present, all Post-Storm Assessment Teams were to be augmented with appropriate Health and Safety representation as deemed necessary by the UAC and ICP Safety Officer. Appropriate representation might include medical, industrial hygiene, and safety professionals.

During the assessment, the team would be required to identify and evaluate the hazards involved in the anticipated tasks and operations specific to each

surveyed location. This information would allow those planning work to identify any additional engineering controls, work practices, and personal protective equipment necessary to minimize exposure risk. Teams were planned to be self-sufficient while completing the assessments so as not to place additional burden on local resources.

Hurricane Alex, Tropical Depression No. 2, and Tropical Storm Bonnie

One tropical cyclone, Hurricane Alex, was observed during the month of June. Alex grew to a Category Two Hurricane with a strong westerly track forecast to impact the northern Mexico coast. The storm made landfall in the area of Soto La Marina, Mexico and never threatened the *Deepwater Horizon* operational area.

Two tropical systems formed during July, Tropical Depression No. 2 and Tropical Storm Bonnie. Tropical Depression No. 2 followed a similar westerly path as Hurricane Alex, but did not strengthen into a tropical storm. Tropical Depression No. 2 made landfall just north of where Hurricane Alex made landfall in the extreme southern tip of Texas and also never was forecast to impact the *Deepwater Horizon* operation area. In late July, Tropical Storm Bonnie formed in the eastern Caribbean. At various times during its track to the northwest, Tropical Storm Bonnie placed the southern tip of Florida and then the northern Gulf coast from Destin, Fla., to Morgan City, La., in the Tropical Storm Warning Area.

By this time, the SWOC was staffed and fully functional, maintaining a common weather picture, conducting conference calls, and advising the UAC and ICPs during its regularly scheduled morning and afternoon command briefs. Close coordination, including twice-daily briefings, with the National Hurricane Center, NWS, and multiple-meteorological support organizations provided a very accurate



VENICE, La. – A U.S. Coast Guard Petty Officer uses a Pathfinder phone to obtain the exact global position of boom damaged by harsh weather conditions. Photo courtesy of U.S. Coast Guard

ST. PETERSBURG, Fla.
– A U.S. Coast Guard officer reviews the latest storm tracking data at the St. Petersburg Branch Command Post in preparation for Tropical Storm Bonnie. Photo courtesy of U.S. Coast Guard

picture of the threat imposed by Tropical Storm Bonnie. That weather picture showed Tropical Storm Bonnie was forecast to diminish in strength as it neared the northern Gulf and would diminish to an area of low pressure. As the SWCP was designed to be flexible enough to order partial changes to operations without wholesale changes to severe weather readiness conditions across the operational area, the UAC was able to suspend operations at Source Control, as well as coastal and the near-shore skimming operations in advance of wind and wave impacts.



The ability to pick specific items from the detailed Action Item Checklists developed by each Incident Commander was highly beneficial to command and control, and understanding of action to be taken at all levels of the organizations. Although the UAC did not order a change to the official Severe Weather Readiness Condition, the partial implementation of action items from individual IC's SWCPs, in anticipation of severe weather impact, proved effective. Fortunately, the temporary halting of Source Control activity occurred after the Macondo well was capped, and although it impacted the drilling of relief wells and support vessel activity, it did not result in further discharge of oil into the Gulf.

5.5 Plans Developed During the Response: Transition Planning

Under the ICS management structure, the primary management tool used to manage the event is the planning cycle. The duration of the planning cycle is determined by the particular requirements of the incident. For example, the cycle may be 12 hours, 24 hours, 48 hours, or longer.

Strategic planning, or long-term planning, is not a normal element of the ICS. Due to the uncertain duration of *Deepwater Horizon* response efforts, Strategic Planning units were established at the NIC, at the UAC, and at the ICPs to plot the response organization's long-term objectives.

Origins of Strategic Planning

The strategic planning concept was born of a need to address emerging issues: critical resources, the potential for oil in the Gulf of Mexico loop current, and development of the UAC Severe Weather Plan.

The nature of the response presented an immediate need for response equipment, particularly boom and skimmers. The CRU was created to anticipate and determine which response resources were required for the spill and once identified, coordinate with the Logistics Section to acquire sufficient supplies. Specifically, the CRU contacted boom supply sources and manufacturers, and located skimming equipment, not only in the United States but worldwide.

The other driver for strategic planning was the scenarios examining the possibility that oil would contact the loop current in the Gulf of Mexico. If oil hit the beaches of western Florida, the Coast Guard and the Responsible Parties (RP) would need to mobilize even more people and resources instantly. The UAC and ICP Houma began to examine requirements to build a response organization for the west coast of Florida. ICP Mobile independently began its own strategic planning process.

It became more essential to examine and plan for requirements to sustain the response when federal resources tripled. The Strategic Planning Team was created on May 28, 2010, the same day of the order to triple resources.

Severe Weather

The creation of the Strategic Planning Team nearly coincided with the June 1 start of hurricane season. As discussed in detail above, the first major project for the UAC Strategic Planning Team was to develop the Severe Weather Plan. Strategic Planners at all levels of the organization engaged to establish detailed plans in the event of severe weather.

Transition Planning

The next major focus of Strategic Planning was transition planning. There were three major anticipated transitions: transition away from offshore to shoreline response and the corresponding release of response resources; consolidation of the response organization by collapsing ICPs to the Gulf Coast Incident Management Team

(CG-IMT); and disestablishment the UAC by folding the remainder of the response organization into a single Incident Management Team, the GC-IMT.

Once the well-kill was achieved in August and after the permanent well-kill occurred in mid-September, when there was no recoverable oil offshore, it was necessary to scale the size of the response organization, particularly those parts dedicated to responding to oil before it came close to land. Part of that process was also shifting the focus of operations to near-shore and shoreline cleanup, with a phased transition including defined, conditions-based trigger points to scale the near-shore and shoreline cleanup operations over time as the cleanup progressed.

ICP Mobile began negotiations for this transition with Alabama, Mississippi, and Florida in late July 2010, soon after the well was capped. Those states

Response	Trigger Status	Activities (summary only)
Level I	All Zone Response Status: Well cap in place – no new product discharging. Recoverable oil on the water in the offshore and near-shore environment and impacting the shoreline. Offshore oil recoverable.	<ul style="list-style-type: none"> - Deploy full offshore, near-shore and onshore recovery operations and protect shorelines, - Begin decontamination of offshore recovery vessels, and - Maintain county Liaison Officers as required.
Level II	Near-shore and Shoreline Assessment and Cleanup Status: No observations of skimmable concentrations of offshore (>3 nm) oil on 3 consecutive days of full saturation over-flights. Remaining oil widely scattered and not available for burning or chemical dispersing.	<ul style="list-style-type: none"> - Place offshore recovery operations in standby and continue to decontaminate them, - Redeploy offshore skimming equipment to near-shore where possible, - Recover near-shore floating oil and protect and clean shorelines, and - Evaluate and implement appropriate boom strategy.
Level III	Detailed Cleanup to Achieve Completion Status: No aerial, vessel, or shoreline observations of skimmable concentrations of oil on three consecutive days of full saturation observations. Remaining oil widely scattered and not skimmable. Remobilization of oil episodic and intermittent. No substantial re-oiling of shorelines.	<ul style="list-style-type: none"> - Place on water skimming operations in standby and decontamination, - Deploy onshore recovery operations to implement SCAT Shoreline Treatment Recommendations and address intermittent reoiling as required, and - Rescale organization based on termination of on-water recovery operations.
Level IV	Maintenance and Monitoring Status: All SCAT Shoreline Treatment Recommendations completed such that further treatment would not provide net environmental benefit. Episodic impacts and discovery of oil continues.	<ul style="list-style-type: none"> - Deploy hot-shot teams to address episodic impacts and discovery of oil along shorelines or in near-shore environment, - SCAT surveys based on triggers relative to beach and shoreline profile (e.g., storm events), and - Review all oil recovery resources.
Level V	Re-evaluation of Level IV Shoreline Segments Status: Winter storm season has passed necessitating re-evaluating of no further treatment shoreline segments.	<ul style="list-style-type: none"> - Deploy hot-shot teams to address episodic impacts and discovery of oil along shorelines or in near-shore environment. Detailed SCAT surveys of impacted shoreline segments.
Level VI	End State: Long-term Monitoring and Restoration Status: Restoration complete. Episodic impacts and discovery of oil continues.	<ul style="list-style-type: none"> - Ongoing monitoring, and - Deploy hot shot teams as required.

Table 5.2:
Zone Responses and Activities

hoped to salvage the summer and fall tourist season along their Gulf beaches and were interested in trying to conclude cleanup operations as quickly as possible. ICP Mobile reached an agreement with those three states for a transition plan, with trigger points, by the end of the month. The plan contained six levels with defined transition points. The plan was agreed to and signed by Mississippi on August 6, 2010, Alabama on August 3, and Florida on August 2.

Discussions with Louisiana over transition planning began with a meeting with the Governor and parish presidents from the eleven coastal parishes in New Orleans, La., on July 27, 2010. The National Incident Commander co-chaired the meeting with the FOSC and UAC and presented a plan based on the one developed for the ICP Mobile AOR. No agreement was reached at the July 27 meeting. Following the meeting several of the parishes developed their own version of a transition plan. The parish-developed plan would have required the FOSC to obtain parish approval for any change in equipment and personnel levels reflected in the plan. As this raised concern over scope of FOSC authority, a second meeting with the Governor and parish presidents was held on August 13 in Houma, La. At this meeting the state made clear they would not agree to an overall state transition plan until the FOSC agreed to individual plans with each of the affected parishes.

Within Louisiana, ICP Houma and their Branch directors in the parishes, with RP representation, began to negotiate transition plans with each parish. St. Mary's and Iberia parishes combined their plans, as did Orleans and St. Tammany parishes; only nine plans remained to be negotiated. The parishes' major concern during negotiation was to ensure the draw down in the scope of the response and amount of response resources did not occur before all potential cleanup work was finished. Most particularly, the oil budget released by NOAA stated 24 percent of the oil spilled was unaccounted for.

Early reporting by some scientists while the well still flowed indicated there was a plume of oil submerged below the surface. Uncertainty over what that meant, and the fact the plans were being negotiated during hurricane season, led parish and Louisiana officials to claim that a significant amount of this oil that was unaccounted for could wash ashore in the event of a hurricane. Although

NOAA personnel attempted to explain this was highly unlikely, state and parish officials insisted the transition plans retain significant response materiel and personnel through the end of hurricane season.

Acquiring parish agreement to transition plans took enormous effort on the part of the Incident Commanders in Houma and the parish Branch Directors, and the UAC. There was suspicion among parish and state officials the federal government would allow the RP to reduce its response effort with the oil well capped. The communities feared they alone would have to deal with oiled shorelines and future re-oiling if a storm pushed submerged oil onto the shores of Louisiana. Coast Guard officials gained the confidence of local leaders assuring them that while the resources were scaling to match the response, all remained committed to the fast and effective cleanup of oiled areas. In addition, the Coast Guard explained the specific activities associated with each level of the plan. (See discussion of Quick Reaction Forces in Chapter 3.) The outreach efforts and complex negotiations to complete the parish transition plans were finished in three weeks.

All nine parish transition plans were agreed to and the state signed an overarching state transition plan that included the nine parish plans. Following the agreements, the FOSC held a third parish president meeting in Houma, La., on September 1, 2010. The Louisiana plan differed from the ICP Mobile plan, not only in the inclusion of the nine parish plans with their specific personnel and equipment requirements, but also in that Levels V and VI of the Mobile plan were combined in the Louisiana plan as Level V.

Incident Command Post Consolidation

Once the state transition plans were signed, the FOSC began planning the consolidation of the incident command organization. With the source secured and the focus of the response operations on shoreline cleanup, there was no longer a need for the overhead of major command posts at ICP Houma and ICP Mobile, and small ICPs in Galveston, Texas, Houston, Texas, and Miami, Fla. In addition, with the source secured, the demand for aviation sorties dropped dramatically. As a result, the Aviation Coordination Center at Tyndall AFB could be consolidated into the overall incident management structure.

Beginning September 1, 2010, the Strategic Planning Team developed a plan to consolidate all of the ICPs into a single Gulf Coast Incident Management Team (GC-IMT). The actual implementation of the consolidation was mainly handled by the UAC Logistics Section. Working with the RP, the GC-IMT was placed in New Orleans, La., co-located with the UAC. In time, the UAC would dissolve and the CG-IMT would assume the role of FOSC.

Monitoring and Maintenance Plan and UAC Transition Plan

Consolidation of the ICPs took place on September 20, 2010. Over the next several weeks, operations focused on continued shoreline cleanup and completion of the Shoreline Cleanup Assessment Technique (SCAT) process. According to the transition plans negotiated in August, once SCAT teams determined that no further treatment was required across the entire AOR, the shoreline would be placed in a monitoring and maintenance phase. In this phase, active shoreline cleanup would only be undertaken when new signs of oiling were discovered. The plans provided for regular shoreline inspections to locate any new oiled areas, generally caused by previously buried oil becoming uncovered by wind or waves, or if submerged tar mats near-shore were pushed onto land by storms. The plans also spelled out resources that would be kept on call, and methods to respond to reports of recoverable oil.

The monitoring and maintenance plans were, like the overall transition plans, split between what had been the ICP Mobile AOR, and the ICP Houma AOR for Louisiana. A significant part of the reason for the continued difference in plans was that most of the shoreline in the two areas differed. In Mississippi, Alabama, and Florida, much of the oiled shoreline consisted of sandy beaches. The federal government, through the National Park Service and U.S. Fish and Wildlife Service, was a significant landowner. In Louisiana, most of the oiled shore was marsh, and the federal government was a far less significant landowner. The cleanup techniques required for the two types of shoreline were very different. Each had separate monitoring and maintenance plans, which allowed them to be tailored to the predominant shoreline type.



FORT MORGAN, Ala. – A layer of oil below the sand on the Fort Morgan Peninsula is revealed by a subsurface Shoreline Cleanup Assessment Technique Team. Photo courtesy of U.S. Coast Guard

In the eastern states, much of the negotiation about the contents of the monitoring and maintenance plan involved technical details concerning how to locate oil on the beaches. For example, there was considerable debate on the depth of the sand to clean. Some tar mats were buried well under the existing top layer of sand by September and October, 2010. Yet digging entire sandy beaches to any significant depth and cleaning the sand had the potential to harm sensitive ecosystems, as well as potentially disturb historic and cultural resources. Once details as to the degree of search and response were settled, the eastern monitoring and maintenance plan was approved.

In Louisiana, the issues related to cleaning marsh were complex. In many instances, there was a scientific concern that attempts to clean marshes could actually do more harm than leaving the area undisturbed, and thus further eroding Louisiana's marshes. On the other hand, local residents found it difficult to accept having oil left in the marsh. Moreover, there were two heavily oiled areas, Barataria Bay and Bay Jimmy, where response operations were ongoing into November 2010. Louisiana officials continued to be concerned about the threat of tropical storms pushing more oil into the marshes.

Over September and October 2010, the western-most coastal parishes agreed with the FOSC to move their shoreline into the monitoring and maintenance phase. The eastern parishes, which had also been far more heavily oiled, did not wish to move to that phase until after hurricane season.

As more and more of the shoreline across the entire UAC AOR moved to the monitoring and maintenance phase, the FOSC tasked the Strategic Planning Team with developing a plan to transition the UAC out of existence and return the supervision of the response to the CG-IMT. The plan called for the elimination of the UAC, and the shift from a flag officer as FOSC to the captain in charge of the GC-IMT. As drafted, this transition plan required two conditions to be met before the UAC would dissolve. The first was for sub-sea monitoring program to report its preliminary results and find no recoverable oil in the water column. The other condition was for the shoreline of the entire AOR, with the exception of limited defined locations such as Baratavia Bay and Bay Jimmy, to transition to the monitoring and maintenance phase.

The FOSC briefed Coast Guard Headquarters and Atlantic Area on this plan on October 29, 2010, and received approval to proceed when the conditions in the plan were met. Over the next several weeks, these areas were transitioned to monitoring and maintenance. The preliminary results of the sub-sea monitoring program were reported on December 16, showing no recoverable oil. Shortly thereafter, the UAC turned over the duties of directing the remaining response operation to the GC-IMT.

As much of the shoreline shifted to monitoring and maintenance, the operational period for IAPS developed by the GCIMT lengthened. With more time built into the ICS planning cycle as the operational period moved out to a week, and the extremely limited response operations, the continued need for a separate Strategic Planning Team was also eliminated.

5.6 Incident Documentation

The enormous scale of the *Deepwater Horizon* response caused a continuous flow of paper documents and electronic media during each hour of the response. By February 2011, an estimated 27 million pages of documents had been collected. After securing computers, laptops, mobile phones, external hard drives, and servers, it is estimated there will be approximately 15–20 terabytes of electronically stored information (ESI) created by the FOSC over the course of this response.

Under the NCP, the FOSC is required to document all phases of response and removal, actions taken, and the basis for cost recovery. When litigation is

reasonably anticipated, parties to the litigation have an obligation to preserve relevant evidence, including all relevant tangible objects and documentation, including ESI. The Department of Justice ordered all federal agencies to preserve information generated by the response.

To promote document preservation, the FOSC issued three directives and Coast Guard Headquarters released a series of messages to its members (see ALCOAST 234/10). The memoranda and messages described the duty to preserve, what to preserve, and how to preserve both paper and electronic records.

Documentation specialists were assigned to oversee the collection and organization of all documentation generated by the response. Department of Justice and Coast Guard preservation orders mandated the preservation of all hard-copy documents generated, including multiple copies of the same document, misprinted documents, and even scrap paper. The Coast Guard's documentation specialists established and managed documentation units at the UAC and each of the ICPs. These specialists traveled to Branches to collect documents and electronic devices on a regular basis.

As time went on and documentation staff increased, a challenge arose: a lack of space at the ICPs and UAC to store all of the documents. As a result, the Coast Guard established a Central Archive for documentation in Mandeville, La. The Central Archive is staffed with 25 personnel assigned on a rotational basis who cull and sort documents delivered from the UAC and ICPs.

Once the records have been collected, culled for trash and duplicates, and sorted, approximately 3.5 million pages will be scanned. These pages will be scanned to searchable digital images and loaded to a server maintained at the Central Archive.

The Coast Guard also developed a protocol for the collection of electronic devices that contained *Deepwater Horizon* related ESI, specifically, laptop and desktop computers, servers, routers, switches, printers, copiers, external hard drives, cell phones, smart phones, and weekly back-up tapes. As electronic devices were no longer needed for the *Deepwater Horizon* response effort, the Coast Guard shipped them to the Central Archive. More than 1,000 laptops, 25 servers, hundreds of back-up tapes, hundreds of mobile phones, several desktop computer towers, external hard drives, and several cameras

were shipped to the Central Archive. In addition, to try to ensure more thorough preservation of ESI generated by responders, Coast Guard Headquarters established servers dedicated solely to the response and transferred the user profiles of all Coast Guard personnel on the Coast Guard Data network to those servers upon check in.

There was no existing ESI preservation and collection policy, practice, and toolset at the start of the incident. Thus, an ESI collection preservation and organization strategy had to be created during the response. CG-6 and CG-094 issued ALCOAST 234/10 to notify responders of their obligations. In the Department of Justice's view, such a general directive partially covered their preservation concerns, but the Department of Justice wanted the Coast Guard to personally notify each responder of his or her preservation obligation and obtain a signed acknowledgement. With over 4,000 Coast Guard responders who had deployed by that time, constructing a mechanism to do this was a big challenge. The method chosen was the delivery of the existing preservation orders to all Coast Guard personnel upon check in to the response. At this time, arriving members would verify they had met all the specific terms of the preservation orders, to include preservation of personal email. Military and civilian members would sign the acknowledgement at check in and again upon departure.

An added complication to the preservation of ESI was the use of personal email accounts to conduct Coast Guard business. Personnel deployed to the field often used commercial email accounts such as Google Mail or Yahoo Mail to conduct official Coast Guard business, because in many areas there was, at least in the first few months of the response, no means for responders to connect to the Coast Guard Data Network. Additionally, field personnel also used personal laptops. As a result, field personnel's emails and computer hard drives were subject to the preservation order. Voice mail, both on land lines and cell phones—including personal cell phones—was also subject to the preservation order if the voice mails pertained to the response.

The process of developing the Central Archive, scanning documents, making electronic information searchable, and establishing an administrative record and meeting discovery requirements for ongoing litigation related to the response continues.

5.7 FOSC Key Points

Area Contingency Plans

This response exposed a number of issues about the Area Contingency Planning process that need to be re-examined.

Local Government Involvement

The plans currently assume any of the interests of local government are coordinated and represented through state involvement in the contingency planning process. While this may be true in many locations, it was not for all of the states impacted by the *Deepwater Horizon* oil spill. As any spill impacts the local government of the affected area, as well as the state government, it is advisable to create an explicit role for local government in the planning process. In the case of the *Deepwater Horizon* spill, it was a necessity.

Other State Agency Involvement

States generally designate a specific agency as the one primarily responsible for carrying out the state's responsibilities under the National Contingency Plan (NCP). For most spills, that works well. But the rest of state government is generally unaware of what happens in oil spills, until there is a major one and then, when a broader range of agencies and actors within state government become involved, lack of prior participation becomes problematic. Ensuring broader understanding of contingency plans by state governments would enable easier adaptation to wider participation for major events.

Area Committees need to meet regularly in order to make sure the Area Contingency Plans are accurate and useful. If these meetings are not regularly held, the plans and relationships may become outdated. Federal, state, tribal, and local government officials, as well as facility owners, become less familiar with one another without planning. This allows for a breakdown in the planning process and reduces the efficacy of the plans themselves. Area Committees need to meet at a required level of frequency.

Detailed planning and testing of response strategies is necessary. When committees do not meet frequently, plans do not develop into detailed response strategies. Plans must be tested to be useful. Communication gaps can lead to a situation

where details are negotiated in the midst of a response, with less than optimal results. In this instance, the limited effectiveness of protective booming in open seas and in fast currents would have been better understood through real deployment and exercises.

There exists no bridge between Area Contingency Plans to provide an overarching construct to deal with spills that cross Area Contingency Plan boundaries. Such a means to coordinate across areas is necessary. For example, if two adjoining areas list the same equipment to meet planning requirements and a spill impacts both areas, existing plans do not account for simultaneous demands for the same resources.

Worst Case Discharge amounts listed in Area Contingency Plans are focused on ship and shoreside facilities. In the context of Plans covering locations where offshore drilling is taking place, Area Contingency Plans need to be coordinated with BOEMRE and the worst case discharge assumptions need to include the potential for a well blow out.

It is to be hoped that lessons learned from the *Deepwater Horizon* response will result in more interaction between the Coast Guard, state, and local emergency management agencies, to bridge the gap between the NCP and the National Response Framework in the future.

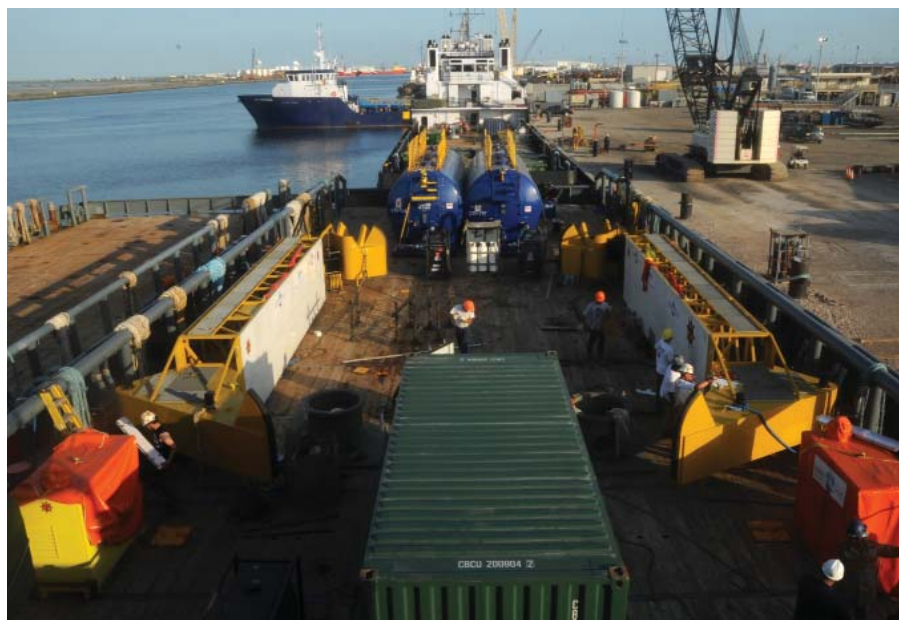
During the *Deepwater Horizon* response, most logistics requirements for response operations were provided by the Responsible Party (RP), BP, which had the necessary resources to identify, obtain, and deploy private Sector response capabilities. As the Federal On-Scene Coordinator (FOSC), the Coast Guard secured resources from itself and other government agencies. RP logistics were overseen by Coast Guard personnel, but the RP used its own procurement, billing, and accounting practices. Much of the role of FOSC staff oversight was to ensure that the logistics needs of the response operation were met and sufficient federal and state resources were provided and coordinated for the response.

The focus of this chapter is Coast Guard, federal, state, and local logistics. The response was a combined effort between the government and the RP. The RP made large-scale and significant contributions to logistics, procuring much-needed resources, such as boom, skimmers, and decontamination equipment, and providing food, housing, and transportation for the more than 47,000 response personnel. The RP also managed the logistics and finance of the Vessels of Opportunity (VOO) program.

6.1 Operational Logistics: Critical Resources (Boom, Skimmers, Beach Cleaning Equipment, Personnel)

Critical resources, specifically oil spill response skimmers and boom, were in high demand within the *Deepwater Horizon* area of operations. The Unified Area Command (UAC) directed critical resources to respond to those areas most likely to experience an impact based on dynamic oil spill trajectories. The UAC aggressively pursued additional resource requests for skimmers from manufacturing sources, oil spill response organizations (OSROs), and potentially from international sources if the equipment and application was appropriate. The RP procurement system purchased skimmers from manufacturers and maintained ongoing research into skimmer purchasing. As of June 9, 2010, 592 skimmers remained within the Response Resource Inventory system (RRI) listed for Coast Guard District Eight (which includes New Orleans). Requests for additional protective measures outside those designated in the Area Contingency Plan (ACP) were considered against the regional demand for resources.

Nationally, the RRI captured response inventory held by OSROs. The movement of skimmers and boom held by OSROs throughout the nation could have impacted their ability to meet local contractual obligations with vessel and facility plan holders, and the regulatory requirements of both the federal and state governments. When examined to determine what inventory of response equipment was available, the inventory did not match reality. For example, some equipment listed was unserviceable, while other equipment was counted by more than one organization, and thus in places the same equipment appeared twice in inventories. Although the RRI is not intended as a real-time inventory, there was no other complete inventory tool available. This made determining what equipment was in fact available for deployment a challenge.



LAFOURCHE PARISH, La. – Workers load “Dutch arms” onto an offshore supply vessel. The skimming system, purchased from Holland, includes infrared cameras that monitor the depth of the oil and a vacuum system to retrieve the oil. Photo courtesy of U.S. Coast Guard

Nationally, 2,063 skimmers of various makes, models, and uses, approximately 431,574 feet of ocean boom, and over 3.1 million feet of near-coastal boom are listed in the RRI and are, in part, supporting Vessel and Facility Response plan holder regulatory requirements for the remainder of the nation. The reallocation of these resources could impact the Marine Transportation System, commerce, and the donor region’s ability to comply with regulatory preparedness and response requirements.

This accumulation of data eventually led to the Resource Unit’s name change to the Critical Resource Unit (CRU). The CRU collaborated with

an RP Vice President assigned to special projects, who reported directly to the RP Incident Command. The CRU's primary function was to find scarce resources and make them available to the response. Resources designated as critical included 18-inch boom, ocean boom, specialized boom for use in in situ burn operations, dispersants, skimmers (both portable and vessel), and Coast Guard personnel.

The CRU was staffed by Coast Guard and Responsible Party personnel. The Logistics Section managed the two sections separately to allow the independent processes to run simultaneously without interfering or becoming interwoven.

Keeping in mind the large spill volumes and taking a long-term view, the RP contacted the company that produced one-half of the U.S. supply of snare boom on May 2, 2010. Working with company representatives and RP Purchasing Supply Chain Management, the RP procured \$15 million of product within two hours of this call. The next call solidified local oil boom production in Louisiana. Calls were placed to an oil spill equipment company, and again, the RP obtained production of 18-inch and 42-inch boom.

The CRU then turned to beach oiling and modeled 12,000 miles of shoreline that was heavily oiled in five states. In order to determine how much waste this would produce, The CRU contacted the creator of a waste calculator program for Emergency Prevention, Preparedness, and Response (EPPR), to create beach loading forecast models. These forecasts were used to obtain estimates and, on May 4, to assign waste management territories to Mobile and Houma Incident Command Posts (ICPs); the request for initiation was forwarded to the Florida operation. RP had master waste management

contracts and the Florida request for initiation in place prior to the response effort.

During the procurement of critical resources, the CRU made compromises to ensure needed resources arrived in the field with little delay. First, the CRU sourced and procured millions of feet of 18-inch spill boom. Boom fabric was in high demand and therefore scarce. The 18-inch boom is the largest boom that can be made with approximately 36-inch width raw material in stock. This allows for folding and welding in a width of material without waste. The fabrication of boom with a skirt longer than 18 inches required more material and added complexity to the process, increasing the overall production and order time. The larger booms, particularly the ocean boom, had longer manufacturing times and provided limited footage. Second, ocean-going Oil Spill Recovery Vessels (OSRVs) were also in high demand and scarce. Vessels with an extended range, which are stable in heavy weather, able to work the fresh oil at the spill locations, and follow weathered oil patches, were difficult to build within the time required to support the response. The CRU did pursue the procurement of smaller 28-foot OSRVs, and eventually 39 new-builds were supplied to the RP. These vessels were more limited operationally and used primarily for harbors or very sheltered weather areas.

To maximize use of available boom, ICP Mobile established a boom repair facility at Theodore, Ala. This facility was able to quickly repair thousands of feet of boom and return it to service, which reduced concerns about whether sufficient boom was available, and reduced waste streams as well.

Another critical resource was beach cleanup equipment. The RP negotiated with local politicians regarding the footprint of the cleanup force and possible technological solutions. Over the course of a few weeks, several products were tested and a sand-sifting machine was found to be one of the best non-manual solutions to remove oil and tar mats from large areas of sandy beach. Excessive daytime heat, at around 100 degrees Fahrenheit, liquefied the oil and tar on the beach. To ensure the maximum effectiveness, operation of the machines were moved to night hours. The machines and manual beach cleaning methods, such as rakes and hand-sifting, required collaboration with area environmental specialists. The specialists helped ensure that sea turtle nesting and migrating patterns,



VENICE, La. – A U.S. Coast Guard Petty Officer inspects snare boom on board a support barge. Photo courtesy of U.S. Coast Guard



PANAMA CITY, Fla. – Workers load 12,000 feet of ocean boom onto a vessel. Photo courtesy of U.S. Coast Guard

habitats for endangered species like the Alabama Beach Mouse, and protected sea oats and dunes were not damaged during cleanup operations.

The widespread mobilization of resources created a high demand signal for real-time resource information. The Coast Guard needed a common operating picture of available resources to understand and communicate the risks associated with strategic critical resource allocation decisions. The RRI system established and maintained the national resource picture through real-time tracking of domestic OSRO resources. The Coast Guard also used the RRI to identify critical and locate critical resources, evaluate OSRO cascade plans, and assess impacts to vessel and facility response plan holders.

At the time of the *Deepwater Horizon* spill, the RRI database recorded nearly 4.5 million feet of oil spill boom available. Slightly more than one million feet of this boom was located in the states that border the Gulf of Mexico. Oil Pollution Act of 1990 (OPA 90) OSRO requirements, private business interests, and the requirements of the One Gulf Plan identified this level of boom as the proper amount.

During the *Deepwater Horizon* response, additional area-specific updates to the regional ACPs were put together by the ICPs in collaboration with local officials. The Unified Area Command and the National Incident Command approved these updates, which increased the amount of boom utilized to protect environmentally and economically sensitive areas. These updates left RP Procurement Supply Chain Management and the Coast Guard CRU in need of approximately five million feet of oil boom.

The CRU addressed the need for five million feet of boom, required as a result of the mid-response re-evaluation of the ACPs through a calculated process that it later repeated for various items identified as critical resources. The RP identified, purchased, or rented, and relocated all the available large stockpiles of boom as necessary. Concurrently, the RP answered the boom production gap by contracting for new production with factories in the United States and China. The RP developed a boom specification and sent technical experts to the field to enforce it and to determine how companies could increase production. Additionally, the RP dealt with the shortage of boom components such as galvanized chain, fabric, and connectors. The CRU had the most difficulty obtaining heavy-duty neoprene rubber ocean boom. This large ocean boom had long delivery times and, after sourcing the world's supply, there was no back supply available in the quantity and time needed to support the response.

The CRU worked with the RP to fill the demand for equipment resources. The demand to source and procure equipment and resources was operationally, politically, and vendor-driven. Within the operations sections of the ICPs in Houma and Mobile, critical resources such as boom, skimmers, and dispersants were in high demand, and the CRU was responsible for sourcing and supplying staging sites to provide this equipment to the ICPs.

The second component of the Logistics CRU was comprised of members responsible for processing and ordering of all Coast Guard personnel for the response. In response to the *Deepwater Horizon* oil spill, the Coast Guard deployed thousands of its members to the Gulf Coast to provide response support to the FOSC. This included the Coast Guard's National Strike Force (NSF).

FOSC Key Points: Inventory of Response Equipment

The National Response Resources Inventory maintained by the National Strike Force Coordination Center, was not intended to function as real-time tracking tool spill response equipment nor was it particularly effective in performing this role. Rather, it was a source against which Oil Spill Removal Organization (OSRO) classifications can be validated. An inventory of available spill response resources, ready for deployment, should be available and accessible to FOSCs. This should extend beyond what is in a specific vessel or facility's response plan and include trained personnel

and physical equipment. If a measure of excess inventory for a long-term spill, or multiple spills, had been available, it would have been useful during the *Deepwater Horizon* response.

6.2 Operational Logistics: International Notification, Cooperation, and the Jones Act

In *The Federal Response to Hurricane Katrina: Lessons Learned*, the Department of Homeland Security acknowledged that the United States lacks the capability and infrastructure to prioritize and integrate a large quantity of offers of international assistance into an ongoing response. The U.S. Coast Guard experienced the same shortfall following during *Deepwater Horizon* oil spill. Throughout the post-casualty response, the international community showed an outpouring of support to the United States. The hundreds of international offers of assistance spanned a large spectrum. Offers included high-capacity oil recovery equipment to specialized technology and experts in the field of oil spill response mitigation. Countries made offers via several lines of communication—some offers came directly to the National Incident Commander through the U.S. Department of State, and others through personal connections within the international response community. The National Incident Command (NIC) staff and DOS held regular meetings with the Unified Area Command Critical Resources Unit to evaluate the critical resource needs and determine if the offers of assistance could fulfill these needs. As the spill response effort progressed, critical resource needs were constantly re-evaluated based on factors such as changing weather conditions, updated response mitigation plans, and migration of the oil.

Despite the efforts to catalog, evaluate, and prioritize the foreign offers, the Coast Guard was not able to accept or decline offers of assistance with certainty. For example, during the response there was a perception that there was not enough oil containment boom deployed to protect the beaches and marshes, and keep oil from reaching the shore. That perception was incorrect. However, to overcome that perception and ensure there was ample boom available to responders, the RP purchased a large amount oil containment boom. Many expressed concern that there was an obvious need for boom, but the FOSC was not accepting

all international offers. However, there are many different types of oil containment boom suited for use in different marine environments. Many of the international offers of boom were not the appropriate type or quantity needed to satisfy the needs of the response. This message to the public was lost, as the hunt for more containment boom drowned out the details of what was being offered compared to what the response requirements entailed.

During the initial response, neither the necessary infrastructure nor the chain of command existed to catalog offers, vet them for accuracy, and match offers with the lists of identified critical needs. In addition to the spontaneous outpouring of offers, the NIC sought additional resources through a request to DOS to work with each country desk at DOS and each embassy to determine what, if any, international resources were available.

The NIC evaluated the current domestic supply of response equipment, identified specific equipment gaps, such as high-capacity skimmers and fire boom, and requested to have the gaps filled by the international community. However, the requests made through each country desk or embassy did not



GRAND ISLE, La. – A group of international representatives from various agencies visited sites affected by the Deepwater Horizon spill. Representatives included members of the Canadian, Swedish, and Irish Coast Guards. Photo courtesy of U.S. Coast Guard

clarify the format for offers or the information that countries offering equipment needed to provide to enable a successful transaction. Offers of assistance were received in various formats. These included emails and letters, which sometimes lacked the required information. As a result, the evaluation of offers took a significant amount of time and numerous back-and-forth communications to obtain the necessary information to activate the movement of equipment, and to reimburse the offering country. DOS identified two representatives through which the NIC could communicate to other countries, and these representatives contacted each country desk or embassy to clarify offers and to ask questions.

Offers came in through different channels, including DOS, congress members, the NIC or FOSC, and the RP. This resulted in governments and companies receiving conflicting and confusing responses regarding the status of their offers. It also created a public perception that the United States was not taking full advantage of the offers, even though the response effort considered and evaluated all offers.

A third challenge was the different criteria and data collection methods used by the FOSC and DOS to determine the type of offer. Offers could be government-to-government, government-facilitated, or private. The FOSC determined that a government-to-government offer meant the country offering the equipment also owned the equipment. A government-facilitated offer occurred when a country, usually via its embassy, facilitated an offer of a privately owned piece of equipment. A private offer came directly from a private vendor in a foreign country. It was necessary to determine if an offer was government-to-government because the NIC pledged to accept all international offers of assistance, allowing the UAC to purchase the equipment without jeopardizing existing domestic contracts or violating Jones Act requirements. The government-facilitated offers presented a significant challenge, as sometimes these offers were actually government-to-government. The U.S. government had to determine the true originator of the offer, identify the product, and then properly classify it.

Some countries offered privately owned equipment through the conduit of government, which created some confusion and delay concerning documentation and prioritization. Once the UAC vetted international offers and determined the offer would fill a critical resource gap, the CRU worked with the RP's purchasing officials to purchase and transport



the items to the desired response area. The NIC and DOS worked jointly to provide administrative support by communicating to the embassy of the offering country and developing diplomatic notes on a case-by-case basis. This facilitated acceptance and delivery of desired resources to the FOSC.

The first step in this process was the CRU receipt of international offers of assistance from DOS. Once received and vetted, the offer was classified as a government-to-government, government-facilitated, or private offer, and then conveyed to the UAC. The UAC pursued each accepted offer through direct purchasing or through RP's commercial procurement process. The NIC provided a letter to the DOS for distribution to each country desk or embassy to close the offer.

The NIC and DOS agreed that a database for tracking the offers would be owned and maintained by the NIC. DOS would provide daily feedback through a daily conference with members of the NIC CRU and DOS. This arrangement improved the accuracy of new international offers that were arriving daily until the oil well was capped.

The database did not clarify the status of existing offers with each country desk or embassy. This situation required meetings with points of contact from DOS to rectify. Once the database improved, the letters acknowledging the offers, accepting the offers, or referring the offers required attention.

The accuracy of the offers still proved burdensome during the letter generating process due to the political sensitivity of the verbiage contained in the letters. To resolve this difficulty, each country desk

NEW ORLEANS – The Icelandic Coast Guard contributed a Bombardier Dash 8 fixed-wing aircraft to serve as command and control platform, and oil spotting resource as part of the Deepwater Horizon response. Photo Courtesy of Icelandic Coast Guard

at DOS verified points of contact and addresses to ensure the UAC acknowledged or notified the proper individuals.

The final step in this process was the acceptance and coordination of delivery of the equipment, which proved challenging due to tracking of offers, and understanding what equipment was physically available. An example of this difficulty was the procurement of foreign fire boom—the fire boom was offered very early in the process, prior to NIC or DOS organizing the initial database. The UAC procured and utilized the boom before the acceptance letter process was instituted. This confused all parties as to understanding what equipment was still available. Overall, the process of tracking the offers, clarifying the offer content, and acknowledging offers in writing provided numerous opportunities to improve efficiency and accuracy for future response evolutions.

Due to the magnitude and nature of the spill, all aspects of the response effort received significant media attention. The process challenges in receiving international offers were not sufficiently articulated to the media, which only noted delays in accepting the international offers of assistance.

Jones Act, Clarified

Known as the Jones Act, the Merchant Marine Act of 1920 (46 U.S.C. 55102) provides that the transportation of merchandise (broadly interpreted) between U.S. points is reserved for U.S. built, owned, and documented vessels. Pursuant to section 55102, “A vessel may not provide any part of the transportation of merchandise by water, or by land and water, between points in the United States to which the coastwise laws apply, either directly or via a foreign port, unless the vessel (1) is wholly owned by citizens of the United States for purposes of engaging in the coastwise trade; and (2) has been issued a certificate of documentation with a coastwise endorsement under chapter 121 of Title 46 or is exempt from documentation but would otherwise be eligible for such a certificate and endorsement.” Consequently, foreign-flag vessels are prohibited from engaging in the coastwise trade—transporting merchandise between U.S. coastwise points. In addition, the same prohibitions apply to U.S. flag vessels that do not have a coastwise endorsement on their document, i.e., those that are not coastwise qualified.

Although there was significant media and some congressional interest in the Jones Act during the *Deepwater Horizon* response, at no time did compliance with the Jones Act actually impede the response operations by the FOSC or the RP. This was due in large part to the fact that most of the foreign-flagged vessels did not actually engage in Jones Act covered activities. The threshold determination of whether or not a vessel activity is covered by the Jones Act is made by Customs and Border Protection (CBP), which has direct responsibility for enforcing the Jones Act. The Coast Guard worked closely with CBP and the Maritime Administration (MARAD) to process requests for waivers of the Jones Act with the Secretary of the Department of Homeland Security, who granted seven limited waivers.

There were three primary activities where questions about applicability of the Jones Act came to the attention of the FOSC. The first was with vessels transporting equipment and supplies to the response sites, and the movement of response equipment on the sea floor. Concerns over foreign flagged vessel participation in those activities were resolved by consulting CBP. The second was with vessels collecting oil from the water utilizing skimming or other equipment. CBP’s position was that oil collected from the water beyond three nautical miles from the baseline did not constitute a Jones Act regulated activity. Therefore, a foreign-flagged vessel engaged in skimming operations beyond three nautical miles could collect oil or oiled seaweed and then transit to a point in the United States and discharge without need of a waiver or exemption.

The third activity related to recovery of oil from the wellhead’s riser after installation of the containment dome. CBP considered the *Deepwater Horizon* wellhead to be a point or place in the United States. However, foreign-flagged vessels were working to process and temporarily store the oil and gas from the containment dome on top of the well as efforts to plug the well continued. To comply with the Jones Act, the oil was then transferred from the storage tankers to coastwise eligible tank ships to carry it into the United States. Nevertheless, there was concern about the potential impact of severe weather on these transfer operations, which led to a request for a limited waiver of the Jones Act.

In addition, 46 U.S.C. 55113 authorizes the use of foreign-flagged Oil Spill Response Vessels if the Federal On-Scene Command finds that an adequate number and type of U.S. flagged OSRVs cannot be engaged to recover oil in a timely manner, and the foreign vessel's flag state extends U.S. flagged vessels the same privilege under similar circumstances. The FOSC issued a finding that there was a need for additional dedicated skimming vessels for the response, and the Coast Guard, MARAD, the U.S. Department of State (DOS), and the Environmental Protection Agency entered into a memorandum of understanding (MOU) to implement this exemption statute. All federal agencies involved worked together to support the FOSC in making Jones Act determinations and facilitate the few granted Jones Act waivers.

The FOSC, National Incident Commander, and CBP received several inquiries from individuals interested in obtaining a Jones Act waiver in hopes of making their vessels more attractive to the RP as a contract option. However, only seven limited waivers were actually required for this response. Under 46 U.S.C. 50, the Secretary of DHS may grant a waiver from the Jones Act when necessary for national defense. As mentioned before, the Coast Guard, MARAD, and CBP have an MOU that addressed each agency's responsibility to advise the Secretary on such a waiver request. Although any interested party inside or outside the government can initiate a waiver request, there must be a genuine operational need for the vessel as part of the response, in order to justify a favorable endorsement by the FOSC. The FOSC coordinated this endorsement with CBP and MARAD. In making that determination, the FOSC evaluated the unique characteristics and capabilities of the foreign flagged vessel compared to what was available in the U.S. fleet and the potential impacts of a delay in operation caused by waiting for a U.S. vessel to become available.

On June 29, 2010, the Secretary of DHS granted six limited waivers for the *MODU Discover Enterprise*, *Toises Pisces*, *FPSO Seillean*, *Loch Rannoch*, *Evi Knutsen Navion Fennia*, and *Helix Producer I*. These vessels were engaged in recovery and temporary on-scene storage of oil from the *Deepwater Horizon* oil well via the containment dome while efforts to plug the well continued. These waivers enabled the vessels either to transfer the oil to a U.S. port themselves or to transfer



the oil to a U.S. vessel that would then carry the oil to a U.S. port. Although there were coastwise-endorsed vessels that could receive recovered oil from the containment system, use of such vessels would have substantially reduced the recovery of discharged oil. Moreover, the vessels would have led to substantial increases of discharged oil entering the Gulf of Mexico—reducing operational safety and substantially increasing environmental and economic damages from this disaster. The U.S. cancelled the waivers after the well was plugged.

Input from MARAD and the DOS aided the determination for the waivers. MARAD provided the availability of U.S. flagged vessels to perform the same mission, and DOS determined whether the vessel's flag state permitted reciprocity under similar circumstances. Exemptions were temporary.

The FOSC, in coordination with other federal agencies, determined on June 16, that there was an insufficient number of specialized oil skimming vessels in the U.S. to keep pace with the unprecedented levels of oil discharges in the Gulf of Mexico. This satisfied the first conditional statutory requirement in 46 U.S.C. 55113. Based upon this determination, foreign specialized skimming vessels could be deployed to response operations if the foreign country provided the same privileges to U.S. vessels. The use of such vessels under these circumstances did not violate the Jones Act or require a Jones Act waiver.

The FOSC makes the ultimate determination if an OSRV is exempt from the Jones Act. If the FOSC determines an exemption is needed, MARAD provides information on the availability of U.S.-flagged vessels to perform this same

GULF OF MEXICO – Gas from the Deepwater Horizon wellhead is burned by the drillship Discover Enterprise. Photo courtesy of U.S. Coast Guard

mission. Further, the DOS facilitates the determination of whether the vessel's flag state accords U.S. vessels the same privileges under reciprocal circumstances.

Over the course of the *Deepwater Horizon* response, the FOSC twice applied the OSRV exemption contained in 46 U.S.C. 55113. The first instance occurred on June 19, 2010, when the FOSC approved the use of three classes of vessels manufactured by a French company. This approval was founded on the June 16, 2010, FOSC determination, the vessels' special design and purpose for recovering floating oil, and confirmation from DOS that France extends similar privileges to the United States.

The second application of the OSRV exemption took place on June 27, 2010, when the FOSC approved the use of the *Burrard Cleaner No. 1*, a Canadian vessel. As with the French vessels, the FOSC's approval of the *Burrard Cleaner No. 1* was based on the June 16 determination, the special design of *Burrard Cleaner No. 1* for recovering floating oil, and the reciprocal privilege Canada offers to U.S. vessels. Because these exemptions were granted contemporaneously with the development of the MOU, they were granted for a period longer than 90 days.

BAYOU LA BATRE, Ala. – A line of shrimp boats serving as Vessels of Opportunity return to Bayou La Batre after a shift change. Photo courtesy of U.S. Coast Guard



6.3 Operational Logistics: Vessels of Opportunity

The RP established the Vessels of Opportunity program to develop a core fleet of local professional mariners who could best perform the diverse skill set required for the response. The requisite skills included:

- On-water oil recovery and removal operations,
- Boom deployment and tending,
- Wildlife recovery,
- Sub-sea surveillance and monitoring,
- In situ burning, and
- Logistical support while capitalizing on local knowledge and professional seamanship.

The program also had the incidental benefit of providing economic compensation for mariners whose livelihoods were impacted by the spill. The program applied the lessons learned from the *Exxon Valdez* oil spill and the many spills thereafter where commercial vessels were used to assist with the response.

Throughout the response, more than 9,000 vessels—a fleet larger than the Allied landing force in D-Day during World War II and nearly three times the number of boats in the U.S. Coast Guard—were contracted by the RP as VOO. This overwhelming participation in the program created a diverse and complex landscape for VOO operational employment and oversight due to disparity in vessel size, sea-going abilities, communications capabilities, crew experience, and language barriers. Despite the RP serving as the contracting entity, the UAC, overseen by the Coast Guard, played a key role in the VOO employment. The FOSC and Coast Guard Incident Commanders (IC) were responsible for optimizing the employment of this diverse fleet in concert with the RP.

In the first weeks of the response, each ICP administered VOO employment. A number of factors presented a challenge to the establishment of the VOO program. First, there were no prior protocols for constructing a VOO program in the Gulf of Mexico. Initial decisions focused on the vessel types, the levels of crew capability and training, and the geographic assignment of each. As the ICP made these decisions, the VOO fleets expanded to include fishing vessels, charter boats, recreation

boats, and other work boats. The UAC assigned VOO to support the full range of offshore, near-shore, and protected water task forces.

Next, many local boat owners were skeptical of the program and as such, did not immediately enroll. Some were concerned that the RP contract for hire would result in the waiver of rights of the boat owners to seek compensation for lost income or other economic damages. The owners also expressed concern they would be forced to indemnify the RP for damages caused by latter's activities while operating within the scope of the VOO program. Public education and outreach, especially through angler and charter boat associations, eventually calmed these concerns.

As the program gained momentum, the inclusion of pleasure boats started to create tension. The public also raised concerns about the employment of out-of-state boats. The favorable rates for VOO service quickly became a magnet for boat owners, with the commercial operators seeking primacy for hire in view of lost revenue from their livelihoods. The use of pleasure boats was challenged because those boaters suffered no direct loss from the spill. Challengers viewed out-of-state boats as interlopers. Rotation between the VOO concerning on-and off-hire status was equally acute, especially considering the prevailing economic conditions. The result was that the VOO program was slow to mature, but expanded greatly to the point where the ICPs had to cease additional enrollments. There was an odd consequence of the breadth of the VOO program and its opportunity to offset economic loss through the rates paid by the RP: the program created a disincentive for some VOO operators to return to their normal lines of business.

To address issues of pleasure boats, out-of-state boats, and rotations for hire, ICPs engaged local communities to assist in developing the program to ensure fairness and local ownership. A trusted community representative from the local commercial fishing or charter boat community was essential to ensuring integrity, equity, and validity to the program. As the response progressed and enrollment and rotation processes were established, the ICPs transitioned tactical VOO command and control to the Branch level.

With the first observations of oil making landfall in June 2010, media reports of VOO not being meaningfully employed (or not employed at all) created



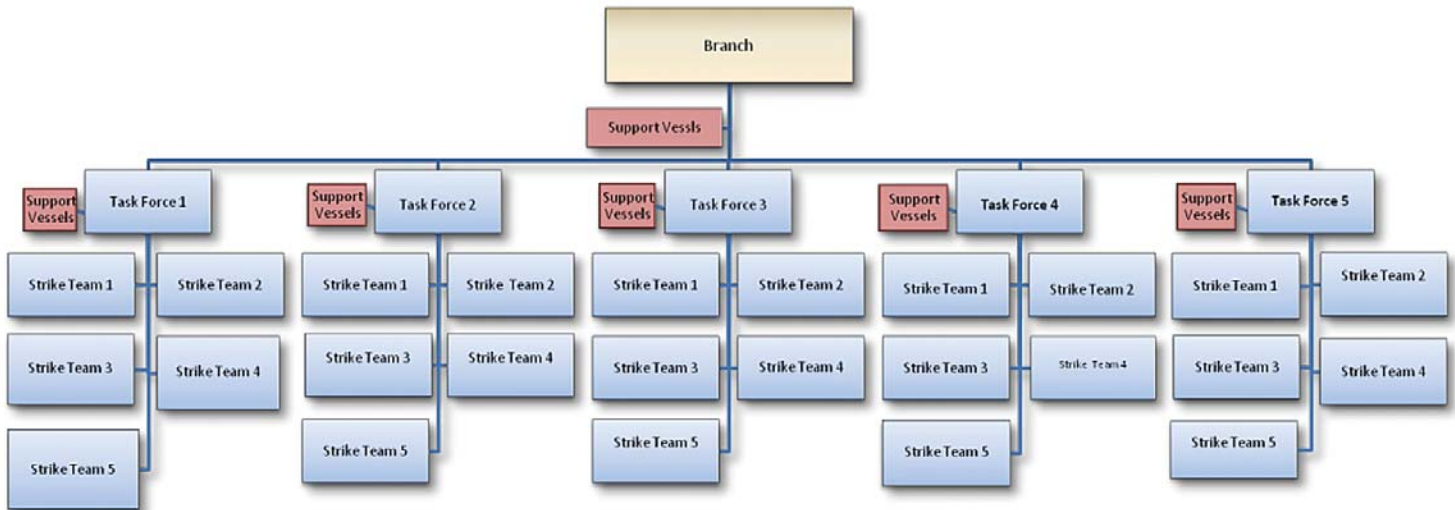
extensive external scrutiny of the program. While locally coordinated operations are a cornerstone of the Incident Command System, the decentralized oversight of the VOO program hampered the FOSC's ability to provide a consistent, consolidated report of VOO operations to governmental officials. This was due primarily to ICPs Houma and Mobile using different definitions and criteria for daily VOO reporting. Additionally, on several occasions, the inability of a federal, state, or local official to establish radio contact with a VOO while flying over an area fueled perceptions that there was inadequate federal command and control of the response efforts.

Coast Guard and RP personnel representing ICP Houma, ICP Mobile, and the UAC completed an extensive analysis of VOO operations. This analysis resulted in the FOSC and RP signing a VOO policy on July 2, 2010. In this policy, the FOSC and RP outlined the strategy for standardized concepts of VOO usage throughout the response, the appropriate organizational structure, required training and safety measures, and contractual and logistical requirements.

The VOO policy stated the number, or fleet size, and type, or capability, of VOO based upon the operational requirements established by the Incident Commander and determined at the Branch level during daily tactics meetings. Each Branch maintained an inventory of available VOO and capabilities using a standard database to build an inventory of available vessels. Once the operational tasking was determined, the ICS-215

PENSACOLA PASS, Fla. –
Two Vessels of Opportunity work with sorbent boom to collect oil four miles off Pensacola Pass. Photo courtesy of U.S. Coast Guard

Figure 6.1: VOO Command and Control Structure



requested daily VOO mobilization and assigned vessels from the Branch inventory. Once activated, the Branch assigned vessels to a standard VOO taskforces architecture model used throughout the response for duration of the vessel's employment.

The first step was standardization of the VOO Command and Control structure. In the field, promulgation of the standard Branch, Task Force (TF), and Strike Team (ST) organization was the critical step to improving command and control of the VOO fleet. Specifically, a Branch would have command of three to seven VOO TF; each TF would lead three to seven ST with a designated lead vessel; and each ST would direct three to seven vessels with a designated lead vessel (see Figure 6.1).

This structure provided an easily understood arrangement to inform vessel operators how they fit into the organization and to whom to report. It formalized leadership roles and provided a clear path for tasking to be passed from the Branch command to each vessel in the organization via the TF and ST leaders. Additionally, as many VOO operators were non-military personnel, having a common lexicon and organization structure was critical to allowing personnel outside of the UAC organization to understand VOO employment.

In guiding the Branch in mobilizing VOO, the UAC policy provided several biases:

1. A preference for local vessels,
2. A preference for commercial and charter fishing vessels (only using recreational vessels as an exception),

3. A preference for operator owned vessels,
4. Use of a vessel rotation, and
5. Activation limited to one vessel per owner.

As an exception to this guidance, the UAC agreed to allow the parishes of Jefferson and Plaquemines to maintain a fleet of vessels for cleanup. The parish presidents oversaw these fleets for the duration of the response.

The UAC and ICPs encountered several problems related to the VOO program. The first was command and control challenges regarding VOO employment. Specifically, many of the VOO operators were accustomed to operating independently, and not in a structured task force. Each ICP Branch addressed VOO command and control separately, which was necessary because of the varying demographics and areas of operation of the fleets. For example, the VOO fleet in Louisiana comprised primarily commercial fishing vessels. In Mississippi, ICP Mobile established a separate VOO Branch, which was jointly managed by the ICP and the Mississippi National Guard. This arrangement coordinated tactical employment and integrated VOO operations with National Guard over flights.

Communications issues with the VOO also arose during the *Deepwater Horizon* response. The VOO Master Vessel Charter Agreement, which is the contract signed between the RP and the vessel owner, stated that the each VOO have at least one VHF-FM marine radio. Additionally, each VOO could be required to conduct hourly communications with the assigned TF leader and designated dispatcher. However, the RP did not enforce this requirement.

Language barriers with VOO operators also hampered communications. Many commercial vessel operators in the Gulf region are native Vietnamese, Spanish, and Khmer speakers; English is their second language, if spoken at all. The RP overcame the language barrier by ensuring all lead vessels had English and bilingual speakers.

The use of ICS communications plans was reinforced for each VOO organization and supporting aircraft. The RP emphasized that communication would occur between aircraft and TF and ST leaders, who in turn would pass relevant information to VOO.

The large and variable number of VOO under contract on a daily basis resulted in supervision and direction overhead. The breadth and scope of the VOO program, in terms of numbers and geographic dispersion, created serious logistical challenges to outfit VOO, arrange waste disposal, and ensure integration of the VOO fleet into the common operating picture. It was also difficult to track such a high number of VOO—the response used these resources before they contained fully employed technological tracking solutions for VOO.

The policy mandated that TF and ST lead vessels be equipped with a tracking device, preferably Automatic Identification System (AIS), to support the communications flow. Additionally, the use of these devices allowed for the monitoring of VOO activities and employment locations through the

provision of a common operating picture available to the public via the Internet. The Coast Guard considered requiring all VOO to be outfitted with a Class A or B AIS device, but this was not implemented because it would have been impractical to install on some VOO and could have overloaded the National AIS infrastructure with thousands of devices in a small area.

For accountability purposes, many small VOO conducting daily voyages received Radio Frequency Identification badges. Using a check-in and check-out process, shoreside personnel used laptops connected to a VOO database to log both vessels and personnel on-hire daily.

Despite these efforts, there was still a need for an on-water federal presence, particularly in the near-shore environment. The Coast Guard accomplished this using Coast Guard patrol boats, Coast Guard liaisons, and National Guard personnel, who rode on TF or ST leader vessels.

Table 6.1, promulgated in the UAC VOO policy, reflects the expected employment based upon general vessel capabilities and operating environments. It was developed based upon the actual operational employment of VOO during the first two months of the spill.

Oil Spill Removal Organizations are required by facility and vessel response plan regulations to maintain oil spill response equipment to address

		Vessel Size (ft)			
		<30	30-45	45-65	>65
Zone	Well-Site - Within 5 nm of Deepwater Horizon	-	-	Yes	Yes
	Offshore - Greater than 3 nm of the maritime baseline out to the well	-	Yes	Yes	Yes
	Near-shore - Within 3 nm of the maritime baseline	Yes	Yes	Yes	Yes
	Inshore - Waters inside the maritime baseline (includes beaches, marshes, and estuaries.)	Yes	Yes	-	-
	Shallow - Less than 6 ft of water	Yes	-	-	-
Response Activity	Boom Deployment	-	-	Yes	Yes
	Boom Tending and Maintenance	Yes	Yes	-	-
	Skimming Operations (trawling containment boom)	-	-	Yes	Yes
	Sheen, Light Oil Recovery, Tar Ball Recovery	Yes	Yes	-	-
	Removal of Oily Waste (sorbent boom and pads)	Yes	Yes	Yes	Yes
	Decontamination Support	Yes	Yes	Yes	-
	Transportation and Supplies	Yes	Yes	Yes	Yes
Transportation and Personnel or Wildlife	Yes	Yes	-	-	

Table 6.1:
Expected VOO
Employment

worst-case discharges from either source. The *Deepwater Horizon* oil spill was so large in scope and duration that it outgrew the capability built by these regulations, both locally and nationally. The VOO successfully complemented and sometimes supplemented OSRO capabilities. Offshore, OSROs provided all deep water skimming vessels. VOO did not have the offshore oil recovery efficiency or capacity to be effective at the source. Some VOO towed fire boom to facilitate in situ burning operations, which freed other OSRO vessels for more critical source skimming operations.

Closer to shore and within the bays and marshes, VOO chased and recovered streamers of oil, and tar balls and tar mats before they impacted the shoreline. Additionally, VOO transported shoreline cleanup workers, placed and tended boom, and provided general response support to keep operations moving. VOO offered the advantage of shallow water capacity and maneuverability in areas that were confined or difficult to access by larger OSRO vessels. Using VOO operators who had local knowledge helped pre-identify natural collection points where the oil was likely to impact, and where to place protection and collection measures.

The Master Charter Agreement between the RP and the vessel owner outlined general VOO logistical procedures such as oily waste removal and replenishment of oil removal supplies. Additionally, the agreement outlined minimum staffing and communications requirements. For every mission, operators were required to provide assurance that

all personnel aboard the VOO were physically able to complete ordinary and emergency response shipboard functions such as movement on slippery decks, standing watch, firefighting, and abandoning ship. The VOO operator was responsible for ensuring that all personnel on VOO duties while under contract with the RP were alcohol and drug free. Each VOO was also required to have passed a Coast Guard vessel safety examination at the dock.

VOO crewmembers were required to complete a spill-specific, Occupational Safety and Health Administration (OSHA) approved, four-hour Worker Safety Training Course titled RPMC 252, Module 3 Marine. If a VOO was to come in direct contact with oil, OSHA required at least one person on board to have completed the 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training.

All personnel aboard VOO were required to wear appropriate personal protective equipment provided by the RP, as prescribed by safety professionals based upon the operations conducted. VOO operators were required to adhere to UAC heat stress, fatigue management, and inclement weather policies.

As the need for VOO diminished when there was no recoverable oil, the rather generous daily reimbursement scheme provided by the RP served as a disincentive for VOO to return to their normal operations, i.e., commercial fishing, even after fisheries waters were reopened.

RIGOLETS, La. – A Vessels of Opportunity skimmer makes its way up and down the Rigolets to capture any stray tar balls. Photo courtesy of U.S. Coast Guard





ST. PETERSBURG, Fla. – A U.S. Coast Guard Petty Officer observes the Gulf waters from a C-130 out of Coast Guard Air Station Clearwater, Fla. Photo courtesy of U.S. Coast Guard

6.4 Operational Logistics: Aviation Operations and Airspace Safety

The Aviation Coordination Center (ACC) was a key component in the safety of the federal response to the *Deepwater Horizon* oil spill incident. It established immediate order among disparate aviation interests within the airspace of the Gulf of Mexico. It also increased the effectiveness and efficiency of diverse aviation response operations. The ACC was unique in leveraging specialty skills and resources of the U.S. Air Force, and effectively aligning interagency representatives in a functional management process.

The ACC was an operational element of the Unified Area Command, responsible for regional management of aviation operations. The ICPs in Houma and Mobile established the priorities and aircraft tasking through the aircraft branch of the Operations Sections and set out in the Incident Action Plans. The Aviation Coordination Center then used the prioritization set out in the IAPs to manage and deconflict the airspace. Coast Guard and Air Force personnel jointly staffed the ACC, along with a cadre of interagency representatives from participating response agencies. Establishing a centralized organization of experienced and appropriately equipped planners and decision makers was a natural evolution as air activities expanded beyond the span of control of individual Incident Commands.

The Air Boss in the Operations Section of the Incident Command in Houma, La., had the initial responsibility for managing aviation activities during the first 5 weeks of the spill response. This included scheduling, support, post-flight information assimilation, and future aviation resource requests. ICP Mobile was satisfied with this arrangement, but safety concerns soon emerged as the number and frequency of flights across ICP borders quickly exceeded the capability to monitor them. Fixed and rotary winged aircraft were congested near the

well site and a number of other areas outside of radar coverage and ICP control. At the same time, spotting and dispersant application flights were increasing in number. The FAA implemented a temporary flight restriction (TFR) near the well, and a P-3 aircraft from CBP was enlisted to monitor offshore flights and relay track data to the Federal Aviation Administration (FAA).

Near-shore flights, in contrast, remained a safety concern. CBP also contributed a remote terminal for radar information from its Air and Marine Center (AMOC) that enhanced situational awareness for the Air Boss at Houma. However, increasing mission challenges persisted, and the migration of air operations toward the shorelines quickly warranted a more robust organization. Daily missions exceeded 200, often involving numerous individual sorties, and there were nine near mid-air collisions reported. Incident Commanders also needed better, faster, and more efficient imagery fusion.

The ACC was established to remove conflict among all air traffic in the northern Gulf of Mexico during activities associated with *Deepwater Horizon* operations and private interests. The ACC Charter clearly outlined its goal of providing safe, effective, and timely control of airspace. The ACC managed a wide range of aviation support missions. Command and Control, oil detection, skimmer spotting, dispersant sprayers, boom placement, beach patrols, environmental impact assessment, transportation, and public affairs were common categories of aviation sorties in support of response operations. These missions had to be executed safely across two ICP boundaries, and integrated with commercial

carriers, fisheries flights, military operations, media sorties, private aircraft, and other non-participants with access to the airspace.

Airspace management, offshore and along the coasts, was a paramount challenge. It required a governance process for territorial airspace that was partially served by radar coverage, and uncontrolled international airspace in which separation was dependent on a pilot's ability to see and avoid other aircraft. It also involved a wide variety of competing interests between government, commercial, and private operators, and each ICP.

Large numbers of disparate air assets exacerbated these challenges. For example, small single engine helicopters used for spotting oil and vectoring skimming vessels were very difficult to detect from larger and faster fixed wing aircraft, using sensors to collect imagery in the same airspace. These aircraft were also typically using different radio frequencies and unaware of each other. Therefore coordination instructions had to be generally applicable to all federal, state, and local responders. This involved accommodating different sizes, speeds, endurances, operational altitudes, communications capabilities, fuel requirements, and utilization standards, as well as runway and hangar requirements. Other management challenges included differences between military and civilian aviation cultures, unique priorities of individual states, differing authorities, business cultures and priorities, measures of effectiveness, curious media, and members of the public.

PORT FOURCHON, La. – An Army National Guard helicopter hoists sandbags that will be dropped in one of five key locations along the Louisiana coast. Photo courtesy of U.S. Coast Guard



Effectiveness and efficiency were also important objectives. Aviation support is inherently expensive, and a successful federal effort mandated thoughtful stewardship of response aircraft and aircrews. The ACC provided ready aircraft and sensor expertise to match resources and missions. Aircraft and sensor specialists were especially skilled at employing large fixed wing assets with infrared capabilities in the pre-dawn hours, to aid efficient placement of aircraft spotters at sunrise.

The ACC also ensured alignment of air tasking with surface operations. Information gathered by aircraft at night was the basis for pre-dawn tasking for surface assets and shore teams. Imagery collection was extremely important in finding actionable oil for skimming and in situ burning, and maximizing the capabilities of on-scene assets, which were key priorities of the Unified Area Command. Air support was continuously adapted to support large skimmers near the source, collecting as much crude oil as possible, or task forces of smaller skimmers keeping oil away from barrier islands, beaches, and entrances to bays, rivers, and harbors.

Aviation management began with a Temporary Flight Restriction (TFR) for the offshore airspace in which surveillance and response operations were being conducted. Notices to Airmen (NOTAMs) were also issued with compulsory instructions for all, participating and non-participating aircraft operating along the Gulf Coast and close inshore. The ACC reached out to state, commercial, and other public operators to garner support and negotiate special arrangements. They then employed a common grid system and integrated flight operations into a master flight schedule. All of the requisite airspace and flight information was published on a single, easily accessible website.

The ACC was operational within a week of inception. Additional specialists augmented the surge of forces within another 10 days. At full strength, there were nearly 120 military and interagency personnel assigned. This investment provided seven key functions:

- 1. Information Analysis and Awareness (IAA).** The ACC established a daily schedule for gathering imagery and sensor data to inform spotter and skimmer assignments and operational planning at each ICP.
- 2. Area Asset Management.** A regional approach ensured safe operations, particularly for cross

border flight activity between Incident Commands and in congested areas. Publishing a Regional Asset Management Plan (RAMP), Special Instructions (SPINS), TFR-Notams, and Communications Plans, aligned the air support available with mission demand priorities.

3. **Flight Schedule Conflict Prevention.** An integrated master schedule provided aircraft separation by timing, altitude, route of flight, or with coordinated safeguards. Active outreach and a public awareness campaign enhanced safety.
4. **Flight Following.** Pilots were given advisories, mission numbers, real time tasking adjustments, and partial monitoring. Watchstanders also inserted real-time data from the on-scene P-3 aircraft and mission reports to update the common operating picture. A live watch of over 50 experienced air operations specialists provided situational awareness, centralized information, standardized reporting, and unity of command.
5. **Mission Resource Matching.** Aircraft and sensor employment decisions and investment choices benefited from informed recommendations and advocacy. Subject matter experts at the ACC evaluated the airship, Unmanned Aircraft System (UAS), and multi-spectral sensors packages for utility in *Deepwater Horizon* operations.
6. **Contingency Planning.** Forward-looking strategies were developed for mishaps, hurricanes, and evacuations. Planners also pursued efficiencies in boom placement and pick-up, decontamination, and other essential functions.
7. **Performance Measurement.** Mission reports and analysis provided essential decision support in the UAC and each ICP.

The Special TFR airspace model used in the *Deepwater Horizon* Response was a significant, if not the largest known governance construct ever implemented in international and domestic airspace. Exercising special FAA authority to control air activities in the airspace adjacent to five states was a critical aspect in achieving a safe environment for aircrews.

Another significant aspect of the ACC involved the decision to leverage Aviation Operations Center (AOC) personnel and facilities of the 601st AOC

at Tyndall AFB. These specialized U.S. Department of Defense (DOD) forces provided skills and assets to set up the initial command structure and sustain operations. Initial staffing included 52 permanent party watchstanders. However, with augmentation forces that followed, total staffing peaked at 97 military members. Interagency representatives, including FAA, NOAA, FWS, DOI, and CBP represented an additional 23 workers. Coast Guard staffing included one Captain, one Commander, and two Lieutenants.

Facilities at Tyndall, including connectivity, security, and media support, could not be duplicated elsewhere. Investing in these resources contributed to a number of successful features of the ACC, including:

- **Integrated IAA.** Co-locating Coast Guard, USAF, NGA, and other agencies in a secure facility at Tyndall, adjacent to the ACC Operations Center, linked information analysts with mission planners and watchstanders. Imagery files, trend data, weather reports, and other decision aides were quickly developed and delivered up and down the user chain. The IAA staff also matched surveillance resources with tasking requirements and helped evaluate specialized equipment and mission performance.
- **Strategic Planning.** An area-wide perspective was essential to safety, effectiveness, and efficiency. Air support is as inherently dynamic as it is expensive, and often restricted in availability. The ACC provided a level of dedicated management that far exceeded the capacity of an individual Incident Command.
- **Mission Support Liaisons.** The cadre of interagency representatives and platform experts assembled at ACC met daily to assess scheduled missions and negotiate priorities derived from the UAC or the ICs. Communications problems, alignment with goals, performance measures, asset evaluations, aircrew training, and job aids were among the common issues discussed. Strong relationships developed, allowing fair negotiations, rapid decision-making, and sound recommendations. All interagency priorities were ultimately reconciled. Similarly, liaisons dispatched to the UAC and ICPs accelerated the flow of information for decision makers and helped foster teamwork.

- **Seamless Transportation Missions.** Establishing a single point of contact to source logistics requirements and reliably coordinate short-fuse, complicated passenger and cargo missions had immediate advantages. Missions were bundled, alternatives were considered, and suitable providers were assigned to lower costs and prevent abuse.
- **Web-based Governance.** Having the RAMP, flight schedules, special instructions, mission reports, operational stats, and performance measures published in the public domain provided transparency and invited full participation from commercial and military aircrews alike. The ready availability of current information also increased mission accountability and feedback.

The ACC was unique in enlisting the specialized skills of the USAF largely in a domestic environment. The effectiveness of resources at Tyndall AFB were demonstrated in the recent Haiti earthquake response, and in the aftermath of Hurricane Katrina. However, this mission was a new experience in that the DOD component directly supported a UAC involving a Coast Guard Flag officer and a commercial entity or RP. The challenges of adapting cultures and interpreting processes and language to ICS standards were anticipated and resolved with an assigned ICS coach. Yet the restrictions imposed by requesting forces, answering questions about affordability, and awaiting funding approval were sources of frustration. Ultimately, the functionality at ACC was scaled

to the level of approved resources, which proved to be adequate and functional for the tasking and mission of the ACC. Pre-determined surge levels for participating response agencies may alleviate some delays and confusion in future missions.

The other initial challenge for the ACC was gaining early buy-in from Incident Commands and aviation activities alike. There was reluctance to relinquish control of information or resources during the initial ACC implementation. However, the exchange of liaisons and timely delivery of aviation services helped engender strong partnerships with each of the requisite stakeholders. The ACC was also privileged to have the original Air Boss from Houma assigned as the Deputy Director. This officer brought both *Deepwater Horizon* response experience, and personal relationships with many of the local air operators. This enhanced ACC credibility. The key also was allowing the ICPs to continue to fly aircraft, with the ACC in a supporting role to the FCs.

The ACC met a critical safety need and significantly improved the oil spill response mission. It was a bright spot in organizing the unified response to this incident. Airspace governance was timely and effective with the dividend of efficient aviation services. The success of the ACC was directly related to the skill-sets and resources provided by each agency, and particularly by the host, the U.S. Air Force.

FOSC Key Points: Aviation Coordination Center

Initial aviation control efforts worked well, but as the number of sorties of widely varying types directly affiliated with the response grew, more formal means of control with sophisticated tracking and traffic management capability became necessary. Tyndall Air Force Base performed well. The FAA's assistance with TFR, combined with Tyndall Air Force Base's ability to fuse information to help enforce the airspace, brought the response activities under control and ensured operations were safe.

MOBILE, Ala. – The Southeast Region Commander of the Civil Air Patrol (CAP), CAP Chaplain, and CAP National Commander discuss the Incident Command Post Mobile's area of responsibility. The CAP provided three daily surveillance flights to ICP Mobile to check on boom deployed in sensitive areas. Photo courtesy of U.S. Coast Guard



6.5 Operational Logistics: Vessel Decontamination

The *Deepwater Horizon* response arguably produced the largest, most complex, and diverse vessel decontamination effort encountered in a U.S. oil spill. A massive fleet of response vessels performed a wide variety of tasks including oil containment, ferrying, oil recovery skimming, burning, logistics, relief well drilling, flaring, and surveillance. The vessels ranged in size from small trailerable vessels to 800-foot drill ships located at the spill's source. Depending on each vessel's assignment and role, oiling ranged from none or very little to considerable contamination. The decontamination process that followed involved thousands of vessels being comprehensively cleaned of oil.

Decontamination was required to ensure that vessels were adequately free of oil to prevent the re-introduction of oil into the environment outside of the theater of operations. Decontamination became a time-consuming process, particularly on more sophisticated vessels such as Offshore Supply Vessels (OSV), large drill ships, and other large commercial vessels.

In many cases, recoverable oil was removed from sea chests and other fittings. An extensive situation involved hundreds of gallons of oily water removal from the ballast tanks of *Discoverer Enterprise* which was among the most heavily impacted vessels because it remained at the site of the spill and was exposed to some of the most severe oiling. Other vessels such as trailerable VOOs were very simple to clean and examine. Worker safety was a top priority. Consistency in applying decontamination processes and policy was also a priority to ensure compliance with the Clean Water Act and protecting the environment from secondary pollution.

At its height of operations from August to October 2010, the decontamination system involved 17 individual sites across the five Gulf Coast states, employing 4,000 RP, Coast Guard, contracted, or sub-contracted individuals.

Further discussion on worker safety is located in Chapter 4 of this report.

Establishment of Decontamination Branch

A FOSC representative and an RP representative developed the priorities, processes, and policies of the decontamination program. The program was initially managed at the ICP level, and then consolidated and managed by the Vessel Decontamination Branch as part of the UAC, with east and west regions divided by the Mississippi River. In mid-October, the scale of the decontamination program grew beyond the designed Branch capacity and an independent Vessel Decontamination Section was formed, reporting directly to the UAC.



Vessel Decontamination sites ranged from established shipyards to vacant lots, leased for the purposes of hosting temporary decontamination operations. Among the most productive sites for large commercial vessels were existing shipyards and facilities in Tampa Fla., Mobile, Ala., Port Fourchon, La., Lake Charles, La., Galveston and Texas City, Texas. The other facilities included major decontamination hubs that were located in Theodore, Ala., Pascagoula, Miss., Venice, La., and sites in Port Fourchon, La. The remaining sites were typically managed under the Operations Section Branches and handled smaller vessels such as trailered VOOs and fishing vessels. These sites often had no pre-existing infrastructure.

Captains of the Port controlled potentially oiled vessels and required decontamination surveys offshore. As the spill cleanup progressed, vessel traffic was reasonably effective at avoiding oil. The UAC Consolidated Decontamination Plan was signed and promulgated on September 13, 2010,

TAMPA Fla. – Rear Admiral Roy Nash, Deputy Federal On-Scene Coordinator for the Deepwater Horizon Response, speaks with the Commanding Officer of the Coast Guard Cutter Elm while touring a dry dock facility that decontaminated Coast Guard cutters involved with the Deepwater Horizon cleanup. Photo courtesy of the U.S. Coast Guard

Figure 6.2: Vessel Decontamination Locations

and significantly formalized the decontamination process. The decontamination process can be analyzed using six main guiding elements that aid efficient operations and reduce risks across the UAC's decontamination operations. The first element was site establishment. This encompassed the planning and execution of all the activities associated with starting new decontamination sites to a common standard. The second element was assessment. Assessment provided centrally deployed vessel assessment teams (marine surveyors or subject matter experts) to evaluate the condition of large vessels via on board assessment as vessels entered the demobilization queue. This phase determined the level of contamination and required decontamination including the necessity of dry-docking. The third element included work planning. This element built consistent work planning packages that specified the required decontamination task and repairs required to certify the vessel as clean. Additionally in work planning, the vessel would be returned to the owner in the condition specified in the charter contract. The fourth element incorporated decontamination scheduling to provide a central scheduling function for large vessels to optimize throughput.

In the fifth element, integration, decontamination operations incorporated into a single process to ensure vessel off-hire activities were scheduled in coordination and in parallel with decontamination tasks to accelerate off hire status. The sixth and final element included optimization. This element

advised field sites on process optimization or improvements, measured metrics, and deployed teams of optimization experts to improve site throughput.

As illustrated in Figure 6.3, the decontamination process involved several steps:

1. Assess the vessel and equipment to be decontaminated;
2. Schedule the work; and
3. Enter a decontamination site, complete the work, re-examine the task for completeness, exit the decontamination facility, and take the vessel off-hire.

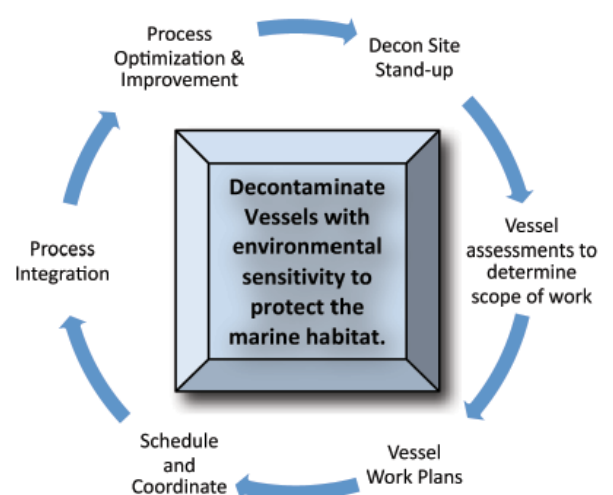
Figure 6.3: Decontamination Process

Figure 6.4: Cleaning Agent Use Onshore DECON Operations

Cleaning Agent	TX	LA	AL	MS	FL	Total
PES 51	110.0	31,625.0	1,100.0	935.0	825.0	34,595.0
Cytosol	0.0	20,185.0	2,750.0	0.0	1,650.0	24,585.0
Accell Clean	110.0	4,235.0	13,035.0	5,060.0	0.0	22,440.0
Aqua Clean	0.0	1,100.0	0.0	0.0	0.0	1,100.0
Citra Clean	0.0	5,275.0	0.0	0.0	0.0	5,275.0
DG-955 Degreaser	0.0	7,975.0	0.0	0.0	0.0	7,975.0
Chem Station	0.0	18,560.0	7,575.0	1,630.0	0.0	27,765.0
Big Green Degreaser	0.0	825.0	0.0	0.0	0.0	825.0

Figure 6.4

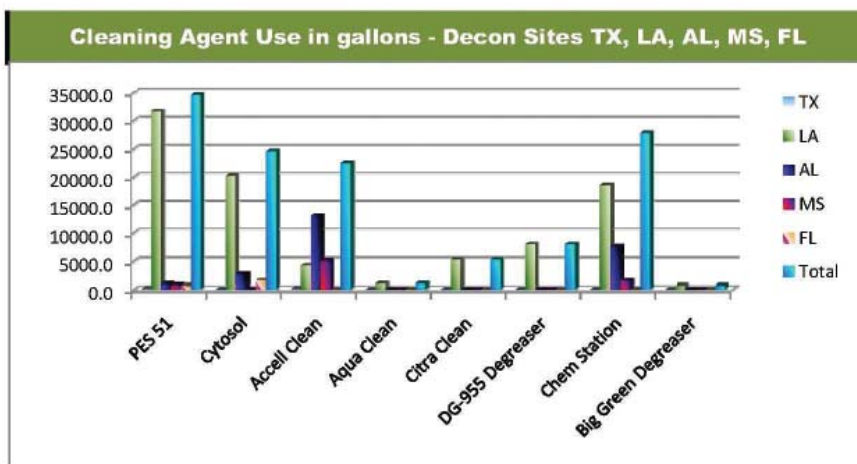


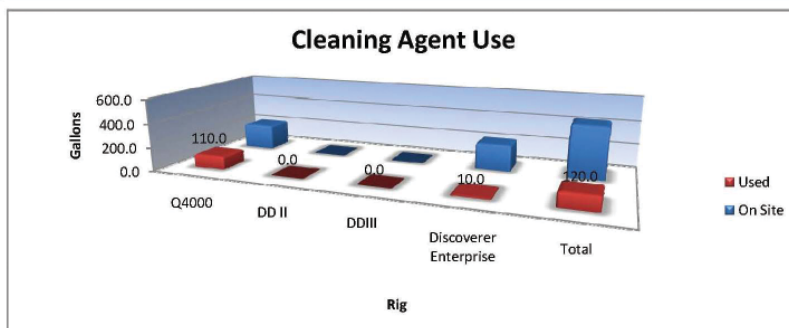
Figure 6.5: Cleaning Agent Use Rig Decon Operations

Total gals recorded:

Rig	Decon Location	Cleaning Agent		
		On Site	Used	Balance
Q4000	Gulf Copper - Galveston TX (Dry Dock)	220.0	110.0	110.0
DD II	Offshore MC-30	0.0	0.0	0.0
DDIII	Offshore MC-30	0.0	0.0	0.0
Discoverer Enterprise	Offshore MC-30	220.0	10.0	210.0
Total		440.0	120.0	320.0

Figure 6.5

Cleaning Agent Use - Rig Decon





GULF OF MEXICO – A crewmember aboard a tug uses a high-pressure fire hose to wash oil from the hull of a barge as part of a gross-vessel decontamination process. Photo courtesy of U.S. Coast Guard

Cleaning

Decontamination methods and tools varied with the type of vessel and what it was exposed to. In general, cleaning proved to be simple but laborious, and required several days of intensive cleaning was normally required for a typical large vessel. Small vessels, such as fishing vessels or other small VOOs could complete decontamination in one or two days. Decontamination included:

- Complete hull and deck cleaning,
- Anchor and ground tackle cleaning,
- Cleaning of mooring gear,
- Sea chest and sea bay cleaning,
- System flushing (as necessary), and
- Equipment cleaning (as necessary).

In most cases, hot water with a floating cleaning agent proved an effective external cleaning method. Sorbent pads, brushes, and other simple cleaning tools aided workers through the painstaking effort to locate and clean all visible oil from the vessels' hulls, decks, equipment, and systems (see Figures 6.4 and 6.5). Workers, managers, and Coast Guard decontamination examiners required job specific training including Hazardous Waste Operations and Emergency Response (HAZWOPER), site-specific safety instruction, decontamination process and techniques, as well as UAC Decontamination Plan contents, goals, and policy.

Standards and Certification

The UAC applied the Clean Water Act as the threshold of decontamination, which was the goal for all vessels entering the decontamination process. In order to be considered decontaminated, a vessel had to be free of oil or oil residue that may, through the normal course of operations, pose a risk of sheening or polluting the environment as described in the Clean Water Act. Vessels seeking demobilization were required to first attain a certification of decontamination from the Coast Guard. The Coast Guard created three tiered decontamination stages to control pollution threats based on risk and operational need.

Stage I, or the gross stage, involved removing light or heavy oil from the hull of a vessel that was contaminated during the response effort. The objective of Stage I decontamination was to ensure that the vessel would not emit a sheen during operations, although a stain may still exist.

Stage II, or the secondary stage, involved removing light or heavy oil and oily residue from a vessel hull, ancillaries, appurtenances, and equipment that a Stage I decontamination could not accomplish. The Stage II decontamination process was more detailed. The Stage II standard was that the vessel would not likely emit a sheen, sludge, or emulsion from its deck spaces or engineering piping systems into waterways during transit in all anticipated sea conditions and weather (e.g., rain). Stage II could apply temporary methods such as plugging scuppers, placing additional sorbent material on deck or in way of deck drains and freeing ports, or sheltering contaminated equipment from wash, spray, and rain, in order to move a vessel to a suitable location for Stage III decontamination.

Stage III, or the final stage, involved removing all oil contamination from the vessel, equipment, and materials. An objective of this decontamination process was to ensure that all liquid and solid waste generated by the decontamination process was also removed from the vessel. Upon final verification, the Coast Guard examiners could issue a final Stage III letter as evidence of compliance with Stage III decontamination protocol.

Decontamination was a prerequisite to demobilization. In some locations, field workers developed their own economy of effort by integrating decontamination examinations with other demobilization surveys including damage surveys, equipment

removal verification, and associated documentation of taking vessels off hire. Due to the very large number of vessels hired for this response, normal systems for tracking vessels (requiring decontamination) in the fleet were initially overwhelmed. Out of necessity, several innovative data collection systems were created to track and manage the fleet of vessels in the decontamination queue.

Nautilus is a purpose-built information technology system created by an RP contractor. The system tracked vessels through the decontamination process and provided administrators and users with real-time data regarding specific milestones in the decontamination and demobilization process, and was invaluable in documenting each vessel's status. Additionally, hand-held personal data assistant (PDA) devices with decontamination checklists and certification forms were utilized by Coast Guard examiners in the field. The PDAs updated the Web-based database upon examiner entry of data and featured cameras for digital imagery, for inclusion in vessel case files. The PDA was also capable of electronic signature and delivery of paper copies of Stage II or Stage III letters, which could be produced for vessel personnel to complete the documentation process. Furthermore, the system electronically captured all electronic signatures and automatically fed the Nautilus database.

Resources Committed

The massive endeavor of assessment and decontamination of thousands of vessels across five states demanded a considerable array of resources and infrastructure. The RP estimated the commercial value of the entire decontamination program at \$1.5 billion.

People were the most critical resource. The decontamination process was a very tedious, time consuming, and labor-intensive task. The physical labor required many entry-level laborers for the bulk of the work. More technically qualified labor was required for complex vessels and engineering systems. At the height of operations (mid-August through October 2010) there were more than 4,000 personnel solely committed to the decontamination program. From an examination perspective, the Coast Guard employed approximately 112 personnel to ensure compliance with decontamination standards. Pollution Investigators and FOSC representatives possessed sufficient skill sets to examine and verify smaller vessels, such as VOOs



and workboats. Marine inspectors were employed to examine ships and more complex engineering systems.

The decontamination process was exclusively funded by the RP, which involved a considerable process, infrastructure, equipment, and training. A significant contributor to the prioritization of vessel decontamination and demobilization were vessel day rates which ranged by vessel from hundreds of dollars to hundreds of thousands of dollars per day. At the height of operations between September 1 and November 15, 2010, the daily cost (burn-rate) for on-hire resources, whether they were actively responding or waiting in a queue, significantly exceeded \$20 million.

Responders maintained a strong bias toward natural surface cleaning agents. There was a continual evaluation of agents to minimize environmental effects. All cleaning agents met a stringent approval process. In order for consideration for the decontamination program, each cleaner required listing on the EPA's National Contingency Plan Product Schedule. Additionally, the RRT VI vetted cleaners and each state consulted on concurrence before a cleaning agent received authorization. Authorized cleaning agents for use over the water (offshore or dock side) were required to be floating agents to assure rapid recovery from the water's surface using sorbent material. The decontamination program prohibited any agent that might have acted to disperse or otherwise scatter oil into the water column.

GRAND ISLE, La. – A U.S. Navy salvage vessel is cleaned at the vessel decontamination station. The station also decontaminated boom and vehicles. Photo courtesy of U.S. Coast Guard



VENICE, La. – A response worker cleans a skimming vessel at the Deepwater Horizon response Plaquemines Branch decontamination unit. Photo courtesy of the U.S. Coast Guard

Most decontamination sites were outfitted with an extensive capacity for portable liquid storage in the form of Frac Tanks. Typical Frac Tanks provided a holding capacity of 21,000 gallons and were used to retain oil, oily waste, cleaning residue, or other waste water to prevent secondary oil pollution. Frac Tank contents were contained and properly disposed per local and state hazardous waste disposal laws. Additionally, mobile traditional tanker trucks were employed to move oily waste water to disposal sites over the road in varying capacities up to 9,500 gallons.

Dock side decontamination sites required extensive use of durable workboats to maintain protective containment boom and provide platforms to perform hull cleaning and examination. Extensive use of 12-inch to 18-inch hard harbor containment boom was common. Vessels undergoing dock side decontamination were boomed with hard harbor boom and typically lined with sorbent boom. The boom was placed around contaminated vessels to contain any oil or oily residue that may have become waterborne during the decontamination process. The protective booming strategy ensured any oil was recovered and removed.

GRAND ISLE, La. – Workers toss bags of oiled waste products into a compactor at a decontamination station. Photo courtesy of the U.S. Coast Guard



Most sites were equipped with large containment berms more commonly referred to as pools. Typical uses for pools included decontamination of small vessels and equipment by simply placing the entire contaminated asset in the pool for cleaning. Pools were valuable in preserving shoreside habitat, soil, and ground water from oil or chemical damage by containing all runoff. Vacuum trucks were used at most sites to collect oily waste water from vessels and collection pools. The trucks were important components in completing the decontamination cycle in an environmentally sensitive manner. Vacuum trucks were commercially available and most capable of handling the waste water produced by the decontamination process. Trucks ranged in size from 1,000- to 3,000-gallon capacity, and assured that waste was properly stored and disposed of.

Other resources used at decontamination facilities were underwater examination assets, including divers, and remotely operated vehicle (ROV) technology. General purpose rags, brushes, approved cleaning supplies, and safety equipment, such as Tyvek suits, hard hats, eye and ear protection, and gloves were also used.

Decontamination Challenges

The absence of a pre-existing decontamination plan presented a challenge to responders as resources needed to be diverted to address the precedent setting decontamination situation. The UAC Decontamination Section then wrote and field tested a comprehensive plan describing processes to ensure

vessels and equipment were free of oil before being released from the *Deepwater Horizon* response.

During the response, the RP, as overseen by the UAC staff, established numerous vessel decontamination sites throughout the spill AOR. As a by-product, large amounts of oily waste water were produced and required transfer from the vessels in the cleaning process to storage containers or appropriate disposal sites.

Some decontamination sites handling quantities of oily waste were treated as temporary bulk liquid facilities for the purposes of 33 CFR 154, and permitted as such by the local Captain of the Port. UAC Decontamination staff worked with the sector and RP site supervisors to assure safety and environmental stewardship.

During the decontamination process, it became apparent that some vessels were simple to clean and others were very difficult. Offshore Supply Vessels, MODUs, and commercial vessels with sophisticated salt water cooling systems posed decontamination and examination challenges. A principal challenge was determining oil contamination in sea-chests, sea bays, and other underwater openings where oil might escape detection. Baffles divided some sea-chest configurations, which made detection even more difficult. In some cases, several of gallons of oily mixture were removed from sea chests. Other systems posing challenges were anchor chains and chain lockers. While the process of cleaning was simple, the effort was time consuming and labor intensive. In a few rare cases, oil migrated into ballast tanks and moon pools, which again, proved to be a simple but a time-consuming process to remove. Through field innovation, internal system flushing was employed using a mild cleaning agent in a closed loop for contaminated raw water systems. In some extreme cases, certain system components required removal and specific cleaning before verification as decontaminated.

Continuity and Training

The Coast Guard developed a training program for decontamination and PQS system that Coast Guard FORCECOM and Training Center Yorktown adopted. To gain qualification as an examiner, each Coast Guard examiner completed this training, which included pre-requisite qualifications, completion of a formal classroom style course,

on-the-job training, and issuance of a qualification letter. Further, the Coast Guard applied a traveling inspector strategy that employed a subject matter expert to visit sites to promote consistency in cleaning practices, as well as examination standards and documentation.

Offshore Vessels

Among the challenges of the Decontamination Section was the in situ decontamination of the three large vessels that prominently supported the well capping operation at the spill's source. The Coast Guard consulted with the National Oceanographic and Atmospheric Administration, and the State of Louisiana Department of Environmental Quality to develop decontamination alternatives at the spill's source, which provided the maximum protection to the environment. Separate and distinct plans were tailored to each vessel as each had unique challenges and systems. Careful coordination was required to maintain the vessels' positions within areas that remained closed to fishing until decontamination of these vessels was completed.

Pre-assessment Surveys

As vessels were demobilized, their vessel condition was naturally an area of focus. Pre-assessment surveys or pre-hire surveys were not adequate to reconcile perceived discrepancies between pre- and post-spill service condition. Without documented pre-assessment surveys, it was sometimes difficult to judge if damage was pre-existing or if it was response related. While response-related damage was more easily handled through the claims process it was sometimes a challenge to explain to vessel owners the nuanced difference between a hull stain that posed a pollution threat (Coast Guard compliance issue) and one that was simply a matter of aesthetics (RP claims issue).

Decontamination exams required specific photography that captured certain vessel angles, the name, distinctive identifying numbers, and any areas of concern. Further, documentation was electronically captured in the Nautilus Database. The detailed exit-survey captured the decontamination condition of vessels at demobilization.

6.6 Operational Logistics: Waste Management

The decontamination process produced large quantities of waste including oiled boom, sorbents, clothing, protective suits, oiled gear, and oily waste. Oiled waste was required to follow strict hazardous waste disposal methods in accordance with federal, state, and local law as outlined in the ICP waste management plans, and later in a consolidated UAC waste plan. After extensive consultation with appropriate state and local authorities, it was determined that the best method for managing the waste water was relocating the waste via truck to approved land-based waste disposal sites.



GRAND ISLE, La. – Contract workers offload soiled sorbent boom, oily debris, and trash from a Vessel of Opportunity at the Grand Isle decontamination station. Photo courtesy of the U.S. Coast Guard

As a result of the response effort, miles of used boom and other debris required disposal. To ensure that wastes were handled properly, ICP Houma and ICP Mobile prepared separate waste management plans, which were subsequently reviewed and approved by the Coast Guard, the EPA, and the involved states regionally. Later, the EPA and the Coast

Guard stated their intention to implement a single waste management plans through two directives. The directives were intended to both create one unified plan that could provide direction across the *Deepwater Horizon* response theater, and to implement accountability that would go beyond some state requirements. Developing the one Unified Waste Disposal Plan required some negotiation regarding sampling requirements and classification of waste. The critical aspects of recycling and reuse were not incorporated in the plan. In general, the waste management plan was intended to be a consistent document that could be applied to each affected state while also allowing adaptability to the needs of the spill response.

The One Gulf Plan includes an outline of the Disposal Group Supervisor’s responsibilities, with Waste Management and Temporary Storage options to ensure that federal, state, and local disposal laws and regulations are followed, necessary permits are obtained, and the RP submits a disposal plan for approval. The applicable Sector New Orleans Geographic Response Plan provides a list of area disposal companies and a supplemental

Removal and Disposal Checklist, which provides guidance to ensure appropriate waste characterization, classification, and disposal are implemented.

In May 2010, the CRU began to develop various worst-case-scenario models to estimate waste estimates. The unit modeled 12,000 miles of beach being heavily oiled in five states. Using a waste calculator program, the CRU calculated potential waste totals. The CRU contacted the largest waste handlers in the United States to garner insights and request assistance. Next, waste management company executives met with CRU staff, RP, and key members of the UAC. The CRU indicated there was a potential for oiling in five states and provided the companies with the numbers from the waste calculator. The companies provided verbal proposals that included beach receptacles, waste sites, land farms, and other disposal options. Within days, the CRU assigned one waste management company to ICP Mobile, one to ICP Houma, and another to the Florida operation. The RP executed master contracts and released news of the arrangements to the ICPs.

The first formal waste management plan for the spill was issued on May 8, 2010. On June 14, 2010, version 3 of the Recovered Oil and Waste Management Plan for the Houma ICP was approved to cover waste issues in Louisiana. This over-arching plan covered a broad range of waste management issues including:

- Oil skimmed off the water,
- Oil collected from absorbents,
- Decontamination, shoreline impact cleanup,
- Wildlife rehabilitation waste disposal, and
- Other cleanup related issues.

A similar Solid Waste Management Plan for the Mobile ICP was issued on May 9, 2010, and later revised on July 2, August 5, and August 25, 2010. This plan covered the states of Mississippi, Alabama, and Florida.

On June 29, 2010, the Coast Guard and EPA issued their first directive requiring the RP to test its waste for hazardous elements, publicize the results, and consult with communities about where the waste was to be stored. Due to the nature of the waste, including oil exploration and production (EP) waste, the oil and oily water were technically exempt from classification as hazardous waste. The RP initially sampled waste intended for disposal as a matter of voluntary due diligence.

There was also discussion over how often this waste should be sampled, e.g., each load transported, random samples once per week, once per month, etc. In fact, the frequency of sampling varied, though the EPA conducted twice-monthly testing of debris and posted the results on the Internet. As of November 17, 2010, EPA's tests had not shown any of the waste to be hazardous. In addition to EPA and RP, and some counties also sampled the waste to ensure it was non-hazardous. For example, Harrison County, Miss., tested waste before its disposal at the Pecan Grove landfill.

The final version of the Gulf-Wide Recovered Oil and Waste Management Plan was signed on October 4, 2010, and superseded the previous waste management plans for both the ICPs Mobile and Houma. To avoid duplication and confusion, this single plan was used for all waste generated from the *Deepwater Horizon* response, including the decontamination program.

Cooperation among representatives of the oil and gas industry, commercial waste management facilities, and state governments resulted in development of guidelines for third party commercial firms handling and managing EP waste. These guidelines reflected a continuing commitment to environmental protection and to assurance that the wastes from oil and gas EP waste were properly managed.

The EP Waste Workgroup created these guidelines to help identify design, construction, and operational options that could be used, depending on site-specific conditions, at facilities to protect human health and the environment. The EP Waste Workgroup sought to provide flexible guidance to waste management facility owners and operators while protecting human health and the environment. Although these guidelines were intended to be useful to a varied audience, three audiences found the information particularly useful—EP waste facility owners and operators, customers of the waste management facility (i.e., EP companies), and state regulatory personnel.

Oil EP wastes are classified as non-hazardous by law and do not require specialized disposal. Oil contaminated debris and oily waste generated from the cleanup of this oil spill were considered solid waste.

The waste was classified into three categories: recyclables, municipal trash, and crude oil-contaminated (oiled) waste. The recyclables and municipal trash primarily came from office buildings

where RP, UAC, and ICPs were located, supply distribution warehouses, response equipment, and personnel field mobilization sites.

Crude oil-contaminated waste was generated by shoreline cleanup, skimming, booming, and decontamination of vessels or equipment. The oiled waste was both solids and liquid. Oil contaminated items included shoreline cleanup equipment, tar balls, vegetation, oiled sand, oiled debris, used personal protective equipment, and disposal equipment.

The decontamination process produced large quantities of waste including oiled boom, sorbents, clothing, and protective suits, and other oiled gear. Large quantities of waste water were also produced from high pressure hull cleaning, hand cleaning, and engineering system flushing.

In some cases, decanting of oily waste water was studied to increase efficiency, as was processing waste water through municipal Publicly Owned Treatment Works (POTW). After extensive consultation with appropriate state and local authorities, the Coast Guard, EPA, and the EP Waste Workgroup determined the best method for managing waste water was to relocate waste via truck to approved land-based waste disposal sites. The large volume of waste water produced in the decontamination process was too great for the intended design of the POTWs that were considered (specifically in Port Fourchon and Lake Charles).

Although trucking waste water added some risk and cost, it avoided unnecessary direct environmental risk of either decanting oily water into the waterway or overwhelming POTWs. The group also studied the responsibility of the waste originator and the separation of a decontamination contractor from the parameters of the UAC Waste Management Plan. It was determined that individual

VENICE, La. – Workers at a decontamination site clean oil containment boom, which will then be transferred to a staging area and eventually put back into service. Photo courtesy of U.S. Coast Guard



contractors should not be authorized to originate their own waste because this would make tracking, oversight, and enforcement of waste management too challenging and create gaps and improper or inadequate waste disposal.

To the extent possible, water was separated from the oil, treated, and reused, or disposed of at permitted disposal facilities. The recovered oil was sent to facilities that recycle or reprocess the oil. Recovered oil that was not suitable for recycling or reprocessing was disposed of at permitted facilities. Waste was sent to municipal waste landfills with the appropriate permits. The designated sites were Chastang, Ala., Spring Hill, Fla., Pecan Grove, Miss., and various sites in Louisiana.

Used boom was placed in watertight, covered roll-off boxes at a decontamination station. Then it was taken to a staging pad where the boom was pressure-washed with hot water and a cleaning solution if needed. Recovered oil was collected for treatment, reuse, or disposal. The wash water was treated on-site, and recycled or sent to a permitted disposal facility.

As mandated in the Coast Guard and EPA directive, a percentage of materials, such as boom, needed to be recycled or reused. Decontaminated boom that could be reused was redeployed to the response or returned to the owner. A small percentage of boom was used as a fuel source in electrical generation. Some boom was recycled into plastic materials used for benches or other objects. If the boom could not be reused or recycled, it was disposed of in a landfill.

Oiled sorbent materials and other oily debris were bagged and placed in watertight containers for transport to permitted solid waste landfills.

6.7 Operational Logistics: The Severe Weather Contingency Plan

The Severe Weather Contingency Plan (SWCP) addressed how spill response activities and waste management would be conducted if severe weather impacted ongoing *Deepwater Horizon* response efforts. The SWCP established severe weather preparedness and response guidelines for the personnel, equipment, and resources assigned to support the *Deepwater Horizon* oil spill response. The primary function of the SWCP was to serve as the FOSC mechanism to direct the timely and

effective suspension of response operations, potential relocation of *Deepwater Horizon* response assets, and the reconstitution of those assets after a severe weather threat or event passed through the region.

The complicating factor was that the oversight and funding mechanism for the response to a severe weather event (under the Stafford Act) is fundamentally different from the oversight and funding mechanism used to respond to typical oil spills under the Clean Water Act and OPA 90.

The SWCP delineated the components of oil cleanup operations that would be conducted and funded under the Stafford Act with FEMA's oversight, and which would continue to be conducted under the *Deepwater Horizon* FOSC's direction, following the NCP in the case of severe weather. Resumption of oil spill response operations after a severe weather event would be initiated in a phased manner as soon as the affected areas were deemed safe for reentry and support services were adequately restored to support an effective response. Due to the possibility that non-*Deepwater Horizon* point-source oil spills could occur from storm surge, flood, or infrastructure damage from a severe weather incident, potentially mixing with *Deepwater Horizon* oil, the cleanup process after a storm would require a comprehensive post-storm assessment and a spill-sampling plan to ensure accountability and chain of custody were maintained. FEMA and EPA policy does not authorize Stafford Act funds for the cleanup of a pre-existing oil or hazardous materials spill.

The SWCP therefore outlined procedures to identify oil matching the *Deepwater Horizon* Macondo well for removal funding purposes, and noted that the cleanup, transport, storage, and final disposal of the oil associated with the *Deepwater Horizon* spill would be conducted under the FOSC's existing protocols. Meanwhile, oil or contaminated debris associated with other sources compromised by the severe weather event would be handled separately under Stafford Act procedures. For more information on the SWCP, see Chapter 5 of this report.

6.8 Support Logistics: Command, Control, Communications, Computing and Information Technology (C4IT)

At the beginning of May 2010, the Unified Area Command (UAC) Logistics Section, then located in Robert, La., comprised five persons, plus a detached Personnel Resources Unit (PRU) located at the Coast Guard District Eight offices in New Orleans, La. The Communications Unit, under the Logistics Section in accordance with the Incident Command System (ICS) construct, operated independently. There was also an Information Technology (IT) support Branch operated by Electronics Support Unit (ESU) New Orleans (NOLA). This Branch operated independently of the Communications Unit to provide IT support services, much like an Electronics Support Detachment at a Coast Guard unit.

The Coast Guard Command, Control, Communications, Computers, and Information Technology Service Center (C4IT SC), Field Service Division created an ESU structure within the UAC to provide effective around-the-clock IT support, and to manage the myriad requests for additional IT infrastructure for response personnel. New ESU commanding officers were cycled in every four weeks for a 30-day period to provide leadership for the ESU Logistics Cell inside the UAC. Essentially, the C4IT logistics component of the response could be accurately described as an ESU operating within the current ESU NOLA to support the UAC and all Coast Guard responders.

To streamline property accountability and delivery, the ESU New Orleans was the inventory control point for all *Deepwater Horizon* C4IT equipment. In addition, ESU NOLA established an IT Boot Camp as a two-day program designed for incoming IT personnel to bring the personnel current regarding specific issues related to the *Deepwater Horizon* response, and to provide refresher training on the most common IT support tasks.

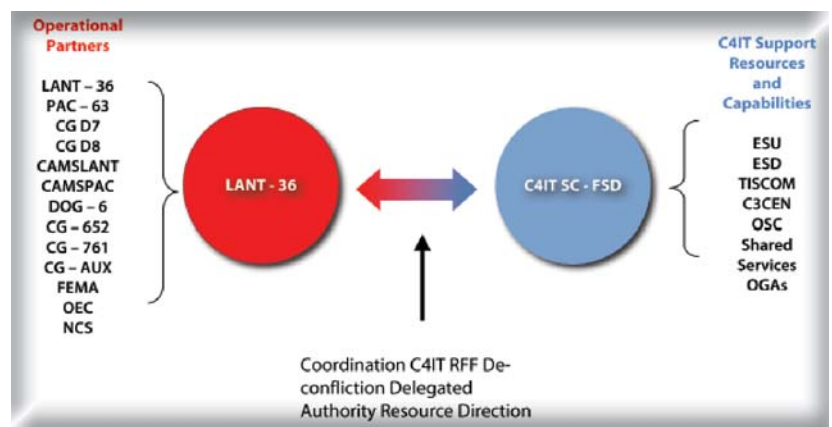
To assist with tracking C4IT resources, IT support personnel developed a C4IT common operational picture (COP) through ArcGIS, a data management system. User-friendly spreadsheets were developed for C4IT logistics personnel to identify and enter deployed personnel and equipment. The spreadsheet data was imported daily into ArcGIS, which permitted the display of all deployed C4IT

assets and resources in a visual format. This greatly aided the Field Service Division (FSD) in keeping C4IT SC leadership and the Assistant Commandant for C4&IT (CG-6) apprised of the C4IT force lay-down.

The increasing size of the response operation affected multiple ESUs beyond ESU NOLA alone. ESU Miami supported the ICP in St. Petersburg, Fla., which transitioned to ICP Miami and the Florida Peninsula Branch operating under ICP Mobile. ESU Portsmouth, Va., supported the Atlantic Area Integrated Management Team (LANTAREA IMT), and the Coast Guard Headquarters Support Facility supported response elements in the National Capitol Region such as the National Incident Command (NIC) staff.

As the incident quickly escalated from a regional to a national event, the C4IT SC Field Service Division assumed coordination of all C4IT service and resources. Operational C4IT resources were managed by the Coast Guard Atlantic Area Staff Operational Communications and Safety Division (LANT-36). The diagram below shows the relationship between operational communications and C4IT support entities. This structure between the operational communication and C4IT support community and was a key element to successful C4IT management for the Coast Guard in the *Deepwater Horizon* response.

Figure 6.6: C4IT Support Resources and Capabilities



Within the response structure, the UAC Communications Unit oversaw the ICP Communications Units. The UAC Communications Unit monitored field detachment activities, coordinated rapid installation of commercial communication lines whenever needed, provided around-the-clock technical support, managed key personnel requests, and assignments at the enterprise level while routing ICS-213s request forms through the UAC for appropriate accounting.

Almost immediately, the Coast Guard released 105 Coast Guard laptops stored in Baltimore, Md., to the response. The Coast Guard also dispatched C4IT personnel to assess C4IT equipment and infrastructure needs, which enabled the entire C4IT organization to accommodate the needs of Coast Guard responders through the duration of response operations. In anticipation of the rapid depletion the Coast Guard stores of standard laptops, C4IT SC procured, imaged, and installed an additional 1,200 Coast Guard Standard workstation computers and associated infrastructure to support deployed personnel. In anticipation of the rapid depletion of the Coast Guard stores of standard laptops, C4IT SC procured, 'imaged' and installed an additional 1,200 Coast Guard Standard workstation computers and associated infrastructure to support deployed personnel. 'Imaging' of a workstation computer is the loading of the standard Coast Guard operating system, attached security systems, and authorized enterprise applications onto the machine. Because the imaging process is time-consuming, the Coast Guard Telecommunication and Information Systems Command (TISCOM) increased its imaging capacity to an around-the-clock operation. In addition, the rapid deployment of laptops proved a significant property management and accountability concern.

Coast Guard cutters with legacy connectivity could not effectively coordinate with command and control entities on shore. Working with TISCOM, medium endurance cutters working the *Deepwater Horizon* response effort were outfitted with satellite connectivity solutions. With higher bandwidth satellite connectivity and the updated version of Internet browser software, cutters and other communications assets were able to access the incident COP software ERMA. The cutters could also then use the Homeland Security Information Network and the Jabber Chat client via commercial satellite providers to coordinate with the UAC and ICPs ashore.

The C4IT organization helped Coast Guard Surface Forces Logistics Center (SFLC) personnel establish and support shoreside Vessel Support Units. Each Vessel Support Unit provided vital maintenance support to the cutters and small boats involved in the response effort. Coast Guard ITs provided connectivity to the cutters and assisted with computer casualties while Coast Guard Electronics Technicians (ETs) provided casualty and preventive maintenance assistance to the crews.

The RP provided phone lines to the command centers, ICPs, and Branches. Additionally, cell phones were issued to Coast Guard command staff, and the cell phone resource requests were handled through a special request requiring section leader approval for accountability purposes. Cell phones were in near constant demand as staff levels continued to surge through June 2010. Cell phones generally fell into three categories—heavy-duty phones for field use, regular phones for those in staff assignments, and smart phones for liaisons and senior staff. (Smart phones were set up with Goodlink for email receipt.)

C4IT SC also implemented the Electronically Stored Information capture process in accordance with U.S. Department of Homeland Security (DHS), U.S. Department of Justice, and Coast Guard Legal guidelines. Using the DHS approved Symantec Enterprise Collector E-Vault data collection tool, electronically stored information from standard and non-standard laptops are in the process of being archived. When complete, the data will be stored at the DHS collection facility at NASA's Stennis Space Center in Mississippi. The result will yield a searchable data archive to meet Freedom of Information Act and other information requests for *Deepwater Horizon* response related data.

The RP provided internet access at the UAC, ICPs, Branches, and other locations. Other agencies largely relied on these commercial internet avenues to access their computer networks, and relied largely on their own cell phones for communication. Where necessary, they used Coast Guard, and at times, the RP provided communications.

Tactical Communications: Organization and Personnel

ICPs Houma, Mobile, and Miami had a Communications Unit Leader (COML) assigned and responsible for all C4IT issues within that ICP area of responsibility. There also was an assigned COML at the UAC to manage C4IT issues within the UAC

due to its size. The Branches were concerned with tactical communications. There the IT staff implemented the use of Incident Communication Center Managers (INCMs) and Radio Operators for the first time on a Coast Guard response. Many of the Radio Operators were contracted by the RP, but they reported to a Coast Guard INCM. At each ICP and working for the COML was a variety of support personnel including Operations Specialists, supply personnel, and a number of Information System Technicians under the supervision of a senior IT or C4IT person. This person provided IT support throughout the ICP area of responsibility.

C4IT leaders decided early in the response to select personnel to fill the COML positions from the small group of personnel who had graduated from the recently implemented ICS-358 COML class. This limited the pool of candidates to 142 personnel who had graduated ICS-358 at that time. The requirement that COMLs be graduates of the ICS-358 course created a baseline skill set that could then be built on through on-the-job experience.

Several of the Branches became so large and dispersed that it was necessary to assign COMLs at the Branch level to coordinate operational communications in smaller geographic areas. COMLs assigned at the Branch level reported to the ICP COML.

Due to the scope and complexity of this response, another ICS position at the UAC was used for the first time on a Coast Guard response, that of the Communications Coordinator. The Communications Coordinator was a senior communicator from a district or area staff, a graduate of the ICS-358 COML class, and someone with extensive operational communications experience. The Communications Coordinator was responsible for coordinating all C4IT issues between the various response organizations and supporting agencies and organizations. The responsibilities of the coordinator included:

- Spectrum and frequency management,
- Communications plan review,
- Critical communications resources (computers and radios) ordering and allocation, and
- The personnel ordering process for critical communications personnel.

The Coast Guard identified the insufficient number of frequencies to provide effective communications to all responder aircraft and vessels as an organizational communications challenge early in the

response. ICPs were competing with one another for frequency assignments. The solution was to bring all key communications leaders together from the various ICPs and with the RP identify key integration points and common frequency plans and strategies. Once the meeting was held, the situation rapidly resolved through agreed allocation and effective communications resumed.

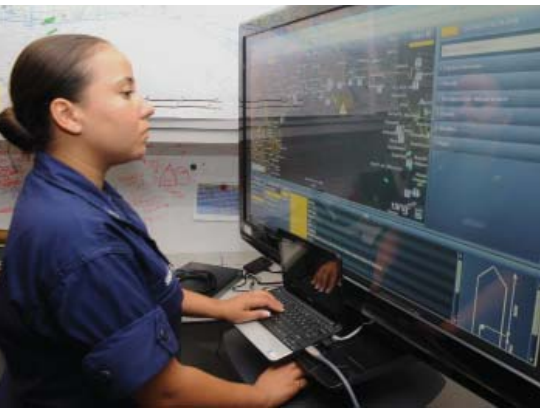
Vessel Communication

Vessel communications proved to be the most challenging issue faced by the communications organization. A total of more than 9,000 VOO and response vessels were assigned to the incident, ranging in size and capability from 16-foot Jon boats with little or no communications equipment, to 270-foot Coast Guard cutters with a full suite of military communications systems, and major commercial vessels with state of the art commercial communication systems. Responders needed to communicate from remote marsh areas and the well site 50 miles offshore. Developing an effective, comprehensive communications plan, which accounted for language barriers and provided the appropriate level of communications to all vessels, was a major undertaking.

In the early stages of the operation, vessel communications were limited to available marine band channels. Using non-traditional marine band channels with Federal Communication Commission permission, and permission from coastal operators with licenses to use specific marine band channels, C4IT responders were able to develop a solution based on VHF-FM marine band with frequency reuse occurring based on geographical separation. The RP assisted by installing radios on vessels not already equipped.

Communication with responders on or near the shore was primarily a concern in the Louisiana coastal region, as that was where oil impact first occurred. The Louisiana Governor's Office of Homeland Security and Emergency Preparedness was engaged to utilize their statewide 700 and 800MHz radio system. Within four days of the beginning of the response, they provided radio coverage on shore throughout the Louisiana area of operations.

The State of Louisiana continued to implement a project it was working on called the Gulf Coast Wireless Interoperability Network (GWIN). By mid-May, Louisiana radios could communicate



MOBILE, Ala. – A U.S. Coast Guard Petty Officer disseminates the coordinates of oil sheens provided by personnel in aircraft to offshore vessels in the Gulf of Mexico. The large screen being monitored displays real time vessel tracking in the Gulf. Photo courtesy of U.S. Coast Guard

in the coastal region from Orange Beach, Ala., to the Texas border; this system also provided limited GWIN coverage in the Houston, Texas—connectivity that proved important later as heavy weather plans involved relocating parts of the response organization to Houston, Texas.

Beginning in mid-May 2010, the RP also began utilizing Louisiana’s existing radio network. The network was a repeater-based system operating primarily in the VHF-FM business band throughout the Gulf region. Ultimately totaling 17 repeater or gap-filler sites, this network provided repeater based radio coverage throughout the five-state theater of operations. Most repeat locations also included one or more VHF-FM marine band channels and a VHF-AM air-ground frequency. All radios were connected using Motorola Motobridge equipment, and were controlled from Incident Communication Centers (ICCs) throughout the region. With radio operators, communication technicians (COMTs) and INCMs at each ICC (more than 10 ICCs at one point), this network was the largest, most complex radio system deployed for a single emergency response, and it continues to work well.

The RP provided VHF radios, which operated on the RP’s network, to VOO squadron leads. The RP managed the VOO program, which is discussed in more detail earlier in this report. Communications with offshore cutters equipped with satellite capability was facilitated by the mobile ICP from Communications Area Master Station Atlantic.

In addition to utilizing state and RP communications equipment when available, the Coast Guard used large Coast Guard vessels or personnel aboard commercial vessels, such as the *Seacor Lee*, to coordinate communications as vessels ranged further offshore.

Aviation Communications

With more than 200 missions per day at the height of the response, establishing a communications plan for aircraft assets was critical. Complicating the aviation communications-planning task was the many commercial aircraft contracted to provide operations capability which only had one or two aviation band radios, which limited their communications capability.

Customs and Border Protection P-3 aircraft were used for both communications coordination as well as airspace de-confliction. The P-3 aircraft personnel obtained commercially available headsets suitable for aircraft operations, allowing the use of the RP handheld radios and the RP radio network. This arrangement significantly improved air-to-ground communications. All frequencies were added to the RP radio network on several tower locations, providing additional coverage. Finally, the establishment of the Aircraft Operations Center at ICP Houma improved flight planning and frequency management.

The ESU and C4IT team worked with the U. S. Department of Defense (DOD) and other governmental agencies to establish the Aviation Coordination Center at Tyndall Air Force Base in Panama City, Fla. There were numerous network security and authorization challenges to support Coast Guard personnel in the Air Force command and control environment. C4IT personnel successfully installed Coast Guard Secret Internet Protocol Router Network (SIPRNET) terminals and provided Coast Guard network connectivity to Coast Guard response members.

Rescue 21 Utilization

Early in the response, the Coast Guard decided not to use Rescue 21 (R21) capability as the primary communications system for the event. There were several reasons for this. The Sectors involved did not have the physical space to add watch standers and workstations to coordinate the *Deepwater Horizon* response and there was uncertainty as to whether the Coast Guard Data Network or R21 could handle the additional voice and data traffic generated by the *Deepwater Horizon* response.

All *Deepwater Horizon* communications ultimately used the Louisiana and RP networks to the maximum extent, with emergencies reported via Channel 16 VHF as would normally occur.

Information Management: Network connectivity and infrastructure

Bandwidth during the initial stages of the response was strained. Both the UAC, when located in Robert, La., and ICP Houma experienced significant problems with Remote Access Solution (RAS) and terminal server connectivity, primarily due to constraints of available bandwidth.

The use of local domain controllers, file, and print servers, in conjunction with moving response personnel profiles, proved effective in resolving most connectivity issues for users. The RP deployed much of their bandwidth over wireless connections, making it very difficult to connect and use Coast Guard standard workstation laptops until the Coast Guard Data Network was available.

TISCOM and the C4IT SC were very responsive to operational requirements. Multiple high capacity, DS-3 and T-1 cables in various configurations were ordered and provisioned in very short order. Integration of Coast Guard and RP IT support was effective even during the early stages of the response and helped prevent duplication of efforts. The use of different colored cables made it easy to identify Coast Guard versus RP networks when connecting computers.

As it became apparent that the spill response would continue, TISCOM invoked National Security or Emergency Preparedness Telecommunications (NS/EP) policy to provision the UAC and ICPs with Coast GuardOne T1 broadband circuits. This provided each location with the same connectivity as most other Coast Guard units.

Electronically Stored Information

As discussed in Chapter 5, prior to the beginning of the response there was no existing process to collect response data for the purposes of administrative record maintenance required by the NCP and needed for electronic discovery related to possible litigation. Protocols to ensure capture of Electronically Stored Information (ESI) were developed with the assistance of the Department of Justice over the course of the response.

Imposition of a uniform nomenclature for the event (*Deepwater Horizon*) helped the process of finding and collecting ESI, as did the order to file response related ESI separately from Coast Guard user's other electronic data. Creation of on-site servers and transfer of Coast Guard user profiles to the response servers upon arrival, once set up, made the process of segregating response ESI much easier. The process of locating and archiving all response related information was complex, because local servers were not running until well into the response and support to the response was provided from throughout the Coast Guard.

6.9 Support Logistics: Federal On-Scene Coordinator Logistics Policies

From an organizational construct, it became apparent in May 2010 that the Coast Guard would have a large number of its personnel involved in the *Deepwater Horizon* response for an unknown time. Consequently, the Coast Guard saw the need to create a support structure at the UAC similar to a large



VENICE, La. – A geologist, who volunteered his time to find birds affected by the *Deepwater Horizon* oil spill, conducts an hourly radio operations check along the Gulf of Mexico shoreline. Photo courtesy of U.S. Air Force



MOBILE, Ala. – The Coast Guard enhanced mobile incident command post is parked just outside the Mobile, Ala. Incident Command Post to provide additional communications for operations in the Gulf of Mexico. Photo courtesy of U.S. Coast Guard

Coast Guard Sector, with the ICPs and Branches as the operational field units. The goal was to bring structure to the burgeoning organization, similar to starting a new unit. The UAC would set policies and provide services that would extend to the ICP and Branch. These included:

- Providing Coast Guard Services and policies related to the administration and discipline of personnel;
- Setting work hours, watch rotations, and schedule expectations;
- Implementing a performance evaluation system to capture members' performance while assigned to the *Deepwater Horizon* response;
- Implementing Commandant polices, providing guidance and assistance with travel claims and Joint Federal Travel Regulations related entitlements; and
- Establishing check-in, orientation, and check-out procedures for Coast Guard members.

The Logistics Section also arranged for services for members similar to any Coast Guard unit, including

- Providing accessible medical and dental care and guidance;
- Establishing a motor pool with policy guidance;
- Providing adequate Employee Assistance Program;
- Providing access to chaplains and religious services;
- Providing Incident Command System (ICS) and job-specific training for members by bringing in contractors to teach ICS classes; and

- Establishing the Pollution Investigator and Federal On-Scene Coordinator's Representative (FOSCR) training at Coast Guard Base Support Unit New Orleans.

While all policies and associated information were posted on the Homeland Security Information System Network per DHS guidelines, there was still some confusion with the implementation and enforcement of common policies. This resulted from the constant turnover of Coast Guard personnel as the response continued over the course of many months. With the turnover of personnel, institutional knowledge became lost, requiring the constant retraining of new personnel on some policies and processes.

6.10 Support Logistics: Area Command Critical Resources Unit

Located within the Planning Section at the UAC, the Area Command Critical Resources Unit Leader (AC CRESL) processed all critical resource requests. The AC CRESL received the requests, filled the orders, and tracked all of the critical resources for the *Deepwater Horizon* response.

Per Chapter 13 of the Incident Management Handbook, COMDTPUB P3120.17A, the AC CRESL is responsible for submitting critical resource needs to the AC Logistics Section Chief, and the AC Logistics Section Chief is responsible for obtaining the requested critical resources; however, this construct was modified for the *Deepwater Horizon* response in that the AC CRESL actually obtained all of the needed critical resources for the response. After the AC CRESL had received the critical resources, Resource Request Forms ICS-213RR were submitted to the Logistics Section for documentation.

There were only two designated critical resources at the beginning of the response, hard boom and high-capacity skimmers. The RP directly procured boom and provided high-capacity skimmers beyond federally controlled resources. Boom was so critical that the RP appointed a specially designated point of contact from its corporate offices to implement a comprehensive boom acquisition and distribution strategy from the Area Command Critical Resources Unit. Boom and skimming resources are discussed in further depth in Chapter 3 of this report, Operations.

6.11 Support Logistics: Resource Request Process

In addition to structure, policy, and critical resources (i.e., boom and skimmers), the FOSC needed many other resources, and followed the ICS pre-established policies for requesting those resources. The standard Resource Request Form, ICS-213RR, was used for all resource requests. All resource requests at the UAC were tracked in an Excel spreadsheet called the *Mississippi Canyon 252* log, using an assigned, sequential number for each request.

Each ICS-213RR had to be signed by the requestor, the applicable incident command section chief, and the Resource Unit Leader (RESL) prior to being signed by the Logistics Section Chief. The RESL confirmed whether the requested resource was already assigned to the response and currently available for disposition. After the Logistics Section Chief signed the form, it was routed to the Finance Section Chief for procurement, or travel order number assignment (TONO) for personnel orders if necessary, and signature. All original documentation was turned into the Documentation Unit Leader, and copies were retained in the files.

Each resource request recorded in the *Mississippi Canyon 252* log at UAC was cross-referenced with the applicable Mobilization Readiness Tracking Tool (MRTT) number for Coast Guard personnel requests, and the applicable Request for Assistance (RFA) number with the corresponding Military Interdepartmental Purchase Request (MIPR) number for DOD and State National Guard requests (discussed in more detail below). Requests for critical resources were specially annotated in the *Mississippi Canyon 252* log.

Each ICP utilized a unique numbering system to track its specific resource requests. Resource requests at the UAC and ICP were also entered into Homeland Security Information Network to create a permanent record.

6.12 Support Logistics: Requests for Assistance (RFA) from the Department of Defense (DOD) and State National Guards

RFAs were available for DOD and state National Guard resources. DOD resources utilized included aircraft, vessels, spill equipment, and skimming equipment. DOD, the National Guard Bureau, and each of the four state National Guards involved

with the response had liaison staff at the UAC. The Coast Guard worked with these individuals at the UAC to process the RFAs and resulting MIPRs for the response.

The RFA staff at the UAC had a unique position within the ICS construct. Chapter 13 of the Incident Management Handbook does not specifically address RFAs, DOD, or National Guard resources. At the outset of the response, the RFA staff was a command staff element that reported directly to the Coast Guard Area Commander and Deputy Area Commander; however, this was quickly modified in early May 2010 when a decision was made to incorporate the RFA staff under the Logistics Section. This provided better management and oversight of the personnel who performed this very high profile task. Moreover, it ensured that the processing of these requests was standardized and consistent with the processing of all other resource requests for the response.

For the DOD resources, the Coast Guard needed an ICS 213RR form to start the RFA process. Additionally, the National Guard required a Fragmentary Assistance Assignment (FAA) document to proceed with the RFA process. A memo was created for the FOSC's review and signature. While the RP was given the opportunity to approve all RFAs via signature on the ICS-213RR, the RFA was still processed even if the RP refused to sign it, as long as the FOSC approved it.

Once the FOSC signed the documents, DOD or the respective state National Guard were notified. Working concurrently with the contracting officer in the Finance Section, a MIPR number was assigned to fund the RFA. Once the CRU had all signatures on the paperwork and a MIPR number to ensure funding, everything was scanned into Homeland Security Information Network to create a permanent record. An entry was also made into a sequential RFA log for tracking purposes.

ICPs used their established resource ordering processes approved by the UAC. The only exceptions were requests for critical resources, RFAs, and Pollution Removal Funding Authorizations (PRFAs), which had to be approved by the FOSC at the UAC. In addition, requests for Coast Guard assets that could not be filled through the local Sector or Air Station, and all requests for Coast Guard personnel, were routed through the UAC.

The RFA staff developed a report for the tracking of the personnel, equipment levels, and funding that was authorized for each of the state National Guards, RFAs and MIPRs. The report tracked the expiration of any RFA and prompted the RFA staff to initiate renewal or allow the expiration of each RFA in the form of a notification reminder 10 days prior to the RFA expiration date.

When the services or period outlined in the RFA and MIPR were complete, the RFA and MIPR were either amended to extend the period of performance, if the resources were still required, or the RFAs and MIPRs were allowed to expire and closed out. RFAs and MIPRs were frequently amended to adjust the amount of funding or the period of performance of the resources involved.

The closeout process for an RFA required coordination with the DOD or respective state National Guard staff, as well as the contracting officer in the Finance Section. This coordination ensured the MIPR funding was accurate for the RFA.

6.13 Support Logistics: Organization and Facilities

The UAC was initially located in Robert, La., and managed four ICPs, each with numerous Branches, and Staging Areas. The UAC was organized per Chapter 13 of the Incident Management Handbook (COMDTPUB P3120.17A).

At the start of the response, the three ICPs were ICP Houma, La., ICP Mobile, Ala., and ICP St. Petersburg, Fla. There was also a contingent of Coast Guard technical specialists assigned to source control with the RP in Houston, Texas, which evolved into an ICP. ICP Miami, Fla., was organized at the end of May 2010.

The RP provided the facilities for the UAC, ICP, Branches, and Staging Areas. Within Robert, La., the UAC was located at the Shell Company Training Facility. This created a unique situation because Shell initially had students and staff at the facility in addition to the RP, Coast Guard, and other agencies personnel associated with the *Deepwater Horizon* response.

As the number of *Deepwater Horizon* personnel at the UAC grew, the RP constructed additional office trailers in the parking lot. In June, the Coast Guard worked with the RP on a cohesive plan to move to a location that could accommodate all

personnel, including computers, phones, and associated equipment.

The Coast Guard used a badge system provided by the RP to identify all *Deepwater Horizon* personnel on site. The badge system and accompanying software enabled the UAC to obtain daily manpower summary reports of the total number of *Deepwater Horizon* personnel located at the UAC. This same badge system and software were used at the ICPs, and to some extent at the Branches and Staging Areas, enabling the report of manpower data for the entire response. While this system did capture the number of personnel at the location on a daily basis, it was not designed to capture the number of hours worked.

By way of example, from May 31, 2010, to June 1, 2010, there were a total of 382 *Deepwater Horizon* response personnel at the UAC, including 202 federal government personnel (e.g., Coast Guard, DOD, and other federal agencies), as tracked by the RP badge system and software.

The UAC ultimately became too large for the Robert, La., facility, and the decision was made to relocate the UAC to New Orleans, La.

The RP directly procured and leased all facilities for the *Deepwater Horizon* response at its own expense. Thus, the facility role of the Coast Guard's Logistics Section coordinated with the RP to ensure the UAC and the government responder requirements were met.

The Coast Guard executed a small number of leases for evidence storage and preservation locations following extensive discussion with Coast Guard, the RP, and Department of Justice. It was decided that the government would execute and fund separate leases for evidence storage.

The Coast Guard also executed MIPRs with the Air Force and Navy to provide aircraft and mooring facilities at Tyndall Air Force Base and Naval Station Pensacola.

For UAC logistics, the only facility obtained separate from the facilities procured by the RP was the Readiness and Assessment Team (RATT) at Coast Guard Base Support Unit (BSU) New Orleans.

Staging areas for boom and other resources were established by the individual ICPs logistics and resources personnel. In early June 2010, logistics experts from Coast Guard Headquarters and DOD were brought to the UAC to assist in creating an effective property staging and distribution system.

The Logistics Sections at the respective ICPs ensured the Coast Guard staff at each staging area had the communications, IT, and safety equipment needed to oversee RP logistics with the ordering of critical resources. Staffing at Staging Areas fell to the Operations Section. All major equipment held at Staging Areas was the responsibility of the Logistics Section.

6.14 Support Logistics: Vehicles and Transportation

The Coast Guard created a Ground Support Unit (GSU) at the UAC in the end of May 2010. For the most part, the RP contracted for extensive transportation capabilities throughout the impacted area, and thus the need for separate government transportation was not pressing until the size of the organization began to expand. The RP provided shuttle van transportation for all UAC members to and from the UAC to the contracted accommodations and the airport. Rental cars were authorized for certain members of the UAC because the nature of their work required extensive travel around the region.

The Ground Support Unit Leader at the UAC established a motor pool operation in May with General Service Administration (GSA) and Navy vehicles. The Ground Support Unit Leader acquired 71 vehicles for use by government personnel assigned to the *Deepwater Horizon* response. These vehicles provided low cost transportation services for members to and from airports and assigned locations, as well as for trips through the region for readiness and response related activities. The Finance Section secured payment for all vehicles from the Navy using the OSLTF accounting string. This was after the NPFC confirmed that the vehicles were an acceptable expense to be charged against the OSLTF.

A majority of the GSA leased vehicles were forward deployed to field personnel, with a few remaining on hand at the UAC for daily check-out through the Ground Support Unit Leader.

6.15 Support Logistics: Lodging and Feeding

Lodging for UAC personnel was provided using RP concierge services. The RP provided rooms at hotels in cities located near the Shell Training

Facility in Robert, La., and later the UAC in New Orleans, La. The Coast Guard decided to require use of this lodging, both in Robert and New Orleans, as it greatly assisted in personnel accountability, particularly in the event of severe weather evacuation. It also eliminated the need for Coast Guard members to pay for rooms, and simplified travel claims because no reimbursement for this expense was required. Other government agencies made their own decisions regarding use of RP procured lodging, but they were offered this option.

The RP also provided meals at the UAC, ICPs, and some larger Branches. This eliminated the need for a Food Services Unit under the Logistics Section within the ICS organization at the UAC and ICPs

Personnel assigned to the ICPs located in Houma and Mobile, Ala., were also provided accommodation and meals. Overall, ICP Mobile had few problems with lodging. However, as a result of the surge in Coast Guard personnel in late May and June 2010, there was inadequate housing available in the Houma area. Responders were provided accommodations in New Orleans hotels, and traveled the 116-mile round-trip to ICP Houma. The scarcity of lodging was a theater-wide problem, not limited to Houma.

6.16 Support Logistics: Personnel

The majority of the resource requests processed were for Coast Guard personnel. The PRU was relocated from Coast Guard District Eight offices in New Orleans, La., to the UAC, under the Logistics Section in May 2010. A detachment was established at Base Support Unit New Orleans, to facilitate a central staging of all *Deepwater Horizon* personnel, including training, medical, and all items necessary to ensure members were ready to be deployed into the field. At the end of May, this responsibility transitioned to the CRU working within the Logistics section at the UAC.

An important step in trying to structure the *Deepwater Horizon* response operation was the establishment of a personnel allowance list similar to any Coast Guard unit. This personnel allowance list



GRAND ISLE, La. – A tug is moored to a floating hotel (flotel) which houses approximately 80 contract workers for the *Deepwater Horizon* response. The flotel provides a galley, laundry facilities, television, rooms, and wireless internet. Photo courtesy of U.S. Coast Guard

would specify all needed Coast Guard positions by number at the UAC, ICPs, Branches, and other locations, and the persons who would fill each of those positions. The system had to be flexible to account for increases, decreases, and changes of positions on the list, and had to track the dynamic rotation of personnel assigned at all locations of the response.

By the end of May 2010, the process had matured. The FOSCs and FOSCRs identified and forwarded personnel needs to the Resource Unit Leader. The Resource Unit Leader would then canvass internal to the response for potential personnel resources to fill the request. If not available, the UAC Logistics Section attempted to source the request from within the local Coast Guard district through the PRU.

If the Resource Unit Leader could not locate a personnel resource, the UAC or ICP forwarded a signed standard Resource Request Form (ICS 213RR) to the UAC CRU. The requirement was entered into MRTT and the resource request was processed. To process an ICS 213 RR request for personnel, the UAC Logistics Section sent a Request for Forces (RFF) message to Atlantic Area Command and transmitted the request in MRTT for nationwide sourcing, as discussed in Chapter 9. TONOs and accounting data were provided by UAC Finance Section, and funded by the OSLTF.

Coast Guard civilian personnel were used at the UAC and ICPs, but it quickly became apparent that a mechanism was needed to provide overtime relief for these personnel. From a cost perspective, civilian personnel were an expensive resource due to paid overtime requirements.

Coast Guard auxiliarists also worked on the *Deepwater Horizon* response at various locations, providing expertise and service at the cost of only travel and per diem. There were 147 auxiliarists deployed to the response, and these personnel were a valuable asset.

6.17 Support Logistics: Personnel Demobilization

The demobilization process evolved over the course of the response. At first, all personnel were required to complete a check-out process when they departed the UAC, and the forms were collected in a folder by the Coast Guard Logistics Section.

Improvements to this system continued as time went on, and the UAC Planning Section developed a more viable Demobilization Unit to better demobilize departing personnel. This involved the creation

of a check-in recorder process under the Planning Section for incoming personnel. Both the check-in and check-out processes were functioning smoothly by the end of May 2010.

There was close coordination among the Logistics Section, Finance Section, and the Planning Section's Resources Demobilization Unit to ensure all incoming and outgoing Coast Guard personnel were properly recorded.

The response established three locations for demobilization of personnel:

1. ICP Mobile, Ala.;
2. The RATT located at the BSU in New Orleans, La.; and
3. The UAC, later the Coast Guard Incident Management Team (CG-IMT) in New Orleans, La.

It was important for each demobilization site to have the medical staff to conduct physicals and ensure the readiness status for Coast Guard members, especially Reservists who were demobilizing from the response.

The mobilization (check-in) and demobilization (check-out) processes were eventually integrated at the CG-IMT, consolidated data entry into one database to track and account for personnel in theatre.

The biggest personnel demobilization challenge involved Reserve members. All *Deepwater Horizon* deployed Reserve forces underwent a medical readiness review when reporting in, and a demobilization review when departing the response. The *Deepwater Horizon* Event Health-Related Inventory and Reporting Tool was used to process both. In order to screen Reservists for medical readiness, processing points staffed with medical and dental staff were established at Coast Guard Base New Orleans and Aviation Training Center (ATC) Mobile. Accounting for care, orders, and unique medical issues of mobilized Reserves required significant effort and the establishment of an infrastructure sufficient to handle those issues.

6.18 Support Logistics: Property and Equipment

Property disposal was largely run through the Finance Section. With the concurrence of Coast Guard Headquarters, the signature authority for property surveys was delegated to the Coast Guard Logistics Section Chiefs.

Proper demobilization helped ensure the items that were no longer needed were properly disposed or removed from contract if leased. This saved time and money for the Finance Section and provided accountability of equipment and personnel.

In preparation for demobilization efforts, the UAC Logistics Section tasked a member to travel the area to locate as much Coast Guard Marine Environmental Response equipment as possible. This member visited 72 staging areas and decontamination stations in four states, locating more than \$2 million in equipment. This resulted in the efficient reconstitution of the Coast Guard's response capability equipment at the Central Maintenance facility in Prichard, Ala., for critical deployment elsewhere.

Electronic items, such as computers, phones, and data storage devices have particular requirements for disposition and archiving of data; please see Chapter 5 of this report for additional details. The removal of data from the units must be conducted by qualified and knowledgeable personnel. A location was created for this task and the process required the equipment to be transported to the documentation warehouse in Mandeville, La., for information

retrieval. The equipment was then sent to a warehouse in Harahan, La., for accounting consolidation and final disposition. This process crossed many organizational boundaries—Legal, Finance, Command, Control, Communications, Computing, Information Technology, Civil Engineering, and Security.

Demobilization, decontamination, and disposition of critical resources, such as boom, VOSS, SORS, and cutters, became logistically challenging. It was critical to have a documented process for accounting for equipment from deployment to recovery.

The table below outlines the Coast Guard *Deepwater Horizon* response inventory as of March 2011. It does not capture the inventory assigned at the peak of the response.

The RP consolidated facilities as response requirements changed. The Coast Guard supervised these efforts to ensure the response was the right size, and that facilities were adequate to enable current response operations. When closure of a facility occurred, the personnel employed were demobilized or relocated to other parts of the response organization.

Item Type	Quantity	Value
Computers - Each	1,551	\$2,030,915.99
Electronics Equipment and Supplies - Each	2,772	\$346,801.78
PPE - Each	521	\$118,962.43
Electrical Equipment - Each	144	\$6,836.96
BOOM - Feet	3,131,107	\$680,000.00
Cleaning Equipment - Each	38	\$0.00
Dispersant - Gallon Drum	142	\$0.00
Facilities - Each	60	\$0.00
Portable Storage - Each	415	\$0.00
Pumps - Each	94	\$1,043,055.00
Skimmers - Each	57	\$997,150.00
General Support Resources - Each	107,399	\$1,456,201.22
Trailer - Each	54	\$996,538.95
Vehicle - Each	43	\$635,649.00
Vessels - Each	18	\$0.00
Barge - Each	4	\$236,484.00
Total Warehouse Inventory	3,244,419	\$8,548,595.33

Table 6.2:
Total Response Inventory

6.19 FOSC Key Point

Vessels of Opportunity Protocols

There were valuable lessons learned about how to employ Vessels of Opportunity during the *Deep-water Horizon* response. For instance, pre-scripted requirements for safe operating of VOO platforms would be helpful if outlined in Area Contingency Plans. These could inform a FOSC, who could then more knowledgeably assess VOO operators and platforms. A pre-scripted format or set of requirements for VOOs is important to safety and effectiveness. An example of a minimum prerequisite safety level for evaluating suitability of a fishing vessel or VOO would be a current Coast Guard courtesy vessel exam and sticker carried on board the vessel

7.1 Response Funding

The *Deepwater Horizon* response required an unprecedented level of activity, not only from the Responsible Party (RP), but from government agencies at the federal, state, and local level, including Department of Defense assets.

These elements could not be mobilized without substantial financial resources. Although the RP was willing to pay for the response, it is not possible for agencies to receive direct funding from any RP. This funding comes from the Oil Spill Liability Trust Fund (OSLTF) and is administered by the Coast Guard's National Pollution Funds Center (NPFC).

The OSLTF, established in the Department of Treasury, was created in the Oil Pollution Act of 1990 (OPA 90) and is available to pay the expenses of a federal response to oil pollution under the Federal Water Pollution Control Act, 33 U.S.C. 1321(c), and to compensate claimants for oil removal costs and certain damages caused by oil pollution, as authorized by OPA 90 (33 U.S.C. 2701). The OSLTF expenditures are generally recovered from the RP, liable under OPA 90, when there is a discharge of oil to navigable waters, adjoining shorelines, or the Exclusive Economic Zone.

The OSLTF is established under Internal Revenue Code section 9509 (26 U.S.C. 9509), which describes the authorized revenue streams and certain broad limits on its use. The principal revenue stream is an eight cent per barrel tax on oil produced or brought into the United States (26 U.S.C. 4611). The tax expires at the end of 2017. Other revenue streams include oil pollution related penalties under 33 U.S.C. 1319 and 33 U.S.C. 1321, interest earned through Treasury investments, and recoveries from liable responsible parties under OPA 90. At the onset of the *Deepwater Horizon* response the OSLTF balance was approximately \$1.6 billion. There is no cap on the fund balance, but there are limits on its use per oil pollution incident.

OPA 90 further provides that the OSLTF is available to the President for certain purposes (33 U.S.C. 2712(a)). The first purpose includes payment of federal removal costs consistent with the National Contingency Plan (NCP). This use is subject to further appropriation, except that the President of the United States may make available up to \$50 million annually to carry out 33 U.S.C. 1321(c), removal actions, to initiate the assessment

of natural resource damages. This initial funding is considered the OSLTF Emergency Fund (EF), and is available until expended. An additional \$100 million may be advanced from the OSLTF when the EF is inadequate, subject to notification of Congress no later than 30 days after the advance (33 U.S.C.

2752(b)). Additional amounts from the OSLTF for federal removal are subject to further appropriation.

The payment of claims for uncompensated removal costs and damages are not subject to further appropriation from the OSLTF (33 U.S.C. 2752(b)). The advancement authority and appropriation process was used for the first time during this response. Congressional action to acquire additional advancements was also required on multiple occasions as the scope of government activity expanded with the ongoing release of oil.

The second purpose of the OSLTF includes payment for natural resource damages in an amount no more than \$500 million, as mandated by 26 U.S.C. 9509(c)(2). The maximum amount available from the OSLTF for any one incident is \$1 billion.

The third purpose includes payment of federal administrative, operating, and personnel costs to implement and enforce the broad range of oil pollution prevention regulations. Response and compensation provisions are addressed by OPA 90 and are subject to further appropriation to various federal agencies. For Fiscal Year (FY) 2010 this amount was \$92 million.

As the response progressed, OSLTF costs were documented in the field and provided to NPFC for reconciliation and eventual cost recovery against the RP. Federal trustees also requested funds to initiate an assessment of natural resource damages, which the NPFC provided from the EF.

On April 22, 2010, the Federal On-Scene Coordinator (FOSC) requested an initial monetary ceiling for the *Deepwater Horizon* incident. At that time, the balance of the EF was \$40 million. As the scope of the incident grew, it consumed a growing portion of the available EF balance. It quickly became apparent that the response was going to exhaust both the balance of the EF and the pending



GULF SHORES, Ala.
– A National Oceanic and Atmospheric Administration employee diligently takes notes and makes use of a GPS to gather exact locations and record data. The data is passed daily to the *Deepwater Horizon* response Unified Area Command in New Orleans, La. Photo courtesy of U.S. Coast Guard

Table 7.1: Federal Project Number N10036 for OSLTF funds tracking purposes.

Date	Amount Available For All Other Federal Responses	FPN N10036 Federal Project Ceiling	FPN N10036 Unobligate Balance	Remarks
4/20/2010	\$107,000,000.00	\$0.00	\$0.00	Explosion occurs on the <i>Deepwater Horizon</i> on station and latched up at Mississippi Canyon 252.
4/21/2010	\$106,675,000.00	\$25,000.00	\$25,000.00	The Oil Spill Liability Trust Fund (OSLTF) Federal Project No. 10036 Ceiling (Ceiling) is assigned, and opened by the Federal On-Scene Coordinator (FOSC).
4/22/2010	\$105,675,000.00	\$1,000,000.00	\$1,000,000.00	First Ceiling increase.
4/26/2010	\$95,675,000.00	\$10,000,000.00	\$10,000,000.00	Second Ceiling increase.
4/30/2010	\$75,675,000.00	\$30,000,000.00	\$30,000,000.00	Third Ceiling increase.
5/5/2010	\$62,000,000.00	\$45,000,000.00	\$15,826,929.24	Fourth Ceiling increase. Initiation of Natural Resource Damage Assessment (NRDA) Interagency Agreement (IAG) between Federal Natural Resource Trustees and the National Pollution Funds Center (NPFC) set at \$4,182,704.00.
5/10/2010	\$42,000,000.00	\$65,000,000.00	\$19,905,507.55	Fifth Ceiling increase.
5/16/2010	\$37,211,834.16	\$85,000,000.00	\$14,797,952.14	Sixth Ceiling increase.
5/21/2010	\$37,211,834.16	\$100,000,000.00	\$33,827,058.80	Seventh Ceiling increase.
5/26/2010	\$18,622,348.00	\$120,000,000.00	\$37,247,179.13	Eighth Ceiling increase.
5/28/2010	\$4,564,676.00	\$135,000,000.00	\$33,674,992.70	Ninth Ceiling increase.
6/8/2010	\$40,283,825.27	\$150,000,000.00	\$35,856,725.93	Tenth Ceiling increase.
6/12/2010	\$29,135,171.28	\$160,000,000.00	\$22,229,606.88	Eleventh Ceiling increase.
6/17/2010	\$29,849,213.91	\$260,000,000.00	\$69,899,102.75	Twelfth Ceiling increase. \$100 million request for appropriation funds to the Emergency Fund from the Principal Fund of the OSLTF per P.L. 111-91 approved by the Office of Management and Budget (OMB).
6/23/2010	\$29,367,435.48	\$259,500,000.00	\$61,339,236.85	NRDA IAG increased by \$500,000.00 to \$4,682,704.00. Ceiling lowered by \$500,000 to fund this increase.
7/2/2010	\$31,543,260.69	\$359,500,000.00	\$117,382,256.65	Thirteenth ceiling increase. \$100 million apportionment from the Principal Fund received per P.L. 111-191.
7/27/2010	\$26,943,058.90	\$442,500,000.00	\$96,931,832.10	Fourteenth Ceiling increase. \$100 million apportionment from the Principal Fund received per P.L. 111-191. \$83 million is applied to the FOSC's Federal Project Ceiling. The NRDA IAG is increased by \$17,732,421 to a new total of \$22,415,125.00.
8/5/2010	\$26,775,308.71	\$441,767,579.00	\$71,403,367.88	The Ceiling is lowered by \$732,421 to provide funding for the NRDA IAG.
8/6/2010	\$21,328,992.39	\$541,767,579.00	\$106,524,514.67	Fifteenth Ceiling increase. \$100 million apportionment from the Principal Fund received per P.L. 111-191.
9/1/2010	\$16,430,233.02	\$641,767,579.00	\$117,676,985.61	Sixteenth Ceiling increase. \$100 million apportionment from the Principal Fund received per P.L. 111-191.
10/19/2010	\$55,686,780.52	\$741,767,579.00	\$133,728,169.33	Seventeenth Ceiling increase. \$100 million apportionment from the Principal Fund received per P.L. 111-191. Also, OMB executes the regular \$50 million annual Emergency Fund apportionment for FY 2011.
10/21/2010	\$55,419,232.65	\$714,178,588.00	\$105,999,042.63	The Ceiling was lowered by \$27,588,991.00 to provided additional funding for the NRDA IAG. Total funding for the NRDA IAG is now \$50,004,116.00.

one-time \$100 million advancement provision of OPA 90. The fund was in extremis.

The Coast Guard proposed legislation extending advance authority beyond \$100 million. While waiting for the expanded advancement authority, the Coast Guard received the \$100 million advance from the OSLTF principal fund prescribed in OPA 90. The Coast Guard also requested and received an apportionment of \$50 million from FY 2006. (The FY 2006 apportionment had not been provided previously due to a substantial carry over balance in the EF that year.) The expanded response consumed this infusion of funding. In order to sustain its response while waiting for additional funding, the Coast Guard transferred its response obligations and expenditures to the Coast Guard Operating Expense appropriation. Additionally, the period of performance of existing Military Interdepartmental Purchase Requests (MIPRs) with Department of Defense was reduced to two weeks from a month. These actions sustained the response until Public Law 111-191 was enacted and signed authorizing additional advancements from the Principal Fund for the *Deepwater Horizon* response subject to the \$1 billion cap on the overall incident. If the incident had happened later in the fiscal year, the EF would have reached *extremis* sooner. If that had been the case, the Coast Guard would not have had the capacity in the operating expense appropriation to extend the response.

As of February 2011, the Coast Guard received \$700 million in advances from the Principal Fund—\$100 million in accordance with the advance provisions in OPA 90 and \$600 million as authorized in Public Law 111-191. Table 7.1 outlines the overall OSLTF balance and the specific advances made to the *Deepwater Horizon* response effort regarding Federal Project Number (FPN) N10036 for OSLTF funds tracking purposes.

The unprecedented nature of this response—an uncontrolled, substantial release for 87 days—required funding unlike any other response in the history of the OSLTF. Even though the RP was willing to fund government activities, it was difficult for them to provide funding in a way agencies

could accept. As such, the OSLTF performed a valuable function in distributing funds to these agencies and in seeking reimbursement by the RP.

Even though the OSLTF was reimbursed by the RP, reimbursements did not count as credit against the \$1 billion statutory cap on spending for any one incident. Accordingly, the balance of the OSLTF became less important than the incident cap of \$1 billion, which made possible a scenario whereby the OSLTF was fully viable, but could not be used for any further response actions or the payment of claims. The OSLTF is not like a checking account that is rebalanced when the RP pays an NPFC invoice.



At its inception, a \$1 billion OSLTF seemed sufficient to provide for potential government involvement in a spill response. The passage of time combined with an ongoing and uncontrolled release, provided compelling evidence that such a limitation could prevent the government from protecting the nation. Additionally, an incident of this size and character involving an RP without the extensive resources of a major oil company would stress the OSLTF beyond its ability to finance response operations.

GONZALES, La. – Approximately one million feet of ready-to-deploy sorbent boom was stored at the Lamar-Dixon Staging Area. Photo courtesy of U.S. Coast Guard

7.2 Responsible Party Liability, Role, and Funding

Liability for the *Deepwater Horizon* oil pollution incident is governed in part by OPA 90. OPA 90 provides that a designated RP or RPs are strictly liable for oil removal costs and certain damages that result from a discharge or a substantial threat of discharge of oil from a vessel or facility into or upon the navigable waters, adjoining shorelines, or exclusive economic zone of the United States subject to the limits of the RP's liability. Damages include natural resource injuries, loss or injury to real or personal property, loss of profits and earning capacity, loss of subsistence use of natural resources, loss of government revenues, and increased public services expenses of a state or political subdivision. Any person may present a claim to the RP for uncompensated removal costs or damages. Generally, the RP for an offshore facility is the lessee or permittee of the area where

OPA 90 may be limited to certain amounts. For an offshore facility, OPA 90 may allow for liability to be limited to all removal costs plus \$75 million for OPA 90 damages. Liability for any RP may be unlimited if the incident was proximately caused by gross negligence, willful misconduct, or violation of a federal regulation. OPA 90 provides for three defenses to liability. These defenses may apply when the incident is solely caused by an act of God, an act of war, or the act or omission of a third party.

7.3 Payment of Claims and Billing

On April 28, 2010, the NPFC, under its authorities and responsibilities delegated from 33 U.S.C. 2714, designated BP as the RP for the *Deepwater Horizon* oil spill incident. BP accepted the designation. The NPFC further tasked BP to develop, implement, and advertise a claims process by which people could be made aware of their potential damages and how to submit claims under OPA 90. Additionally, the RP was required to advertise that if a claimant was denied or not satisfied within 90 days the claimant could submit that claim to NPFC for consideration. The NPFC provided regular updates to the FOSC regarding developments in the claims process and the FOSC then informed affected and concerned parties within the spill's impacted area.

The RP worked quickly to comply with the requirements, and to establish a procedure for processing claims. The RP opened more than 30 claims centers throughout the Gulf Coast, and advertised its process in 35 newspapers, as well as local television and radio stations across the region. The RP also began a database for capturing information on the claims submitted through the local offices and the claims call center. Through the 2010 summer, its public notice included information relating to denied claims, the NPFC process, and NPFC contact information. This notice was also disseminated in Spanish and Vietnamese in media. Information on claims data was collected and passed through the NPFC to the FOSC.

To assist in handling claims, the RP contracted with one or more claims adjusting firms. Subsequently, on June 16, 2010, the White House issued a press release announcing that the RP would establish an independent claims facility and \$20 billion escrow fund to fulfill these and other legal



GONZALES, La. – Approximately 300,000 feet of ready-to-deploy containment boom is stored at this Staging Area for the *Deepwater Horizon* response. Photo courtesy of U.S. Coast Guard

the facility is located. When a Mobile Offshore Drilling Unit (MODU) is operating as an offshore facility and a discharge occurs on or above the water surface, the MODU is treated first as a tank vessel for purposes of liability for that discharge. The RP for the tank vessel is any owner, operator, or demise charterer. For removal costs and damages in excess of the vessel liability limit, the MODU is treated as an offshore facility and the RP is the lessee of the area.

RP liability for removal costs and damages under

obligations. The claims facility is responsible for developing and publishing standards for recoverable claims, under the authority of Ken Feinberg, who would serve as an independent administrator. The RP announced that, effective August 23, 2010, the Gulf Coast Claims Facility (GCCF) would replace the original claims process and fulfill their obligations under OPA 90 with respect to private economic loss claims. On that day, the Gulf Coast Claims Facility (GCCF) began accepting and adjudicating claims for the RP. Like the RP, the GCCF advertised its process through a campaign that included more than 500 advertisements in approximately 277 newspapers around the Gulf Coast. In addition, notification posters were mounted in more than 5,000 physical locations. Finally, all RP claimants received a letter from the GCCF notifying them that the GCCF was taking over the RP claims process and explaining the requirements to maintain a claim before the GCCF. These letters included the toll-free number to the GCCF hotline and redirected those dissatisfied to the NPFC. Even as the FOSC downsized the response footprint, the claims process continues as required under OPA 90.

Potential claimants were informed of their options to submit a claim directly to the NPFC or to litigate with the NPFC if their claim was denied or not acted upon by the RP within 90 days. As of February 7, 2011, the GCCF reported 486,704 unique business and individual claimants. Of that number, GCCF reports 254,402 claims paid totaling an amount in excess of \$3 billion. By February 7, the NPFC received 541 additional claims, issued determinations on 282 claims and had 259 claims, valued at \$29.5 million pending. No additional claims have been paid.

While no funds have been expended from the OSLTF for claims, approximately \$700 million in removal costs were incurred and billed to the RP. Table 7.2 contains a record of invoices to and payments from the RP for the *Deepwater Horizon* incident.

The RP did not have an adequate mechanism for funding multiple government agencies at every level of government. However, the RP's contracting procedures mandated the establishment of a Master Vendor Agreement for providers of services. The establishment of such agreements with the federal government would have been problematic for both the RP and the United States.

Table 7.2: Invoices to and Payments by the Responsible Party for Deepwater Horizon.

INVOICE NUMBER	INVOICE DATE	AMOUNT	DATE PAID	AMOUNT PAID
N10036-001-10	27-May-10	\$1,820,725.36	1-Jun-10	\$1,820,725.36
N10036-002-10	2-Jun-10	\$69,090,958.57	11-Jun-10	\$69,090,958.57
N10036-003-10	21-Jun-10	\$51,435,548.27	30-Jun-10	\$51,435,548.27
N10036-004-10	13-Jul-10	\$99,661,359.34	23-Jul-10	\$99,661,359.34
N10036-005-10	10-Aug-10	\$167,896,494.27	27-Aug-10	\$167,896,494.27
N10036-006-10	7-Sep-10	\$128,450,327.60	29-Sep-10	\$128,450,327.60
N10036-007-10	12-Oct-10	\$62,622,046.71	9-Nov-10	\$62,622,046.71
N10036-008-11	18-Nov-10	\$25,376,838.50	17-Dec-10	\$25,376,838.50
N10036-009-11	11-Jan-11	\$26,249,015.69	8-Feb-11	\$26,249,015.69
	TOTAL:	\$632,603,314.31		\$632,603,314.31

While the RP was able to provide funding at the parish, county, and state levels through various mechanisms—primarily through a government claims process and grants—it was determined that the state National Guard elements that assisted with the response should be funded by the OSLTF, which is funded through interdepartmental agreements between the Coast Guard and the Department of Defense.

7.4 Finance Section Organization

Key functional areas of the UAC Finance Section were organized and titled using the Incident Management Handbook (IMH): Time Unit, Cost Unit, Procurement Unit, and Claims and Compensation Unit. In addition to the Coast Guard Finance Section, the RP maintained a standalone Finance Section that mirrored the Coast Guard section structure. The two sections were necessary due to agency and company specific financial reporting requirements outside the ICS structure requirements. Reporting requirements notwithstanding, the two finance sections worked in close proximity, shared information, attended command meetings, and accepted joint responsibility for non-agency-specific Finance Section tasks.

Technical specialists were assigned to the Finance Section to oversee all matters of financial management, as required by the NPFC and the Shore Infrastructure Logistics Center (SILC). Two Case Officers from the NPFC were employed as technical specialists for management and oversight of Pollution Removal Funding Authorizations (PRFAs). In addition, they provided use-of-funds

opinions for the FOSC and Finance Section Chief (FSC), and performed a liaison function with the NPFC. A Contracting Officer from the SILC with an unlimited contracting warrant served as a technical specialist for MIPRs, and provided management oversight for MIPRs and FOSC use-of-funds opinions. Moreover, the specialist provided procurement opinions for the FSC and Logistics Section Chief regarding items and services over the micro-purchase threshold, and served a liaison function with the SILC.

Coast Guard Finance Section staffing was initially decentralized across the Unified Area Command (UAC), Incident Command Posts (ICP), and Branches (also known as Forward Operating Bases (FOBs)). Decentralized staffing facilitated the local evaluation of resource requirements based on complex response needs in geographically, politically, and commercially diverse regions. The structure enabled the rate of purchases necessary to support the rapidly expanding response requirements. The decentralization also provided necessary oversight for the MIPR and PRFA.

The trade-off cost for decentralization was a reduction in the control and coordination of financial documentation. The requirements of financial transparency and alignment across the entire response, when combined with greater RP and Office of Management and Budget (OMB) scrutiny of cost after the spill source was secured, led to an increased demand for standardized documentation. Department of Homeland Security (DHS) and DHS–Office of Inspector General (DHS–OIG) audit requests and site visits additionally improved transparency and standardization.

The number of personnel in the Finance Section increased after the consolidation of the financial management activities from the National Incident Command (NIC), UAC, and the Houma, Mobile, Houston, and Miami ICPs into the Gulf Coast Incident Management Team (GC-IMT) on September 20, 2010. As the operations at Branches were secured and the branches closed, finance personnel were integrated into the GC-IMT Finance Section or released from the response. As the overall complexity of response needs decreased with command consolidation and the securing of the spill source, the evaluation of the use-of-funds function was centralized at the UAC level, and transitioned to the GC-IMT.

As the financial management function centralized, daily monitoring of Coast Guard field personnel was reduced. The lack of on-scene oversight for forward deployed field personnel presented a safety problem for accountability during a hurricane evacuation and a control problem for reporting. As the response matured, processes were clarified and procedures became institutionalized, and a deep financial knowledge at the branches became less necessary. The response recruited a new cadre of storekeepers and provided response-specific just-in-time training for incident response timekeeping and the property inventory custody roles. Once trained by the Finance Section, the finance storekeeper's accountability shifted to the Operations Section as they were sent to forward-field locations. The Finance Section controlled the timeliness and quality of daily Finance reports, and the property custodian responsibilities.

7.5 Resource Request and Ordering Process

The Logistics and Finance Section Chiefs normally collaborate in developing a resource request and ordering process upon being assigned to an incident. This process is usually developed following the rules set out in two sources:

1. ICS-351 Logistics and Finance Course, and
2. NFPA 1600 – Standards on Disaster and Emergency Management and Business Continuity Programs.



NEW ORLEANS – Oil spill containment equipment is off-loaded from a C-17 at Naval Air Station Joint Reserve Base New Orleans. The Air Force C-17's from Elmendorf Air Force Base, Alaska, delivered the equipment to support the Deepwater Horizon oil spill response. Photo courtesy of U.S. Navy

When developing a resource request or resource ordering process, related documents should explain in great detail how to complete an ICS-213 Resource Request Form (ICS-213RRs), the required signatures on the form, ordering the resource, possible constraints and limitations, accountability of the resource when it arrives, and final disposition of the resource. The resource request process entails ordering a resource internally within the Incident Command System (ICS) organization. The resource ordering process entails ordering a resource from outside the ICS organization, such as contractor services, other government agency services, Department of Defense services, etc. Thousands of ICS-213RRs were processed over the course of the response at ICPs Mobile and Houma and the UAC. These forms served as the first stage of the audit trail of resources for the response.

Reimbursable agreements were used extensively in the response—more than 120 PRFAs and MIPRs totaling more than \$550 million in obligations have been issued to federal, state, and local government entities. The financial documents were agreements that allowed the FOSC access to the widest variety of services from all levels of government to ensure effective response to the spill while documenting its many outcomes.

Many of these agreements, particularly MIPRs, required on-the-spot negotiations to ensure proper cost documentation was available for accurate accounting of government funds and for support to future audits. This documentation was also valuable for potential cost recovery actions.

Previously, MIPRs allowed for the agency providing services to access the agreed-upon funding without submission of cost documentation via the Interagency Payments and Collections (IPAC) process. Valuable cost data and information on the activities undertaken by the FOSC would have been unavailable. These documents would also not be available for the use of auditors, for historical purposes, and for cost recovery.

To overcome this problem, the Coast Guard entered into a detailed, 22-page agreement with the Defense Finance and Accounting Service to ensure proper documentation of costs incurred. The creation of the ground rules ensured that packages received were properly prepared and fully documented. It also ensured that submissions

met NPFC guidelines with regard to reimbursable expenses, thus reducing the time necessary to review and authorize payment.

MIPRs were also issued to non-Department of Defense entities, including the Department of the Interior–National Maintenance Contract (DOI–NMC) and the Department of Energy (DOE), to ensure their assistance could be secured in a timely manner. These reimbursable agreements provided the necessary funds for each agency to support the response and afforded the UAC with another means of monitoring and controlling field operations. Agencies were aware that only activities described in the agreements would be reimbursed and only with proper documentation. These agreements provided a mechanism to ensure that OSLTF funds were used only for the purposes allowed by the statute and in support of FOSC objectives.

Given the massive scale of the response operation, frequent changes to the agreements were the norm rather than the exception. The more than 120 PRFAs required approximately 600 modifications, ranging from extensions of the period of performance to carving out entire new mission areas and areas of operations. They also required a substantial administrative overhead in creation, review, and tracking of the agreement from an initial requirement from the Planning Section until final reimbursement was distributed by the Coast Guard Finance Center.

The *Deepwater Horizon* response encountered unique and specific problems with some agencies. Some of the problems included proper handling of Confidential Business Information (CBI), protection of information essential to potential criminal prosecution, and management of agency structuring of appropriations and how appropriations affected the ability to be reimbursed by the OSLTF.

The NPFC tracked reimbursement agreements and reviewed invoices submitted in agency requests for reimbursement. There were more than 120 Pollution Removal Funding Authorization (PRFA) and over 70 MIPR reimbursement agreements in place, many with multiple modifications that the FOSC was approving for a one-month period of performance.

7.6 Cost Tracking, Resource Tracking, and Financial Reporting

The FOSC verified whether a particular cost was incurred for removal and was consistent with the NCP (40 CFR 300); the FOSC could not incur costs otherwise. The NCP also requires the FOSC to collect and maintain documentation to support full-cost recovery against the RP. Once the FOSC has certified all removal costs for the incident, the documentation is submitted to the NPFC to determine what will be billed to the RP and to use all legal methods to collect these costs.

The Coast Guard manually entered all indirect and direct costs (see Section 7.7) into the electronic CG-5136 workbook. Documentation came from different systems; and, there was no standard method for gathering or storing the documentation. Documentation for basic ordering agreement contracts and MIPRs was stored at the SILC, with the signed MIPR, invoices, and logs maintained on-site during the response.

Requested forecasting of costs led to the development of an internal capability to establish a daily burn rate and to forecast the cost forward on a risk basis. The forecasts were created at the request of the FOSC on a monthly basis. The forecasts were submitted through NPFC to the Coast Guard Office of Budget Execution (CG-831) to develop consistent forecasts for external stakeholders; the forecasts were not shared with the RP.

GULF OF MEXICO – Two Coast Guard petty officers track resources at a branch command post. Photo courtesy of U.S. Coast Guard



7.7 Tracking of Personnel and Resources

The NPFC provides guidance to the sector commands on how to record personnel and other resources through the use of Technical Operations Procedures (TOPS) for cost documentation, which is part of the NPFC User Reference Guide (URG). The NPFC also provides job aids to complement these TOPS.

The Mobilization, Readiness, Tracking Tool (MRTT) was one of the tools used to

solicit or order personnel to the incident. First, an ICS-213RR form with all signatures and specific skill sets was entered in MRTT with an assigned Travel Order Number (TONO). Then, requests were published throughout the Coast Guard to identify appropriate personnel who met the advertised criteria. MRTT had some constraints and limitations. For example, using the MRTT, the Coast Guard advertised 20 key ICS positions, each with a TONO assigned to the position. Some positions were filled immediately and others were not. One month later, the Coast Guard submitted a second request for the same unfilled positions. It was possible during this period that personnel transitioning within the ICS organization caused confusion regarding which positions remained vacant. This shuffling led to those positions previously advertised being re-entered in MRTT with new TONOs. Some of the TONOs were assigned yet never obligated in the Finance and Procurement Desktop because they had no listed personnel names just an MRTT identification (ID) number. Over time, this resulted in many TONOs to be tracked with associated costs, but not all obligated—this added a substantial increase in the Travel Cost category. The Coast Guard eventually corrected this, all the un-obligated TONOs were closed, and the cost category reduced to the correct amount.

The CG-5136 electronic workbook is one of the primary tools for listing personnel and other resources. The workbook is maintained by the NPFC and updated regularly when the Assistant Commandant for Resources, Office of Resource Management (CG-83) updates the Coast Guard Standard Rates Instruction. This workbook contains several pieces of key information, such as hours worked by Coast Guard, which must be sought by the Finance Section—in particular, the Time and Cost Unit Leaders. The CG-5136 workbook was constantly evolving during the response as it was updated regularly to provide near real-time information based on interests in different cost categories. The costs are broken down into two categories, direct and indirect, as described below. The direct costs listed above were part of the Coast Guard's normal financial management paper process. The process flow evolves as follows:

1. A request is submitted and approved,
2. An obligation document is created in Finance and Procurement Desktop,

3. The resource is delivered with a receipt,
4. The resource is utilized, and
5. A final disposition of the resource is recorded for an audit trail.

This process was challenging because of the volume of purchases and the management of the financial records, particularly travel orders, PRFAs, MIPRs, and Reservists orders, over several months.

The indirect costs posed a unique scenario. Each of these categories required knowledge about how to seek and locate this information or have the information automatically sent. For various reasons, tracking the costs of—and hours expended by—Coast Guard personnel, cutters, small boats, aircraft, and vehicles during this response was difficult.

Pollution response equipment costs brought several financial tracking issues to light for the Coast Guard during the *Deepwater Horizon* response. The first was accountability of the equipment brought to the response and the absence of a standard rate for recording some equipment in the CG-5136 workbook. The standard rate instruction has a generic list of Coast Guard owned pollution response equipment that did not cover all Coast Guard response equipment deployed. The National Strike Force Center deployed members of all three strike teams with equipment, and no standard rate to record the hours utilized. Thus, some cost information went unreported. The lack of a rate category for tracking purposes was the primary cause of unreported equipment costs.

Each of the ICPs for *Deepwater Horizon* response collected, collated, and recorded information as it applied to their specific command post. A NPFC representative became the daily collector of all the electronic workbooks. This NPFC member reviewed each workbook for information consistency, made corrections, fixed any corrupted formulas, and provided feedback to the creator of each workbook. The NPFC collected 17 workbooks each day and combined all into one report that the NPFC sent to the FOSC staff. This report was used for cost projection analysis by the FOSC staff, NPFC staff, and CG-8 for advising the Department of Homeland Security and Office of Management and Budget on financial implications of this response on the Oil Spill Liability Trust Fund.

7.8 Property Management and Tracking

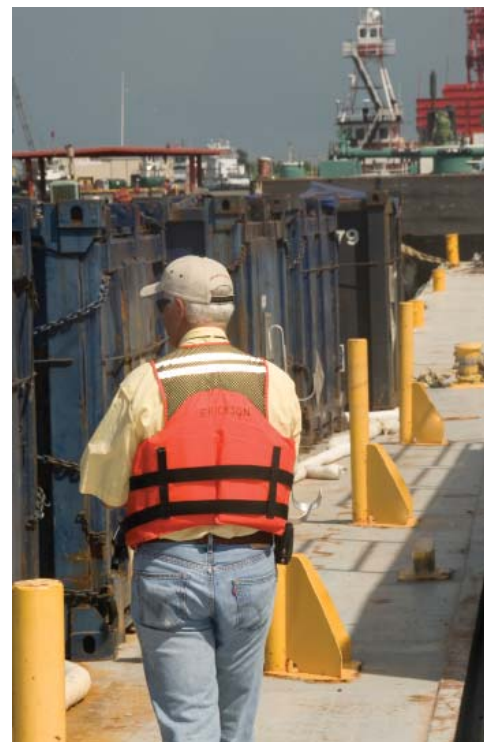
For much of the response, Property Management sought to catch up as the focus at the beginning of the response was on initial start-up and the procurement needed to sustain the response. A significant amount of property was purchased or transferred into the UAC and the ICPs for use before the property management system was fully established. The Finance Section Chief was designated the Property Officer, and on-site property custodians were assigned from the available workforce.

An Operating Facilities Code (OPFAC) is required to establish an account in the Oracle property management system (Oracle).

However, due to system limitations, a response specific OPFAC could not be created in Oracle to track property. Instead, the Coast Guard used the OPFAC from first responding unit, MSU Morgan City. Later in the response, transactions were transferred to the Coast Guard District Eight OPFAC, and then finally transferred to the NPFC account. The custodians were then able to conduct inventories and populate Oracle. The Marine Environmental Response Asset Line Field Office in Prichard, Ala., handled the tracking of capitalized property.

The Marine Environmental Response Asset Line Field Office's primary function was to re-outfit equipment used during the spill response and return it to the donating command. This task was complicated by incomplete or missing Requisition and Invoice Shipping Documents (DD-1149s), and a lack of a physical inventory when the equipment first arrived in theater.

The procurement system did electronically capture and store documentation for a transaction, but did not automatically feed the property system. Even if the system had had these abilities, there was no OPFAC associated with the *Deepwater Horizon* response, and the ICS Incident Property Tracking form (ICS-261) was not designed for such a large response. Absent a systematic means to prevent duplication, loss of version control, and other issues, the Coast Guard used the Oracle asset



VENICE, La. – A contract worker walks along a staging barge on the Mississippi River, conducting inventory as part of keeping all Deepwater Horizon response assets identified and tracked. Photo courtesy of U.S. Coast Guard

management module to track personal property. Though time consuming, Oracle provided a common means to assert that there was a set dollar amount of property on hand on any given day. Without the hard controls or radio-frequency identification tracking devices employed by the RP, the Coast Guard tracked capital assets using a paper system—a slow process for such a large response.

Personal property requires storage and control. During the *Deepwater Horizon* response, the Coast Guard stored and rebuilt capital assets at the Marine Environmental Response Asset Line Field Office. Non-capital assets were gathered on site, demobilized, and then transferred to a property warehouse where the assets were inventoried, bundled, and prepared for disposal.

7.9 Cost Reconciliation

One of the duties of the UAC staff was to reconcile the weekly Program Element Status (PES) reports from Core Accounting System (CAS) to Finance and Procurement Desktop (Finance and Procurement Desktop) for the *Deepwater Horizon* account. With more than 70 MIPRs and 120 PRFAs, many with multiple modifications specifying different periods of performance, it was critical to include forecasting in the cost unit to understand, manage, and forecast the daily burn rate. There was a decentralized control structure for tracking and reconciling the costs of blanket travel orders, and no systems integration between staffing management, travel management, and financial management systems. For the first five months of the response, the Cost Unit did not lead reconciliation of transactions, making it hard to understand the real-time running cost of the response. This made it difficult to explain bills to the RP, and created a backlog of undelivered orders and un-reconciled transactions.

Between June and November 2010, PES reports for the *Deepwater Horizon* account generated reports containing up to 7,000 transactions each week. This major increase in transactions put a strain on the CAS and Finance and Procurement Desktop platforms. For example, it would take several hours to process a single PES report with 7,000 transactions. Additionally, every time a transaction required updating on a PES report, PES report would have to be re-generated, starting the lengthy loading process anew. One solution was to run these PES reports during off hours,

such as nights and weekends, which did cut down the processing time. The Coast Guard Finance Center also promulgated restrictions to the rest of the Coast Guard to ease constraints on the system during peak hours.

The Coast Guard experienced instances when transactions occurred in the general ledger in CAS, but never appeared on the PES report for that week. This was a sporadic problem that seemed to be linked to system down times, such as month-end and fiscal year closeouts. If an obligating document never appeared on a PES report and the expenditure and liquidation of that obligation was specified on a subsequent PES report, there was no reconciled Undelivered Order (UDO) to settle the account. This meant the document had to go into an unresolved status until the original obligation appeared. Once it appeared, a help desk ticket to the Coast Guard Finance Center was required to have the obligation document reprocessed.

Direct expenditures on the PES report became a major issue for the reconcilers to process. The Coast Guard had many systems used to create different types of transactions, such as Direct Access for Reserve Orders and Coast Guard Travel System (TPAX). These systems are not tied to the Coast Guard accounting system, which means that if a document is created in one, it will not enter automatically into the Coast Guard financial system. Eventually, the expenditure will enter the financial system when the Coast Guard Finance Center processes a payment for that transaction, which creates a direct expenditure. Initially, these direct expenditures were labeled as unresolved transactions until the Finance Section could research the expenditures to determine the validity of each transaction. At one point, there were more than 10,000 unresolved items in the Finance and Procurement Desktop requiring research.

The use of a government purchase cards also cause direct expenditure issues for the Coast Guard. Many cardholders switched their purchase cards to the *Deepwater Horizon* accounting line when they deployed to the response. However, as the reconciler did not have a master list of all the cardholders who changed their card to this account, it was difficult to determine not only who had changed, but what was purchased under a specific expenditure.

From the outset of the response it was evident that a significant number of Coast Guard Reserve personnel would be needed to support the effort. This posed both logistical and financial challenges. Typically, the Coast Guard uses Direct Access to issue Reserve Orders and associated travel orders. Yet during the *Deepwater Horizon* response, the Coast Guard could not use the Direct Access computer code to issue orders funded by the OSLTF as the correct appropriation supporting the FOSC response.

A cross-disciplinary team drawn from NPFC, CG-13 Mobilization Staff, Coast Guard Pay and Personnel Center (PPC) Topeka, and CG-83 Budget Execution Staff were able to make necessary changes to Direct Access during May 2010. By early June 2010, all reserve orders issued in Direct Access correctly cited the OSLTF accounting string. To ensure accurate financial management of obligations, automated Direct Access obligations were augmented by Coast Guard Force Readiness Command manual obligations in CAS for each set of orders, including travel, for each Reservist. Coast Guard Force Readiness Command correctly recorded more than \$50 million in obligations for reserve orders in CAS for the *Deepwater Horizon* incident.

The changes made to Direct Access were not a one-time fix, but transcend the *Deepwater Horizon* response to apply to future situations where the OSLTF is funding the activation of Coast Guard Reservists for oil spill response.

Early in the response, there was confusion over the proper method of capturing and approving civilian overtime. COMDTINST 12550.4I governing the management of civilian overtime was outdated. The Coast Guard resolved this issue early and overtime was tracked and processed, although not in the period earned. The biweekly cap on civilian pay was waived but not the annual cap (the annual cap of GS-15 Step 10 remained in effect). However, it did not appear that controls in the current time and attendance system were sufficient to prohibit a member from being paid in excess of this annual cap.

The combined magnitude of the response effort and the practice of billing the RP (based on 75 percent of MIPR and PRFA obligations to other supporting agencies) made it necessary to capture and record accrual data on Coast Guard financial

statements. The difference between the amount paid by the RP and the expenses actually incurred by the government had to be recorded as deferred revenue. The amount of expenses actually incurred by the government had two components:

1. The value of services performed by the agency, billed to the Coast Guard, and actually expended in CAS, and
2. The value of services performed by the agency but not invoiced to the Coast Guard, which was recorded as accrued accounts payable.

The challenge associated with the accrual process was in attempting to determine the dollar value of services performed but not invoiced to the Coast Guard from each agency involved in the response. The Coast Guard Office of Financial Management, Transformation, and Compliance Internal Controls Division (CG-851) coordinated the collection of this information for the FY 2010 Financial Statements. The NPFC coordinated the collection of the data for the FY 2011 First Quarter. This required significant effort to identify the correct office or individual within each agency to generate the accounts payable accrual figures and then additional follow up with to ensure figures were provided in time to be properly recorded on the Coast Guard financial statements.



VENICE, La. – A contractor works in the supply trailer dispensing perishable goods to workers during the response. Supply personnel ensure all responders are equipped with life vests, hardhats, safety boots, sunscreen, bug repellent, safety glasses, and safety suits before going into the field. Photo courtesy of U.S. Coast Guard

7.10 Resources Committed

Figure 7.1:
Mississippi
Canyon 252
Cumulative
Financial
Summary

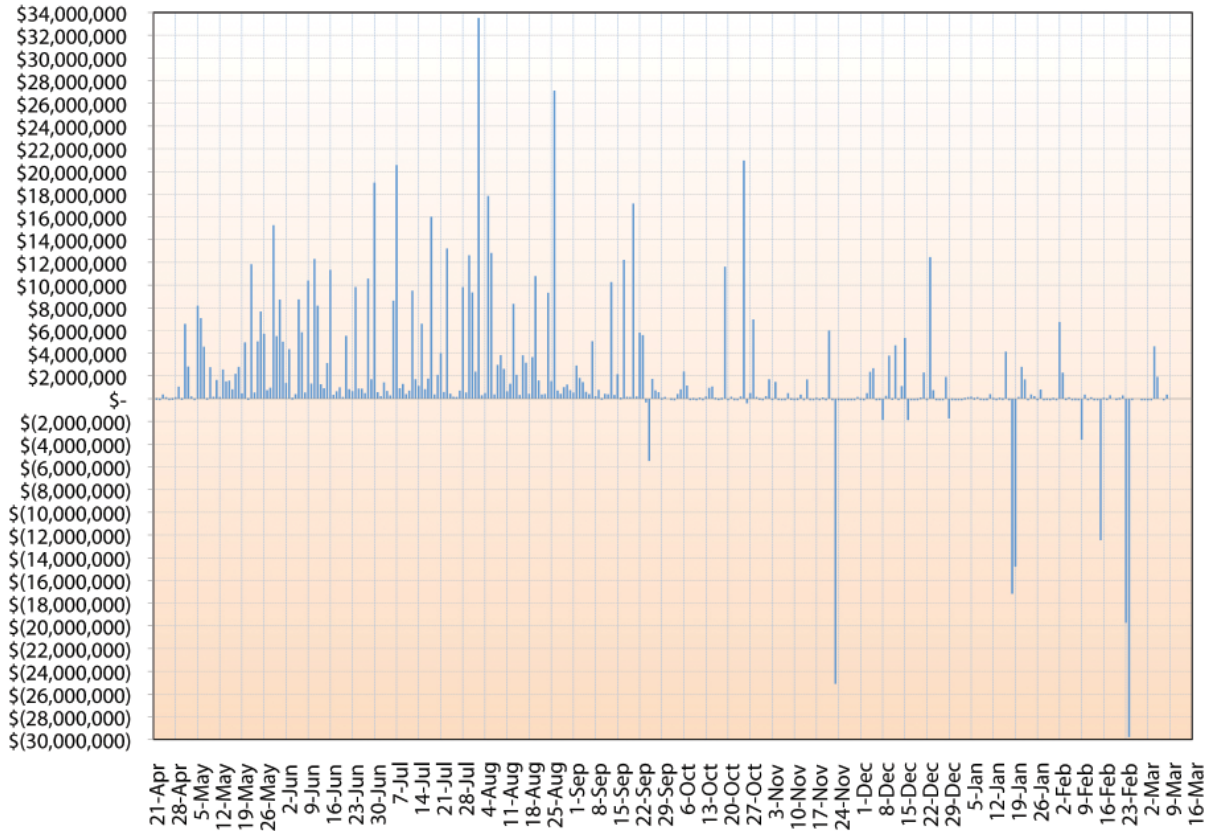
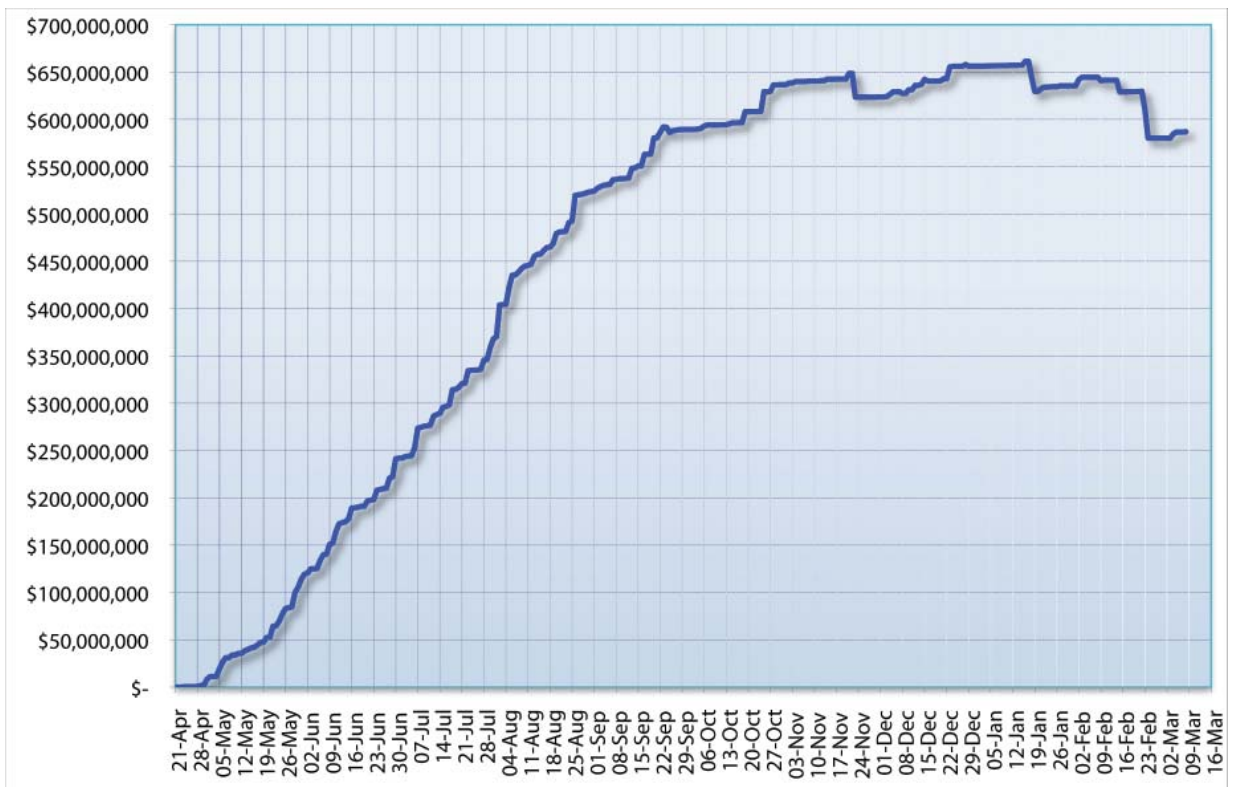


Figure 7.2:
Mississippi
Canyon 252
Daily
Financial
Summary



7.10 Resources Committed

7.11 FOSC Key Points

Responsible Party Solvency

The outcome of the response to this spill could have been very different had the RP not been able to fund the extraordinary expenses involved. In the planning process, and during drills, participation of the RP is presumed. If an RP proved unable to pay for a major spill, the ability of the government to organize a response of this nature and complexity—including securing the sub-sea source, contracting resources, and funding removal actions—would be severely strained. All levels of government had difficulty sustaining their involvement the *Deepwater Horizon* response. If the government had had to organize every aspect of the response, the strains may have become overwhelming. Current planning and drills do not address the potential for government having to manage a major response due to the unavailability of the RP.

OSLTF Caps

The structure for funding responses set out in the Oil Pollution Act of 1990 (OPA 90), and limitations on per response costs were outdated and needed a legislative change in mid-response to address. In addition, without a solvent RP who was willing to undertake not only real-time funding of response costs—both directly but also in terms of payments to the NPFC, as well as setting aside vast sums for claims—the OSLTF Emergency and Principal Funds could have been overwhelmed. Until the arrangements with the RP to provide reimbursement to the OSLTF as the response progressed were established, the existing caps limited the funding for participation of other agencies through PFRAs and Requests for Assistance (RFAs).

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As soon as the spill began, the National Oceanic and Atmospheric Administration (NOAA), U.S. Fish and Wildlife Service (USFWS) and other natural resource trustee agencies recognized that the potential impact on wildlife from the *Deepwater Horizon* spill could be enormous. The concerns focused primarily on three areas:

1. Marine mammals and sea turtles,
2. Migratory birds, and
3. Endangered species (many of the marine mammals and all of the sea turtles are threatened or endangered).

The spill also impacted a large number of historic and cultural properties.

8.1 Marine Mammals and Sea Turtles

Statutory authority and trustee responsibility for the 29 species of marine mammals and five species of sea turtles in the Gulf of Mexico are shared between the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA NMFS), which is responsible for cetaceans and sea turtles in water, and the USFWS, which covers manatees and sea turtles on land. These species are addressed under two federal statutes, the Marine Mammal Protection Act (MMPA), and the Endangered Species Act (ESA). All 34 species were presumed at risk from impacts of the oil from the *Deepwater Horizon* spill.

Recognizing the potential risk to these taxa from the *Deepwater Horizon* spill, concerns about impact to them were specifically included in the considerations and activities of the Operations Section, Wildlife Branch of the Coast Guard response. Due to several factors, including the specialized expertise required for response and rehabilitation, and the pre-existing response infrastructure, these taxa were pulled into a distinct group, the Marine Mammal and Sea Turtle Group (MMSTG), under the Wildlife Branch at the beginning of the wildlife response.

Initial Establishment of the Marine Mammal and Sea Turtle Group

Upon initial notification of the *Deepwater Horizon* spill, the Southeast Marine Mammal Stranding Coordinator contacted the NOAA Scientific Support Coordinator (SSC). NOAA deployed scientists to the Unified Area Command (UAC) for marine mammal and turtle coordination and support. The Responsible Party (RP) contacted the Oiled Wildlife Care Network, University of California Davis (OWCN) to assist on marine mammal and sea turtle issues, and OWCN then worked with NOAA NMFS to coordinate efforts. By April 30, 2010, the MMSTG was formed under the Wildlife Branch and was represented at the Houma Incident Command Post (ICP). The MMSTG was separated into two units, Sea Turtles and Marine Mammals.

In addition to those deployed, NMFS utilized pre-existing marine mammal and sea turtle response personnel and infrastructure in an off-site capacity. The personnel included:

1. Both the NMFS and USFWS national sea turtle coordinators,
2. The national marine mammal health program manager,
3. The regional cetacean and sea turtle stranding network coordinators at the NMFS Southeast Fisheries Science Center in Miami, Fla.,
4. The regional cetacean stranding network administrator at the NMFS Southeast Regional Office in St. Petersburg, Fla., and
5. The manatee stranding network coordinator at the USFWS office in Jacksonville, Fla.

MMSTG incorporated these persons into the organization chart within their traditional capacity.

The personnel at the UAC were responsible for



VENICE, La – An oiled sea turtle is swabbed down by response workers during Deepwater Horizon oil spill. Specialized volunteers from numerous organizations helped the plight of the sea turtles. Photo courtesy of U.S. Air Force

oversight of the MMSTG and its integration into the unified command, in coordination with those operating from their home offices. Integration efforts included:

- Developing protocol, review, and approval,
- Requesting logistics and procurement,
- Obtaining information from and coordinating activities with other Branches of the response (e.g., finding the daily coordinates for the in situ burn activities to avoid these areas by the turtle on-water capture teams), and
- Reporting daily to the FOSC (Federal On-Scene Coordinator).

When multiple ICPs were established across the Gulf region, the MMSTG maintained a single operational area, which included coastal and offshore areas from the Texas-Louisiana border through Apalachicola, Fla., with overall MMSTG coordination out of Houma, La. The operational area was established through discussions with the SSCs, as well as biological information available from the Environmental Unit. This facilitated the collection of all animals that might likely be impacted by oil or oil-spill-related activities. Liaison positions were created at the other ICPs: one person within the Wildlife Branch, one person within the Environmental Unit at ICP Mobile, and one person in Florida. The liaisons served as a central point of contact regarding marine mammals and sea turtles, coordinated the protocols developed at ICP Houma through each command post, and addressed or relayed concerns or issues regarding marine mammals and sea turtles.

GULF OF MEXICO –
A Louisiana Department of Wildlife and Fisheries biologist releases a turtle 50 miles south of Grand Isle, La. Photo courtesy of U.S. Coast Guard



Response to Oiled and Stranded Marine Mammal and Sea Turtles

In 2004, the OWCN developed guidelines for marine mammal oil spill response. The document outlines stranding response requirements, data collection, records maintenance, safety and human health, field recovery and transportation of oiled wildlife, intake procedures, animal washing, and instructions on how to complete the required forms.

At the beginning of the *Deepwater Horizon* response, the MMSTG used previously developed guidelines for determining equipment and personnel needs, structuring the organization, and as a basis for animal de-oiling and care protocols. During the response, the MMSTG



PORT FOURCHON, La. – An oiled dolphin lies stranded on the beach.

expanded these protocols for the various aspects of the response and adapted the pinniped and cetacean guidelines for sea turtle and manatee response and rehabilitation. MMSTG developed additional documents including protocols for sea turtle nest protection, hatchling encounters by cleanup crews, offshore collection of live and dead oiled turtles, and marine mammal carcass retrieval.

MMSTG also developed a transition plan to detail the future of the MMSTG response following the successful capping of the *Deepwater Horizon* wellhead. The transition plan presented criteria to guide decisions for the gradual demobilization of marine mammal and sea turtle response and recovery actions.

Marine mammals and sea turtles are considered to be stranded if they are found dead or in need of assistance (sick, injured, debilitated, or in distress) on the beach or in U.S. waters. Covering most of our coastline, stranding networks consist of different organizations that respond to reports of stranded animals. Network participants are authorized and coordinated by NMFS (sea turtles, cetaceans, and pinnipeds) and USFWS (manatees and sea otters).

The wildlife hotline was created by the FOSC to provide a single reporting number for all oiled wildlife calls, including birds, turtles, dolphins, manatees, and other terrestrial or marine wildlife. Hotline reports were received from members of the response, as well as the public. All reports of stranded marine mammals and sea turtles were forwarded to the Houma MMSTG, and one of the MMSTG personnel relayed the report to the appropriate stranding network organization.

The Sea Turtle Stranding and Salvage Network (STSSN) has operated in the Gulf of Mexico since the 1980s. When the *Deepwater Horizon* spill occurred, NOAA and USFWS called on the expertise of sea turtle stranding responders located in the region. Unfortunately, the area expected to be most severely impacted was in a location with the least developed STSSN response capability. With an expectation that increased numbers of sea turtles would become stranded because of the oil spill, NOAA and USFWS began enhancing stranding operations by increasing the number of responders (federal, state, and contracted personnel), procuring additional equipment, and developing response protocols.

Following the stranding response protocols for oiled sea turtles, all stranded sea turtles were photo documented, externally wiped to sample any petrochemicals, and collected for necropsy (if dead) or for rehabilitation (if alive). Vessels of Opportunity (VOO) were used to respond to strandings reported near-shore or stranded on barrier islands, and those reported from remote locations along the northern Gulf Coast. In addition, response and reporting protocols were developed and distributed to all UAC Operation Sections likely to encounter sea turtles.

Equipment kits necessary for the safe capture and recovery of wildlife were also ordered and distributed. A challenge encountered during the early response period was the proper distribution of equipment and reporting information to individuals in the field. Although reporting and collection protocols were disseminated at the Houma

and Mobile ICPs, the information did not consistently reach the cleanup operations and Shoreline Cleanup Assessment Techniques (SCAT) teams on the beaches; this impeded response capabilities of stranding responders.



VENICE, La – A staff biologist with Riverhead Foundation for Marine Research and Preservation scoops up a sea turtle in the Gulf. Photo courtesy of U.S. Air Force

Discussions about stepping down the enhanced oil spill stranding response began in mid-August. A step-down plan was developed specifying criteria under which stranding response would transition back to the traditional response levels. The transition would occur 30 days after the last oiled turtle was observed in any of the Wildlife Branch activities. Stranding response returned to pre-spill levels (demobilized) on October 20, 2010. STSSN participants remained on alert for possible oiled post-hatchlings. No further reports of oiled post-hatchlings were received. If *Deepwater Horizon* oil is confirmed on any future stranded sea turtles, the expert working group will convene to determine the best course of action.

Sea Turtle Rescue

MMSTG on-water response operations included sea turtle rescue. Offshore convergence areas in the Gulf of Mexico, especially areas with Sargassum algae serve as a primary habitat for several species of sea turtles. These areas provide forage and shelter particularly during the juvenile oceanic life stages of sea turtles. Because these convergence zones are generally located offshore near the Deepwater Horizon site, MMSTG expressed



GULF OF MEXICO – The U.S. Navy MZ-3A Airship serves as a platform for aerial observers looking for marine mammals and other wildlife that may be in distress. Photo courtesy of U.S. Coast Guard

significant concerns for impacts to sea turtles specifically the juveniles. This was not only due to their known usage of this habitat, but also because the surface oil (both fresh and weathered) concentrated in the convergence zones compounding the exposure risk.

Beginning in mid-May 2010, the MMSTG began an at sea survey to determine the probability of locating, documenting, and recovering oiled sea turtles that utilized *Sargassum* algae lines as primary habitat. As a result of initial effort, the MMSTG initiated the Sea Turtle At Sea Rescue operation. This operation used one or more ves-



GULF OF MEXICO –
Members of the Audubon Nature Institute and Louisiana Department of Wildlife and Fisheries prepare to release a sea turtle. Photo courtesy of U.S. Coast Guard

sels and an associated aircraft. The aircraft would locate habitat with the potential for oiled turtles, then direct vessels to those locations.

The vessels would work through the convergence zones (of *Sargassum* algae or weathered oil) locating and capturing oiled or debilitated turtles. The location of suitable habitat and

convergence zones varied considerably depending upon the prevailing weather conditions, but was generally at least 20 miles offshore. At times, the closest convergence zones were 50-60 miles from the vessels' ports. The rescue operations initially consisted of one team based in Venice, La., and subsequently expanded to include teams located at the two additional ports of Orange Beach, Ala., and Destin, Fla. VOO were used at all three sites.

From mid-May 2010 until on-water operations ended September 21, 2010, on-water teams capture 461 sea turtles. Of these, 330 live oiled and debilitated turtles were brought in for rehabilitation, and five dead sea turtles were brought in for necropsy. After the *Deepwater Horizon* oil well was capped, an additional 126 lightly oiled turtles were examined at sea, cleaned, and released at their capture sites. The majority of the rescued sea turtles were juvenile Kemp's Ridley and juvenile green turtles. The remainder were juvenile Loggerhead and Hawksbill turtles.

The on-water rescue effort involved staff from the

Florida Fish and Wildlife Conservation Commission, the In-water Research Group, the Riverhead Foundation for Marine Research and Preservation, NMFS, USFWS, and Louisiana Department of Wildlife and Fisheries.

Relocation of Sea Turtles' Nests

The *Deepwater Horizon* spill overlapped in space and time with the sea turtle nesting season in the northern and eastern Gulf of Mexico, necessitating sea turtle nesting beach monitoring operations. Approximately 700 nests are laid annually in the Florida Panhandle and up to 80 nests annually in Alabama. These nests were expected to produce approximately 50,000 hatchlings in 2010. The nesting season spans from mid-May to the end of August, with the hatching of nests and emergence of hatchlings in July through October. Several concerns were raised surrounding nests and hatchlings, including the potential for disturbance by cleanup operations and the possibility that hatchlings would emerge on oiled beaches or swim into oiled waters.

To minimize the potential for spill responders to harm nests, an intensive visible marking effort was undertaken with daily surveys for freshly laid nests. Additionally, the MMSTG worked within the ICP Mobile to ensure Best Management Practices (BMPs) were developed and implemented for nesting beach protection.

In early June, the MMSTG convened a meeting of experts in New Orleans, La., to address the threats to the turtle hatchlings. A plan was developed and submitted for approval through UAC to relocate nests during late-term incubation to the east coast of Florida for final incubation and release of hatchlings into the Atlantic Ocean. These efforts were necessary to prevent hatchlings from entering oiled waters of the northeastern Gulf of Mexico. A total of 274 nests (primarily loggerhead) were relocated between late June and mid-August, and 14,796 hatchlings were subsequently released. This unprecedented effort involved numerous state, federal, local non-profit organizations, and volunteers, as well as a commercial courier service that donated the use of a climate-controlled, air-ride suspension truck to transport the nests to Florida.

As with many of the MMSTG response activities, procurement of supplies, personnel, contracts, and approval of plans within the ICS hampered response efforts. The nest translocation effort had

to be started before a contract could be finalized for the required activities on the east coast of Florida. The contract proved challenging to negotiate due to the clauses required by the RP.

In order to provide a mechanism for the rescue of animals that were incidentally involved in on-water cleanup operations and to document interactions between the response and the resources, the



Bon Secour National Wildlife Refuge, Ala. – Refuge staff make preparations to relocate a sea turtle nest. Photo courtesy of U.S. Fish and Wildlife Service

MMSTG and the Southeast Regional NOAA Fisheries Service Endangered Species Branch Chief requested observers be placed on skimmers and other on-water cleanup operations. During July 2010, the MMSTG built the Protected Species Observer Program. This program provided an on-water person to observe in situ burn operations, offshore skimmers, near-shore skimmers, and several experimental on-water oil cleanup technologies. All observers were trained in marine mammal, sea turtle, and seabird identification, and Hazardous Waste Operations and Emergency Response (HAZWOPER), and were provided the necessary equipment. The data collected from their observations was reviewed and evaluated during the spill and will be used by NOAA Fisheries Service and the USFWS as they dispatch their personnel for consultation on the *Deepwater Horizon* event.

Of note, and perhaps not widely known, science staff from the Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE), Gulf of Mexico OCS Region, and the UAC's Environmental Unit provided the FOSC with the scientific guidance for attacking the spill. This staff also assisted in placement of response resources to mitigate natural resource damages. BOEMRE provided advice and information concerning over

flights needed for monitoring and potential impacts of in situ burns, and for the sub-sea monitoring program.

Scientific information and expertise from BOEMRE-funded studies proved indispensable during the *Deepwater Horizon* spill response. BOEMRE's protected-species biologists worked with the National Park Service and other wildlife trustee agencies to develop a comprehensive wildlife management plan.

Sea Turtle Rehabilitation Efforts

By way of the sea turtle response, significant improvements were made to sea turtle rehabilitation facility capabilities in the northern Gulf. Four pre-existing facilities (Audubon Nature Institute in New Orleans, La., Institute for Marine Mammals Studies in Gulfport, Miss., Gulfarium in Fort Walton Beach, Fla., and Gulf World Marine Park in Panama City Beach, Fla.) were designated as primary care facilities. As such, these facilities were equipped to administer de-oiling of animals, veterinary care, and rehabilitation of large numbers of oiled sea turtles. Five secondary facilities (SeaWorld Orlando, Disney Living Seas, Mote Marine Laboratory, Clearwater Marine Aquarium, and Florida Aquarium) were secured for short- or long-term holding of sea turtles following de-oiling at the primary facility, but prior to release. Protocols for medical clearance of turtles prior to release and release plans were developed and implemented. In July 2011, the last few rehabilitated sea turtles were released, resulting in a total of 388 turtles that were successfully rehabilitated and released back into the wild. [Update: In July 2011, the last few rehabilitated sea turtles were released, resulting in a total of 388 turtles that were successfully rehabilitated and released back into the wild.]

The greatest challenges to the sea turtle rehabilitation efforts during the response were the procurement

NEW ORLEANS – A loggerhead sea turtle brings her head above water at the Audubon Nature Institute Rehabilitation Center. Photo courtesy of U.S. Coast Guard



of veterinarian and veterinary technician contracts, de-oiling equipment, additional tanks, and veterinary and husbandry supplies. All four primary rehabilitation facilities required equipment and staffing to meet response needs, and it proved extremely difficult to meet these needs in a timely fashion.

Dolphins

In order to protect and mitigate damage to bottlenose dolphins, visual health assessments were initiated. Dolphin communities in the Perdido Bay complex (Wolf, Perdido, Bay La Launch, and Arnica Bays) near Orange Beach, Ala., have been the focus of a dedicated eco-tourism industry for almost twenty years. Several dolphin tour captains and citizens expressed concern about animal health and welfare during the oil spill crisis. To determine if any intervention was needed, the MMSTG conducted visual health assessments of the bottlenose dolphins in this area.

The assessments investigated whether the dolphins were exhibiting signs of distress or behavioral anomalies that could potentially require an intervention (on-water capture).

The visual health assessments required near-shore, boat-based surveys. The MMSTG utilized a registered VOO assigned to the Wildlife Branch. Sighting information and behavioral observations of the dolphins were recorded on data sheets, and photographs and video were taken to document behavior and body condition. Additionally, surveys attempted to identify specific animals using individual markings of the animals' dorsal fins.

The visual assessment team conducted surveys

in June, July, and August. During this time, several groups of dolphins in the Perdido Bay complex, including calves recently born, were observed and documented in good condition. Moreover, these dolphins were exhibiting normal socializing and feeding behaviors with no visible signs of illness. These surveys were essential to assess the animals' health status and determine if further action was warranted; none was warranted. During the July and August surveys, an independent marine mammal veterinarian with extensive expertise in dolphin health accompanied NOAA's marine mammal biologists. The veterinarian confirmed the dolphins were exhibiting good body condition and showed no visible signs of illness. Following the surveys, community outreach efforts were conducted to present the findings and inform residents about the health status of the animals and to explain the MMSTG's protocols for responding to animals in distress.

Over the summer of 2010, two dolphins stranded dead in the Perdido Bay complex, but neither showed visible signs of oiling. Follow-up monitoring and behavioral observations during future visual health assessments will continue to provide the scientific evidence to determine when interventions or rescues are warranted.

Marine Mammal Stranding Operations

The Southeast Marine Mammal Stranding Program has operated in the Gulf of Mexico since the 1970s. The program operates under the direction of NMFS' Southeast Regional Office and the Southeast Fisheries Science Center for cetaceans that strand in the Gulf of Mexico. This is the same network under authorization of the USFWS for manatees that strand in Alabama, Louisiana, and Mississippi. The UAC increased operational capacity through these organizations. As of February 2011, response to stranded animals was still ongoing for some areas where there were recent detections of oiled animals.

Based on the Marine Mammal Oil Spill Response Guidelines, spill response protocols were expanded for cetaceans and adapted to provide response for manatees. Efforts to enhance detection and reporting of marine mammal strandings were also instituted.

Any live stranded marine mammals were responded to as rapidly as possible, evaluated on the beach or in the water, and either immediately released

NEW ORLEANS –
A veterinary technician with the Audubon Nature Institute comforts Louie the dolphin before he is loaded onto a Coast Guard HC-144 Ocean Sentry from Air Station Miami. Members from the Audubon Nature Institute, the Louisiana Marine Mammal and Sea Turtle Rescue, and the Dolphin Research Center cared for and relocated Louie after he was found covered in oil in the water near Port Fourchon, La. Photo courtesy of U.S. Coast Guard.



on-site, transported to rehabilitation, or euthanized. The marine mammal response depended upon the enhanced reconnaissance and response efforts from within the Wildlife Branch (with the primary objective of detecting and responding to oiled birds) and the VOO program, to provide reports of animals stranded and to assist with collection of, or access to, animals. Given the low frequency of manatee strandings in the northern Gulf Coast, arrangements were made for rapid response teams from Florida to provide animal rescues and rehabilitation. Fortunately, those assets were not needed. A transition step-down plan for response was implemented on November 2, 2010. The plan provided a response re-initiation clause based on triggers of oiled dol-



PORT FOURCHON, La. – U.S. Coast Guard personnel comfort a stranded, oiled dolphin on the beach near Port Fourchon, La., while awaiting a marine mammal rescue crew.

phins and advice from the working group. Since December 3, 2010, three oiled dolphins have been recovered and an intermediate response was in effect for central and eastern Louisiana through March 25, 2011.

Response operations have not been re-initiated for the other geographic areas within the Gulf of Mexico, and these stranding organizations are using normal response protocols.

Due to the high rates of strandings since February 2010 in the northern Gulf of Mexico, consultation with the MMSTG on Marine Mammal Unusual Mortality Events (UMEs) was initiated. In addition, a formal UME was declared and a UME investigation launched for cetacean strandings occurring in the Northern Gulf area from the Louisiana and Texas border to Apalachicola, Fla.

The marine mammal program used three of the same rehabilitation facilities as for sea turtle care in the northern Gulf (Audubon Nature Institute

in New Orleans, Institute for Marine Mammals Studies in Gulfport, and Gulf World Marine Park in Panama City Beach) for the UME. These facilities were augmented and capacity was developed through equipment, structures, and training to enable transport, de-oiling, and holding of oiled marine mammals. Arrangements were also made to access additional facilities (mobile facilities and secondary rehabilitation groups) if the local facilities exceeded capacities.

Working with partners from outside of the response area, the MMSTG deployed experienced veterinarians, animal handlers, and sample and data managers to these primary facilities to assist with the overall response as needed. Given the low frequency of manatee strandings on the northern Gulf Coast, two additional Florida rehabilitation facilities under use agreements were not needed during the response. Although 12 cetaceans stranded live, only three bottlenose dolphins were taken to rehabilitate, the others were released in the field, died, or were euthanized. Rehabilitation challenges include transport time, de-oiling training for handling oiled dolphins, logistical support for access, and obtaining resources.

8.2 Migratory Bird Activities and Volunteer Wildlife Response Assistance

A paraprofessional and volunteer coordinator position, identified as a need during the *Deepwater Horizon* incident, was established to oversee all activities related to Oiled Wildlife Rehabilitation Centers, transportation of oiled wildlife, paraprofessional coordination, and volunteer coordination throughout Louisiana, Mississippi, Alabama, and Florida. In addition to the coordinator position, four other positions were established to fulfill the duties involved in rehabilitation and response to impacted wildlife during the incident. These positions included an assistant coordinator, a transport coordinator (located in Houma, La.), and one position to maintain the paraprofessional list (located in Atlanta, Ga.).

Within seven days of the *Deepwater Horizon* oil rig explosion, the paraprofessional coordinator arrived in Houma, La., to meet the executive director of a rehabilitation organization to discuss the need for Wildlife Rehabilitation Centers to be established in response to the incident. In an effort to channel available resources, including staff for

8. Natural Resources and Wildlife

the Centers, the idea of using paraprofessionals on a volunteer basis was discussed with the RP and a volunteer paraprofessional was defined. A volunteer paraprofessional was defined as an individual who:

- Possessed, or worked directly under a person possessing, an active permit or authorization related to the species cared for;
- Was affiliated with a wildlife organization working within the Wildlife Branch of the UAC;
- Was an employee of a wildlife trustee agency;
- Agreed to work under, and abide by, appropriate planning documents prepared by the UAC (such as Site Safety Plan, Incident Action Plans, public affairs requirements, etc.); and
- Had working knowledge and experience (at least three months) with the general protocols, procedures, and safety hazards associated with working on the species identified as at risk.

An assessment was made to quantify the potential wildlife response in each state and the number of persons needed to staff each. It was determined that additional personnel were needed. A paraprofessional announcement was published nationally, regionally, and internationally. An email account

was established and managed by the USFWS Migratory Bird Permit Office in Atlanta, Ga. The paraprofessional roster ultimately contained more than 1,000 individuals from almost every state in the United States and nine other countries. Each capture team (a two-person team) in Mississippi, Alabama, and Florida, was comprised of one agency employee and one experienced wildlife rehabilitator. Those individuals who did not meet the qualifications were directed to the National Audubon Society for potential volunteer opportunities.

In order to fill these positions, the RP ultimately agreed to pay the volunteers to staff the Centers and the capture teams. After the number of positions



JEFFERSON PARISH, La.- Louisiana Department of Wildlife and Fisheries and U.S. Fish and Wildlife Service personnel prepare to net an oiled pelican in Barataria Bay, La. Photo courtesy of U.S. Coast Guard

and the hiring processes were established, the paraprofessional coordinator staffed these positions both at the Centers and on the capture teams for the duration of the incident. This involved managing 70 positions on a two-week rotational basis.

The transport coordinator developed the protocols and system for transporting animals from the field to the Centers, to the release sites, and to other rehabilitation facilities. In addition, the coordinator arranged flights for the on-site Veterinarian and Branch Director. When the oiled wildlife hotline began receiving calls, a system was developed to retrieve the animals (mainly migratory birds) and safely transport them to the Centers.

Safely transporting the animals involved many factors. Considerations included high temperatures, number of birds, manpower, logistics of managing a high volume of calls, and response for an area the size of four states. The first calls received were from vessels in the Gulf of Mexico, close to the source of the oil spill. Initially, the RP sought to obtain services of volunteers to transport oiled wildlife. At that time, the National Audubon Society was contacted for assistance. The paraprofessional coordinator on the incident also met with the Louisiana state director to identify areas with immediate need for transporters. The biggest challenge was identifying volunteers who were both trained to encounter potentially oiled animals and individuals who met the paraprofessional definition. This combination limited the available pool of volunteers.

Early in the incident, a system was established where National Audubon Society was contacted

GULF OF MEXICO – A biologist holds an oiled brown pelican rescued from the Gulf. Photo courtesy of U.S. Fish and Wildlife Service



to locate volunteers to retrieve the wildlife. Bringing animals to designated sites posed problems. Some designated sites were great distances from the nearest Center. The process quickly became too risky for the birds and for the individuals providing transportation. Proper vehicles were not available. There were already protocols established by International Bird Rescue and Research Center for transporting wildlife at oil spills which did not include using vehicles the National Audubon Society volunteers had available. Eventually, liability concerns drove a change to use of contract transportation services for oiled wildlife. As a result, three companies were contracted to provide cargo vans and purpose-built vehicles to provide transportation for wildlife. Purpose-built vehicles allowed safe transport of the animals in climate-controlled environs. Cargo vans were used to carry animals from capture sites to the Centers, and purpose-built vehicles transported large num-



NEW ORLEANS – A U.S. Fish and Wildlife Service veterinarian and a U.S. Coast Guard Petty Officer observe a sea turtle aboard a U.S. Coast Guard HC-144A Ocean Sentry aircraft. The turtle was found stranded on the Louisiana coast and transported to Egmont Key National Wildlife Refuge near St. Petersburg, Fla. Photo courtesy of U.S. Coast Guard

bers of birds to the Centers, long-term rehabilitation centers, and to release sites.

Once the contracts for transportation services were in place, transport teams stationed at designated places began to accept animals brought there by the capture teams. Purpose-built vehicles were either at the Center in Louisiana, or on call with a 12- to 24-hour report time. The transport coordinator position maintained the schedule for transport teams and arranged transportation for all animals to the designated release sites.

The paraprofessional and assistant coordinator positions were also tasked with organizing the

volunteer organizations that offered help. Many calls came from volunteers and those seeking to donate supplies to the response effort. It became apparent a system was needed to manage the offers for volunteer assistance.

The National Audubon Society had an established website designed for volunteer management. Their website allowed a volunteer to provide online information about their skills and availability. The Audubon Society also set up a thirty-person call center in Mississippi to help organize volunteer efforts throughout the four affected states. Due to the ease of this system, the RP's volunteer coordinator asked to have all volunteer requests funneled through the Audubon Society for the remainder of the response. The Audubon Society then became the source for all non-paraprofessional volunteers used by the Wildlife Branch and was responsible for maintaining the volunteer schedule. Volunteer management proved the biggest challenge for the paraprofessional team due to the enormous need for, and the limited supply of, experienced individuals with the requisite skills for handling oiled wildlife. Audubon's assistance with this process was essential.

Volunteers were placed at each marina in Louisiana to which capture teams were bringing wildlife. The positions were manned 12 hours each day, and the volunteer was responsible for calling the transport coordinator to arrange transport if a vehicle was not on-site. Each volunteer was tasked with ensuring the animals received from the capture teams were not disturbed and were protected from the elements until the transport team arrived. This allowed the capture teams to deliver the wildlife and return immediately to their duties.

The paraprofessional coordinator and assistant coordinator acquired permits from Texas, Louisiana, Mississippi, Alabama, Georgia, and Florida to import and export wildlife for release after rehabilitation. They were also responsible for issuing permits for USFWS employees and their agents to perform activities under the Migratory Bird Treaty Act. The paraprofessional coordinator also

HOUMA, La. – A U.S. Coast Guard pilot and U.S. Fish and Wildlife Service veterinarian transfer a cage of Brown Pelicans to an HC-144A Ocean Sentry aircraft for transport to Port Aransas, Texas, for release. Photo courtesy of U.S. Coast Guard





VENICE, La. – A member of the U.S. Fish and Wildlife Service documents birds affected by the oil spill and records their overall behavior on a daily basis to determine if human intervention was necessary. Photo courtesy of U.S. Air Force

worked with the affected state's wildlife agencies to verify appropriate release sites and to coordinate the activities of the Wildlife Operations Branch to include state agency participation. These coordinators were also responsible for supervision of the two wildlife hotline dispatchers at the Daphne, Ala., Wildlife Operations

Branch when the BP hotline was disbanded. The coordinators temporally supervised evidence custodians in Alabama, Florida, and Mississippi until those duties were transferred to another position. The paraprofessional coordinator still serves as the liaison for USFWS's Migratory Bird Program for the Southeast Region and responds to all migratory bird related issues related to the *Deepwater Horizon* spill.

Migratory Bird Habitat Initiative

As part of the whole-of-government response to the *Deepwater Horizon* spill, the Department of Agriculture Natural Resource Conservation Service (NRCS) developed a proposal to use existing programs to enhance migratory bird habitat in the southern Mississippi River flyway to encourage birds to not migrate as far as the potentially oiled shorelines along the Gulf Coast, or at least delay their arrival to reduce impact on migratory populations. One, called the Wetland Reserve Program, contracts with private landowners to use flooding of crop land in appropriate places to provide additional migratory bird habitat. The other program would flood appropriate locations in land managed by the federal government. NRCS made the decision to implement these programs and initially funded them through reallocation of funds from other areas within those existing programs. Regardless, a number of tracts of agricultural lands received support from the Department of Agriculture to flood and create diversionary wetlands. At the conclusion of migratory season, this diversionary tactic proved to be ineffective.

In June 2010, while oil flowed unconstrained from the well and it was not known when the source would be secured, the FOSC indicated such actions could be appropriate and thus might be funded under the OSLTF. NRCS submitted its funding request in August, by which time the well had been capped.

The FOSC made the final determination not to use OSLTF funds on the land flooding initiative.

8.3 Environmental Compliance with the Endangered Species Act

There are 26 threatened or endangered species in the Gulf of Mexico area. Oil represented a threat to each



JEFFERSON PARISH, La. – A member of the U.S. Fish and Wildlife Service carries an oiled pelican from a nesting area in Barataria Bay, La. to a waiting boat for transport to a stabilization center on Grand Isle, La. Photo courtesy of U.S. Coast Guard

of them. As endangered and threatened species were present in the area where the spill response took place, the Endangered Species Act (ESA) requires consultation with wildlife management agencies prior to taking action that might jeopardize listed species or adversely impact their habitat. In 1999, the Coast Guard consulted with wildlife management agencies on the general use of dispersants as part of its Region VI Regional Response Team (RRT VI) Oil Spill Dispersant Use Policy. The policy was developed in accordance with ESA consultation procedures and pre-authorized dispersant use three miles seaward of land in waters at least 10 meters deep. This policy formed the basis for the initial use of dispersants as part of the *Deepwater Horizon* spill response. In addition, a Memorandum of Agreement (MOA) regarding Oil Spill Planning and Response Activities under the Federal Water Pollution Control Act's National Oil and Hazardous Substances Pollution Contingency Plan and the ESA was signed in June 2001. The MOA guided ESA Section 7 inter-agency consultation compliance for the *Deepwater Horizon* oil spill. As soon as it became clear that oil would likely reach the coastline of the northern Gulf of Mexico, the USFWS and other Natural Resource Trustee agencies began to compile a list of federally threatened and endangered species likely to be

Table 8.1: Endangered and Threatened Species

SPECIES	SCIENTIFIC NAME	OCCURS IN RESPONSE AREA	STATUS
Fish			
Gulf Sturgeon	Acipenser oxyrinchus desoto	Y ²	Threatened
Reptiles			
Loggerhead sea turtle	Caretta caretta	Y	Threatened ¹
Green sea turtle	Chelonia mydas	Y	Endangered
Kemp's Ridley sea turtle	Lepidochelys kempii	Y	Endangered
Leatherback sea turtle	Dermochelys coriacea	Y	Endangered
Hawksbill sea turtle	Eretmochelys imbricata	Y	Endangered
Alabama redbelly turtle	Pseudemys alabamensis	Y	Endangered
Birds			
Piping Plover	Charadrius melodus	Y	Threatened
Wood Stork	Mycteria Americana	Y	Endangered
Mississippi Sand Hill Crane	Grus canadensis Pulla	Y	Endangered
Marine Mammals			
Sperm Whales	Physeter macrocephalus	Y	
Sei Whales	Balaenoptera borealis	Uncommon	
Finback Whales	Balaenoptera physalus	Uncommon	
Blue Whales	Balaenoptera musculus	Uncommon	
West Indian Manatee	Trichechus manatus	Y	
Terrestrial Mammals			
Alabama beach mouse	Peromyscus polionotus ammobates	Y	
Perdido Key beach mouse	Peromyscus polionotus trissylepsis	Y	
Choctawhatchee beach mouse	Peromyscus polionotus allophrys	Y	
St. Andrew beach Mouse	Peromyscus polionotus peninsulari	Y	
Critical Habitat			Critical habitat
Gulf Sturgeon	Units 8,9,10, 11, 12	Y	Critical habitat
Piping Plover	Multiple units	Y	Critical habitat
Alabama beach mouse	Multiple units	Y	Critical habitat
Perdido Key beach mouse	Multiple units	Y	Critical habitat
Choctawhatchee beach mouse	Multiple units	Y	Critical habitat
St. Andrew beach Mouse	Multiple units	Y	Critical habitat

¹ Loggerheads have been proposed to be updated to endangered status.² The Gulf Sturgeon is an anadromous fish; adults spawn in freshwater, then migrate to feed and grow.

affected by the oil and the response activities. In addition, these agencies gathered conservation recommendations and BMP that would help minimize these impacts. On May 12, 2010, USFWS issued an emergency consultation letter to federal agencies with general guidelines, BMPs, and contact information to support the memorandum of agreement with the Coast Guard and acknowledging that an emergency Section 7 consultation was underway. Shortly thereafter NOAA's NMFS issued a similar letter.

Endangered Species Act Response Actions

RRT VI did not discuss impacts on specific species as part of its deliberations on dispersants, or as part of its discussion of other response activities. The Environmental Planning Unit of the UAC did review species-specific impact issues. Those discussions were determined to be "adequate alternative procedures ... consistent with the requirements" of the ESA under 50 CFR 402.5. More than any other of the endangered and threatened species in the Gulf of Mexico, the five species of sea turtles that live in the Gulf received the most significant public and media attention.

The USFWS *Emergency Permit to Rehabilitate Sea Turtles Affected by the Deepwater Horizon Oil Spill, Gulf of Mexico* allowed turtle advocates to perform the following tasks:

- Examine and document stranded sea turtles,
- Tag turtles,
- Collect data and specimens,
- Transport live and dead sea turtles to rehabilitation facilities,
- Satellite transmit attachment and necropsy sites,
- Locate egg chambers, retrieve eggs for protected incubation,
- Provide care for incubating sea turtle eggs,
- Release hatchling sea turtles,
- Capture juvenile sea turtles in nets, and
- Collect associated data.

GULF OF MEXICO – An aerial view of the Gulf Coast shoreline as seen from a C-23 Sherpa aircraft operated by the Florida National Guard's Detachment 1, Company H, 171st Aviation unit, which supported the Fish and Wildlife Conservation staff in its effort to photograph and report tar and oil that approached the shoreline. Photo courtesy of U.S. Army

The primary elements of the marine mammal and sea turtle rescue and protection efforts were two-fold. First, the response effort focused on debilitated, distressed, and dead marine mammals and sea turtles. As noted previously, the response effort significantly augmented the pre-*Deepwater Horizon* spill marine mammal and sea turtle stranding networks. The increased capacity enhanced detection, response, and rehabilitation capabilities across the four states of the upper Gulf of Mexico. The second prong of efforts to protect sea turtles, marine mammals, and other sensitive wildlife, was the use of BMPs, which describe practices that should be followed by spill responders (during cleanup activities) to minimize, mitigate, or avoid impacts to protected resources, including sea turtles and marine mammals. The UAC Environmental Unit (Planning Section) managed BMP implementation. Development of the BMPs was accomplished by a network of liaisons working in cooperation with trustee agencies, including the USFWS. The Environmental Unit worked closely with the Operations Section to identify the applicable BMPs for each response activity and facilitate their implementation. If a BMP could not be complied with, the responders had to provide detailed explanations.

Natural Resource Trustee Agency Oversight of Endangered Species Act Requirements in the Response

NOAA, USFWS, EPA, the National Park Service (NPS) and other agencies and organizations sent representatives who became involved in day-to-day discussions of endangered species. In addition,



several volunteer groups contributed time and resources to the turtle recovery programs.

The Coast Guard and the EPA had incorporated the established ESA Section 7 consultation procedures into the response effort, including the procedures regarding the use of dispersants. Dispersants have not been used in the *Deepwater Horizon* response since July 19, 2010. However, consultation is ongoing, and the Coast Guard, EPA, and other agencies continue to work to assess the impact of the spill on endangered and threatened species.

The FOSC conducted emergency consultation with NOAA and USFWS throughout the process of approving dispersants for use. This consultation followed the procedures of the ESA implementing regulations 50 CFR 402.05 and the Inter-agency Memorandum of Agreement Regarding Oil Spill Planning and Response Activities Under the Federal Water Pollution Control Act's National Oil and Hazardous Substances Pollution Contingency Plan and the ESA (2001) Memorandum of Agreement. The emergency consultation procedures allowed the FOSC to draw upon endangered species expertise and incorporate concerns about listed species into response efforts under the National Contingency Plan and relevant Area Contingency Plans.

Several BMPs specific to the use of dispersants were developed and implemented by the Environmental Unit within the Resources at Risk group in each ICP. These BMPs included monitoring criteria to detect surface dwelling species and geographic limitations that would prevent any impact dispersants might have on sensitive habitats.

In addition, EPA undertook multi-phase toxicity testing of eight chemical dispersants listed on the National Contingency Plan product schedule. EPA also monitored dissolved oxygen levels at and around the well site where sub-surface injection of dispersants was occurring. Monitoring information and data are posted on EPA's website at <http://www.epa.gov/bpspill/>. NOAA also dispatched the research vessel *Gordon Gunter* to study the effects of the spill on endangered sperm whales and other species.

During the midst of the response the FOSC was informed of one potential lawsuit and an actual suit that was filed—both centered on concerns about the impact of response activities on endangered species. On June 2, 2010, a Notice of Intent to Sue alleged that the Coast Guard and the EPA had



unlawfully exceeded their authority by allowing specific chemical dispersants to be used in response to the *Deepwater Horizon* spill in amounts unanticipated in environmental planning documents covering regional oil spill response operations; thus they had not satisfied requirements for ESA Section 7 consultations. Review of the applicable regulations and memorandum of agreement about emergency consultations, as well as information about the BMPs, persuaded the non-governmental organization that filed the suit to first engage the Coast Guard, EPA, and trustee agencies rather than immediately pursue a lawsuit.

The Coast Guard worked with the Department of Justice to defend the ICP Houma response operations and protocols relating to in situ burns and turtle protection. As part of the government's reply, the FOSC submitted a declaration that explained the response processes, authorities, endangered species oversight, and consultation with NOAA and USFWS, and the value of in situ burning provided as a response mechanism. Four non-profit environmental organizations filed suit that sought to enjoin future oil spill response operations (including in situ burns) that could endanger sea turtles. Prior to the July 2, 2010 hearing, the plaintiffs voluntarily withdrew their motion for a Temporary Restraining Order; however, the complaint is still pending.

The BMPs for turtles specifically included having turtle rescue vessels, with trained rescue personnel, accompany burn taskforces into the burn box. Personnel would then rescue the turtles prior to burning operations, while oil was being boomed

PENSACOLA, Fla. – A National Park Ranger guides citizens through orientation and training to become volunteer park rangers for Gulf Islands National Seashore to educate the public on information regarding the impact of the Deepwater Horizon oil spill on the shores and beaches. Photo Courtesy of U.S. Army.

8. Natural Resources and Wildlife



GULF OF MEXICO – A U.S. Coast Guard officer logs sample data from oiled water in the Gulf of Mexico to help environmental scientists determine the effectiveness of dispersants used to break down oil. Photo courtesy of U.S. Coast Guard

VENICE, La. – An oil burn task force, which includes a wildlife observer looking out for any oiled wildlife, particularly turtles, watches a recently ignited in situ burn in the Gulf of Mexico. Photo courtesy of U.S. Air Force



or awaiting burning. Where turtle rescue vessels were unavailable, BMPs sent turtle rescue vessels into the next day's projected burn box to search for and rescue turtles, and had a trained observer or a crew member dedicated to looking for sea turtles (and marine mammals) join corralling

operations to record each sighting event.

Upon receiving the notice of the impending ESA lawsuit, ICP Houma and the UAC searched for any information that might suggest that the in situ burning practices caused turtle death. They found that of the dead turtles found in the Gulf of Mexico, none showed evidence of being burned. Furthermore, no observations were reported of any turtles being burned by ICP Houma in situ burns.

Emergency consultations occur, as addressed in the memorandum of agreement, during responses to an oil spill in order to give advice on measures that will minimize effects from response actions. USFWS field offices in Alabama, Florida, Louisiana, and Mississippi assisted the U.S. Army Corps of Engineers (USACE) by responding to multiple requests for emergency consultation for specific response actions permitted by the USACE, such as boom placement, dredging, and temporary dock placement to accommodate response actions initiated by state agencies or other non-federal entities. The field offices also provided local support in identifying areas of natural resource concerns, temporary meeting facilities, and local points of contact to the Natural Resource Damage Assessment (NRDA) and response teams.

In June 2010, the USFWS staffed the UAC with an ESA Liaison. Also, the USFWS and NMFS developed a list of refined BMPs by habitat type to minimize impacts to listed species and critical habitats. Since early July, these checklists were incorporated

into every Shoreline Treatment Recommendation (STR) and supplied to all Natural Resource Advisors (NRAs) and Resource Advisors (READs). A Section 7 liaison was placed into each sector and each state Branch to maintain ESA compliance, answer BMP questions, provide training, and maintain documentation. Job aids and compliance checklists were developed to facilitate the implementation and monitor the effectiveness of the BMPs, and to document any catch. In December 2010 and early January 2011, the USFWS updated the BMPs.

In order to document baseline conditions for the NRDA, as well as impacts of the oil spill on threatened and endangered species, the USFWS expedited the review and issuance of a number of research permits under the ESA. The review allowed the permitting of incidental take of endangered or threatened species for scientific research and to enhance the propagation or survival of listed species.

With the success of the static and bottom kills of the Macondo well, a transition period began that afforded NMFS, the USFWS, and the Coast Guard time to prepare for the after-the-fact formal inter-agency consultation under Section 7 of the ESA. As of early February 2011, the USFWS continued to staff six Section 7 liaisons to the incident and to coordinate information requests, BMP compliance issues, and additional guidance as required. For example, the USFWS prepared training for each state Branch office to educate READs and NRAs on courtship and nesting behaviors of shorebirds and colony nesting migratory birds. The READs and NRAs could then delineate the habitats, allowing work crews and response actions to avoid the area while continuing cleanup operations. The USFWS provided maps of known nesting locations to prioritize cleanup in these areas, so that the cleanup could be completed prior to the beginning of the 2011 nesting season.

The USFWS and NMFS are currently assisting the FOSC in review of a statement of work to contract the preparation of a biological assessment. The biological assessment will address all the potential and known effects to endangered and threatened species, and their critical habitats resulting from cleanup activities associated with the *Deepwater Horizon* spill. The biological assessment will also include an analysis of ESA effectiveness regarding the compliance process implemented during the response. Once the biological assessment is finalized, the USFWS will analyze the effects of the

cleanup activities in a Biological Opinion. It will determine the amount of take that has occurred, if any terms and conditions are needed to minimize that take, and if any recommendations are needed to facilitate ESA compliance during future spill response activities.

While the 2001 memorandum of agreement among the Coast Guard, NMFS, and EPA outlined emergency consultation procedures, it did not specifically identify positions in the ICS as an ESA Liaison. After BMPs were provided, it took considerable work to incorporate them into the Shoreline Treatment Recommendations (STRs) and for BMP checklists to be provided to work crews. The turnover of personnel and lack of consistency over time hampered the rapid processing of approvals and information requests.

8.4 Wildlife Challenges

All wildlife operations encountered challenges in three major areas: communications, training and preparedness, and logistics. Communication was a challenge throughout the response given the large scale of the event. As NOAA and USFWS had never before engaged in a response this size for sea turtles or marine mammals, it was a challenge to ensure MMSTG information was shared among those serving in command posts, in organizational functions but at their home office, and those deployed in the field. Despite conference calls and virtual meeting technologies, messages were often not correctly conveyed and understood.

Information sharing between wildlife-focused portions of the incident command such as the MMSTG and other UAC field operations, SCAT field teams, NRDA field teams, and the VOO coordinators was also challenging. Often information was communicated to counterparts in the ICPs for ultimate use by these programs, but was not transferred effectively to the field. It was difficult for biologists and experts to inform the public of the immense efforts undertaken to respond to migratory birds, marine mammals, and sea turtles.

Training and preparedness was another challenge that pre-existing stranding network responders and agency personnel faced. While oil spill and ICS training had been previously offered to these members, it was not taken by everyone due to the perceived low probability of being involved in an oil spill. Remedial training efforts were made through

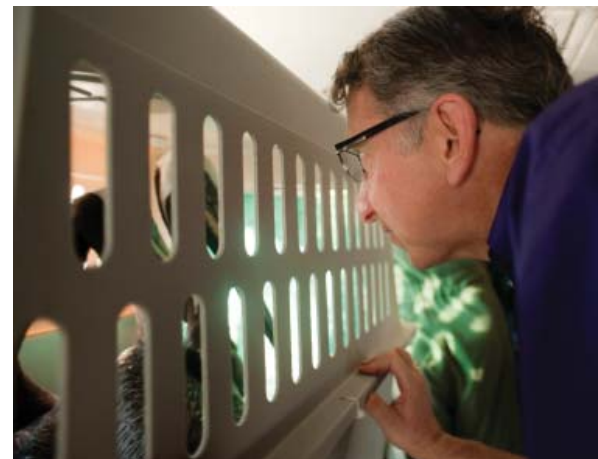


GULF OF MEXICO – The U.S. Fish and Wildlife Service leads the wildlife and habitat recovery efforts in the Deepwater Horizon oil spill. Photo courtesy of U.S. Fish and Wildlife Service

mechanisms such as recorded Webinars, but those in the field did not always utilize these opportunities. Supplies and equipment were not always readily available.

Logistics had a significant impact on both personnel and equipment. Contracts took time to process through the UAC Logistics Section. Proper distribution of equipment and reporting information to individuals in the field was also a challenge. Although reporting and collection protocols were disseminated at the Houma and Mobile ICPs, they did not consistently reach cleanup operations and SCAT teams on the beaches. This diminished the effectiveness of stranding responders. Delays locating and then procuring specialized de-oiling equipment, additional tanks, and veterinary and husbandry supplies caused significant impacts on the wildlife operations.

Personnel from the USFWS National Conservation Training Center did an excellent job of establishing a training system. However, training needed to convey the unique safety precautions to both bird specialist personnel and those personnel involved in oil spill cleanup. Many of the responders did not appreciate the harm that could come to birds from their actions, and many biologists did not respect the potential harm that could result from carelessness near spilled crude oil. Cross-training and experience in both areas would have been beneficial. Developing systems to train workers quickly for HAZWOPER certification and wildlife capture for rehabilitation created a challenge that was answered on an ad hoc basis.



HOUMA, La. – A veterinary avian specialist takes a last look at some Brown Pelicans before they depart in a Coast Guard HC-144A Ocean Sentry aircraft for a flight to the Port Aransas National Wildlife Refuge in Texas where they will be released. Photo courtesy of U.S. Coast Guard



RACCOON ISLAND, La. – Members of a Shoreline Cleanup Assessment Technique team search for oil on Raccoon Island, a protected bird breeding sanctuary with a variety of species. Photo courtesy of U.S. Navy

Some response actions, undertaken independently of the FOSC response organization, caused additional harm to wildlife habitat, such as changing the profiles of dunes, eliminating dune vegetation, compacting beach sand with equipment, and disturbing birds and nesting sea turtles with the volume of personnel responding. Trying to protect

bird-nesting colonies with boom anchored in areas of strong currents and high wave action for sustained periods caused the spilled oil to become sequestered inside the boomed area adjacent to the nesting colonies. This increased the birds' exposure spatially and temporally. It should be noted that some of the boom provided more of an esthetic barrier than actual environmental protection.

Despite these challenges, significant and unprecedented achievements were made in several areas:

1. Successful rehabilitation of marine mammals and a large number of oiled sea turtles;
2. On-water capture of sea turtles;
3. Marking of nests and relocation of sea turtle eggs; and
4. The overall efforts to protect and mitigate the damage to all the wildlife. The experiences gained will help improve future responses.

8.5 Section 106 of the National Historic Preservation Act Consultations

Situation

Section 106 of the National Historic Preservation Act, 16 U.S.C. 470f, requires all federal agencies to consider historic properties when conducting their activities. These responsibilities are carried out in the context of federal agency response to oil spills in accordance with the 1997 Programmatic Agreement for the Protection of Historic Properties during Federal Emergency Response. The Programmatic Agreement requires the FOSC, in the context of spill response, to consult with all stakeholders regarding

possible impact of the spill, and response activities on Historic Properties. It also requires the Coast Guard to conduct, on a government-to-government basis, consultations with federally recognized tribes having either current land ownership or historic interests in the impacted areas.

During the course of the response, 778 archeological sites were checked, including 113 newly discovered sites located during the response. Of those sites, 121 were impacted by oil or response activities (four in Alabama, 39 in Florida, 59 in Louisiana, and 19 in Mississippi).

The Department of the Interior provided expert staff, mostly from the NPS, to assist the FOSC with carrying out the responsibilities within the Programmatic Agreement from the earliest days of the response. Given the geographic scope of the impacted shoreline from the *Deepwater Horizon* spill, it took time to gather information about the full extent of impact of the spill on historic sites.

Historic property information is sensitive. This is particularly true of Native American sites. Most State Historic Preservation Offices (SHPO) carefully control access to information about historic sites as part of the preservation process. Native American tribes are even more cautious about access to information about their sites. Coordinating historic property information across five states, including the interests of eleven federally recognized tribes, was difficult and required the assistance of historic properties specialists on a scale not previously encountered in a spill response.

Another issue faced when addressing historic and traditional cultural properties is the presence of non-federally recognized Indian tribes in the impacted area. Federal law confers standing and rights only on tribes recognized by the federal government. Some groups in the area are recognized by states as Indian tribes, and some have applied for recognition by the federal government. These groups, from the perspective of the FOSC carrying out responsibilities under federal law, are not afforded rights to consultation. The FOSC did meet with them, separately at times, and allowed them to voice their concerns through cultural monitors, but not through tribal monitors and not in the context of government-to-government consultations.

First Actions Taken

The first steps toward compliance with Section 106 were taken by the RP. Before the end of April 2010, the RP hired an environmental services contractor who initially supplied an archeologist to assist with archeological sites that might be impacted by the spill. On approximately May 4, 2010, the NPS conducted a conference call with a federal agencies stakeholder to discuss actions that might need to be taken to protect historic properties and comply with Section 106. By mid-May, NPS had its first Section 106 staff member at the UAC. Over the next several weeks, NPS worked to ensure Section 106 concerns were brought to the attention of the FOSC. The Section 106 staff worked with the response documentation staff to address concerns about access to information on archeological sites and traditional cultural properties, which was developed during the course of the response.

Challenges

The biggest challenge faced was that Section 106 requires consultation with stakeholders prior to any ground disturbing activities, with a 30-day review period of proposed undertakings prior to approval. The Section 106 team used the broad language of the Programmatic Agreement to adapt the review protocols to meet the intent of the law whereby input was provided within a few days, rather than the standard 30 days.

Another challenge for Section 106 compliance was the lack of capacity of the SHPOs and the federally recognized tribes to participate in a response organization of this size, especially over an extended period. As a result, the NPS hired persons selected by the SHPOs and Tribes with delegated authority to serve as SHPO and tribal liaisons. This approach required the willingness of the tribes to make significant concessions in regard to direct government-to-government consultation with every tribe having concerns in the affected areas. This innovative approach was successful in giving stakeholders meaningful input into consultation and regarding protecting historic properties. As such, it is worth emulating in other disaster response contexts.

Resources Used

The archeological services contractor hired to assist the RP in Section 106 requirements performed site identification and assessments, collected data, provided advice and expertise to responders, and generally ensured that the requirements of Section 106 and the Programmatic Agreement were met. The RP consistently held its contractors to a high standard of compliance with historic and traditional cultural properties requirements.

Once the well was capped, the first opportunity arose to examine the entire cleanup operation from the perspective of the need to comply with the National Historic Preservation Act. As such, NPS planned a formal consultation between the FOSC and historic properties stakeholders.

Phase Two Actions Taken

Although historic properties consultations took place continuously from the outset of the response, the first formal consultation between the FOSC and stakeholders regarding historic properties took place on August 20, 2010. The NPS Historic Properties specialists organized this consultation. Participants in the meeting included SHPOs from five states, representatives of federally recognized and state recognized Indian Tribes, and interested federal agencies.

The meeting provided a forum to discuss a range of issues with those having interest in historic properties. One example was a subcontractor who established a staging area at a National Historic Landmark

NEW ORLEANS – Members of the U.S. Coast Guard meet with governmental members of federally recognized Native American tribes during a government-to-government consultation regarding the Deepwater Horizon response in New Orleans. Photo courtesy of U.S. Coast Guard



8. Natural Resources and Wildlife



NEW ORLEANS – Members of the Muscogee Creek Nation, Thlopthlocco Tribal Town, the U.S. Coast Guard, and other local, state, and federal agencies attend the Historic Property and Cultural Resource Trustee meeting in New Orleans, La., to discuss the ongoing Deepwater Horizon oil spill response and the impact on historical properties. Photo courtesy of U.S. Coast Guard

in Alabama. The sub-contractor closed the park to the public and to the state agency that administered the site, and engaged in a variety of ground disturbing activities at the park without consulting with the State. There was a Native American burial site within the park, which posed

a major concern. When the RP Incident Commander learned of the contractor's actions at Fort Morgan, they immediately fired the contractor.

On June 14, 2010, the NPS held its first meeting with only the federally recognized tribes concerning the response and the protection of traditional cultural properties. That meeting led to the hiring of the first tribal liaison in early July. The first government-to-government consultations with the FOOSC and eleven federally recognized tribes took place on September 17, 2010. The tribes that attended were:

- Alabama-Coushatta Tribe of Texas,
- Chitimacha Tribe of Louisiana,
- Choctaw Nation of Oklahoma,
- Jena Band of Choctaw Indians,
- Mississippi Band of Choctaw Indians,
- Muscogee (Creek) Nation of Oklahoma,
- Seminole Tribe of Florida, and
- Thlopthlocco Tribal Town.

The United South and Eastern Tribes, an umbrella organization representing the interests of 25 tribes in the eastern states, also attended.

The tribes expressed concern that consultations with the FOOSC had not taken place earlier, and requested to begin the consultations with direct discussion with the FOOSC alone. The consultations resulted in a list of action items:

- Meet with the FOOSC on a regular basis;
- Hold a second consultation with the tribes (which took place, per their request, on November 12, 2010);
- Create a map of the oiled archeological sites,
- Utilize cultural monitors on archeological surveys;
- Develop a Sharepoint website to share information with the tribes;
- Develop processes for handling archeological and ethnographic data developed during the course of the response;
- Develop a binding non-disclosure agreement for beach operations personnel and boat operators to ensure all those who obtain information on archeological sites agree not to disclose anything about the locations or contents of those sites (the RP developed an agreement within a week of the consultations); and
- Provide the tribes access to the UAC and Gulf Coast IMT organization charts.

After the initial meeting, four more government-to-government consultations took place between the tribes and the FOOSC. Tribal monitors have participated in the SCAT Teams, and tribal liaisons continued to review Shoreline Treatment Recommendations to address traditional cultural property concerns.

NEW ORLEANS – A second chief from the Muscogee (Creek) Nation of Oklahoma speaks with members of the Deepwater Horizon response during a government-to-government tribal consultation in New Orleans. The purpose of the meeting was to discuss consultation on the protection of historic and cultural properties and tribal lands during the response. Photo courtesy of U.S. Coast Guard



The issue of personnel readiness and training is also addressed in the Coast Guard's Incident Specific Preparedness Review (ISPR). The discussion in this chapter mostly focuses on specifics of federal government personnel and training issues and does not duplicate other readiness efforts addressed in Section III.1 of the ISPR Report.

9.1 Federal Government Personnel Overview

The response to the mobile offshore drilling unit Deepwater Horizon oil spill was the single largest peacetime operation in U.S. Coast Guard history. The response to this Spill of National Significance mobilized more than 7,750 personnel, which caused unprecedented challenges to the Coast Guard's personnel resources. The 42,883 Coast Guard active duty force is generally fully employed executing the 11 statutory missions of the organization, which leaves very little surge capability. The authorized 8,100 member Coast Guard Reserve does

provide an organizational surge capability, but the focus of workforce planning for the Reserve since 2001 has been to respond to Maritime Security threats and support U. S. Department of Defense (DOD) operations. As such, neither the Active Duty Coast Guard nor the Reserve was structured to provide the specific skill sets or competencies required to respond to an environmental contingency of this magnitude.

Other governmental agencies also dispatched large numbers of response personnel. For example, the U.S. Fish and Wildlife Service (USFWS) deployed 1,761 personnel, seventeen percent of its workforce. The National Park Service filled 1,200 requests for personnel, a number of which were filled by people who deployed multiple times. The Department of Interior (DOI) sent a total of 214

staff to the response. The DOI Office of Environmental Policy and Compliance had eight people deploy to the Gulf and five to the National Incident Command (NIC), and fifteen others who performed some work related to the response. The DOI Office of Occupational Health and Safety deployed 80 percent senior technical staff and twelve other people from elsewhere in DOI to assist with health and safety concerns. The Bureau of Land Management deployed two personnel. The U.S. Geologic Survey had 420 employees and contractors work on the spill response. NOAA personnel from across the agency participated, contributing numerous areas of expertise. Finally, the Bureau of Ocean Energy Management, Regulations and Enforcement (BOEMRE) had 170 personnel work on the spill response, both in the Gulf region and on the NIC staff.

The scope and scale of the Deepwater Horizon event overlapped jurisdictions and authorities at the federal, state, and local levels. Agencies, including the National Oceanic Atmospheric Association, Department of Interior, Department of Justice, Department of Defense, the Department of Homeland Security, and the states of Alabama, Florida, Louisiana, Mississippi, and Texas all contributed personnel to the response. Several of the agencies experienced similar limited surge capability issues as the Coast Guard. Some agencies employed creative personnel solutions, including the recall of retired personnel with Incident Command System (ICS) and environmental response experience.

BP accepted designation as the Responsible Party (RP) for the Deepwater Horizon event. Had BP not assumed responsibility, the Federal On-Scene Coordinator (FOSC) would have been required to hire a broad array of contractors and cleanup personnel, funded through the Oil Spill Liability Trust Fund (OSLTF). While this was not necessary, the OSLTF was still utilized as the mechanism for funding the mobilization of government personnel, reimbursed by the RP. The total number of personnel working on the response peaked at approximately 47,000 people in July 2010.

COCDRIE, La. – Members of a Rapid Assessment Team (RAT) investigate and collect tar balls discovered on the south shore of Timbalier Island, La. RAT teams are multi-agency response teams designed to respond to initial reports of potential oil on the coast and in the Gulf. Photo courtesy of U.S. Coast Guard



RIVIERA BEACH, Fla. – Personnel from different federal and Florida state agencies discuss oil identification procedures during a Shoreline Cleanup Assessment Technique team training scenario held at U.S. Coast Guard Station Lake Worth Inlet, Texas. Photo courtesy of U.S. Coast Guard





VENICE, La. – The Coast Guard Reserve Forces Master Chief meets with members of the Coast Guard reserves deployed to Venice, La. Photo courtesy of U.S. Coast Guard

The Coast Guard mobilized 14 percent of its total workforce as part of the Deepwater Horizon response (7,750 people out of a combined active duty and Reserve force of approximately 51,000). This required developing a careful balance between providing on-scene response capabilities while simultaneously performing the remainder of the Coast Guard's missions. In other words, only Reservists can be considered as "surge" personnel. Active duty personnel were pulled away from other missions using a risk model, and creating a greater risk to Coast Guard missions in various locations across the nation.

9.2 Staffing the Response

The Deepwater Horizon response was unique in the history of United States environmental events in that the source of the spill was uncontrolled for a long period (87 days), and therefore the impacts covered a large area. Trying to control the disaster at the outset by committing all available resources had to be balanced by the possibility of staffing the response for several months or even years. These unique consequences presented challenges to staff the Deepwater Horizon event. To capture these challenges, it is best to examine response staffing in three separate phases, each with distinct obstacles to overcome. These phases include the initial phase, which lasted for the first 30 days of the event; a dynamic phase, which spanned day 31 through 120; and a transitional phase, from day 121 through the date of this report.

There is a distinct element of personnel logistical support, including transportation, berthing, messing, medical, and administrative support addressed in Chapter 6. The Personnel Section is primarily focused on planning and sourcing activities.

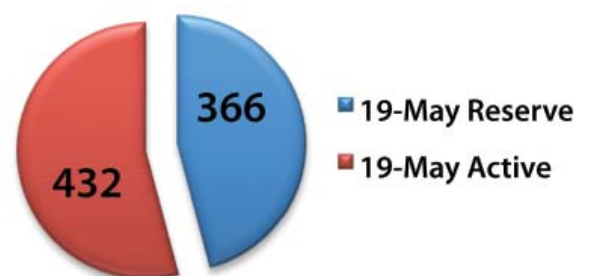
9.3 Initial Phase (April 20 – May 19, 2010)

The initial phase of the incident was characterized by great uncertainty surrounding the scope of the event. During the initial search and rescue phase, and the subsequent realization that oil was indeed escaping from the broken riser, personnel requirements were largely undefined. As knowledge of the scope of the event changed at a frenetic pace, planners struggled to remain apprised of the emerging requirements, making it very difficult to develop a functional incident personnel list.

The earliest Coast Guard response was executed with active duty and Reserve personnel assigned to local commands in Robert and Houma, La. Support from active duty forces sourced at the national level soon followed. The Coast Guard was quick to request the ability to involuntarily recall Reserve forces that were under authority granted within 14 U.S.C 712 for an initial authorization of 500 Reserve personnel. This required Secretary-level approval, which was granted within days of the request. A short delay in approval was due, in part, to the determination of how the OSLTF would be accessed to fund pay and entitlements for Reserve forces being brought on duty before April 23, 2010.

Although Reserve forces and Coast Guard Chaplains from local responding units were on scene from the outset of the event, the first Reserve forces mobilized on the national level began to arrive in theater April 23, 2010. In total, 1,138 Coast Guard personnel rotated through the event during this phase of the response, with an average of 834 personnel in theater on any given day. The initial rotational period for active duty personnel was 30 days, and 60 days for Reservists. The primary difference in active duty and reserve periods was driven by reserve recall duration defined in 14 U.S.C. 712. Civilian personnel rotations varied by position.

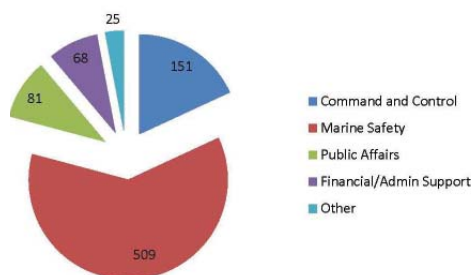
Figure 9.1 Coast Guard Personnel in theater by Type, May 19, 2010



Initial personnel requirements focused on certain core competencies that impacted specific Coast Guard skill set communities, such as command and control (i.e., ICS) staff, marine safety, public affairs, financial and administrative support, and Chaplain personnel. The specific core competencies and qualifications included the ICS, Federal On-Scene Coordinator Representative (FOSCR), Pollution Investigator (PI), Public Affairs (PA), and Procurement Officials with contracting warrants. The great demand for personnel with those specific competencies quickly strained the Coast Guard human resources inventory during the initial phase of the response.

A portion of the personnel rotating through the Deepwater Horizon response area included 16 Coast Guard Chaplains, one Navy Reserve Chaplain, as well as Chaplains from the Civil Air Patrol and the Army Air National Guard. Civilian pastoral services were not contracted for the duration of the response but were provided by volunteers. At the beginning of the response effort, all Chaplain services were provided by the four Chaplains assigned to Coast Guard District 8. Additional Coast Guard Active Duty and Reserve Chaplains were requested from the onset of the response and began reporting on June 15, 2010, to augment the District 8 staff. Chaplains from all agencies provided essential support to response personnel such as religious worship services for multiple faiths. Separation, family, grief, and individual counseling sessions were also provided. Chaplain services were not restricted to military members, but instead were open to all governmental agencies and contracted personnel. Services were based in the major ICPs rotating with Chaplains through all Branches on a regular schedule with additional site visits as requested.

Figure 9.2: Coast Guard Personnel by Skill set May 19, 2010



9.4 Dynamic Phase (May 20 – 15 August 15, 2010)

As the scope of the environmental impacts of the event became more defined, media scrutiny and public perception of the unfolding events led to increased interest and involvement by political leadership. This resulted in a tripling of government responders following Presidential and U. S. Department of Homeland Security (DHS) Secretary visits, and subsequent directives, in late May. This increase in requirements created a mass influx of personnel ordered into theater ahead of existing plans for their utilization. It overtaxed the response organization’s personnel processing ability, and stressed the Coast Guard’s pool of qualified personnel. Other agencies also experienced strains associated with the need to immediately grow the size of the response organization, and sustain the number of people needed to oversee response operations over many months.

In order to manage the arrival and field deployment of incoming personnel, a central arrival and in-processing area was established in Kenner, La. This central processing facility helped redirect some arriving personnel to higher priority positions than those they were originally ordered to fill. While this enhanced the capability of the FOOSC to meet emerging requirements, it became apparent that personnel management systems had gaps caused by the mid-stream redirection. This created uncertainty about which requirements still needed to be filled. The process of correcting for these redirections was time consuming and difficult.

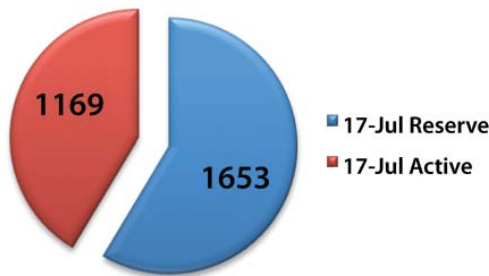
In total, 4,986 Coast Guard personnel rotated through theater during this phase, with a peak number of 2,855 personnel in theater on July 17. One tool that proved valuable in reducing the number of personnel rotations was a newly instituted ability to offer Reservists voluntary Active Duty Operational Support (ADOS) orders for periods up to 180 days. ADOS orders were granted at the conclusion of the Reserve member’s 60 days of involuntary Title 14 active duty. By the end of this phase, approximately 350 Reservists volunteered for ADOS,

VENICE, La. – U.S. Coast Guard Capt. Larry Hewett, Incident Commander for the Deepwater Horizon Houma Incident Command Post, speaks during an all-hands meeting to answer questions from Coast Guardsmen about the current and future operations. Photo courtesy of U.S. Coast Guard



significantly reducing the number of personnel rotations required. Planning for the potential use of targeted skill sets of personnel from other government agencies occurred during this phase, but was not widely implemented due, in part, to a slowing pace of operations after well containment on August 15, 2010.

Figure 9.3: Coast Guard Personnel in Theater by Type, July 17, 2010



9.5 Transitional Phase (August 16, 2010 – December 17, 2010)

By August 15, 2010, the discharge from the Deepwater Horizon event had been secured; the permanent well kill occurred September 19, 2010. No recoverable oil was observed in the offshore environs, and operations focused on near-shore and onshore locations, as well as on equipment recovery. During this period, the NIC transitioned response leadership to the Unified Area Commander and FOSC. The Unified Area Command (UAC) worked with state and local officials to draft and implement an acceptable transition plan that would reduce the size of the response organization footprint in affected states.

Also during this time, the organizational structure changed. For most of the response, operations were organized through the UAC with Incident Command Posts (ICPs) in Houma, La., and Mobile, Ala., and smaller command posts in Miami, Fla., and Houston, Texas. An air operations center was located at Tyndall AFB, Panama City, Fla. With the source secured and response operations focused on shoreline cleanup, there was no longer the need for the overhead of ICPs Galveston, Houston, Houma, Mobile, and Miami, so the demand for aviation sorties dropped dramatically.

Beginning September 20, the ICPs were consolidated into a single Gulf Coast Incident Management Team (GC-IMT), located in New Orleans with the UAC. This consolidation resulted in a personnel requirement of 253 CG personnel.

On December 17, the UAC dissolved and the GC-IMT remained.

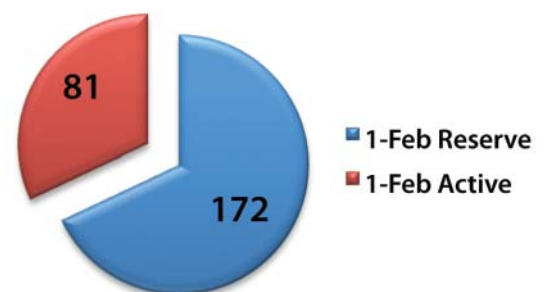
9.6 Project Phase (December 18, 2010 – Present)

By December 18, 2010, most stretches (approximately 90 percent) of beach and marsh had Shoreline Treatment Recommendations (STRs) that outlined the steps toward final cleanup. Most of these stretches of beach and marsh were already in the maintenance and monitoring phase. In essence, each STR represented a project. Each project had associated resource requirements and an estimate timeline until it was complete. The response was no longer a dynamic, reactionary event, but a quasi-systematic project. The remaining smaller stretches of beach or marsh needed new STRs and some existing stretches needed revised STRs, but, overall, the response was being managed as a massive project with sound performance and activity metric that enabled overarching decisions to move resources and effort to environmentally and politically sensitive areas across the AOR.

9.7 Coast Guard Personnel Tracking

The primary Coast Guard personnel management system, the Mobilization Readiness Tracking Tool (MRTT), struggled to keep up with the volume and position specific requirements that would allow Incident Commanders to re-allocate forces within an ICS construct.

Figure 9.4: Coast Guard Personnel in Theater by Type, February 1, 2011



Also, personnel were frequently shifted to different positions and locations. This personnel transfer process was called reallocation. When members transferred, the CRU had to ensure the moves were properly recorded—a difficult process, considering the number of shifts and the number of locations in which personnel were deployed.

9.8 Other Federal Agency Personnel Efforts

Strains to provide personnel to participate in the Deepwater Horizon response were not limited to the Coast Guard. All agencies that played a role in the spill response were challenged to staff the response organization with appropriately skilled personnel.

For example, the USFWS deployed 1,761 responders (17 percent of its workforce), many of whom deployed multiple times. USFWS responders contributed over 586,000 hours of work (or the equivalent of 338 full time employees) through February 12, 2011. This number does not include the numerous contributions from state and federal partners who deployed in support of USFWS activities and who were critical to USFWS activities, especially during the preliminary stages of the response. As of mid-October 2010, USFWS received assistance from more than 313 individuals (greater than 74,000 hours or 71 FTE) from numerous state and federal agencies, and administratively determined hires.

There were a total of more than 1,000 individuals deployed as part of EPA's efforts in response to the Deepwater Horizon oil spill. This included both direct support to field operations, EPA, and contractor personal from EPA Regions 4 and 6, as well as support from the Emergency Operations Centers in Washington, D.C., Atlanta, Ga., and Dallas, Texas. This number does not include the hundreds of individuals who also provided support from their offices. Of the numbers mentioned, many individuals were deployed for numerous rotations.

The USFWS has a small contaminants program representing approximately 200 individuals nationwide who typically respond to oil and hazardous substance releases. The USFWS initial response relied heavily on this contingent. However, the requirements of this response quickly overwhelmed USFWS' typical responder pool. At the height of the response USFWS had approximately

500 people deployed at one time. The duration of this response also taxed its resources beyond sustainable levels, and it had to rely on wild land firefighting teams to provide planning, logistical, and operations support. USFWS also relied heavily on other state and federal agency partners for assistance.

This response was unique in that a large number of technical specialists were required to fulfill USFWS obligations and to provide support to response and cleanup efforts. The USFWS deployed wildlife observers and handlers (by ground, boat, and air), Endangered Species Act Section 7 and National Historic Preservation Act Section 106 experts, resource advisors, veterinarians, and many others. This response also taxed very limited sets of potential responders in the areas of public affairs, safety, air operations, finance, and administration, information technology, and documentation. Very few of these staff had ever deployed to an incident and were not registered in the qualifications database or supported by USFWS resource ordering and status system. Very few of the 1,761 responders had any experience responding to a spill, and most had not previously been trained regarding spill response generally, or their role in the spill response.

The National Park Service relied on a mix of full-time, part-time, seasonal, emergency hires, retirees, and term appointments to meet the demands for NPS' expertise. Some emergency hires and term appointments exceeded 120 days. The DOI Office of Environmental Policy and Compliance had to borrow personnel from other agencies within DOI to meet requests for its staff; this was the largest ever deployment of DOI Office of Environmental Policy and Compliance personnel for a response. The DOI Office of Occupational Health and Safety and BOEMRE struggled to find sufficient personnel with the necessary skills to assist in response efforts and had to rely on multiple deployments of some personnel.



VENICE, La. - A U.S. Fish and Wildlife Service Southeast Louisiana regional supervisor operates a boat in the Delta National Wildlife Refuge in search of workboats removing boom from the marshes. Photo courtesy of U.S. Coast Guard

9.9 Training

The Deepwater Horizon response tested the limits of personnel preparedness and training. As the response grew, particularly after the requirement to triple personnel, identification of people with the right set of skills and competencies for positions within the response organization became very difficult. The size of the organization precluded screening and selection of all personnel based on their qualifications. This was a continuing concern.



BAYOU LA BATRE, La. – Petty officers work with a civilian boat crew to deploy an oil skimmer during a training exercise aboard a converted commercial shrimping vessel. The Coast Guard Reserve members work with Coast Guard active duty members to train civilian boat crews to set up and deploy Coast Guard skimming equipment on Vessels of Opportunity. Photo courtesy of U.S. Coast Guard

To address this challenge, a Just-in-Time-Training (JITT) center was established at Coast Guard Base New Orleans and at the UAC. This allowed agencies to surge personnel with a basic level of training within a required competency to the JITT center to receive

the higher level of training needed to meet mission demands. JITT proved effective in training more than 2,077 responders through the center. However, the time members spent training for their positions reduced the amount of the time they were available for response duties. The UAC retained ICS experts who provided basic ICS training, position-specific training, and acted as coaches at all levels of the response organization to enhance responder function within the Incident Command System.

Issues of training and qualifications for a response the size and duration of the Deepwater Horizon spill were not limited to the Coast Guard. As a representative example, sourcing trained personnel to the response was also a challenge for the USFWS. During the first few weeks of the response, USFWS identified that trained personnel were a critical resource. The USFWS National Conservation Training Center in Shepherdstown, W. Va., was employed, dispatching a team to ICP Houma where they conducted a training needs assessment. The needs assessment showed that the greatest demand was for Hazardous Waste Operations and Emergency Response (HAZWOPER) Training and Orientation Training. Within a week,



VENICE, La. – A geographic information systems coordinator with the U.S. Fish and Wildlife Service discusses communication methods with an airboat operator in South Pass, La. The U.S. Fish and Wildlife Service provided on-the-ground intelligence on oil sightings and cleanup methods to the Unified Area Command. Photo courtesy of U.S. Coast Guard

the training center opened a Pre-Deployment Training Academy near ICP Houma that delivered on-site training to USFWS and other agency responders. Deploying personnel were assessed during check-in at ICP Houma and if they did not have the required training, they were sent to the Academy for four hours of Orientation Training and up to two days of HAZWOPER training. A duplicate Pre-Deployment Training Academy was established near Mobile a week after the Houma training was stabilized.

Simultaneously, National Conservation Training Center staff in Shepherdstown, W. Va., arranged hazardous material training for Internet delivery. Once the Internet training was launched, deploying personnel received the majority of their spill response training before arriving on scene. However, orientation to ICP Houma operations and ICP Mobile operations continued for months and the training staff from National Conservation Training Center worked on improved job aids and met new training needs as they arose (bird identification, bird handling, Resource Advisor training). By mid-September 2010, all training was converted to Internet delivery and the training staff was released from the response. The National Conservation Training Center website is still operational for staff deploying to the Gulf.

The National Park Service required similar JITT efforts. They were able to make use of the National Conservation Training Center incident specific Web site for deployed DOI staff to acquire required training. Many NPS, U.S. Geological Survey, and other DOI field personnel had to receive

HAZWOPER training. BOEMRE required a number of employees to receive aviation safety training for their roles in the response, and BOEMRE arranged for a number of their deployed personnel to receive basic ICS training as they deployed.

In general, personnel mobilization across the federal government to support the Deepwater Horizon response was successful. The Coast Guard mobilized 14 percent of its total workforce, establishing the equivalent in personnel numbers of an Area command, two District commands, and several Sectors. In total, over 7,750 Coast Guard personnel mobilized to support Deepwater Horizon operations in theater. Of those, the breakdown by source was 53 percent active duty, 44 percent Reserve, and three percent civilian personnel. The volunteer-based Coast Guard Auxiliary contributed an additional 147 personnel. While each phase of the response had unique challenges for personnel managers, several common themes were observable. Other agencies were similarly able to find a way to sustain participation in the response effort. The USFWS deployed an even greater percentage of its workforce—seventeen percent. All agencies that played a significant role in the response, particularly those trustee agencies that frequently



respond to large spills, experienced difficulty sustaining the number of personnel required to oversee the response operations over the many months required. On July 7, 2010, the number of response personnel reached its pinnacle of 47,849 responders. Figure 9.6 provides a representation of the responders by agency and by geographic location at the point in the response when the highest number of personnel were assigned.

RIVERA BEACH, Fla. – A geologist provides training for federal, state, and county personnel on methods of identifying and documenting oil along various shoreline types. Photo courtesy of U.S. Coast Guard

State	Key	Location	RP	USCG	National Guard	Contractor	Other	Total	Totals
LA	1	UAC - New Orleans	63	165	4	122	89	443	19,488
	2	ICP - Houma	95	191	6	653	213	1,158	
	3	Field	146	795	941	14,959	1,046	17,887	
AL	5	ICP - Mobile	91	273	9	662	216	1,251	9,308
	6	Field	20	269	374	7,350	44	8,057	
MS	4	Field/Branch	6	31	146	7,008	57	7,248	7,248
FL	7	ICP - Miami	9	40	2	33	24	108	8,944
	8	Field	5	35	97	8,629	24	8,790	
	9	Tyndall AFB	-	-	46	-	-	46	
TX	10	ICP - Houston	265	5	-	220	22	512	512
Offshore	11	Offshore	23	556	-	1,734	36	2,349	2,349
Total			723	2,360	1,625	41,370	1,771	47,849	47,849

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10.1 Information Management

During the *Deepwater Horizon* response, strategic decision making depended upon accurate, timely, and relevant information. The response required coordination and information sharing across many federal, state, and local governments, the Responsible Party (RP), and response organizations.

Natural barriers to synchronized, holistic information management included the vast geography of the response area of operation, the lack of appropriate interoperable communications technology, the limited ability to push real-time data both vertically and laterally throughout the response organization, and differing computing standards. These barriers and others were overcome through the application of advances to communications and organizational changes.

Application of Advances to Communications to Support Information Management—Development of a Common Operating Picture

During the early stages of the *Deepwater Horizon* response, the development of a Common Operating Picture (COP) became critical to provide full situational awareness. At the beginning of the operation, a series of maps prepared by a contractor was the source for situational awareness at the Unified Area Command (UAC). The response organization soon outgrew that process.

At the Incident Command Post (ICP) level, a variety of systems maintained operational awareness. Different RP contractors used different proprietary systems to track the developing situation—there was one system at the UAC, one at ICP Houma,



NEW ORLEANS, La. – Admiral Thad Allen provides a briefing to the Unified Area Command in New Orleans. Photo courtesy of U.S. Coast Guard



JEFFERSON PARISH, La. – The U.S. Coast Guard Commandant, Admiral Robert Papp, gives an interview to local a news station during his visit to the [Deepwater Horizon](#) response in Grand Isle, La. Photo courtesy of U.S. Coast Guard

and another at ICP Mobile. National Oceanic and Atmospheric Administration (NOAA) employed Environmental Response Management Application (ERMA) as a situational awareness tool, at first for NOAA use, at the UAC in Robert, La. and ICPs in Houma, La., and Mobile, Ala. NOAA also established a secure File Transfer Protocol (FTP) site to provide data management and file sharing for all parties and platforms. Initially, neither the National Incident Commander nor the underway Coast Guard cutters had access to this real time operational data.

On June 5, 2010, the National Incident Commander determined ERMA would be the backbone of a response-wide COP. Developed through a partnership between NOAA and the University of New Hampshire's Coastal Response Research Center, ERMA is a Web-based Geographic Information System (GIS) tool designed to assist emergency responders and environmental resource managers with environmental incidents. ERMA synthesized and integrated various forms of information and provided a common operational picture of the oil spill situation and trajectory, among other data representations, for the incident. It also improved communication and coordination among responders and stakeholders, and provided resource managers with the information necessary to make faster and better-informed decisions. The application was used in the March 2010 Spill of National Significance (SONS) exercise. NOAA established the Gulf of Mexico Exercise (GOMEX) ERMA in less than two days at the end of April, and had on-site staff in UAC Robert and ICP Houma to start posting response data.

ERMA assisted the responders and environmental resource managers in a variety of ways. It provided a centralized system for the stakeholders' data storage, manipulation, and information sharing requirements. Furthermore, it provided a secure upload and download capability for plotting new data on customized maps. These specialized maps could display a variety of existing data, including Environmental Sensitivity Index shoreline classifications, spill response plans and resources, contaminant data sets, regulated facilities, baseline resource data (including resources at risk), and restoration projects. The maps had the capability to display real-time data on blue force locator, weather forecasts, and tidal information from observation buoys. The system allowed computer uploading and access to data such as field surveys, over flight information, satellite imagery, and hi-resolution photogrammetry on incident command areas.

ERMA, as enhanced during the *Deepwater Horizon* spill, was an information sharing tool. It improved communication and coordination among responders and stakeholders and identified inconsistencies with data across state lines. This highlighted the need for standardized products such as operational divisions, symbology for Shoreline Cleanup Assessment Technique (SCAT) team survey results, over flight oil observation waypoints, and vessel tracking. It allowed functional user interface through the ability to choose a desired base map view such as NOAA navigational charts, raster images, or aerial photography. It also afforded a central location for stakeholders to access links to documents, such as spatially referenced photos, area contingency plans, and site survey results.

The ERMA tool also presented current federal and state information on seafood safety and fisheries closure areas. Command staff, responders, and stakeholders were able to request added functionality as needed. Requests included find bar function, enhancements to Automatic Identification System (AIS) displays, animations, and slide shows. It was also capable of accepting and managing non-standard data formats. ERMA was first used in a UAC briefing on June 14, 2010. It generated the ability to see real-time information regarding response assets, spill trajectory, and environmental conditions.

An added benefit of ERMA was the ability to generate awareness of the response via the public face of ERMA, www.geoplatform.gov/gulfresponse.

This site represented the response effort and presented updates to a range of groups affected by the spill. While access to the full ERMA functionality was restricted, the public could access a similar version with a subset of the response layers and functionality. Agencies touted the public version of ERMA as a central access point for detailed, near-real-time information about the response. While publically announcing the introduction of ERMA, the Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator stated:

“This website provides users with an expansive, yet detailed geographic picture of what’s going on with the spill; Gulf Coast fisherman, recreational boaters, beach users, and birders will be able to become more informed. It’s a common operational picture that allows the American people to see how their government is responding to the crisis.”

Within 48 hours of its inception, the website received 3.4 million visits. The Government Accountability Office proclaimed the use of ERMA to be a best practice for government transparency.

Because of the number of vessels involved, vessel tracking became an important facet of the response effort, and resulted in a challenge to create a display of vessels supporting the spill and their corresponding functions. ERMA had the ability to receive AIS track, which identifies the position of nearby vessels, but it proved a challenge to identify the vessels supporting the response filtered from all other vessels in the region. Ultimately vessels were tracked through the creation of a database that could house and cross reference Maritime Mobile Service Identity numbers and associated vessel names with their performed function. Functions included skimming, government, research, support, or Vessels of Opportunity (VOO) operations. The Coast Guard manually updated the vessel database throughout the response as vessels reported and departed.

The National Incident Commander authorized the posting of real-time AIS data for response vessels in ERMA. Initial security concerns for posting this information were outweighed by the need for public awareness of response assets' real-time positions. There was a related issue regarding cutters, and particularly patrol boats, which transferred to the response for one-week periods. The problem arose when these vessels were not immediately removed from the database once they resumed law enforcement operations outside of the *Deepwater*



VENICE, La. – A reconnaissance data gatherer inputs GPS data into a spread sheet while conducting a daily mission. Reconnaissance missions are done twice daily to record sightings of oil findings from the Deepwater Horizon spill. Photo courtesy of U.S. Air Force.

Horizon response. The Coast Guard and NOAA worked diligently to update information on the patrol boats.

Not all response vessels were initially AIS equipped because they did not meet the carriage requirements. Notable exceptions were contract sentry vessels deployed north of the Florida Keys near the Loop Current, some Vessels of Opportunity Skimming System (VOSS)-equipped workboats, and the majority of the VOO. There were concerns that supplying every vessel, particularly thousands of VOO, with either Class-A or Class-B AIS transmitters would overwhelm the Nationwide Automatic Identification System (NAIS). Policy was implemented to ensure that all major response vessels, as well as VOO lead vessels, were equipped with a tracking ability and displayed in ERMA using commercial product transmitters.

Misinterpretation of data became another concern for the COP. Due to the nature of some layers in ERMA, it became easy to misinterpret data without the benefit of a technical advisor. For example, a common misperception was that the National Environmental Satellite, Data, and Information Service Anomaly Analysis displayed the actual extent of the oil slick—it did not. It showed analysis of the

total area in which data indicated slicks could be expected to be found, but did not indicate oil covered the area displayed; actual slick coverage was a small percentage of the surface displayed by the Anomaly Analysis. In this case, the science and technology behind the display could easily be lost on the viewers, fostering misinformation. This reality underscored the value of the NOAA Scientific Support Coordinator (SSC) and the ERMA team's on-scene presence to provide interpretation of remote sensing data and explanation of the scientific data. Furthermore, ERMA's ability to provide direct access to metadata gave context to both the advanced and novice users of the response data in ERMA.

ERMA has a tremendous capacity to display a wide variety of data and to have these data entered from multiple locations and time zones. However, one of the early limitations to data management and coordination among the GIS groups was the ability to create and store timely compatible data files to facilitate real-time decision-making. This required a robust staff of GIS specialists at each layer of the response, to include SCAT teams on the beach inputting photos of oil impacts and making them available to the UAC, and decision makers in a timely fashion.

Those generating data included federal, state, and local government agencies, as well as the RP and its supporting contractors. The Federal On-Scene Coordinator (FOSC) swiftly generated large amounts of information from these disparate data sources to meet specific and often unique requirements. The overall understanding of the digital delivery of these data varied between data sets as well. Unfortunately, the metadata behind some of these datasets were incomplete due to the immediacy of the response requirements. As a result, it proved challenging to evaluate, leverage, and manage the numerous datasets generated in support of this response.



DAUPHIN ISLAND, Ala. – A Coast Guard petty officer works with a Vessel of Opportunity operator from Bayou La Batre, Ala., to log data collected with sub-surface oil surveillance gear near Dauphin Island in the southwest corner of Mobile Bay, Ala. Photo courtesy of U.S. Coast Guard

An additional challenge to utilizing ERMA was its incompatibility with some Coast Guard computers. At the time of the response, ERMA required a specific type of Internet browser to operate. Many Coast Guard computers, including all carried on the supporting cutters, had an older standard image, which did not support the ERMA requirement. At the back end of ERMA, the versions of the layering and mapping functionalities also caused incompatibility issues. This was outside of the Coast Guard's control. Furthermore, Coast Guard Information Technology policies prohibited the installation of alternative browsers or programs. To address this, each ship received newer laptops with updated systems, in order to provide supporting cutters, such as the medium endurance cutters and sea going buoy tenders, with the COP.

Responders had additional concerns in making the website public, including the original server

capacity and preserving the responder ERMA site. The responder site remained at the University of New Hampshire, and only malfunctioned once due to a power failure from a lightning strike. ERMA was down for only a few hours, and the new server moved to a different building. NOAA secured a robust infrastructure for the public ERMA site, and replicated the ERMA database several times to balance the volume of visits to the site. This infrastructure is part of NOAA's Web Operations Center (WOC).

For the *Deepwater Horizon* response, there was no previous ERMA coverage, and NOAA established ERMA in less than two days. There are ERMA regional products currently in New England, the U.S. Caribbean, Puget Sound, the U.S. Arctic, and the U.S. Pacific Islands. NOAA is working toward national coverage, but should another spill occur, NOAA could quickly create a COP with ERMA.

Organizational Changes to Support Information Management

Information management also entailed tracking resources and responding to Requests for Information (RFIs) using near real-time reports created from the authoritative repositories that contained the actual data entered about the plans, activities, and outcomes by the field-level response organization.

The Incident Command System (ICS) structure prescribes standardized information reporting timelines, forms, and procedures. Under the ICS construct, the ICPs transmit information to the UAC for compilation. The UAC then routes the consolidated information to the National Incident Command (NIC) for distribution and response to information requests. Situation Units at each level of the response organization are the focal points for operational information.

In the first six weeks of the response, the volume, type, and frequency of data requested taxed the situation units at every level. The internal and external demand for immediate spill response information often caused a departure from the ICS information protocols. For example, requests for information regarding boom placement in a particular state might often be routed from the NIC level directly to the ICP level. The NIC received information from the ICP that was not yet reviewed by the UAC to determine whether it was the most current

information available. State emergency responders reported information obtained at ICPs and Branches to other parts of their state government. Depending on who was asked, when the question was asked, and which part of the command structure prepared the response, different reports of what appeared to be similar types of data were generated. Also, states, counties, and parishes were interested in information segregated by political subdivisions, not by ICP or Branch, the way the ICS structure initially tracked resources. The differing numbers and answers provided without prior vetting and the lack of immediately available requested data for officials led to perceptions that the response organization did not know what was happening.

To resolve this issue and provide accurate and timely information, the response organization established a separate dedicated unit, entitled the Information Reporting Unit. This unit, staffed by senior Coast Guard officers, became the central conduit for information management. As the scope of the situation escalated, consultants were brought in, including contract support and a team from Coast Guard Headquarters.

The comprehensive Incident Action Plans (IAPs) produced by each ICP proved unwieldy for reporting response status. Overall, a need for standardized enterprise metrics in a simplified, concise reporting format became readily apparent. It took time for the ICPs to come to a consensus on how to measure the same things, the same way.

The response organization overcame this challenge by developing a definition of metric calculations and units of measure. The Coast Guard identified best practice measures for gathering, validating, and finalizing data, and for reporting and establishing tracking teams to tag assets based on common categories. The UAC directed information flow through one central collection point and developed procedures for collection, distribution, assignment,



MOBILE, Ala. – Retired Admiral Thad Allen, National Incident Commander for the *Deepwater Horizon* response, briefs the crew at Incident Command Post Mobile. Photo courtesy of U.S. Coast Guard

tracking, and resolution of requests. The FOSC conducted regular briefings of the National Response Team and then the U.S. Department of Homeland Security (DHS), and published periodic reports using this standard template.

The response organization also developed systems to facilitate information sharing across the broad geography of the *Deepwater Horizon* response. NIC Staff, UAC, and ICPs used the Homeland Security Information Network to post unclassified yet sensitive information, such as operations plans and official correspondence. Responders also utilized the SharePoint system, set up by the RP, which allowed for version control over important documents. However, the use of the RP SharePoint site required a process to duplicate data on government systems.

10.2 Interaction with Federal and State Officials, and Congressional Affairs

Because of the size and scope of the *Deepwater Horizon* response, many networks and processes were involved in facilitating cooperation between the federal government, states, and impacted local communities. Intergovernmental collaboration was key to the effective execution of the *Deepwater Horizon* response effort.

The NIC Legislative and Intergovernmental Affairs Branch coordinated responses to all matters of official inquiries regarding response operations, including informal questions and answers (Q&As) passed through congressional affairs staff, official correspondence from elected officials, briefings

of congressional staff, and prepared senior Coast Guard officials prior to formal testimony before Congress and its committees.

To respond to informal requests for information from members of Congress and the Congressional Research Service (CRS), the NIC utilized the Coast Guard Resource Directorate's pre-existing internal process of Q&As. The Coast Guard utilized the Q&As to track inquiries from members of Congress, CRS, the Office of Management and Budget,



GRAND ISLE, La – The entire process of beach cleaning is explained to members of the Senate staff from the Committee for Science, Technology, and Commerce. Photo courtesy of U.S. Coast Guard

and various Department of Homeland Security (DHS) offices. The existing process required only minor changes to incorporate the review by personnel from the NIC, DHS, and the White House. During the period of April 20 through August 31, 2010, 1,064 Q&As were drafted and delivered. Of these, 656, or 62 percent, were directly related to the Deepwater Horizon response. In addition to the Q&A responses, the Coast Guard senior personnel participated in 17 hearings in Washington, DC and in the field, and provided 10 briefings in Washington, DC.

From the onset of the *Deepwater Horizon* spill, the governors of all affected Gulf States were intimately involved in the response efforts. To provide the governors of Alabama, Florida, Louisiana, Mississippi, and Texas with the most current information on response efforts, the White House staff instituted and moderated a daily conference call. During these calls, the NIC, FOSC, Incident Commanders from the Incident Command Posts, and other federal agencies briefed the governors of affected states and the White House staff.

The daily conference call was not only to impart information, but also to provide the governors with

a venue to ask questions, communicate concerns, and share their priorities and assessments of the response. In return, their candid feedback allowed the FOSC to adjust priorities, focus efforts, and tailor response strategies with each state. This forum became an important medium that influenced tactical decisions and shifts in strategy such as boom deployment, skimming equipment allocations, and other protection and removal actions such as the sand berms. Additionally, the daily operations statistics and policy papers prepared for this call were widely disseminated throughout the response structure as well as through the inter-agency group. The papers provided responders and departmental leaders information that facilitated a unified approach among the NIC, FOSC, and responders in the field. The daily conference call also allowed the governors to discuss many social and economic issues, such as seafood testing to promote consumer confidence in Gulf seafood, as well as to share the behavioral and mental health concerns of their affected constituents with the federal government.

The UAC developed systems to keep state and local officials informed. To ensure governors had immediate access to the response efforts, the Incident Commander for ICP Mobile assigned senior officers as Deputy Incident Commanders in Alabama, Florida, and Mississippi. In Louisiana, the Incident Commander and FOSC were in state, and they interacted with the Governor and his staff through a dedicated liaison officer and in person. This step made unity of effort and information sharing easier, to leverage these relationships and ensure the response organization was meeting the needs of the public. Each Deputy Incident Commander focused on states' critical resource allocation, as well as state response activities, and served as the communications bridge between their state and the ICP. The Incident Commander then ensured the FOSC knew of those concerns.

The Government Affairs team developed out of the UAC in New Orleans, La. and through DHS Offices of Intergovernmental Affairs and Legislative Affairs. The Government Affairs staff in the UAC and ICPs helped answer questions from state and federal elected officials, arrange tours, over flights, and coordinate subject matter experts for daily or tri-weekly calls with state, local, and federal officials. They also ensured state, local, and Tribal partners had the opportunity to provide input



VENICE, La – Admiral Thad Allen speaks during a conference call at Coast Guard Station Venice. Admiral Allen received input from local, state, and other federal officials concerning the uncontrolled oil discharge into the Gulf of Mexico. Photo courtesy of U.S. Coast Guard

into UAC operations. The Government Affairs team established local government hotlines in Robert, La., Houma, La., and Mobile, Ala. The daily calls provided participants with key information and contact information, as well as a daily update. The daily Government Affairs update helped distribute the claims and information hotline number Gulf-wide. The distribution list for the daily update grew from approximately 40 contacts at the end of April 2010 to more than 760 by the end of June 2010. The list expanded as other agencies, such as the Environmental Protection Agency, U.S. Department of Interior, and NOAA, which shared information on their outreach efforts. Government Affairs also coordinated with the Joint Information Center (JIC) to develop outreach materials for intergovernmental partners.

To address further local concerns, Federal Emergency Management Agency (FEMA) deployed Government Relations Teams to resolve immediate questions from local community-based organizations and businesses. The Government Relations Teams consisted of approximately 80 FEMA staff members, operating as DHS personnel. This included two outreach specialists in each affected county or parish (with the exception of Alabama), a government relations leader in each ICP, and

support staff throughout the coastal region. The Government Relations Teams provided local groups and businesses with the latest information on the claims process and the overall response effort.

After the well was capped, the number of government affairs personnel decreased commensurate with the workload. A government affairs lead remained in the UAC and the ICPs to help distribute information to state and local partners. They also coordinated elected official and congressional delegations.

10.3 Interaction with Local Government

To ensure the highest level of coordination, the National Incident Commander created formal liaison officer positions throughout the *Deepwater Horizon* response organization. These positions were filled by dedicated Coast Guard officers and were found at many levels within the state organizations. CGLOs (Coast Guard Liaison Officers) were assigned to work closely with state and local officials in Louisiana, Mississippi, Alabama, and Florida, specifically to handle emergent needs and provide direct access to the response for local officials. The ultimate goal of the liaison program was to capture the concerns of state and local leaders,

and resolve issues in the most efficient way, and at the most localized level possible.

Soon after the *Deepwater Horizon* oil platform sank on April 22, 2010, the state of Florida proactively established and staffed an Emergency Operations Center (EOC) function for the incident at its facility in Tallahassee, Fla. Coast Guard officers from the Seventh Coast Guard District acted as liaisons to the Florida EOC. The Florida EOC continued to operate throughout the response.

ICP Houma established a formal Liaison Officer function under the Command Staff in accordance with the ICS; however, the RP initially staffed this function. The liaison group focused on community relations and not on traditional liaison role of intergovernmental communication and coordination. Soon after its establishment, ICP Mobile also founded a liaison function for community relations. The UAC assigned a Liaison Officer to the Governor of Louisiana. The UAC also formed a small liaison staff that coordinated reports. While this served the community relations goals of the RP and the response, it did not provide state and local emergency management and elected officials with the federal presence they wanted to ensure a coordinated, unified response. Further, this structure did not adequately apprise national-level leadership of developing issues in Gulf Coast communities.

In response to this organizational gap, on May 27, 2010, senior officials directed the assignment of Parish President Liaison Officers (PPOs) for the *Deepwater Horizon* response in the coastal parishes of the Louisiana under ICP Houma. Soon after, the program was extended to the coastal counties of the states of Alabama, Florida (Panhandle counties only), and to Mississippi as County Liaison Officers and State Liaison Officers under ICP Mobile. Up until late June 2010, Coast Guard Sectors on the west coast of Florida peninsula provided information on the potential impact and response operations to local officials. The Coast Guard Seventh District office managed outreach to congressional members for Florida.

In late June 2010, and in anticipation of potential oil spill impact in these areas, Coast Guard Liaison Officers assigned under the Florida Peninsula Command Post (FPCP), initially located in St. Petersburg but eventually established as ICP Miami, began to work with local elected officials from the west

coast of Florida. In addition, the CGLOs engaged representatives from the Chamber of Commerce and tourism boards, as well as the commercial shipping, fishing, and cruise line industries.

On July 9, 2010, the UAC assigned an officer to coordinate the reporting of CGLOs across all three ICPs—Houma, Mobile, the Florida Peninsula—and the Louisiana Governor's office. After the oil well was capped in mid-July, the UAC directed a gradual demobilization and consolidation of CGLOs as the requirement for liaisons diminished over the next few months.

The RP also established liaisons whose primary focus was providing information on the claims process and helping local businesses and private citizens submit claims. They also managed the involvement of local and regional volunteer organizations in the response, as well as the process for local businesses and private citizens to participate in the VOO program.

The primary responsibility of the CGLOs was to relay information between the Incident Commanders at their respective ICPs, the state and local emergency response, and elected officials in their area of responsibility. CGLOs were a single point of contact for these officials to obtain information and understand the ICs' operational plans, policies, and future intentions. They also relayed requests, concerns, and issues from state and local officials to the Incident Commander. Generally, PPOs worked daily with their designated parish presidents, and were the ready source of information on response operations and the conduit for the officials to the Incident Commander. The County Liaison Officers and State Liaison Officers' responsibilities entailed many individual and group visits with the officials, as well as daily operations briefings in the EOCs. Secondly, the CGLOs compiled and relayed a nightly report of developing local issues to the UAC and to the national level of the federal government.

The UAC encouraged stakeholders (including state and local officials, and other entities such as private citizens and local businesses) across the response theater to present ideas to improve the unified response for consideration and potential implementation. CGLOs helped the stakeholders understand the process for submitting their ideas, monitored the proposals, and provided status updates to their proponents.

CGLOs filed daily situation reports and internally briefed continuing and pressing issues throughout the response. These reports included top issues from state and local elected officials, details on how these issues were addressed, engagements with state and local officials, and potential future issues in the CGLOs' areas of responsibility. Once the *Mississippi Canyon 252* Macondo well was capped on July 15, 2010, the CGLOs incorporated recovery information in addition to information on response operations.

The ability of the liaison officers to act as effective conduits between response leaders and local officials depended on the seniority of the liaisons. Junior officers were replaced with more senior officers. Points of friction remained, however. Some liaison officers had to be replaced when their relationships with local officials broke down, usually over expressions of concern regarding spill response actions taken by local responders outside the incident command structure. A local official threatened to arrest one liaison officer if the ICP removed any response equipment from his jurisdiction in advance of Tropical Storm Bonnie.

Ten senior Coast Guard active duty and Reserve officers staffed the PPLO positions in Louisiana. A staff of three to four officers at the ICP Houma oversaw and coordinated the program. In some cases, the PPLOs had Coast Guard junior officers or senior enlisted members to assist them. Senior Coast Guard officers staffed 13 County Liaison positions in the coastal counties of Alabama, Florida (panhandle counties only), and Mississippi. In addition, each of these counties had one or two county EOC representatives (a total of 15) who were more junior Coast Guard personnel.

At the peak of activity, ICP Mobile had a staff of five officers who oversaw and coordinated the CGLO function across the three-state operational area. ICP Miami had approximately 10 personnel involved in the CGLO function, and the UAC had five personnel. At the height of the response, the number of personnel involved in the CGLO function across the entire area of operation totaled approximately 70 officers distributed across 33 state, county, and parish governments. After the oil well was capped July 15, the number of CGLOs began to decrease, commensurate with the scale of response operations.

PPLOs faced significant information technology

and connectivity challenges due to the remote nature of their operating areas in coastal Louisiana. Most had no consistent way to access the Internet, and those who had smart phones generally did not have sufficient data plans or coverage. PPLOs' effectiveness was sometimes constrained by their inability to send and receive timely and complete information via email. For example, dissemination of voluminous Incident Action Plans for ICP Houma was both technically and organizationally challenging. Response personnel, including PPLOs, were often unable to utilize or distribute large IAPs, hampering execution of a more centrally developed plan. Long travel distances from ICP Houma to field destinations made paper copy delivery an especially arduous backup to electronic delivery.

Generally, the County Liaison Officers and State Liaison Officers in Alabama, Florida, and Mississippi did not experience the connectivity issues faced by the PPLOs in Louisiana. This was due primarily to the more robust communications infrastructure present in those states. Those states disseminated daily operations briefings, maps of response resource placements, and other situational awareness information electronically each morning to the County Liaison Officers and State Liaison Officers. The county EOCs used these reports to conduct daily briefings and provide timely information to state and local elected officials.

The CGLOs represented the Incident Commander and the federally led response at many public forums and gatherings of state and local elected officials. Prior to deployments to their individual assignments, CGLOs received briefings on what they would generally encounter in the field, along with an outline for standard presentations. However, they did not receive any formal training to prepare them for the often highly charged and politically nuanced activities they would experience. Quite often CGLOs encountered hostile and emotional situations that would have challenged even the most seasoned and fully trained. Due to varied backgrounds and experiences, some CGLOs were more successful in navigating these challenges.

10.4 Interaction with Affected Communities

The *Deepwater Horizon* incident attracted attention on many levels, including internationally, nationally, and locally.

Initially, the response organization addressed the local populace through town hall meetings to provide updates on actions taken directly by Incident Commanders. The meetings consisted of response representatives in front of the room in panel format, presenting information on stage to a seated public audience. These meetings proved ineffective at communicating information about the response to the local citizens who attended. The format was revised and an exposition style event was adopted. In this presentation style, citizens could converse one-on-one with experts at booths and tables configured around the room, each devoted to a particular topic of the response. Topics included use of dispersants, in situ burning, skimming, booming, health and safety, the VOO program, alternative response technologies, employment opportunities, claims, and many others. This format proved more beneficial and constructive than the town hall forums.

Broader based community outreach meetings eventually evolved to an open house meeting style as well, and likewise proved more beneficial than town hall meetings. The open houses encouraged and enabled open dialogue between responders and community members. They allowed members of

BRAITHWAITE, La. – Capt. Meredith Austin, Deputy Incident Commander of the Houma Incident Command Post, part of the *Deepwater Horizon* oil spill response, answers a reporter's questions during an open house at Phoenix High School in Plaquemines Parish. Photo courtesy of U.S. Coast Guard



VENICE, La. – Venice community members voice concerns about the safety of seafood at a dockside chat in Venice. Several senior federal agency officials attended the meeting to promote safety of seafood. Photo courtesy of U.S. Coast Guard

the response organization to tell their story directly to stakeholders. The open house featured multiple tables placed along the perimeter of a large space, each staffed with a subject matter expert to address particular response topics. Tables contained materials needed to convey information; visual displays of hardware, photos, and charts. The public was able to browse and visit each table. In the middle of the room, visitors could meet with more subject matter experts who could speak to broader response issues and answer more questions. This facilitated one-on-one dialogue about individual concerns. The UAC and ICP Houma held open houses extensively throughout the Gulf Coast. Every parish and county where response operations took place had at least one open house.

In addition to open house meetings, the UAC and ICPs identified key stakeholders, non-governmental organizations, and community leaders and invited them into the ICPs. There, they had the opportunity to view all the planning and response activities.

The FOSC held several parish presidents meetings over the course of the *Deepwater Horizon* response. These gatherings facilitated discussion on specific topics of greatest importance to local governments regarding the spill response and future institutions. While at times emotional, the meetings were well attended and created the necessary unity of effort to resolve a wide array of pollution response issues affecting the lives of those living and working in the impacted communities. The FOSC also regularly visited county and city officials in Alabama, Florida, and Mississippi.

10.5 Strategic Communications

Situation and Actions

During the first several days after the explosion of the *Deepwater Horizon* Mobile Offshore Drilling Unit, the FOOSC relied upon the Eighth Coast Guard District Public Affairs Office and BP Public Information Officers handled the initial media response by sending news releases, establishing an incident website, responding to media queries, arranging media over-flights, providing video and photos to the media, coordinating news interviews, and arranging and participating in news conferences.

Public Affairs Specialists were deployed to Houma, La., on April 21, 2010, in support of the incident, followed by the Public Information Assist Team (PIAT). A JIC was soon established at ICP Houma using the National Response Team/National Incident Management System JIC model prescribed in the National Contingency Plan (NCP).

Shortly thereafter, on April 23, 2010, the UAC was established in Robert, La., to oversee the multiple functions of the growing response. A JIC was established and the UAC became the primary interface for the media and external entities including intergovernmental and community relations. A Government Relations Officer (GRO) established relationships with local governments. Daily briefings between the GRO and the media were scheduled, but did not always take place. The Coast Guard dispatched photographers and videographers to capture operations, town hall meetings, and dignitary visits. In its first week, the JIC established media pools for over-flights. The UAC JIC approved all corresponding releases and images for review, release, and posting. It also established a daily press brief with the UAC FOOSC and the RP representative.

As the spill and response continued, the number of personnel and resources dedicated to public affairs and intergovernmental affairs expanded significantly; this included deployment of resources to support and staff media embeds on cutters and aircraft, media visits to staging areas and forward operating bases, and bolstering external affairs capabilities at the various ICPs. By early May 2010, a hybrid structure based on the National Response Framework's ESF-15 model was established to place media, governmental, and congressional affairs under one entity, yet all the traditional functions of a National Response Team JIC remained in place.



The UAC External Affairs Section established a daily internal communication process to coordinate activities of the staff in Robert, La., the ICP JICs and field external affairs entities. This included two daily meetings. The UAC external affairs staff morning meeting was used to gather information and coordinate the staff in Robert, La. In the evening, an additional meeting of the external affairs leadership the ICP JIC staffs (via conference call) was used to establish priorities, develop daily strategies, exchange information, and plan for the following day. This capability was bolstered as ICPs with JICs were staffed in Mobile, Ala., and the Florida Peninsula (Miami). These efforts were synchronized with national efforts via daily National Incident Communications Conference Line calls that included participating federal entities and interagency senior communicator calls.

In late May 2010, the NIC became a significant interface for the national media, shifting daily press briefings away from the UAC (FOOSC). These briefings were combined with conference calls to allow hundreds of outlets to participate; they then were transcribed, and the transcripts and audio files were posted to the incident website daily. The UAC External Affairs staff maintained frequent communications with the NIC Press Secretary, and continued daily coordination with Coast Guard Headquarters, DHS, and other federal Public Affairs staffs based in Washington, DC, via the senior communicator's calls. While the National Incident Commander became the

NEW ORLEANS, La.
– Coast Guard petty officers field media inquiries at the Unified Area Command's Joint Information Center. Both women work as part of an integrated team of civilian and military personnel who provide timely and accurate information about BP oil spill cleanup operations to the media and public. Photo courtesy of U.S. Coast Guard

primary spokesperson for the response, the UAC JIC remained the central point of release for all entities including the NIC, UAC, and the FOOSC.



ST. PETERSBURG, Fla.—Members of the Joint Information Center at the *Deepwater Horizon* Unified Command in St. Petersburg, Fla., work to keep the public informed of the ongoing response efforts. Photo courtesy of U.S. Coast Guard

In June 2010, FEMA assumed leadership and organization for the UAC New Orleans Community Relations Section, which augmented the efforts of the UAC External Affairs staff. This section provided foreign language assistance and experienced Public Information Officers to canvass the community. In addition, CGLOs were provided to local and state government officials to expedite the flow of information and enable efficient communications between the federal-led response and local and state government officials.

By late June, the response included a robust force of experts for the demanding missions in public affairs, community relations, intergovernmental affairs, and congressional and tribal outreach. This talented force was assigned across four primary locations: the UAC, ICP Houma, ICP Mobile, and ICP Miami. They were also supported by the NIC staff and the Coast Guard Headquarters congressional and Public Affairs staffs of the participating federal agencies. Additionally, external affairs experts were employed in supporting media over flights, bolstering community outreach efforts, and enabling visits to the offshore source control operation and to cleanup and recovery operations onshore. At the height of the response in July 2010, there were approximately 220 responders serving in the role of external affairs.

The Macondo well was successfully capped on July 15, 2010, stopping the influx of petroleum into the environment, and subsequently killed and permanently sealed over the subsequent two-month period. National media interest greatly declined once the well was no longer leaking, and continued to decline in the months afterward. In proportion, external affairs support at the ICPs and Branches decreased throughout the six months following including disestablishing ICPs, and consolidating their JIC functions and resources to UAC. In October 2010, the response website shifted from the www.deepwaterhorizonresponse.com response site to www.restorethegulf.gov restoration website. The shift to a .gov address in place of the .com address was made in part to ensure compliance with the 2004 OMB web guidelines on use of approved domains.

Resources Committed

During the course of incident response, 88—or 80 percent of the active duty Coast Guard Public Affairs force—and 10—or 97 percent of the billeted Public Affairs Officers (PAOs)—deployed to the *Deepwater Horizon* response. Many of these personnel deployed multiple times from April 2010 to January 2011. Multiple former Coast Guard PAOs also augmented this staff, and 90 percent of the enlisted Coast Guard PA Reserve force (23 Reserve Public Affairs Specialists) deployed.

In addition, the FOOSC relied heavily on PAOs from other agencies to serve on the UAC external affairs staff and in the field at JICs and Branches. PAOs from all the participating agencies—NOAA, USFWS, EPA, and National Parks Service—as well as those from agencies not involved in the operational response—Department of Defense, Air National Guard, Federal Bureau of Investigation, Customs and Border Protection, Immigration and Customs Enforcement, Federal Emergency Management, Health and Human Services, U.S. Geological Survey, U.S. Marshals, U.S. Secret Service—were crucial to staffing external affairs functions. Many other agency PAOs were used in crucial roles where one agency's PAOs did not possess the required governmental affairs or large response experience. In total, more than 300 inter-agency PAOs supported the response.

Challenges Encountered

The response culled all available talents and resources from the Coast Guard Public Affairs and external affairs communities—active duty, Reserve, civilian, auxiliary, and even Coast Guard retirees serving in other agencies. The effort validated the depth of training and commitment by all. The effort also revealed the finite pool of talent and resources for establishing, staffing, and maintaining the external affairs capabilities for a military-campaign-scope response with international visibility. In all, the response produced a bevy of deliverables including press briefings, on-camera interviews, town hall meetings, press releases, photo releases, video releases, and updates to the two websites, and multiple social media outlets. In addition, novel tactics were used to inform the public, including multi-day embarkations on a cutter at the well site, first person immersion media embeds with field teams, live media broadcasts from cutters offshore an airship conducting oil spill surveillance, routine press tours of animal treatment facilities, and real-time reporting from the drill ships during key well kill operations.

The response identified a need for capabilities in public affairs positions, intergovernmental affairs positions, and community relations positions and a

worst-case scenario for building the required capacity at these positions. This model can be wed to training and skill-honing opportunities. Specific emphasis should be given to commissioning a coding system for key skill sets of members expected to serve in future responses from among interagency partners represented in the NRT. The fine nuances of hosting VIPs, handling protocol for Presidential and other senior official visits, fluidly communicating with emotionally distraught members of a local community, adeptly addressing the needs and concerns of key demographics and ethnically distinct groups (especially Native Americans), and proactively engaging in dialogue for both local and national media should not be overlooked. These are critical skills that are learned and matured with real time practice and experience.

The adoption of a blended Natural Response Framework Emergency Support Function-15 and NCP JIC model for this response allowed for the alignment of outreach to governmental, congressional, media, and stakeholder audiences at all levels from local to national and international. It also allowed PAOs familiar with one or the other system to have a frame of reference to begin their support for the organization. However, it produced difficulties for those who had trained and exercised over the years



GULF OF MEXICO – National Incident Commander, Admiral Thad Allen (Ret.) is interviewed by a reporter for the *New Yorker* during a flight from Mobile, Ala., to New Orleans. The reporter embedded with the National Incident Command for two days. Photo courtesy of U.S. Coast Guard

using solely the decentralized JIC model for spill response. As SONS doctrine is reviewed, these two models should be compared and doctrine updated to prescribe the best organization and process for future SONS. In addition, the two models should be harmonized for other types of responses where both will be used, such as a hurricane where a Stafford Act FEMA-led ESF structure is employed alongside the National Incident Management System JIC structures used by state and local emergency management entities, and Coast Guard incident response activities.

Having the JIC serve as the single, central point of contact for all inquiries, including national level policy issue questions, has the benefit of creating great synergy and alignment in information but is also problematic. The incident-specific JIC staff was sometimes overwhelmed by a high volume of inquiries coupled with a broad base of interest—often exceeding the authority and subject matter expertise of the JIC staff. This resulted in unanswered calls, an irritable press corps working against deadline, countless opportunities for miscommunication and antagonistic interaction, and an overall perception of less-than-transparent media access and responsiveness. It can also result in the confusion of tactical, operational updates to be provided by field Public Affairs entities, and strategic, government-wide, or agency specific issues to be provided by other agencies, departments, or national leaders. In future incidents, decisionmakers should consider the value and importance of a national-level, policy-focused JIC at the NIC working closely with the operational JIC to better respond to information requests and separate tactical from strategic issues. The relationship between the Multi-National Forces Iraq Operations Center and the Aerospace and Defense Public Affairs staff might be a useful model.

Finally, understanding that other federal agencies are a key resource pool for Public Affairs staff in an event of this magnitude (or even in more routine natural disasters), the NRT should advocate cultivating relationships, skills, and standardization of incident Public Affairs training. This should include JIC operations for other agencies' PAOs. A more refined outcome could include a pool of reserve or stand-by federal Public Affairs staff members who are categorized by their skill sets, such as photographers, data researchers, news desk managers, field specialists, across the federal government.

10.6 FOSC Key Points

The Need for a Common Information Reporting Template

The response demonstrated the need to capture accurately where critical resources were located, what was deployed, what was staged, and what activities had taken place. Incident Action Plans are not suitable in communicating the status of the response to those outside the incident command. This is particularly true the larger the response. Predetermined information reporting templates designed for executive use, along with established processes, standardized and readily explainable terms, reporting times, and protocols for information sharing are necessary. In any major spill, the ability immediately to report accurate information about response activities and resources is essential.

Common Operating Picture

NOAA's ERMA was scalable and capable of performing as a COP. It is currently available and unclassified. During the *Deepwater Horizon* response, it was modified to make much of the data in the COP available to the public. Because of its success, ERMA should be adopted as the COP for oil spill response. The need for a COP is linked to the requirement for a common information reporting template—it is essential to be able to communicate adequately with officials, the public, and the media, as well as within the response, in a uniform manner.

External Affairs

In order to meet the media demands of a large spill response, a robust external affairs staff, including one large enough and with the requisite skills to engage with social media, is necessary. Also, it is important to be able to maintain a consistent rhythm for media engagements. This includes communicating with the press daily, issuing press releases, managing embed opportunities, overflights, and interview opportunities.

Chronology

On April 20, 2010, at approximately 10 p.m. Central Standard Time (CST), an explosion occurred on the *Deepwater Horizon* oil drilling rig in the Gulf of Mexico, located at 28 degrees 45.23 minutes north of the equator and 088 degrees 18.89 minutes west of the meridian, approximately 42 miles southeast of Venice, La. There were 126 people on board at the time. Fifteen of those people were injured and 11 went missing. Commercial vessel operators and Coast Guard assets rescued 115 crewmen and rig personnel. The *Deepwater Horizon*, owned by Transocean Ltd., was under a contract with Beyond Petroleum (BP) to drill an exploratory well. BP was the lessee of the area in which the rig was operating. At the time of the explosion, BP and Transocean were in the process of temporarily closing the well in anticipation of returning in the future for commercial production. Halliburton had completed some cementing of casings in the well less than 24 hours prior to the accident. The Coast Guard responded to the explosion and subsequent fire, and President Obama was alerted to the unfolding events. The following is a timeline of events as they unfolded.

April 21, 2010 – DAY 2: Representatives from the Coast Guard, Department of Homeland Security (DHS), National Oceanic and Atmospheric Administration (NOAA), Department of the Interior (DOI), and the Environmental Protection Agency (EPA), as well as state and local representatives activate the Regional Response Team (RRT). The RRT begins developing plans, providing technical advice, accessing resources and equipment from its member agencies, and overseeing BP's response. The modeling team at NOAA's Office of Response and Restoration begins generating daily trajectories for the *Deepwater Horizon* oil spill. Search efforts continue for the 11 missing rig workers.

April 22, 2010 – DAY 3: The *Deepwater Horizon* sinks into the Gulf of Mexico at 10:22 a.m. CST, containing upwards of 700,000 gallons of diesel fuel on board and taking with it the riser pipe that remained attached to the blow-out preventer (BOP). The riser pipe breaks as the *Deepwater Horizon* sinks. The Coast Guard activates the National Response Team (NRT). Air and sea restriction zones are established at the response site for safety. Aircraft apply surface dispersants for the first time.

April 23, 2010 – DAY 4: The Commandant of the Coast Guard signs a memorandum naming the Eighth District Commander, Rear Admiral Mary Landry, as the Federal On-Scene Coordinator (FOSC) for the *Deepwater Horizon* spill. The Coast Guard establishes the Unified Area Command (UAC) in Robert, La., and creates a Unified Command (UC), and an Incident Command Post (ICP) in Houma, La. A remotely operated vehicle (ROV) survey locates the sunken rig upside down, approximately 1,500 feet northwest of the BOP. Oil sheen is reported, but no apparent leak is discovered. NOAA's Office of Response and Restoration begins conducting flyovers and modeling the movement of the oil. At 5 p.m. CST, the Coast Guard suspends the search and rescue efforts. An initial debrief of the surviving crew members places the 11 missing in the vicinity of the explosion.

April 24, 2010 – DAY 5: ROVs inspect the capsized rig on the sea floor and find two oil leaks from the well pipe along the sea floor (at a depth of approximately 5,000 feet). The Coast Guard establishes the Joint Information Center in Robert, La., and an ICP in Houston, Texas.

April 25, 2010 – DAY 6: An attempt is made to activate the BOP rams with the sub-sea accumulator. BP activates a toll-free call center and opens two claims offices to process claims.

April 26, 2010 – DAY 7: The Louisiana governor issues an executive order that calls for the flags at all state buildings to be flown at half-staff in honor the of oil rig explosion victims from this date until sunset May 3, 2010. An ICP is established in Mobile, Ala., at the Mobile Convention Center, reporting to the FOSC and handling operations in Alabama, Florida, and Mississippi. Responders attempt to activate the Variable Bore Ram and actuate shear rams on the BOP using ROVs. The Department of Energy (DOE) assembles a scientific oversight team under the direction of the Secretary of DOE to monitor the progress and critically review the Responsible Party's (RP's) efforts to contain and secure the source of the leak from the Macondo well.

April 27, 2010 – DAY 8: The Secretary of DHS and the Secretary of the Department of the Interior (DOI) sign an order establishing the next steps for a joint investigation into the causes of the explosion. The joint investigation holds the power to issue subpoenas, hold public hearings, call witnesses, and take other steps needed to determine the cause of the incident. A controlled in situ burn test is conducted. The Operations Branch mobilizes near-shore protective resources to Breton Sound Island, La., to initiate the protective booming of sensitive areas. Protective booming is deployed at Pass a Loutre, La., (approximately 9,000 feet) and Pensacola, Fla. (approximately 2,500 feet).

April 28, 2010 – DAY 9: The Louisiana governor visits ICP Houma for a briefing on the oil spill and then joins Coast Guard and BP executives for a flyover of the oil spill area in the Gulf. The Coast Guard and the National Pollution Funds Center (NPFCC) designated BP a Responsible Party (RP) under the Oil Pollution Act of 1990 (OPA 90). Responders conduct the first controlled in situ burn. An additional leak is discovered by a ROV. NOAA sampling for seafood safety begins.

April 29, 2010 – DAY 10: The Secretary of DHS declares the incident to be a Spill of National Significance (SONS), enabling the appointment of a National Incident Commander to coordinate response resources at the national level. The governor of Louisiana declares a State of Emergency.

April 30, 2010 – DAY 11: The Secretary of the Department of Defense (DOD) mobilizes the Louisiana National Guard to assist local communities in the cleanup and removal of oil and to protect critical habitats from contamination. In a precautionary move, the Louisiana Department of Health and Hospitals, and the Louisiana Department of Wildlife and Fisheries announce the closure of select fishing areas and oyster harvesting beds. The governors of Alabama, Florida, and Mississippi declare a State of Emergency. The RP initiates the first test of new sub-sea dispersant techniques in accordance with required testing protocols with the approval of the FOSC and EPA, and with advice from NOAA. The RP dispenses 3,000 gallons sub-sea at rate of nine gallons per minute per the testing procedure. The test appears successful based on sonar data and ROV visual indications.

May 1, 2010 – DAY 12: The Secretary of DHS names Coast Guard Commandant Admiral Thad Allen the National Incident Commander. RP contacts scientists at the Woods Hole Oceanographic Institution about measuring the flow of oil from the BOP using a ROV with sonar and acoustic sensors.

Cumulative statistical snapshot:

Amount of oily liquid recovered:	20,313 barrels
Amount of surface dispersants applied:	156,012 gallons
Amount of sub-sea dispersants applied:	3,000 gallons
Amount of boom deployed:	420,280 feet
Total number of vessels:	231
Total number of skimmers:	98
Total wildlife impacts (includes birds):	1
Total number of responders (does not include Mobile, Ala.):	1,623

May 2, 2010 – DAY 13: *Development Driller III (DD III)* arrives at the Macondo well to drill the first deep-water intercept relief well, located one-half mile from the Macondo well, in a water depth of roughly 5,000 feet. This relief well attempts to intercept the existing wellbore at approximately 16,000 feet below the sea floor. The RP estimates this process to take at least 90 days. A second sub-sea dispersant injection test begins with approval to continue injection until Monday, May 3, with approved total volume of 13,000 gallons. The Alabama governor requests to utilize a state defined booming requirement instead of the current Area Contingency Plan. The FOSC approves this request. NOAA closes federal portions of the Gulf of Mexico to fishing based on the trajectory of the spill.

May 3, 2010 – DAY 14: Training begins for more than 2,000 volunteers to assist in the response effort. Volunteers include local fishing crews, whose boats can be used as Vessels of Opportunity (VOO) to assist contractors in deploying boom.

May 4, 2010 – DAY 15: DOD approves the federal mobilization of up to 17,500 National Guard troops to help various states with the oil spill, assigning up to 3,000 personnel to Alabama, 2,500 to Florida, 6,000 to Louisiana, and 6,000 to Mississippi. The Louisiana Governor sends a letter to the U.S. Small Business Administration requesting that it issue an economic injury disaster declaration for six parishes in Louisiana: Jefferson, Lafourche, Orleans, Plaquemines, St. Bernard, and St. Tammany. This economic injury disaster declaration makes Economic Injury Disaster Loans available to small, private, and non-profit businesses in the parishes and contiguous parishes that are impacted by the oil spill. Dispersant test number two concludes.

May 5, 2010 – DAY 16: The RP plans to deploy the cofferdam, a 125-ton, 14x24x40 foot structure to be set over the end of the riser (the pipe that normally goes from the wellhead to the drilling ship). The RP makes \$25 million block grants to the states of Alabama, Florida, Louisiana, and Mississippi to help them implement oil spill contingency plans.

May 6, 2010 – DAY 17: Oil reaches the shores of Chandeleur Islands, La. The RP cancels the Woods Hole project.

May 7, 2010 – DAY 18: NOAA modifies and expands the boundaries of the closed fishing area to reflect the current location of the oil spill. After deploying test applications of sub-sea dispersants, EPA halts sub-sea dispersant operations, awaiting additional test results. Secretary of DOI Salazar announces that no applications for new drilling permits will go forward for any new offshore drilling activity until DOI completes the safety review process requested by President Obama. The RP completes the cofferdam containment dome, a sub-sea oil collection system that is lowered to the sea floor. Sheen and emulsified oil are confirmed at Chandeleur Islands, La. The oil spill volunteer plan is approved.

May 8, 2010 – DAY 19: The RP announces that while lowering the cofferdam over the riser, an excess of hydrate crystals formed inside the dome, preventing the successful placement of the dome over the leaking riser. The dome remains on the sea floor while the RP evaluates conditions. The RP begins preparing a smaller containment dome known as the top hat, an eventual component of Lower Marine Riser Package (LMRP) containment system. The motor vessel *Brooks McCall* collects the first water sample. Tar balls are reported on Dauphin Island, Ala.

May 9, 2010 – DAY 20: The Coast Guard and EPA sign a Dispersant Monitoring and Assessment Directive. Tar balls are confirmed on Dauphin Island, Ala. Cleanup operations commence.

Pinnacle for the entire *Deepwater Horizon* incident: Highest single-day quantity of oily liquids recovered: 33,865 barrels.

May 10, 2010 – DAY 21: EPA accepts a testing protocol created by RP scientists with NOAA oversight as its directive regarding sub-sea dispersant use. Response personnel exceed 13,000.

Pinnacles for the entire *Deepwater Horizon* incident: Highest single-day quantity of aerial dispersants applied: 56,220 gallons. Highest single-day quantity of aerial, surface, and sub-sea dispersants combined applied: 68,530 gallons.

May 11, 2010 – DAY 22: Secretary of DOI Salazar announces that he will restructure the DOI Minerals Management Service (DOI MMS) in order to establish a separate and independent safety and environmental enforcement entity. Secretary Salazar also announces that the administration will seek additional resources for federal inspectors, requests an independent, technical investigation of the causes of the *Deepwater Horizon* spill from the National Academy of Engineers, and requests expanded authority to review explorations plans. The Louisiana Office of Coastal Protection and Restoration applies to the Army Corps of Engineers for an emergency permit to construct berms to help reduce the inland movement of oil.

May 12, 2010 – DAY 23: The Secretary of Energy travels to Houston to participate in meetings with DOE and national laboratory staff, industry officials, and other engineers and scientists involved in finding solutions to cap the flow of oil and contain the spill. The Assistant Secretary of Defense authorizes the use of National Guard assets for the *Deepwater Horizon* oil spill response. The RP releases a 30-second video of oil and gas streaming from the end of the broken riser. The RP places the Top Hat on the seabed.

May 13, 2010 – DAY 24: First attempt at Operation Riser Insertion Tube Tool (RITT) is conducted. As of this date, 6,700 claims for spill-related losses are filed, and around 1,000 are paid. More than 16,000 people are registered as volunteers and 46,500 calls have been made to RP help lines, around 30 percent offering ideas to help the response or other assistance.

May 14, 2010 – DAY 25: President Obama announces that he has ordered Secretary Salazar to conduct a top-to-bottom review of the DOI MMS.

May 15, 2010 – DAY 26: The Secretary of DHS and the Secretary of the Interior issue a letter to the BP CEO reiterating that as an RP for this event, BP is accountable to the American public for the full cleanup of this spill and all the economic loss caused by the spill and related events. The Coast Guard and EPA approve the use of sub-sea dispersants. Operation RITT is tested successfully and inserted into the leaking riser, capturing some oil and gas.

Cumulative statistical snapshot:

Amount of oily liquid recovered:	151,391 barrels
Controlled in situ burns:	10 burns
Amount of surface dispersants applied:	575,816 gallons
Amount of sub-sea dispersants applied	37,813 gallons
Amount of containment boom deployed:	1,294,910 feet
Amount of sorbent boom deployed:	441,620 feet
Total number of vessels:	656
Total number of skimmers:	32
Total wildlife impacts (includes birds):	32
Total number of responders:	19,163

May 16, 2010 – DAY 27: A second drill rig, the *Transocean Development Driller II*, begins drilling a second relief well. The RITT is successfully inserted into the end of the broken riser and begins carrying oil and gas up to the *Discoverer Enterprise* on the surface.

May 17, 2010 – DAY 28: The RP announces grants to help Gulf Coast states promote tourism: \$25 million to Florida and \$15 million each to Alabama, Louisiana, and Mississippi.

May 18, 2010 – DAY 29: Maintenance is performed on the BOP stack. Drilling and casing operations continue on the *Development Driller II* relief well, whose depth remained at 3,537 feet below sea floor. The RITT is operational, initially collecting an estimated 2,000 barrels of oil a day. Gas brought to the surface by the RITT is flared and burned off.

May 19, 2010 – DAY 30: The Secretary of DOI signs a secretarial order leading to the fundamental restructuring of the DOI MMS and the division of its three missions into separate entities for leasing, safety, and revenue collection with independent missions to strengthen oversight of offshore energy operations. In addition, Chairman Markey of the House Energy and Environment Subcommittee requests that the RP immediately make its live video feed from the underwater ROVs of the leak points and undersea activities publicly available. The National Incident Command (NIC) creates the interagency Flow Rate Technical Group to generate a preliminary flow rate as soon as possible.

May 20, 2010 – DAY 31: Secretary of DHS Napolitano announces that Coast Guard Admiral Thad Allen will keep his role as National Incident Commander after stepping down from his post as Coast Guard Commandant. In addition, Secretary Napolitano and EPA Administrator Jackson send a letter to BP CEO Tony Hayward stressing their expectation that the RP conduct all actions in a transparent manner, with all data and information related to the spill readily available to the U.S. government and the American people. The EPA also issues a directive requiring the RP to identify and use a less toxic and more effective dispersant from the list of EPA authorized dispersants. The directive requires the RP to identify this less toxic alternative—to be used both on the surface and under the water at the source of the oil leak—within 24 hours, and to begin using the less toxic dispersant within 72 hours of submitting the alternative. The RP makes available a live feed of the underwater leak at its source that was posted by The Committee on Energy and Commerce. The RP does this following Chairman Markey’s request on May 19.

May 21, 2010 – DAY 32: The RP launches a second website with a live webcam of the underwater oil leak at its source.

May 22, 2010 – DAY 33: President Obama signs an executive order establishing the bipartisan National Commission on the BP *Deepwater Horizon* Oil Spill and Offshore Drilling with former Florida Governor and Senator Bob Graham and former EPA Administrator William K. Reilly serving as co-chairs. The Administration tasks the bipartisan National Commission on the BP *Deepwater Horizon* Oil Spill and Offshore Drilling with providing recommendations on how to prevent—and mitigate the impact of—any future spills that result from offshore drilling.

May 23, 2010 – DAY 34:

Cumulative statistical snapshot:

Amount of containment boom:	1.75 million feet
Amount of sorbent boom:	997,000 feet
Amount of surface dispersants applied:	704,000 gallons
Amount of sub-sea dispersants applied:	116,000 gallons

May 24, 2010 – DAY 35: Secretary of Commerce Gary Locke declares a fisheries disaster for commercial and recreational fisheries in the Gulf of Mexico as a result of the ongoing impacts from the *Deepwater Horizon* oil spill. The fisheries closure encompasses 19 percent of federal waters in the Gulf of Mexico. The RP commits \$500 million to the Gulf of Mexico Research Initiative—a ten-year open research program to study the impact of the spill and response on the environment.

May 25, 2010 – DAY 36: Oil spill information websites are established for Alabama, Florida, Louisiana, and Mississippi.

May 26, 2010 – DAY 37: The top kill procedure commences in an attempt to stop flow of oil by injecting heavy drilling fluids into the well. The FOSC and EPA issue Dispersant Monitoring and Assessment Directive Addendum III, a directive requiring the RP to significantly scale back the use of dispersants. Coast Guard Parish President Liaison Officers are assigned to the potentially affected parishes in Louisiana.

May 27, 2010 – DAY 38: The NIC’s Flow Rate Technical Group develops an independent, preliminary estimate of the amount of oil flowing from the RP’s leaking oil well. The analysis estimates that 12,000 to 19,000 barrels per day are leaking into the Gulf. The ACOE approves a scaled-back Louisiana sand berms project. The National Incident Commander approves the implementation of a section of Louisiana’s Barrier Island berm project proposal that could help stop oil from coming ashore. The Subcommittee on Energy and Environment holds a hearing titled “Combating the BP Oil Spill.” The hearing examines the ongoing response to the oil spill at the *Deepwater Horizon* drilling rig site. The first billing for over \$1.8 million is sent to the RP for response and recovery operations relating to the *Deepwater Horizon* oil spill.

May 28, 2010 – DAY 39: President Obama travels to the Gulf Coast for the second time. The President announces that he directed Secretary of DHS Napolitano and the National Incident Commander to triple the manpower in the places where oil has reached or will reach the shoreline within 24 hours of impact in order to intensify the response effort.

May 29, 2010 – DAY 40: The RP announces that the top kill procedure did not overcome the flow of oil, despite 30,000 barrels of heavy mud pumped into the well. Plans begin for deployment of the LMRP containment cap from the *Discoverer Enterprise* to pump oil and gas to the surface.

May 30, 2010 – DAY 41: The 100th controlled in situ burn is conducted. Estimates of cumulative total oil burned at the completion of the 100th burn range from approximately 48,185 to 68,947 barrels. The DOI MMS moratorium on deepwater drilling takes effect, halting work on 33 offshore deepwater rigs in the Gulf of Mexico.

May 31, 2010 – DAY 42: NOAA extends the northern boundary of the closed federal fishing area in the Gulf of Mexico. The closed area represents 61,854 square miles, slightly less than 26 percent of Gulf of Mexico federal fisheries waters. In addition, the RP issues a statement that it has found no evidence of underwater oil plumes, despite evidence documented by scientists.

June 1, 2010 – DAY 43: The U.S. Attorney General visits Louisiana to coordinate the Administration’s response to the oil spill. NOAA extends the northern and southern boundaries of the closed federal fishing area in the Gulf of Mexico to include portions of the waters off eastern Alabama and the western tip of the Florida panhandle. The closed area represents 75,920 square miles, which is slightly more than 31 percent of Gulf of Mexico federal fisheries waters. Coast Guard Rear Admiral James A. Watson assumes the FOSC position from Coast Guard Rear Admiral Mary Landry. The 2010 Gulf of Mexico hurricane season officially begins.

Cumulative statistical snapshot:

Amount of oily liquid recovered:	338,848 barrels
Controlled in situ burns:	125 burns
Amount of surface dispersants applied:	755,893 gallons
Amount of sub-sea dispersants applied:	238,530 gallons
Amount of containment boom deployed:	2,002,946 feet
Amount of sorbent boom deployed:	2,192,430 feet
Total number of vessels:	1,783
Total number of skimmers:	120
Total wildlife impacts (includes birds):	867
Total number of responders:	18,081

June 2, 2010 – DAY 44: The Coast Guard directs the RP to pay for five additional barrier island projects, in addition to the one previously approved, attempting to protect coastal communities from oil. A second billing of more than \$69 million is sent to the RP for response operations relating to the *Deepwater Horizon* oil spill. The Administration states that it will continue to bill the RP regularly for all associated costs to ensure the Oil Spill Liability Trust Fund (OSLTF) is reimbursed on an ongoing basis.

June 3, 2010 – DAY 45: The Secretary of the Department of Commerce declares a fishery disaster in Florida due to the economic impact on commercial and recreational fisheries from the oil spill, increasing the affected area from the May 24 determination, which includes Alabama, Louisiana, and Mississippi. The RP cuts off a portion of the riser and successfully lowers the LMRP containment device over the source area to capture the leaking oil; recovers oil and gas, which begins to be siphoned through riser to the *Discoverer Enterprise*. The RP releases live feeds from all 12 underwater cameras to the public. The cameras are mounted on automated rovers working on the oil spill.

Pinnacle for the entire *Deepwater Horizon* incident: Highest number of square miles of fisheries closed: 88,522 square miles.

June 4, 2010 – DAY 46: President Obama makes a third trip to the Gulf Coast. The RP announces advance payments of claims for those losing income or net profit. The RP closes the first valve on the LMRP cap. The Coast Guard establishes the Interagency Alternative Technology Assessment Program to receive, acknowledge, and evaluate response-related product ideas. Tar balls are discovered in Pensacola, Fla.

Pinnacles for the entire *Deepwater Horizon* incident: Highest single-day quantity of sub-sea dispersants applied: 20,655 gallons. NOAA opens more than 16,000 square miles of previously closed fishing area off the Florida coast. Additionally, NOAA closes a 2,275-square mile area off the Florida panhandle as a precautionary measure to ensure that seafood from the Gulf will remain safe for consumers. The total closed area represents 33 percent of Gulf of Mexico federal fisheries waters.

June 5, 2010 – DAY 47: EPA Administrator and the National Incident Commander convene a meeting of science and technology experts in Houma, La., to explore new ideas and methods for coastal protection and cleanup technologies.

June 6, 2010 – DAY 48: Tar balls are sighted at Fort Walton Beach, Fla.

June 7, 2010 – DAY 49: The House Subcommittee on Oversight and Investigations holds a field hearing titled, “Local Impact of the *Deepwater Horizon* Oil Spill,” in Chalmette, La. The hearing examines the impact of the oil spill at the *Deepwater Horizon* drilling rig site on the Gulf region.

June 8, 2010 – DAY 50: The LMRP containment cap collects 15,000 barrels to date. A Memorandum of Understanding is established between the Occupational Safety and Health Administration (OSHA), Department of Labor (DOL), FOOSC, DHS concerning OSHA issues related to the *Deepwater Horizon* response.

June 9, 2010 – DAY 51: The Secretary of DOL travels to Louisiana to inspect the ongoing efforts to ensure the health, safety, and well-being of workers affected by the oil spill. The House Energy and Environment Subcommittee holds a briefing titled, “Beneath the Surface of the BP Spill: What’s Happening Now, What’s Needed Next,” where witnesses discuss the evidence of underwater plumes and suspended oil pollution in the water column.

June 10, 2010 – DAY 52: The House Energy and Environment Subcommittee holds a hearing titled, “The BP Oil Spill: Human Exposure and Environmental Fate.” The hearing examines the potential impacts to humans and the environment associated with the spill. The *Discoverer Enterprise* completes its first offload of oil. The RP provides an additional \$25 million in grants to Alabama, Florida, and Mississippi for their protection plans. The ICP relocates from St. Petersburg, Fla., to Miami, Fla. A Branch remains in St. Petersburg, Fla.

June 11, 2010 – DAY 53: The FOOSC, Rear Admiral James Watson, issues a letter to BP Chief Operating Officer Doug Suttles to identify additional leak containment capacity within 48 hours.

June 12, 2010 – DAY 54: A 5,000 pound tank from the *Deepwater Horizon* platform washes ashore in Panama City Beach, Fla.

June 13, 2010 – DAY 55: The Coast Guard extinguishes the first of two controlled burns that were never purposely extinguished. The extinguished burn is burn number 182. The total duration of the burn is 11 hours and 21 minutes, the second longest burn recorded. The total quantity of oil burned is approximately 4,774 barrels.

June 14, 2010 – DAY 56: Version 3 of the Recovered Oil and Waste Management Plan for ICP Houma is approved to cover waste issues in Louisiana.

June 15, 2010 – DAY 57: President Obama signs an amendment to OPA 90 that authorizes advances from the OSLTF. More than 40 Shoreline Cleanup Assessment Technique (SCAT) Teams begin assessing shorelines in Alabama, Florida, Louisiana, and Mississippi. Relief well drilling continues, the first relief well at an approximate depth of 15,000 feet and the second at an approximate depth of 9,500 feet. The RP prepares to fast track fund \$25 million as part of the Gulf Coast Research Initiative to support environmental studies at Louisiana State University, the Florida Institute of Oceanography, and the Northern Gulf Institute consortium.

Cumulative statistical snapshot:

Amount of oily liquid recovered:	504,590 barrels
Controlled in situ burns:	214 burns
Amount of surface dispersants applied:	885,476 gallons
Amount of sub-sea dispersants applied:	413,735 gallons
Amount of containment boom deployed:	2,543,745 feet
Amount of sorbent boom deployed:	3,479,017 feet
Total number of vessels:	4,323
Total number of skimmers:	136
Total wildlife impacts (includes birds):	1,853
Total number of responders:	31,062

June 16, 2010 – Day 58: The second containment system attaches to the BOP, which sends recovered oil to the *Q4000* service platform via sub-sea manifold, becomes operational. The RP agrees to create a \$20 billion fund over three and a half years to meet obligations arising from the spill. Oil spill claims are to be administered by an independent facility. BP cancels dividend payments for the rest of 2010. The Coast Guard purposely extinguishes burn number 224. The total duration of the burn was 11 hours and 48 minutes. The total quantity of oil burned was approximately 5,956 barrels.

June 17, 2010 – Day 59: BP CEO Tony Hayward testifies before the House Energy and Commerce Subcommittee on Oversight and Investigation. The UAC relocates to New Orleans from Robert, La.

June 18, 2010 – Day 60: Pinnacle for the entire *Deepwater Horizon* incident: Highest single-day quantity of oil burned: 59,550 barrels.

June 20, 2010 – Day 62: The response issues document preservation guidance to all responders.

June 21, 2010 – Day 63: The agency formerly known as the MMS is renamed the Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE).

June 22, 2010 – Day 64: The RP announces that its net revenue from the sale of oil recovered from the Macondo well will be donated to the National Fish and Wildlife Foundation.

Pinnacle for the entire *Deepwater Horizon* incident: Highest single-day quantity of oil recovered: 27,097 barrels.

June 24, 2010 – Day 66: The Mississippi Department of Environmental Quality issues a revised precautionary closure to an additional area of Mississippi marine waters previously closed to commercial and recreational fishing. The 601st Air and Space Operations Center, located at Tyndall Air Force Base in Panama City, Fla., is established to provide centralized airspace management of resources and aircraft activity supporting the *Deepwater Horizon* response in the Gulf of Mexico area.

June 25, 2010 – Day 67: Hurricane Alex enters the Gulf region, heading toward northern Mexico.

June 28, 2010 – Day 70: The Coast Guard Commandant and EPA sign the Joint Interim Rule regarding the response time requirement, location requirement, and re-location of Navy Supervisor of Salvage and Diving. Capping stack fabrication completes. NOAA expands the closed federal fishing area in the Gulf of Mexico to 80,228 square miles, which represents 33 percent of the federal fishing waters in the Gulf of Mexico.

June 29, 2010 – Day 71: The Coast Guard and EPA issue a directive requiring the RP to test waste for hazardous materials and to publicize the results.

June 30, 2010 – Day 72: Pinnacle for the entire *Deepwater Horizon* incident: Highest number of vessels assigned to the incident: 6,050 vessels.

July 1, 2010 – Day 73:**Cumulative statistical snapshot:**

Amount of oil recovered:	557,155 barrels (<i>Discovery Enterprise, Q4000, Helix Producer 1</i>)
Amount of oily liquid recovered:	671,457 barrels
Amount of gas recovered:	1,243.7 million standard cubic feet (<i>Discovery Enterprise, Q4000, Helix Producer 1</i>)
Controlled in situ burns:	275 burns per 237,950 barrels
Amount of surface dispersants applied:	1,051,159 gallons
Amount of sub-sea dispersants applied:	600,971 gallons
Amount of containment boom deployed:	3,017,472 feet
Amount of sorbent boom deployed:	4,954,735 feet
Total number of vessels:	6,026
Total number of skimmers:	550
Total wildlife impacts (includes birds):	2,781
Total number of responders:	43,128

July 3, 2010 – Day 75: Collection of oil from the LMRP containment cap and *Q4000* system continues with 25,000 barrels collected to date. The ACOE denies Jefferson Parish's request to construct rock dike structures for the purpose of reducing oil entering Barataria Basin. A Taiwanese skimming vessel dubbed *A Whale* arrives on-scene.

July 5, 2010 – Day 77: Tar balls are reported at the Rigotlets, at the entrance to Lake Pontchartrain, La.

July 6, 2010 – Day 78: The 601st Air and Space Operations Center begins centralized airspace management of resources and aircraft activity supporting the *Deepwater Horizon* response in the Gulf of Mexico area.

Pinnacle for the entire *Deepwater Horizon* incident: Florida's highest single-day quantity of heavy to moderately oiled shoreline: 18.7 miles.

July 7, 2010 – Day 79: Pinnacles for the entire *Deepwater Horizon* incident: Highest number of personnel assigned to incident: 47,849. Highest single-day quantity of gas recovered: 58 million standard cubic feet.

July 8, 2010 – Day 80: The National Incident Commander issues a letter to the RP requiring a detailed timeline and contingency procedures for the capping stack process to secure the flow of oil from the source.

July 9, 2010 – Day 81: An ICP is established in Galveston, Texas

July 10, 2010 – Day 82: The *Discover Inspiration* moves off to allow capping stack installation. The LMRP containment cap is removed in preparation for its replacement with a sealing cap assembly capable of increasing containment capacity or potentially shutting in the well, includes a flange transition spool and a three-ram capping stack.

Pinnacles for the entire *Deepwater Horizon* incident: Highest number of helicopters assigned to response: 82. Alabama's highest single-day quantity of heavy to moderate oiled shoreline: 24.5 miles. Highest single-day quantity of response wide heavy to moderately oiled shoreline: 180.8 miles. Highest number of VOOs utilized: 3,233.

July 12, 2010 – Day 84: Rear Admiral Paul Zukunft relieves Rear Admiral James Watson as the FOOSC. The RP installs a three-ram capping stack that put the sealing cap in place by the *Discoverer Inspiration*. The BOEMRE issues a revised moratorium that limits drilling based on the equipment a rig uses instead of the depth of the wellhead.

July 13, 2010 – Day 85: The *Helix Producer I* starts oil recovery (20 to 25 thousand barrels of oil per day).

July 14, 2010 – Day 86: Pinnacle for the entire *Deepwater Horizon* incident: Highest single-day number of controlled burns: 26.

July 15, 2010 – Day 87: The RP closes the well capping stack, which successfully stops oil flow, securing the source at 2:22 p.m. Well integrity testing begins.

Cumulative statistical snapshot:

Amount of oil recovered:	817,739 barrels (<i>Discovery Enterprise, Q4000, Helix Producer I</i>)
Amount of oily liquid recovered:	783,490 barrels
Amount of gas recovered:	1,844 million standard cubic feet (<i>Discovery Enterprise, Q4000, Helix Producer I</i>)
Controlled in situ burns:	377 burns per 261,400 barrels
Amount of surface dispersants applied:	1,072,314 gallons
Amount of sub-sea dispersants applied:	762,881 gallons
Amount of containment boom deployed:	3,505,921 feet
Amount of sorbent boom deployed:	6,836,224 feet
Total number of vessels:	5,745
Total number of skimmers:	588
Total wildlife impacts (includes birds):	3,711
Total number of responders:	44,264

July 16, 2010 – Day 88: Following tests, a decision is made that the supertanker skimmer *A Whale* will not be used.

July 17, 2010 – Day 89: The vessel *West Sirius* installs the second free standing riser.

Pinnacles for the entire *Deepwater Horizon* incident: Louisiana’s highest single-day quantity of heavy to moderate oiled shoreline: 153.4 miles. Mississippi’s highest single-day quantity of light to trace oiled shoreline: 107.5 miles.

July 19, 2010 – Day 91: The 411th and final in situ controlled burn is conducted during *Deepwater Horizon*. Estimated cumulative total volume burned ranged from approximately 219,986 to 309,452 barrels. The last dispersant application is conducted.

Pinnacle for the entire *Deepwater Horizon* incident: Highest number of fixed wing aircraft assigned to incident: 20.

July 21, 2010 – Day 93: Pinnacle for the entire *Deepwater Horizon* incident: Highest quantity of containment boom deployed: 3,795,985 feet.

July 22, 2010 – Day 94: Tropical Storm Bonnie begins, occurring through July 24. All response operations are secured. NOAA opens federal fisheries 190 miles southeast of the *Deepwater Horizon* wellhead along the Florida shelf, which is one third of the previously closed area.

July 24, 2010 – Day 96: Tropical Storm Bonnie ends, all response operations are secured. Ships return to the *Deepwater Horizon* wellhead area.

July 25, 2010 – Day 97: Parish presidents participate in an overflight of coastal Louisiana following Tropical Storm Bonnie.

Cumulative statistical snapshot:

Amount of oil recovered:	827,046 barrels (<i>Discovery Enterprise, Q4000, Helix Producer 1</i>)
Amount of oily liquid recovered:	827,829 barrels
Amount of gas recovered:	1,866 million standard cubic feet (<i>Discovery Enterprise, Q4000, Helix Producer 1</i>)
Controlled in situ burns:	411 burns totaling 265,450 barrels
Amount of surface dispersants applied:	1,072,514 gallons
Amount of sub-sea dispersants applied:	771,272 gallons
Amount of containment boom deployed:	3,710,430 feet
Amount of sorbent boom deployed:	7,815,656 feet
Total number of vessels:	1,067
Total number of skimmers:	794
Total wildlife impacts (includes birds):	5,173
Total number of responders:	9,496

July 27, 2010 – Day 99: The first parish presidents’ meeting is held in New Orleans, La.

Pinnacle for the entire *Deepwater Horizon* incident: Texas’s highest single-day quantity of light to trace oiled shoreline: 1 mile.

July 29, 2010 – Day 101: The FOSC issues letters to all parish presidents outlining the creation of parish-specific transition plans utilizing the framework from the UAC’s transition plan, while capturing the impacts of the *Deepwater Horizon* spill unique to each parish.

August 1, 2010 – Day 104:

Cumulative statistical snapshot:

Amount of oil recovered:	827,046 barrels (<i>Discovery Enterprise, Q4000, Helix Producer 1</i>)
Amount of oily liquid recovered:	826,361 barrels
Amount of gas recovered:	1,866 million standard cubic feet (<i>Discovery Enterprise, Q4000, Helix Producer 1</i>)
Controlled in situ burns:	411 burns total 265,450 barrels
Amount of surface dispersants applied:	1,072,514 gallons
Amount of sub-sea dispersants applied:	771,272 gallons
Amount of containment boom deployed:	3,646,640 feet
Amount of sorbent boom deployed:	8,032,036 feet
Total number of vessels:	4,038
Total number of skimmers:	831
Total wildlife impacts (includes birds):	5,675
Total number of responders:	30,075

August 2, 2010 – Day 105: The government approves the RP’s static well kill plan to inject drilling mud slowly into the well.

Pinnacle for the entire *Deepwater Horizon* incident: Highest number of skimmers assigned to incident: 835.

August 3, 2010 – Day 106: Operational annex sub-sea water sampling begins. The RP begins the static well kill process.

Pinnacle for the entire *Deepwater Horizon* incident: Highest single-day quantity of all wildlife collected: 261.

August 4, 2010 – Day 107: Static well kill is determined successful.

Pinnacle for the entire *Deepwater Horizon* incident: Highest single-day quantity of non-visibly oiled wildlife collected: 136.

August 5, 2010 – Day 108: The RP carries out cementing operations to seal the well. Claims payments top \$300 million, with distributions to more than 40,000 individuals and businesses affected by the spill.

August 6, 2010 – Day 109: Cement pumping completed at the wellhead.

Pinnacle for the entire *Deepwater Horizon* incident: Highest single-day quantity of visibly oiled wildlife collected: 168.

August 7, 2010 – Day 110: Well pressure testing begins.

August 8, 2010 – Day 111: The National Incident Commander announces the static well kill cementing procedure pressure test is complete and holding. The controlled burn after action report for May 28 to August 3 is released.

August 9, 2010 – Day 112: Following the completion of cementing operations on August 5, pressure testing indicates there is an effective cement plug in the casing and successful completion of the static kill and cementing procedures.

August 10, 2010 – Day 113: Relief well drilling is delayed due to a tropical storm approaching the Gulf of Mexico. NOAA reopens more than 5,000 square miles of federal fisheries waters for ocean fishing, 52,000 square miles remain closed.

August 11, 2010 – Day 114: Pinnacle for the entire *Deepwater Horizon* incident: Alabama’s highest single-day quantity of light to trace oiled shoreline: 70.5 miles.

August 12, 2010 – Day 115: Relief well work recommences.

August 13, 2010 – Day 116: A second parish president meeting is held in Houma, La. Ambient pressure testing on the oil well begins. The National Incident Commander signs the *Sub-sea and Sub-surface Oil and Dispersant Detection Sampling and Monitoring Strategy Memorandum 16451*.

Pinnacle for the entire *Deepwater Horizon* incident: Louisiana’s highest single-day quantity of light to trace oiled shoreline: 267.4 miles.

August 14, 2010 – Day 117: Bottom kill procedure is authorized to begin.

August 15, 2010 – Day 118:

Cumulative statistical snapshot:

Amount of oil recovered:	827,046 barrels (<i>Discovery Enterprise, Q4000, Helix Producer 1</i>)
Amount of oily liquid recovered:	826,988 barrels
Amount of gas recovered:	1,866 million standard cubic feet (<i>Discovery Enterprise, Q4000, Helix Producer 1</i>)
Controlled in situ burns:	411 burns total 265,450 barrels
Amount of surface dispersants applied:	1,072,514 gallons
Amount of sub-sea dispersants applied:	771,272 gallons
Amount of containment boom deployed:	2,586,653 feet
Amount of sorbent boom deployed:	8,770,086 feet
Total number of vessels:	2,914
Total number of skimmers:	835
Total wildlife impacts (includes birds):	7,175
Total number of responders:	28,277

August 16, 2010 – Day 119: Pinnacles for the entire *Deepwater Horizon* incident: Mississippi’s highest single-day quantity of heavy to moderate oiled shoreline: 11.4 miles. Highest single-day quantity of response wide light to trace oiled shoreline: 543.8 miles.

August 18, 2010 – Day 121: Rear Admiral Zukunft signs the *Sub-sea and Sub-surface Oil and Dispersant Detection Sampling and Monitoring Strategy* Memorandum 16451. The RP flushes drilling mud and hydrocarbons from the Macondo well in advance of pressure test to ensure the well was secure. Bottom kill process is delayed due to analysis of annulus. Ambient pressure testing is under way. The University of South Florida researchers report oil on ocean floor in Desoto Canyon, a valley in the Gulf of Mexico. Twenty-three Kemp’s Ridley Sea Turtles are released into Gulf of Mexico.

Pinnacle for the entire *Deepwater Horizon* incident: Florida’s highest single-day quantity of light to trace oiled shoreline: 130.4 miles.

August 20, 2010 – Day 123: The first formal consultation between the FOSC and stakeholders regarding historic properties occurs.

August 21, 2010 – Day 124: The 48-hour ambient pressure test is deemed successful. All states inside and outside territorial waters east of the Mississippi River, north of the northern shore of Pass a Loutre, and 29 degrees 12 minutes 40 seconds north latitude open to the commercial harvest of crabs. The FOSC approves an operational procedure authorizing the removal of drill pipe segments and an inspection of BOP.

August 23, 2010 – Day 126: The Operational Science Advisory Team is created. The RP reports that it made claim payments of nearly \$400 million during the 16 weeks it managed claims related to the oil spill. The National Incident Commander announces that 90 percent of the containment boom deployed was recovered. The 601st Air Operations Center demobilizes and stops providing centralized airspace management of resources and aircraft activity supporting the *Deepwater Horizon* response in the Gulf of Mexico area. The RP VOO advisor issues a letter to the parish presidents stating that many recreational vessel participants will be removed from the VOO program, and their Master Vessel Charter Agreements with the RP will be terminated.

August 26, 2010 – Day 129: All Florida fisheries, with the exception of blue crabs, which were unavailable for testing, are opened for harvesting.

August 27, 2010 – Day 130: To date, 978 birds have been treated and released to the Atchafalaya Delta Wildlife Management Area (WMA) in St. Mary Parish La., as part of the wildlife rescue and recovery effort.

August 29, 2010 – Day 132: The five-year anniversary of Hurricane Katrina.

September 1, 2010 – Day 135: The third parish president meeting is held in Houma, La.

Cumulative statistical snapshot:

Amount of oil recovered:	827,046 barrels (<i>Discovery Enterprise, Q4000, Helix Producer 1</i>)
Amount of oily liquid recovered:	827,026 barrels
Amount of gas recovered:	1,866 million cubic standard feet (<i>Discovery Enterprise, Q4000, Helix Producer 1</i>)
Controlled in situ burns:	411 burns totaling 265,450 barrels
Amount of surface dispersants applied:	1,072,514 gallons
Amount of sub-sea dispersants applied:	771,272 gallons
Amount of containment boom deployed:	1,755,528 feet
Amount of sorbent boom deployed:	9,239,365 feet
Total number of vessels:	3,242
Total number of skimmers:	835
Total wildlife impacts (includes birds):	8,602
Total number of responders:	28,430

September 2, 2010 – Day 136: The capping stack on top of the *Deepwater Horizon*'s BOP is removed by the drillship *Discoverer Enterprise*.

September 3, 2010 – Day 137: The *Deepwater Horizon*'s BOP is successfully removed from the *Mississippi Canyon 252* well at 1:20 p.m. CST. A new BOP installed by *Development Driller II*. *Development Driller II* then flushes the stack and pressure tests the connection.

September 4, 2010 – Day 138: The *Q4000* raises the *Deepwater Horizon* BOP and secures it on deck to a shipping frame. *DD II* unlatches LMRP and pulls perforated riser to surface. *Discoverer Enterprise* raises capping stack to surface and secures it to the deck.

September 5, 2010 – Day 139: The *Q4000* washes the *Deepwater Horizon* BOP stack and preserves it as evidence, as per protocol.

September 6, 2010 – Day 140: The *Q4000* completes inspection of hoses and fittings on the *Deepwater Horizon* BOP.

September 7, 2010 – Day 141: Aerial observations confirm all containment boom is removed from Alabama, Florida, and Mississippi.

September 8, 2010 – Day 142: The *Development Driller II* displaces riser to mud; tests BOP; cleanout commences to 1,500 feet below the wellhead.

September 9, 2010 – Day 143: The *Q4000* departs for South Pass 55 at 7:01 p.m. CST for the transfer of BOP and LMRP to a transfer barge.

September 10, 2010 – Day 144: The *Q4000* transfers the failed BOP, LMRP, and baskets containing other evidence collected from the sea floor near the Macondo well to transfer barge. The barge is en-route to NASA Michoud facilities in New Orleans, La.

September 11, 2010 – Day 145: BOP arrives at the NASA Michoud facility. Aerial observations confirm that only six parishes in Louisiana still have containment boom deployed.

September 13, 2010 – Day 147: The *Q4000* rig receives Coast Guard certification to move to dry dock in Galveston, Texas. Relief well drilling operations restart from *DD III*. The UAC Consolidated Decontamination Plan is signed and promulgated.

September 14, 2010 – Day 148: The response vessel *Gyre* collects first sediment sample.

September 15, 2010 – Day 149: The VOO program demobilizes in the states of Alabama, Florida, and Mississippi.

Cumulative statistical snapshot:

Amount of oil recovered:	827,046 barrels (<i>Discovery Enterprise, Q4000, Helix Producer 1</i>)
Amount of oily liquid recovered:	827,251 barrels
Amount of gas recovered:	1,866 million standard cubic feet (<i>Discovery Enterprise, Q4000, Helix Producer 1</i>)
Controlled in situ burns:	411 burns total 265,450 barrels
Amount of surface dispersants applied:	1,072,514 gallons
Amount of sub-sea dispersants applied:	771,272 gallons
Amount of containment boom deployed:	690,638 feet
Amount of sorbent boom deployed:	3,437,885 feet
Total number of vessels:	1,911
Total number of skimmers:	835
Total wildlife impacts (includes birds):	9,223
Total number of responders:	25,800

September 16, 2010 – Day 150: The relief well drilled by the *Development Driller III* drilling rig intercepts the annulus of the Macondo well.

September 17, 2010 – Day 151: The first government-to-government consultations with the FOSC and 11 federally recognized tribes is held.

September 19, 2010 – Day 153: The National Incident Commander confirms that well kill operations on the Macondo well in the Gulf of Mexico are completed, with both the casing and annulus of the well sealed by cement.

September 20, 2010 – Day 154: ICPs Houma and Mobile demobilize. Operations are consolidated under the Gulf Coast Incident Management Team (GC-IMT) located in New Orleans, La.

September 22, 2010 – Day 156: Operational annex sub-surface sediment sampling begins.

September 23, 2010 – Day 157: The Cameron Branch and ICP Houston demobilize and close. Commercial and recreational fishing reopen to the harvest of fish, crabs, and shrimp in all state waters east of the Mississippi River and north of the northern shore of Pass a Loutre.

September 25, 2010 – Day 159: Yates decontamination yard closes. *Development Driller III* recovers a 135-by-8-inch casing and sets a third cement plug.

September 26, 2010 – Day 160: The *Development Driller III* continues plug and abandonment operations.

September 28, 2010 – Day 162: Secretary of the Navy Ray Mabus's report titled *America's Gulf Coast: A Long-Term Recovery Plan After The Deepwater Horizon Oil Spill*, is released.

September 29, 2010 – Day 163: Nineteen decontamination sites are operational.

October 1, 2010 – Day 165: The NIC demobilizes and the National Incident Commander's personal report is released. The U.S. Department of Health and Human Services (HHS) launches Oil Spill Distress Hotline.

Cumulative statistical snapshot:

Amount of oil recovered:	827,046 barrels (<i>Discovery Enterprise, Q4000, Helix Producer 1</i>)
Amount of oily liquid recovered:	827,829 barrels
Amount of gas recovered:	1,866 million standard cubic feet (<i>Discovery Enterprise, Q4000, Helix Producer 1</i>)
Controlled in situ burns:	411 burns total 265,450 barrels
Amount of surface dispersants applied:	1,072,514 gallons
Amount of sub-sea dispersants applied:	771,272 gallons
Amount of containment boom deployed:	23,020 feet
Amount of sorbent boom deployed:	389,010 feet
Total number of vessels:	1,329
Total number of skimmers:	835
Total wildlife impacts (includes birds):	9,416
Total number of responders:	19,482

October 4, 2010 – Day 168: The Gulf-Wide Recovered Oil and Waste Management Plan is signed, and supersedes the previous waste management plans for both the ICPs Mobile and Houma.

October 6, 2010 – Day 170: The response returns to standard NRC oil reporting protocols.

October 8, 2010 – Day 172: The St. Mary and Iberia Branch demobilizes and closes.

Pinnacle for the entire *Deepwater Horizon* incident: Highest amount of sorbent boom deployed: 566,140 feet.

October 12, 2010 – Day 176: BOEMRE lifts the moratorium on deepwater drilling. Sixty-nine VOO vessels are taken off hire.

October 14, 2010 – Day 178: Approximately 33 HESCO Baskets are installed at Perdido Pass East in Alabama.

October 15, 2010 – Day 179: Five helicopters demobilize (one at the Western Branch; one at Lafourche; one at Jefferson and two on standby). Twenty aircraft demobilize over the past 30 days; 16 aircraft remain (including 1 military). Bollinger’s site in Texas City, Texas, receives full approval for decontamination safety. The Middle River Decontamination site for Orleans and St. Tammany Parish close with all equipment to be removed by October 18, 2010. A Choctaw Tribe representative and archeologist travels to Sugar Island for a Native American artifact reconnaissance mission. NOAA announces re-opening of 6,879 square miles of oil impacted federal waters for commercial and recreational fishing. The total amount of re-opened waters is 81.4 percent.

Daily statistical snapshot:

Amount of oily liquid recovered:	68 barrels
Total number of vessels:	1,722
Total number of VOOs:	319 (on hire); 2,838 (under contract)
Total number of skimmers:	25
Total number of responders:	15,629

October 16, 2010 – Day 180: Volunteer Beach Cleanup Day is held in Harrison County, Miss. All Shoreline Treatment Recommendations developed by the SCAT Teams for Orange Beach and Gulf Shores, Ala., are ready for implementation.

October 17, 2010 – Day 181: The joint U.S. Geological Survey and the RP near-shore water and sediment sampling operations are complete.

October 18, 2010 – Day 182: RP representatives and Tri-State Bird Rescue and Research hold a press update at the Hammond Wildlife Rehabilitation Center, which was the main rehabilitation center in the Gulf during the response. Operation Deep Clean began in Orange Beach, Ala. The Sediment and Water Column Sampling Program completes.

October 19, 2010 – Day 183: Coast Guard Rear Admiral Zukunft and media personnel fly over the barrier islands (Chandeleurs, Ship Island, and Grand Isle) to survey the response cleanup work completed.

October 20, 2010 – Day 184: The Marine Mammal and Sea Turtle Group ceases operations for sea turtles. Daily reporting of impacted wildlife numbers to UAC discontinues. The Terrebonne Branch receives approval from all agencies to use small walk-behind sand sifters (Sandman 850) on the beaches of Trinity Island and Timbalier Island.

October 21, 2010 – Day 185: NOAA representatives perform a turtle release approximately 60 miles south of Grand Isle, La. These are the first turtles to be released off the Louisiana coast since the start of the *Deepwater Horizon* response. The Stage III STR for operational distance of mechanical beach sifters near the dunes and vegetation lines is reduced from 50 feet to 10 feet on Orange Beach, Ala., amenity beaches.

October 22, 2010 – Day 186: Vermillion Branch demobilizes and closes. The SCAT Technical Advisor gives a presentation to the Alabama Branches to discuss guidelines and objectives in 2010, and treatment techniques for subsurface oil.

October 23, 2010 – Day 187: The last sediment sample is collected by response vessel *Ocean Veritas*, which visited more than 500 stations to create over 2,400 sediment samples and 450 water samples collected for processing and archiving. The Alabama state decontamination site closes. A Strategic Planning and Applied Methods Team forms to facilitate the flow of information and equipment for best methods across the AOR. The Environmental Unit’s Rapid Response Environmental Site Support Team (RRESST) program completes, evaluates, and analyzes findings from more than 2,800 site

inspections. The Shallow Water Submerged Oil (SWSO) program begins a revised sample collection protocol near the Pass a Loutre area, which includes both core soil samples and water samples. Samples are anticipated to be collected at six locations. The Technical Advisory Group is scheduled to meet to discuss next transition milestones. Mississippi completes zero-based inventory analysis. The Florida Branch begins zero-based inventory analysis.

October 24, 2010 – Day 188: The Subsurface Monitoring Unit’s last remaining active vessel completes the assigned offshore sampling and returns to Morgan City, La., to begin the decontamination process.

October 26, 2010 – Day 190: The three-mile decontamination site located near Venice, La., is closed. Special Operations Branch Strike Team No. 3 demobilizes.

October 27, 2010 – Day 191: An amendment to the *Gulf Wide Solid Waste Management Plan* is approved and changes weekly waste stream sampling to monthly sampling beginning November 1, 2010.

October 29, 2010 – Day 193: The fourth parish president meeting is held in New Orleans.

October 30, 2010 – Day 194: A new radio communications repeater is installed on West Point Island in the Mobile Division to improve communications. Approval is received from the National Park Service to use mechanical beach cleaning equipment (Beach Tech) to a depth of six inches on Horn Island, Miss.

October 31, 2010 – Day 195: Four archaeologists conduct enhanced archaeological surveys along Navarre Beach, Fla., in segments that have a high probability for yielding subsurface archaeological artifacts. Florida turtle nesting season ends.

November 1, 2010 – Day 196: Florida Division A operations personnel complete setting the barge anchors under the supervision of a Natural Resources Advisor and a marine archaeologist. The Cameron Parish, La., Hesco Basket Removal Project begins. Florida Division C completed the Zero Based Audit, which results in the release of the one remaining water operations vessel. An STR revision, approved by Section 106, discontinues all vacuum operations in the Upper Barataria Bay marsh areas. The revision is based on field observations and reports from multiple sources, including the Bay Jimmy marsh treatment tests.

Daily statistical snapshot:

Total number of vessels:	932
Total number of skimmers:	19
Total number of VOOs:	2,838 (on contract), 135 (on hire)
Total number of responders:	9,758

November 2, 2010 – Day 197: Plaquemines Branch conducts random drug tests of personnel to continue through November 3. Venice Wildlife Stabilization site, equipment, and personnel demobilize.

November 3, 2010 – Day 198: The Terrebonne Branch is demobilized. The Wildlife Group transports the last remaining bird from the Hammond Rehabilitation Center to the Monroe Zoo. The zoo agrees to care for the bird until it molts. Both marine mammal and sea turtle stranding response reverts back to NOAA and the existing stranding network protocols and procedures. The Army Corps of Engineers approves Louisiana’s request to modify the emergency berm permit to realign the berm construction closer to the Chandeleur Islands.

November 4, 2010 – Day 199: The Subsurface Monitoring Unit meets at the Stennis Space Center in Mississippi to discuss the needs and progress on short-, mid-, and long-term data management and archive issues. The manual removal of Hesco Baskets near the Baldwin County, Ala., Staging Area completes.

November 5, 2010 – Day 200: Hesco Basket Removal Project, Cameron Parish Area C, completes. Operations removes 153 Hesco baskets. FOSC issues a letter to Louisiana Governor Jindal outlining the termination of the RP managed Louisiana VOO program, and transitions to Vessel Charter Agreements.

November 7, 2010 – Day 202: The Long-Term Monitoring Program, established by the Environmental Unit, sets up one additional phragmites (a perennial grass) reference site at Pass a Loutre, making eight sites in the program. Bird recovery data is uploaded to GeoPlatform.gov, powered by Environmental Response Management Application.

November 8, 2010 – Day 203: The Wildlife Branch Technical Advisory Group meets and agrees that the wildlife group is no longer in a reconnaissance and recovery phase but now in a wildlife monitoring phase. A series of five seafood safety forums are scheduled across the Florida Branch, with the initial meeting is set for November 8, in Port St. Joe, Fla., Division C.

November 9, 2010 – Day 204: Responders sign the proposed Environmental Unit Plan to remove all sentinel snares by November 24, 2010.

November 10, 2010 – Day 205: Strategic Planning and Applied Methods Team and SCAT participate in an alternative cleanup method meeting in New Orleans.

November 11, 2010 – Day 206: A UAC SCAT Team participates in a landowner meeting in New Orleans with the Wisner Foundation Representatives to discuss no further treatment guidelines, monitoring, and other cleanup discussion points for property owned by the Foundation.

November 12, 2010 – Day 207: The second consultation between the FOOSC and eleven federally recognized tribes occurs.

November 13, 2010 – Day 208: The first split of the Louisiana Regular Duck Season opens and runs through December 5, 2010.

November 15, 2010 – Day 210: The National Marine Fisheries Services and NOAA announce the reopening of approximately 8,400 square miles of commercial and recreational federal fisheries.

Daily statistical snapshot:

Total number of vessels:	617
Total number of skimmers:	7
Total number of VOOs:	2,838 (on contract), 127 (on hire)
Total number of responders:	6,937

November 17, 2010 – Day 212: The fifth parish president meeting is held in New Orleans. The EPA and the Office of Inspector General visit the UAC to interview staff about dispersant use.

November 19, 2010 – Day 214: GC-IMT Strike Team Chandeleurs recovery and removal operations are secured. St. Bernard Branch decontamination location demobilizes.

November 20, 2010 – Day 215: Snare sentinel removal begins.

November 22, 2010 – Day 217: St. Bernard Branch demobilizes.

November 23, 2010 – Day 218: The Wildlife Branch attempts to install a wailer unit in Bay Jimmy to replace the current air hazing cannons.

November 28, 2010 – Day 223: Cameron Parish, La., Hesco Basket Removal Project completes (3,960 baskets or 59,400 feet of shoreline barrier removed). The contractor expects completion of demobilization activities by November 30, 2010.

November 30, 2010 – Day 225: The 2010 Gulf of Mexico hurricane season officially ends.

December 1, 2010 – Day 226: The UAC dissolves and the GC-IMT remains to lead the response effort. GC-IMT Incident Weather Policy Version 1.0 completes.

Daily statistical snapshot:

Total number of vessels:	427
Total number of skimmers:	2
Total number of responders:	6,363

December 2, 2010 – Day 227: The Marine Mammal and Sea Turtle Group releases approximately 11 sea turtles offshore of Carrabelle, Fla.

December 4, 2010 – Day 229: Snare sentinel removals are 100 percent completed in Caillou Bayou (Terrebonne), Isle Dernieres (Terrebonne), and Lake Barre (Terrebonne). Orleans and St. Tammany Branch demobilize all 11 protection barges. Snorkel SCAT surveys Pelican Island. Nothing significant is found.

December 5, 2010 – Day 230: SCAT Team 3 meets with the Louisiana Department of Wildlife and Fisheries and successfully completes Stage III survey of Middle Ground (North Pass). Vessel *Beau Rivage* returns to port. Communications indicate that no oil is noted on its nets and only two tar balls are collected.

December 8, 2010 – Day 233: The New Orleans and St. Tammany branches close.

December 16, 2010 – Day 241: Orange Beach, Ala., mechanical beach cleaning completes.

December 17, 2010 – Day 242: UAC functions transition to the GC-IMT. Coast Guard Captain Stroh relieves Coast Guard Rear Admiral Zukunft as the FOSC. The FOSC for the *Deepwater Horizon* spill returns to reporting to the Eighth Coast Guard District. The OSAT releases the *Summary Report for Sub-sea and Sub-surface Oil and Dispersant Detection: Sampling and Monitoring Report*. The report includes an analysis of water and sediment samples that represent a subset of the data collected by the Sub-surface Monitoring Program that is most relevant to the primary response questions addressed by the OSAT. A National Park Service archaeologist determines that 80 percent of segment 17 (approximately 1,761 feet) in East Ship Island, Miss., should not continue recovery efforts due to artifacts found in the area. At Grand Isle in Jefferson Parish, the mechanical removal of tar mats is suspended by the State Park Manager until further notice.

December 18, 2010 – Day 243: Captain James Hanzalik relieves Captain Lincoln Stroh as the FOSC.

December 20, 2010 – Day 245: The piling removal subcontractor removes all nine pilings from Bayou Thomas in Orleans Parish. Auguring under the Hesco Baskets in Fourchon Beach completes, with the exception of the sensitive areas identified by archeologists. All carpet boom remaining in St. Tammany (approximately 900 feet) is removed.

December 21, 2010 – Day 246:

Daily statistical snapshot:

Total number of vessels:	260
Total number of responders:	6,170

January 03, 2011 – Day 259: Florida organizational restructuring and a safety demobilization is conducted for all response personnel. A Technical Advisory Group meeting is held to discuss recent bird captures.

January 04, 2011 – Day 260: Hammond Wildlife Rehabilitation Center temporarily re-opens due to oiled birds recently captured.

Daily statistical snapshot:

Total number of vessels	345
Total number of responders	5,428

January 5, 2011 – Day 261: In Plaquemines, Lafourche, and Jefferson Parish, Natural Resource Advisors begin assignments within the operations section of each branch.

January 6, 2011 – Day 262: The FOSC visits the Mississippi Branch and flies over the island operations.

January 7, 2011 – Day 263: Louisiana Piling Removal Project: the divers and equipment demobilize after completion of survey and piling recovery and removal activities. The Environmental Unit's sampling team collects a site closure sample at the Hopedale facility.

January 12, 2011 – Day 268: The Florida Branch location at Mary Esther opens. A consultation meeting between the FOSC and eleven federally recognized tribes occurs.

January 14, 2011 – Day 270: The Tampa, Fla., dry dock site closes and demobilizes. Louisiana National Guard barge commences demobilization and is replaced by a commercial barge.

January 15, 2011 – Day 271: The sand relocation project completes with 34,000 cubic yards of sand relocated in Grand Isle, La. Four hundred feet of containment boom is deployed in Southwest Pass due to tar mat excavation.

January 17, 2011 – Day 273: Alabama Sand Shark operations are suspended due to efficiency of operations. Three helicopters demobilize from Mobile, Ala., and Houma, La.

January 19, 2011 – Day 275: Power Sifters CD1 and CD3 are demobilized from Pensacola, Fla.

January 20, 2011 – Day 276: The Technical Advisory Group meets to discuss transition of responsibilities from the Wildlife Branch to the Natural Resource Damage Assessment (NRDA). The Hesco Basket Removal Project Plan is signed.

January 21, 2011 – Day 277: Marsh Island Refuge in Cypremort Point releases one rehabilitated white pelican and three brown pelicans. The Louisiana National Guard helicopter associated with the Louisiana National Guard barge demobilizes from the response. Dredging begins at Little Lagoon Cut on Dauphin Island, Ala.

January 22, 2011 – Day 278: Dauphin Island Sand Berm removal project completes, and equipment demobilization commences. Beach maintenance duties of Harrison County, Miss., beaches are transferred to the county.

January 23, 2011 – Day 279: The Orphan Anchor Pilot Program approves one location in Lake Borgne, St. Bernard Parish for use.

January 29, 2011– Day 285: Phase one of the Orphan Anchors Retrieval Program begins.

Sources of data:

Unified Area Command Executive Summary daily reports from April 25, 2010, to December 14, 2010.

Unified Area Command Executive Summary weekly reports from December 15, 2010, to January 24, 2011.

Presidential Commission Report, January 2011, Chapter 5 “You’re in it now, up to your neck!”

BP Gulf of Mexico Response, Response Timeline located at <http://www.bp.com/>

Daily UAC and NIC reports located in the Homeland Security Information Network (HSIN).

Department of the Interior press releases.

State of Louisiana Office of Governor Press Release located at www.gov.louisiana.gov/

Press releases and official EPA letters contained at the EPA Response to BP Spill in the Gulf of Mexico website <http://www.epa.gov/bpspill/index.html>.

Department of Health and Human Services Press releases contained at the BP Gulf Spill Response website located at: <http://www.hhs.gov/gulfoilspill/index.html>.

Controlled Burns After Action Report for Burns for May 28, 2010 to August 3, 2010, dated August 8, 2010.

