Oil and Hazardous Materials Response Reports

October 1995-September 1996

December 1996

National Oceanic and Atmospheric Administration
Office of Ocean Resources Conservation and Assessment
Hazardous Materials Response and Assessment Division
Seattle, Washington 98115

00R003

Contents

INTRODUCTION

Between October 1, 1995 and September 30, 1996, NOAA's Hazardous Materials Response and Assessment Division Scientific Support Coordinators and scientific staff were notified of 69 spill incidents. These 69 incidents included potential spills, false alarms, and very minor spills for which reports were not prepared. Technical and operational assistance provided to the U.S. Coast Guard for spill incidents in the Nation's coastal zone included 48 oil spills, 15 chemical spills, 3 spills of unknown material, and 3 miscellaneous spills. In addition to the spills listed, NOAA assisted the U.S. Coast Guard with 35 simulation exercises.

This volume of reports follows the format established for the Oil Spill Case Histories Report prepared in 1992 by the Division with U.S. Coast Guard Research and Development Center support so that major spills meeting the criteria for inclusion may be incorporated easily into updated case histories reports.

Each report in this volume is organized as follows:

- A list of headers that summarizes the spill name; location; product; size; use of dispersants, bioremediation, and in-situ burning; other special interests; shoreline types affected; and keywords.
- A brief *incident summary* including weather conditions and description of the overall spill response.
- A description of the behavior of the spilled material including movement, evaporation, mousse formation, and dispersion.
- A discussion of countermeasures and mitigation.
- A description of other *special interest issues* such as communication problems, unusual hazards encountered, and large losses of organisms.
- A list of *references* that document the response operations.

Although the master list on the following pages includes all of the incidents for which the Division provided support, only those incidents where the pollutant actually entered the environment are reported on in this volume. These reports are abbreviated and are meant to serve only as a summary of the Division's response to requests from Federal On-Scene Coordinators for each of the events.

Additional details on any of the responses may be obtained from the appropriate Scientific Support Coordinator or U.S. Coast Guard office.

Spill Report Keys

Name of Spill:

NOAA SSC:

Date of Spill (mmddyy)**:**

Location of Spill: text description

Latitude: degrees, minutes, N or S

Longitude: degrees, minutes, E or W

Spilled Material: specific product

Spilled Material Type:

Type 1 - Very Light Oils (jet fuels, gasoline)
Type 2 - Light Oils (diesel, No. 2 fuel oil, light crudes)
Type 3 - Medium Oils (most crude oils)
Type 4 - Heavy Oils (heavy crude oils, No. 6 fuel oil, bunker c)
Type 5 - Hazardous material

Barrels (or weight in pounds if hazardous material):

Source of Spill: tank vessel, non-tank vessel, barge, facility, pipeline, platform

Resources at Risk: See A

Dispersants: Yes or No

Bioremediation: Yes or No

In-situ Burning: Yes or No

Other Special Interest:

Destruction of marshes, mangroves, or tidal flats
Extraordinarily successful salvage operations
Massive habitat loss
Massive wildlife impact
Oil/ice interactions and adverse weather conditions
Unusual, experimental, or innovative cleanup techniques

Shoreline Types Impacted: See B

Keywords: See C

Incident Summary:

Date and time of incident
Location of incident
Weather at time of incident
Summary of events
Actions of responsible party and response organizations
Level of federal involvement
Duration of response

Behavior of Spilled Material:

Formation of slicks, sheen, or mousse
Movement on the water of spilled material
Movement in the air of spilled material
Areas impacted
Amount spilled; amount recovered
(land, sea, contaminated debris)
Amount not recovered
(sinking, evaporation, weathering, dissolution)

Countermeasures and Mitigation:

Control at incident site
Offloading and lightering operations; movement of vessel
Precautionary protection of sensitive areas
Open water recovery
Shoreline cleanup
Removal and disposal of spilled material or
contaminated debris

Other Special Interest Issues: See D

NOAA Activities:

Involvement in response (on-scene, by phone and fax)
Support provided
Participation in committees and special projects
Unusual responsibilities
Meetings attended/recommendations made
Duration of NOAA support

References:

Spill Report Keys

A **Resources at Risk**

Habitats
(See *shoreline types* key below), eelgrass beds, submerged aquatic vegetation (SAV), kelp, coral reefs, worm beds

Marine Mammals
Whales, dolphins, sea lions, seals, sea otters, manatees, walruses, polar bears, population concentration areas, haulouts, migration routes, seasonal use areas

Terrestrial Mammals
Mustelids, rodents, deer, bears, population concentration areas, intertidal feeding areas

Birds
Diving coastal birds, waterfowl, alcids, petrels, fulmars, shorebirds, wading birds, gulls, terns, raptors, rookeries, foraging areas, wintering areas, migration stopover areas, wintering concentration areas, nesting beaches, migratory routes, critical forage areas

Fish
Anadromous fish, beach spawners, kelp spawners, nursery areas, reef fish (includes fish using hard-bottom habitats), spawning streams, spawning beaches, estuarine fish, demersal fish

Mollusks
Oysters, mussels, clams, scallops, abalone, conch, whelk, squid, octopus, seed beds, leased beds, abundant beds, harvest areas, high concentration sites

Crustaceans
Shrimp, crabs, lobster, nursery areas, high concentration sites

Reptiles
Sea turtles, alligators, nesting beaches, concentration areas

Recreation
Beaches, marinas, boat ramps, diving areas, high-use recreational boating areas, high-use recreational fishing areas, State Parks

Management Areas
Marine Sanctuaries, National Parks, Refuges, Wildlife Preserves, Reserves

	Resource Extraction Subsistence, officially designated harvest sites, commercial fisheries, power plant water intakes, drinking water intakes, industrial water intakes, intertidal and subtidal mining leases, fish/shrimp/bivalve/plant aquaculture sites, log storage areas Cultural Archaeological sites, Native American Lands
B	**Shoreline Types Impacted**
	brackish marshes coarse gravel beaches coarse sand beaches coastal structures consolidated seawalls consolidated shores cypress swamps developed upland eroding bluffs exposed bedrock bluffs exposed bluffs exposed fine sand beaches exposed riprap exposed rocky platforms exposed rocky shores exposed scarps exposed seawalls exposed tidal flats exposed tidal flats (low biomass) exposed tidal flats (moderate biomass) exposed unconsolidated sediment bluffs extensive intertidal marshes extensive salt marshes extensive wetlands fine sand beaches flats freshwater flat freshwater marshes freshwater swamps fringing salt marshes fringing wetlands hardwood swamps levees low banks mangroves marshes mixed sand and shell beaches

mixed sediment beaches
piers
riprap
salt marsh
saltwater marshes
sand/gravel beaches
shell beaches
sheltered bedrock bluffs
sheltered fine-grained sand beaches
sheltered impermeable banks
sheltered mangroves
sheltered marshes
sheltered rocky shores
sheltered seawalls
sheltered tidal flats
shelving bedrock shores
spoil bank
supratidal marshes
swamp
tidal mudflat
unforested upland
unvegetated steep banks and cliffs
vegetated bluffs
vegetated low banks
vegetated riverbank
vertical rocky shores
wavecut platforms

C Key words

Abandoned Barge Act
air-activated pumps
ARTES
bioremediation
Centers for Disease Control
Clean Bay Inc.
containment boom
Corexit 9527
DBRC
dispersant
endangered species
evaporation
exposed rocky shores
filter fences
Food and Drug Administration
ground truth
high-pressure, warm-water washing
hydro-blasting

	in-situ burning International Bird Rescue and Research Center International Tanker Owners Pollution Federation (ITOPF) low-pressure washing NAVSUPSALV NOAA National Marine Fisheries Service Laboratory Pacific flyway potential spill propane cannons remote sensing reoiling RIDS (Response Information Data Sheets) salvage seafood harvesting ban shallow water recovery siphon dams skimmers SLAR (side-looking airborne radar) smothering sorbent boom sorbent pompoms starshell-type device tourism losses vacuum trucks volunteers weed cutters weir/pump skimmer
D	**Other Special Interest Issues**
	Effects to tourism, recreation areas, or personal property Closure of commercial or recreational fishing areas and public lands Closure of shipping lanes and vehicle traffic routes Wildlife impacts and rehabilitation Ecological destruction and habitat loss due to spilled material impacts Ecological destruction and habitat loss due to cleanup operations Effects to human health and safety Bioremediation, dispersant, in-situ burning operations Unusual, experimental, or innovative cleanup techniques Complex successful salvage operations Logistical or operational problems (including adverse weather conditions) Interaction with foreign or Native authorities Media interest Volunteer response and organization Studies conducted; ongoing research

FY 96 Spills
October 1, 1995—September 30, 1996

Date of Incident	No.	Report Name/Hotline Number	Commodity Involved	USCG District	NOAA Involvement
01 Oct 95	1	Koch Sulfur Products Wilmington, NC	sulfuric acid	5	phone/fax
05 Oct 95	2	Hurrican Opal response* Mobile, AL	miscellaneous	8	1 on-scene
06 Oct 95	3	Abandoned bunker barges Norfolk, VA	waste oil potential	5	phone/fax
11 Oct 95	4	Apex barge 3512 New Orleans, LA	group t oils	8	2 on-scene
21 Oct 95	5	T/B *Patricia Sheridan*/184 Charleston, SC	dioxin in dredge spoil	7	
30 Oct 95	6	F/V *Pioneer* Santa Cruz Island, CA	diesel	11	phone
08 Nov 95	7	ACOE barges* Portland, OR	diesel, lube	13	phone
13 Nov 95	8	Jet* New Orleans, LA	jet fuel	8	phone
17 Nov 95	9	PCB Spill* Bremerton, WA	PCB	13	phone
05 Dec 95	10	Tesoro Tank Spill Nikiski, AK	North Slope Crude	17	phone
06 Dec 95	11	Bird mortality* Outer Washington Coast, WA	dead birds	13	phone
06 Dec 95	12	Mystery Spill* Strait of Juan de Fuca	unknown	13	phone
14 Dec 95	13	Crowley Barge* Washington Coast	dry urea	13	phone
15 Dec 95	14	West Cameron Block 198 Cameron, LA	crude oil	8	1 on-scene
17 Dec 95	15	Chevron Platform/185 Sabine Pass, TX	gas condensate	8	

* indicates spills for which no report is necessary

Date of Incident	No.	Report Name/Hotline Number	Commodity Involved	USCG District	NOAA Involvement
31 Dec 95	16	Morania 430* New Haven, CT	#2 oil	1	phone
03 Jan 96	17	San Diego Mystery* San Diego, CA	unknown	11	phone
09 Jan 96	18	Texaco pipeline Venice, LA	crude oil	8	1 on-scene
10 Jan 96	19	Dan Transport Warehouse Fire Elizabeth, NJ	boron trichloride	1	1 on-scene
11 Jan 96	20	Mystery* Morgan City, LA	unknown	8	phone
13 Jan 96	21	F/V *Venus** Wanchese, NC	diesel	5	potential
13 Jan 96	22	Well blowout* Bay St Louis, MS	natural gas	8	phone
17 Jan 96	23	Jack up rig* Morgan City, LA Gulf of Mexico	oil	8	phone
18 Jan 96	24	M/V *Claudia*/186 New York Harbor, NY	n-butyl isocyanate carbonyl iron powder	1	1 on-scene
19 Jan 96	25	Barge 45* Tarrytown, NY	#2 oil	1	phone
19 Jan 96	26	Tub *Scandia*/187 Point Judith, RI	diesel	1	8 on-scene.
19 Jan 96	27	T/B 106 Fort Eustis, VA	gasoline	5	
28 Jan 96	28	Natural gas leak Morgan City, LA	natural gas	8	phone
03 Feb 96	29	El Cajon Train Derailment/188 Cajon Junction, CA	diesel, hazardous materials	11	1 on-scene
03 Feb 96	30	M/V *Protagoras** Virginia Beach, VA	fuel oil diesel	5	phone
05 Feb 96	31	T/V *Tiempo Bueno** Newport, OR	diesel	13	phone
08 Feb 96	32	Burlington Northern Train/189* Steilacoom, WA	Boric acid/diesel	13	1 on-scene

Date of Incident	No.	Report Name/Hotline Number	Commodity Involved	USCG District	NOAA Involvement
12 Feb 96	33	Bouchard Barge/190 Hart Island, NY	#2	1	
12 Feb 96	34	Newport Pier Spill/191 Newport, OR	Bunker C	13	
13 Feb 96	35	Texaco pipeline* Baymen Lake, LA	crude oil	8	1 on-scene
16 Feb 96	36	M/V *Citrus** Pribilof Islands, AK	heavy oil	17	phone
24 Feb 96	37	M/V *FMG America** Baltimore, MD	fuel oil	5	phone
29 Feb 96	38	F/V *All American** St. George Island, AK	diesel, lube oil, hydraulic fluid	17	phone
03 Mar 96	39	U.S. Navy Point Loma Fuel Pier San Diego, CA	JP-5 jet fuel	11	1 on-scene
09 Mar 96	40	M/V Mare Queen* Houston, TX	virgin gas oil	8	1 on-scene
09 Mar 96	41	Cumene spill* Mobile, AL	cumene	8	phone
11 Mar 96	42	Pelican Island* Galveston, TX	naphtha	8	phone
15 Mar 96	43	Baker Bay Tire Fire/192 Ilwaco, WA	miscellaneous	13	2 on-scene
18 Mar 96	44	Barge *Buffalo 292*/193 Galveston Bay, TX	marine diesel	8	
22 Mar 96	45	ship channel* Corpus Christi, TX	diesel	8	phone
04 Apr 96	46	Asylum Slough Napa, CA	marine diesel, lube oil	11	1 on-scene
04 Apr 96	47	shipping lanes Corpus Christi, TX	perchloroethyene	8	phone
20 Apr 96	48	T/B *TM1-11*/194 Flagler Beach, FL	caustic soda	7	1 on-scene
02 May 96	49	Heritage Platform Santa Barbara, CA	Hondo crude	11	1 on-scene

Date of Incident	No.	Report Name/Hotline Number	Commodity Involved	USCG District	NOAA Involvement
11 May 96	50	Mystery Chemical Spill Unalaska, AK	lead-based paint	17	phone
14 May 96	51	Chevron Pipeline/ 195 Pearl Harbor, HI	#6	14	1 on-scene
17 May 96	52	collision *Saudi Makkah* Norfolk, VA	#6	5	phone
17 May 96	53	leaking container* Baltimore, MD	calcium carbide	5	phone
26 May 96	54	Barge *Buffalo 286*/196 Galveston Bay, TX	#6 fuel oil	8	5 on-scene
06 Jun 96	55	F/V *Provider** Yunaska Island, AK	diesel	17	phone
08 Jun 96	56	Mendenhall Wetlands Juneau, AK	diesel	17	phone
21 Jun 96	57	Barge *MF12*/197 New Orleans, LA	marine diesel	8	1 on-scene
02 Jul 96	58	T/V *Provence*/198 Piscataqua River, NH	#6	1	1 on-scene
17 Jul 96	59	Lime barge* Admiralty Point Puget Sound	limestone	13	phone
18 Jul 96	60	M/V *Hyundai Emperor* Pacific Ocean	lube oil	14	phone
18 Jul 96	61	TWA Flight 800/199 Moriches Inlet, NY	JP-1, lube oil	1	1 on-scene
07 Aug 96	62	Everett pipeline spill Everett Harbor, WA	mixed waste oils	13	phone
10 Aug 96	63	Abandoned well Venice, LA	hydrogen sulfide	8	phone
11 Aug 96	64	F/V *Lady Luck* Cape May, NJ	diesel fuel	5	phone
13 Aug 96	65	Samedon oil field Cameron, LA	crude oil	8	1 on-scene
15 Aug 96	66	BP Oil Refinery Fire* Lima, OH		5	phone

Date of Incident	No.	Report Name/Hotline Number	Commodity Involved	USCG District	NOAA Involvement
23 Aug 96	66	unknown spill Mobile, AL	bilge oil	8	phone
28 Aug 96	67	Koch Gateway piping DeLaCroix, LA	natural gas	8	phone
06 Sep 96	68	Occidental Chemical/200 Muscle Shoals, AL	potassium hydroxide	8	phone
13 Sep 96	69	Apache Corp pipeline Golden Meadows, LA	crude oil	8	phone

FY 96 Drills and Scenarios

October 1, 1995—September 30, 1996

Type	Area	Drill Description	Date Requested	Date Sent
drill	Strait of Juan de Fuca, WA	Movie	10/5/95	10/11/95
drill	New York Harbor, NY	TAT	10/5/95	10/22/95
real-time drill	Los Angeles Harbor, CA	Verbal	10/16/95	10/16/95
drill	Savannah River, GA	TAT	10/12/95	10/29/95
PREP Drill	Corpus Christi, TX	TAT	10/20/95	12/4/95
PREP drill	Charleston, SC	TAT	12/5/96	1/25/96
PREPdrill	Lanai-Molok, HI	TAT	12/6/95	12/8/95
MSO drill	Southeast AK	TAT	12/18/95	12/18/95
drill	South San Diego, CA	LE movie	12/18/95	3/7/96
PREP drill	Strait of Juan de Fuca, WA	TAT	1/16/96	4/18/96
MSO planning	Lower Cook Inlet, AK	LE movie	1/8/96	1/25/96
MSO planning	Coos Bay, OR	TAT	3/4/96	5/22/96
MSO drill	Lanai-Molok, HI	TAT	3/7/96	3/11/96
OSC training	Chesapeake Bay, MD	TAT	3/13/96	3/14/96
PREP	Green Bay, WI	TAT	4/19/96	5/26/96
Navy facility	Suisun Bay, CA	TAT	4/24/96	5/28/96
Industry PREP	Kill Van Kull, NY	TAT/movie	5/23/96	6/4/96
USCG drill	Monterey Bay, CA	TAT	5/22/96	5/31/96
USCG drill	Housatonic River, CT	TAT	5/30/96	6/7/96
PREP	Barbers Point, CA	TAT	6/24/96	9/3/96
USCG drill	Astoria, OR	TAT	6/25/96	8/23/96
Navy drill	Chesapeake Bay, MD	LE movie	6/17/96	6/24/96
Canadian drill	St. Lawrence River, MI	TAT	7/15/96	9/6/96
Canadian drill	Grand Manan, MI	TAT	7/17/96	9/12/96
Navy drill	Dyes Inlet, WA	TAT	7/22/96	8/5/96
BP drill	Maumee River, WI		7/25/96	
Area Plan review	MSO Detroit, MI	Area Plan	7/24/96	8/21/96
RP drill	Salem, MS	TAT	8/2/96	8/22/96
MSO drill	Portland, ME	TAT	8/2/96	8/26/96
Navy drill	Bremerton, WA	real-time	8/21/96	8/21/96
MSO drill	Buffalo, NY	real-time	8/21/96	8/21/96
UNOCAL drill	Upper Cook Inlet, AK	TAT	9/4/96	9/4/96
USMC drill	Kaneohe Bay, HI	TAT	9/12/96	9/19/96
Tosco drill	Ferndale, WA	TAT	9/13/96	
MSO drill	Pismo, CA	real-time	9/24/96	9/24/96

U.S. Coast Guard District 1

Name of Spill:	Mystery Spill
NOAA SSC:	Ed Levine
USCG District:	1
Date of Spill:	10/23/95
Location of Spill:	lower Delaware Bay
Latitude:	38°56.8′ N
Longitude:	75°04′ W
Spilled Material:	heavy black oil
Spilled Material Type:	4
Amount:	3 barrels
Source of Spill:	unknown
Resources at Risk:	**Birds:** diving coastal birds, waterfowl, terns, raptors, migration stopover areas, migratory routes **Fish:** anadromous fish, nursery areas, estuarine fish **Mollusks:** oysters, mussels, clams, seed beds, abundant beds, harvest areas **Recreation:** high-use recreational boating areas, high-use recreational fishing areas **Resource Extraction:** bivalve aquaculture sites
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	DBRC, skimmers

Incident Summary:

On October 23, 1995, the U.S. Coast Guard (USCG) Marine Safety Office (MSO) in Philadelphia was contacted by USCG Air Station Cape May, New Jersey about an oil slick sighted in the lower Delaware Bay. The slick was described as black oil measuring approximately 100 meters by 50 meters. Weather at the time of the incident was warm with winds less than 10 knots.

The USCG contracted with Delaware Bay and River Coop (DBRC) to send a skimmer to the scene and recover the floating oil.

Duration of response was one day.

Behavior of Spilled Material:

The oil appeared to be a bilge oil. It remained a cohesive slick for the duration of the response. The size of the slick also remained fairly constant. No shorelines were impacted. Approximately three barrels of oil were recovered by the skimmer.

Countermeasures and Mitigation:

Open-water recovery was conducted by the DBRC skimmer.

NOAA Activities:

NOAA was notified of this incident on October 23, 1995, by the Regional Response Team (RRT) representative who was concerned about the possible amount of oil that could be in the slick. Speculations were as high as 56,000 gallons. The Scientific Support Coordinator (SSC) calculated that there were only three barrels (126 gallons) of oil on the water.

The SSC was also contacted by the MSO to provide trajectory information. NOAA predicted that there would be no land impacts within the next 24 to 48 hours.

NOAA supported this response for several hours.

References:

NOAA. 1996. *ADIOS™ (Automated Data Inquiry for Oil Spills) User's Manual.* Seattle: Hazardous Materials Response and Assessment Division, NOAA. 50 pp.

Name of Spill:	Dan Transport Warehouse Fire
NOAA SSC:	Ed Levine
USCG District:	1
Date of Spill :	01/10/96
Location of Spill:	Elizabeth, New Jersey
Latitude:	40°41′ N
Longitude:	74°09′ W
Spilled Material:	boron trichloride
Spilled Material Type:	5
Amount:	five 1-ton cylinders
Source of Spill:	warehouse
Resources at Risk:	human health, birds, and fish
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	health and safety issues, evacuation, media interest
Shoreline Types Impacted:	consolidated seawalls, consolidated shores, piers, riprap
Keywords:	none

Incident Summary:

On January 10, 1996, the USCG Captain of the Port (COTP) New York (NY) was notified of a six-alarm warehouse fire, cause unknown, in Port Elizabeth, New Jersey. The fire caused the release of an unknown quantity of boron trichloride and other unknown materials. The weather on-scene was partly cloudy with winds northwest at 17 knots. There were more than two feet of snow on the ground.

The weight of the snow and loss of structural integrity caused the warehouse roof to collapse. Several cylinders housed in the building exploded, causing a large mushroom cloud that reached Staten Island.

The New Jersey Department of Environmental Protection (DEP), Port of Elizabeth Fire Department, and the New York City DEP responded to the scene. Local health departments issued health advisories and the United States Environmental Protection Agency (EPA) performed air monitoring and water sampling on-scene.

The response lasted one day.

Behavior of Spilled Material:

The fire, located in an industrial zone several hundred feet from Newark Bay, caused a smoke plume that moved with the wind towards Staten Island. Odors were reported by area residents and 200 people were evacuated from the vicinity. The EPA sampled water runoff and determined that the Elizabeth Channel had not been impacted. No injuries or casualties were reported.

Countermeasures and Mitigation:

Site control was established by the Port of Elizabeth Fire Department and, as a precaution, dikes were built to channel water away from sensitive areas. Water-recovery operations were not undertaken and shoreline cleanup was not necessary. Spilled material and contaminated debris were removed and disposed of.

Other Special Interest Issues:

Effects to human health and safety were monitored by state and federal officials. The results of the monitoring warranted closing commercial areas and evacuating a furniture store.

Media interest was high due to the spectacular visual images of the fire.

NOAA Activities:

NOAA was notified of this incident at 2200 on January 10, 1996, by the USCG. The SSC was asked to report to the USCG Crisis Action Center on Governors Island, New York.

The SSC supplied support material from reference guides and summary information. The major concern from the boron trichloride was the generation of hydrochloric acid when mixed with water. The slight possibility of the generation of dioxins was also noted. Due to the intense heat from the fire, most of the hazardous substances were incinerated and monitoring showed minimal impact and concerns near the incident.

NOAA supported this incident for approximately two hours.

References:

Association of American Railroads (AAR) 1991. *Emergency Materials in Surface Transportation*. Washington D.C.: Bureau of Explosives.

NOAA. 1993. *The CAMEO™ 4.0 Manual*. Washington, D.C.: National Safety Council. 440 pp.

Lewis, Sr., Richard J.. 1992. *Sax's Dangerous Properties of Industrial Materials, Eighth Edition: Volume I*. ISBN 0-442-01276-4. New York: Van Nostrand Reinhold. 743 pp.

Name of Spill:	M/V *MSC Claudia*
NOAA SSC:	Ed Levine
USCG District	1
Date of Spill:	1/17/96
Location of Spill:	Newark, New Jersey
Latitude:	74°9′ N
Longitude:	40°0′ W
Spilled Material:	n-butyl isocyanate
Spilled Material Type:	5
Amount:	36 fifty-five gallon drums
Source of Spill:	non-tank vessel
Resources at Risk:	human health exposure
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	man-made shoreline
Keywords:	none

Incident Summary:

The M/V *MSC Claudia*, steaming from Europe to Boston, encountered heavy weather and lost 23 containers overboard, presumably along the coast of Ireland. Upon nearing U.S. waters, the vessel contacted the USCG and other local authorities, reporting that she had damage to containers, two of which were listed on the dangerous cargo manifest (DCM). The products of concern were n-butyl isocyanate (thirty-six 55-gallon drums) and carbonyl iron powders (100 drums [9,500 kilograms]). The container carrying the n-butyl isocyanate was damaged, but there was no evidence that any drums inside were breached. The carbonyl iron powder containers showed no signs that the contents had spilled.

Based on information from NOAA's science team and more specific information from the shipper of the n-butyl isocyanate (Bayer Corp.), the USCG, Boston Fire Department, Massachusetts Port Authority, the shipping agent, and the NOAA SSC began developing contingency plans for surveying and offloading the vessel. The vessel was due to arrive at Boston Harbor at 2300 January 16, 1996. She was ordered to remain at the outer anchorage until a contracted survey team and the USCG could board her and assess the risks of bringing her into the inner harbor. The vessel was not allowed to offload the damaged containers until the next day

Because of the delays expected in Boston overnight, the *MSC Claudia* determined it was in her best interest to steam to her next port of call, New York. She requested and received permission from the USCG and changed course for New York. Collected information about the ship and her cargo, contingency planning in progress, and information on the dangerous cargo were forwarded to COTP New York and the New York NOAA SSC.

The M/V *MSC Claudia* arrived at the Ambrose Pilot anchorage on the morning of January 17, 1996. COTP NY and New York City Fire Department Hazardous Material Team personnel boarded the vessel to inspect the condition of containers. The 20-foot

isocyanate container was damaged on one corner where it had been apparently struck by another container. There was no evidence of breaching or spilling of the hazardous liquid. Fire department personnel took HNu readings and found only background levels. Several fasteners were broken. The 40-foot iron powder container was laying on a refrigerated container at approximately a 30-degree angle but showed no evidence of cargo spillage.

The USCG COTP NY called a meeting at 1500 of New Jersey DEP, Port Authority of New York/New Jersey, Protection and Indemnity MSC (insurers and their lawyer), Union City Office of Emergency Management (OEM), and NOAA to discuss options for the vessel. As the on-scene inspection offered little evidence of drum failures, the ship was given permission to arrive at berth in Port Newark on the morning of January 18. Site safety plans were to be developed and approved by the USCG and New Jersey DEP before cleanup activities were begun. Bayer was supplying their own hazardous material response team to remove the container and deliver the cargo to its final destination. MSC hired another company to handle the iron powder.

Behavior of Spilled Material:

N-butyl isocyanate is a clear, colorless liquid with a flash point of 70°F that is used as an additive in paint to inhibit mildew formation. In low concentrations its vapors are irritating to the eyes and mucous membranes. In higher concentrations it is toxic by inhalation. It is lighter than water, insoluble in water, and very slowly decomposed by water. Its vapors are heavier than air and toxic oxides of nitrogen are produced during combustion of this material.

N-butyl isocyanate is poisonous and may be fatal if inhaled, swallowed, or absorbed through the skin. Contact may cause burns to skin and eyes. At a level of concern of 1 part per million (ppm) a release of one 55-gallon drum could yield a plume of about 2.4 miles. Runoff from fire control or dilution water may cause pollution.

The chemical was confined to the container. None was released into the atmosphere.

Countermeasures and Mitigation:

The USCG initiated an Incident Command System at the incident site. The New Jersey DEP began emergency removal operations and the vessel's movements were directed by the COTP NY. *MSC Claudia* was held at the Ambrose Light for inspection and until conditions became amenable to safely proceed to dock in Newark Bay.

Removal and disposal of damaged containers were performed by the responsible party (RP) (Bayer) Emergency Response Team.

NOAA Activities:

NOAA was notified of this incident on January 16, 1996, by the COTP NY. The SSC attended a meeting with the COTP NY to plan for response activities after the vessel arrives at dock. The SSC ran ALOHA™ predictions for the isocyanate and relayed the information to responders. This incident was treated as a delicate situation.

NOAA supported this response for one afternoon.

References:

Association of American Railroads (AAR). 1991. *Emergency Materials in Surface Tansportation*. Washington D.C. Bureau of Explosives.

NOAA. 1992. *The ALOHA™ 5.1 Manual for the Apple Macintosh and IBM Compatibles*. Washington, D.C.: National Safety Council. 350 pp.

NOAA. 1993. *The CAMEO™ 4.0 Manual*. Washington, D.C.: National Safety Council. 440 pp.

Name of Spill:	Barge *North Cape*
NOAA SSC:	Stephen Lehmann
USCG District:	1
Date of Spill:	01/19/96
Location of Spill:	Narragansett, Rhode Island
Latitude:	42°21.7′ N
Longitude:	071°34.9′ W
Spilled Material:	#2 fuel/home heating oil
Spilled Material Type:	2
Amount:	19,643 barrels (825,000 gallons)
Source of Spill:	barge
Resources at Risk:	**Fish:** juvenile flatfish, pelagics **Shellfish:** American lobster, surf clams, quahogs, seastars, crabs **Birds:** shorebirds (piping plover), wading and diving birds **Marine Mammals:** harbor seal **Habitats:** barrier beaches, periodically breached and overwashed salt ponds, permanently breached salt ponds, sheltered tidal marshes (within the salt ponds) **Management area:** Trustom Pond National Wildlife Refuge **Recreational:** summer bathing beaches
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest:	naturally dispersed oil, federal fishery closure, fish tainting, organoleptic testing
Shoreline Types Impacted:	Coarse to medium sand beaches, mixed sand and gravel, sheltered tidal marshes
Keywords:	endangered species, ARTES

Incident Summary:

At 1430 Eastern Standard Time (EST) on January 19, 1996, MSO Providence received a call from Station Castle Hill that the tug *Scandia* was on fire. The tug *Scandia* was located some three miles south and west of Point Judith, Rhode Island towing the barge *North Cape*, which was carrying 94,000 barrels of #2 home heating fuel Weather was severe with sustained winds of more than 40 knots from the south-southeast and forecast to increase. The tug *Scandia* was abandoned and USCG Search and Rescue teams were dispatched to assist the crew.

At approximately 2000 EST, a USCG helicopter reported that the barge *North Cape* was aground on Nebraska Shoals, directly adjacent to the Trustom Pond National Wildlife Refuge, owned and operated by the U.S. Fish and Wildlife Service (USFWS). The helicopter further reported that the barge was releasing oil.

The barge *North Cape* spilled oil in two separate releases. The first, released during the height of the initial storm, was 700,000 gallons and the second, less than a day later, was 125,000 gallons. The combination of the type of oil released and the energy of the storm caused great dispersion into the water column. As a result, in the days following the spill, great numbers of shellfish (mostly bivalves and juvenile lobsters) washed ashore. Subsequently, the Rhode Island Department of Health closed more than 200 square miles of commercial fishery in the area of the spill. This closure was coordinated with

the EPA Region One and with NOAA's National Marine Fisheries Service (NMFS), which closed federal fishing grounds using the Magnuson Act. This is the first time federal fisheries have been closed due to oil contamination.

The emergency phase of the response lasted seven days and the on-scene command post was demobilized following the removal of the barge *North Cape* from the beach. Active USCG spill response and assessment continued from the MSO, including re-survey of key impacted recreational and endangered piping plover nesting beaches.

The full re-opening of the Rhode Island fishery was not complete until the middle of June. Organoleptic panels were established to certify that seafood, lobsters, and clams, in particular, were marketable.

Behavior of Oil:

Due to the extreme weather (onshore gale-force winds), the nearshore bathymetry and the light oil, dispersion into the water column was intensive and immediate. NOAA modelers predicted that 80 percent of the initial release (700,000 gallons) was dispersed within six to eight hours of the spill. Modelers from Norway's IKU confirmed these predictions in an unsolicited effort to support the spill science support team.

Surface sheens traveled as far south as the southern end of Block Island (fewer than 15 miles from the source), as far west as Charlestown Breachway, and east to the southern opening of Narragansett Bay. Narragansett Bay, however, was never confirmed to be impacted with any significant amount oil.

The severe weather caused contamination to two salt ponds that are normally protected from the sea by the barrier beach. Trustom Pond experienced a washover precisely ashore of where the barge grounded. Card Pond, a smaller salt pond to the east of Trustom Pond, experienced a breach that allowed direct flushing with the sea. These phenomena resulted in oil contamination and resource impacts.

Sheens in the open waters south of the spill site were gone within five or six days. Sheens remained in the salt ponds and salt marshes, particularly Point Judith Pond in the Trustom Pond (due largely to the fact that the pond remained ice-covered for several weeks) and in the riprap of the Point Judith Harbor of Refuge for as long a two to three weeks following the spill.

The extent of water column and sediment contamination is open to speculation. However, given the location of contaminated lobsters caught for testing, oil was in the water column at depths of greater than 100 feet, up to 15 miles south of the source.

Countermeasures and Mitigation:

Spill impact mitigation measures were mostly ineffective due to the type of oil spilled, the weather, and the current velocities. Of priority and immediate concern were the permanent breachways of Point Judith Pond, Ninigrit Pond (Charlestown Breachway), and the breachways farther west. Although it was not immediately known that both

Trustom and Card ponds were vulnerable to contamination, little could have been done to protect them. Nevertheless, the washover on Trustom Pond was bermed.

Dispersants were approved through the RRT1 concurrence network and deployed to a staging area, along with a C-130 Hercules aircraft with an area dispersant delivery system pack.

Charlestown Breachway/Ninigrit Pond

Boom was deployed inside the Charlestown Breachway at an acute angle to the incoming tidal current (which can run in excess of four knots). Boom was also deployed within the ponds. The breachway booming was much less effective than the pond booming. This booming did not contain large amounts of oil, however.

Point Judith Pond

A booming strategy for Point Judith Pond was developed by the NOAA Scientific Support Team (SST) and sent to the Federal On-Scene Coordinator (FOSC) before the grounding. Due to logistical constraints and insufficient time, the strategy for the inlet was not implemented. Instead, booming was conducted within the pond, protecting individual marsh areas. Again, because of the rapid dispersion of the fuel into the water column, booming was largely ineffective in the pond.

Block Island

The Great Salt Pond on Block Island, the highest resource priority on the island, was boomed at the entrance. Because the oil never impacted this area in significant amounts, the effectiveness of the booming is unknown.

Outer Beaches

No protection was offered for this area as none would have been effective. The beaches, however, required two separate levels of scrutiny regarding cleanup and remediation based on the type of use on the beach; piping plover nesting beaches and recreational beaches.

The piping plover is a small endangered shorebird. As many as 13 nesting pairs are known to have used the beaches in the spill area in previous seasons. The piping plover's vulnerability to oil contamination is virtually unknown, except as oil contamination impacts apply to all shorebirds and their eggs. The "action level" on the plover beaches was agreed to be 100 ppm total hydrocarbons in the sediments.

Another area of concern was the profile of the beach. Following the operations to remove the barge *North Cape* and the tug *Scandia*, the profile of the beach face was severely altered. The USFWS trustees and refuge managers were concernedthat the altered profile would contribute to nest washover.

Neither the oil contamination at greater than 100 ppm nor the profile of the beach required any cleanup activity before the migrating plovers arrived. A few weeks after

the tug *Scandia* was removed, contamination of the sediments dropped below 100 ppm quickly and the beach re-profiled to its natural pre-spill condition.

The "action level" established for the recreational beaches was odor-based. It was felt that, while there existed no real health threat at levels below 100 ppm, the odor of the oil could be detected at well below 1 ppm and that this would create an unacceptable recreational environment. Therefore, the analysis of the beaches, including the Shoreline Assessment Program, was conducted using odor as one of the assessment factors. Teams were asked to smell the sediments and note if they felt the odor of oil was strong, moderate, slight, or not present. Comparison of chemically analyzed sediments and Shoreline Assessment Team remarks showed almost no correlation between "heavy" oiling and strong odor or "light" oiling and slight odor.

None of the beaches required any cleanup measures beyond the removal of some debris.

Other Special Interest Issues:

Two organoleptic testing protocols were established to determine the marketability of the seafood. The first protocol used three trained NMFS sensory specialists who smelled fish and shellfish caught in the closed area. If a single specimen smelled of oil, the area remained closed. Lobsters were trapped in predetermined areas and all specimens within a single catch or trap were chemically analyzed if any smelled of oil. The latter protocol established a panel of ten trained NMFS sensory specialists. Here a false positive was considered a 2 to 8 vote; three or more panelists agreeing was considered a true positive or a true negative.

NOAA Activities:

NOAA was notified of this incident at 1535 on January 19, 1996, by the USCG who requested a trajectory analysis. At 1616 the NOAA Regional Response Team natural resource trustee was paged. The SSC established a nine-member on-scene SST consisting of personnel from the SSC Branch, Modeling and Simulations Studies Branch, Biological Assessment Team (BAT), Research Planning Inc., and Genwest Systems.

- The SST provided trajectory, overflight maps, and weather briefings for six days, and protection strategies to the FOSC for the beachways.

- A science committee was formed consisting of the state and federal scientific resources, university personnel, non-governmental organizations, and the science consultant to the responsible party. The NOAA BAT leader was assigned to chair the committee.

- NOAA (SST and Damage Assessment Center) was instrumental in preventing the destruction of 40,000 pounds of lobsters that were contaminated while in holding pens due to flow-through water systems in Point Judith Pond. These lobsters were allowed to depurate and released back into the impacted area as seed-stock.

- The NOAA SST organized and managed the Shoreline Assessment Teams as well as establishing the Alternative Response Technologies Evaluation System to better manage vendor requests and solicitations.

- The NMFS Research Vessel *Albatross* was used for retrieving sediment, water, and tissue samples from within the spill impact zone.

- NOAA developed several documents designed specifically for the public (through the media) to explain certain complex issues regarding the spill.

- NOAA continued to provide support to the FOSC and State On-Scene Coordinator (SOSC) on fish tainting and seafood contamination issues for several months after the barge was removed from the beach.

References:

Research Planning Institute. 1980. *Sensitivity of coastal environments and wildlife to spilled oil: Massachusetts. An atlas of coastal resources.* Seattle: Ocean Assessments Division, NOAA. 49 maps.

Name of Spill:	Barge *Bouchard B-140*
NOAA SSC:	Ed Levine
USCG District:	1
Date of Spill:	02/12/96
Location of Spill:	Hart Island, New York
Latitude:	40°51.3' N
Longitude:	73°45.8' W
Spilled Material	#2 fuel oil
Spilled Material Type:	2
Amount:	95 barrels (4,000 gallons)
Source of Spill:	Barge
Resources at Risk:	Terrestrial Mammals: mustelids, rodents Birds: waterfowl, shorebirds, wading birds, gulls, terns Fish: demersal fish Crustaceans: lobster Recreation: marinas, boat ramps, high-use recreational boating areas, high-use recreational fishing areas
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	coarse gravel beaches, coarse sand beaches, coastal structures, marshes, mixed sediment beaches, piers, riprap, salt marsh, saltwater marshes, sand/gravel beaches, tidal mudflat
Keywords:	containment boom, skimmers, sorbent boom

Incident Summary:

On February 12, 1996, the barge *Bouchard B-140* reported hitting an unknown object near Hart Island, New York, at the western end of Long Island Sound, and was leaking oil. Weather at the time was winds from the west at 10 to 15 knots, temperature 29°F, and seas 1 to 3 feet. Once the leak was detected the USCG COTP NY was notified and a Pollution Response Team dispatched. Federal involvement in this incident was to monitor the RP's activities and conduct shoreline surveys to document any impacts; none were observed. This response lasted two days.

Behavior of Spilled Material:

The oil formed a sheen about 300 meters long. No land impacts were observed, but residents downwind of the release reported fuel oil odors. Of the 4,000 gallons of oil reportedly released, the contractor recovered 850 gallons outside the boom and 350 gallons inside the boom by skimming. NOAA predicted that 43 percent of the oil would evaporate, 46 percent would naturally disperse in the water column, and 11 percent would remain on the surface 18 hours after the initial release.

Countermeasures and Mitigation:

The crew of the towing tug deployed sorbent boom. Spill contractors boomed the barge with containment boom and recovered product using skimmers within the containment area. The RP brought two barges along side the *B-140* for lightering. Diver surveys found three cracks in the single-hull, which were temporarily plugged. With a skimmer escort, the completely lightered barge was allowed to travel to a dry-dock in Staten Island, New York. Precautionary protection boom was dispatched to sensitive areas identified in the Area Contingency Plan and as directed by the New York State Department of Environmental Conservation. Open-water recovery was conducted by skimmers. Shoreline cleanup was not necessary because the oil did not reach land.

Other Special Interest Issues:

The COTP NY issued a Safety Voice Broadcast closing shipping lanes and vehicle traffic routes for the area around the *B-140*. Initially, media interest was fairly high.

NOAA Activities:

NOAA was notified of this incident on February 12, 1996, by the COTP NY who requested trajectory analyses and weather information. The SSC supported this incident for several hours by phone.

References:

NOAA. 1993. *ADIOS™ (Automated Data Inquiry for Oil Spills) User's Manual.* Seattle: Hazardous Materials Response and Assessment Division, NOAA. 50 pp.

Research Planning Institute. 1985. *Sensitivity of coastal environments and wildlife to spilled oil: Long Island. An atlas of coastal resources.* Seattle: Ocean Assessments Division, NOAA. 41 maps.

Name of Spill:	T/V *Provence*
NOAA SSC:	Stephen Lehmann
USCG District:	1
Date of Spill:	07/01/96
Location of Spill:	Portsmouth, New Hampshire
Latitude:	43°05'50" N
Longitude:	070°47'15" W
Spilled Material:	#6 Fuel Oil
Spilled Material Type:	5
Amount:	21 barrels (880 gallons)
Source of Spill:	tank vessel
Resources at Risk:	**Fish:** juvenile flatfish, pelagics **Shellfish:** American lobster, surf clams, quahogs, seastars, crabs **Birds:** wading and diving birds **Marine Mammals:** harbor seal **Habitats:** sheltered spartina marshes, cobble shoreline, sheltered mudflats, exposed rocky head headlands **Management area:** Great Bay National Estuarine Research Reserve **Recreational:** bathing beaches, recreational fishing and nature areas, sailing
Dispersants:	Dispersants were discussed as a response option, but were not used due to the nature of the oil.
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest:	In the immediate area, oil occupied several levels in the water column depending on the circulation. Lobster gear was very hard-hit due, in part, to the type of materials used in the netting and bait bags.
Shoreline Types Impacted:	sheltered tidal marshes, mud flats, cobble
Keywords:	none

Incident Summary:

At approximately 2245 Eastern Daylight Time, July 1, 1996, (spring tides) during off-loading operations at a Public Service of New Hampshire (PSNH) dock on the Piscataqua River, the T/V *Provence* broke free of 21 mooring lines securing her to the dock. Two 10-inch diameter hoses were severed, releasing approximately 21 barrels (880 gallons) of heavy #6 oil into the river. The vessel had been carrying 250,000 barrels of #6 oil used to generate electricity at the PSNH Newington Station. The *Provence* drifted to the Maine side of the river and grounded in the mud. A rock jammed in the anchor when the vessel retrieved it while preparing to go to anchorage. The fluke of the anchor was held in the open position and punctured the vessel just above the turn of the bilge. There was very little oil in the punctured tank and little, if any, escaped. The hole in the vessel was not discovered for several days.

Behavior of Oil:

The Piscataqua River is a vertically well-mixed system extending as far as Adams Point and into Great Bay. Since the 6.2 API of the spilled product was heavier than the river water, much of the oil sank and quickly formed small droplets. In areas of strong vertical mixing, the oil droplets mixed throughout the water column and appeared near the surface and within the intertidal zone.

Areas with strong vertical mixing include Fox Point, Dover Point, and the west side of Badger Island. The oil droplets that dispersed throughout the water column spread as widely scattered particles. Pools or large puddles of oil along the bottom were considered unlikely due to the strong currents. Although these particles did not tend to aggregate in pools, they did adhere to lobster pots and other oleophilic material.

Countermeasures and Mitigation:

Spill impact mitigation measures were mostly ineffective due to the type of oil spilled and current velocity. Of priority and immediate concern was the Great Bay, itself; all efforts were concentrated on keeping oil out of this area.

Some limited shoreline cleanup was required at shorelines where the oil was brought to the surface by localized vertical flow and distributed along the shore by winds. Cleaning consisted of sorbent materials where access was appropriate.

Other Special Interest Issues:

Because this oil tended to sink or remain neutrally buoyant, it was difficult to convince the public (and many of the spill response organizations) that less than 1,000 gallons had been spilled. Although it was recognized that the threat of this amount of #6 fuel oil was minor, response activities continued longer than predicted.

Several thousand oiled lobsters were purchased by the spiller as a result of the T/V *Provence* spill, however, none were apparently killed outright. Every lobster trap in the river (approximately 4,000) was purchased and replaced by the spiller.

NOAA Activities:

NOAA was notified of this incident on July 1, 1996, by the USCG FOSC who requested trajectory analysis. On July 2 the SSC reported on-scene at the request of the FOSC. The NOAA Regional Response Team natural resource trustee was notified and briefed by the SSC.

NOAA suggested a method to attempt to qualify the amount and depth of the oil droplets; tie sorbent snare at measured depths along an anchored line. These so-called "traps" were placed at various locations recommended by NOAA and examined daily. Although this technique did not yield much oil, it is felt that in a larger spill of similar oil (type 5), it could be very useful determining change over time and oil movement at depth.

The SSC provided trajectory and weather briefings and organized and managed the Shoreline Assessment Teams.

The SSC also developed several documents designed for the public to explain (through the media and meetings) certain complex issues regarding the spill.

The SSC provided support to the FOSC and SOSC on lobster contamination issues during and following the emergency phase of the spill.

References:

Research Planning Institute. 1980. *Sensitivity of coastal environments and wildlife to spilled oil: Massachusetts. An atlas of coastal resources.* Seattle: Ocean Assessments Division, NOAA. 49 maps.

Name of Spill:	TWA Flight 800 Crash
NOAA SSC:	Stephen Lehmann
USCG District:	1
Date of Spill:	07/17/96
Location of Spill:	Long Island, New York
Latitude:	40°39′ N
Longitude:	072°38′ W
Spilled Material:	JP-1 jet fuel oil
Spilled Material Type:	1
Amount:	714 barrels (30,000 gallons)
Source of Spill:	Boeing 747
Resources at Risk:	**Fish:** pelagics **Shellfish:** American lobsters, surf clams, quahogs, seastars, crabs **Birds:** wading and diving birds **Marine Mammals:** harbor seal **Habitats:** sheltered marshes, sand beaches **Recreational:** bathing beaches, recreational fishing and nature areas, sailing
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest:	seaport
Shoreline Types Impacted:	sheltered marshes, sand beaches
Keywords:	none

Incident Summary:

At approximately 2040 Eastern Daylight Time, July 17, 1996, TWA Flight 800 en route from New York's JFK Airport to Paris, exploded off the coast of Long Island, New York. The plane crashed into the ocean with 229 passengers and crew onboard; there were no survivors. JP-1 jet fuel, hydraulic oil, and lube oil were released and burned.

Behavior of Oil:

The impact site was approximately 10 miles offshore of Moriches Inlet. The aircraft was carrying 30,000 gallons of JP-1 and an unknown amount of lube oil. No slicks were reported. Given the method of loss (an explosion followed by a fire), much of the JP-1 or the lube oil was lost. If the JP-1 had spilled directly onto the water and there had been no fire, estimates of the evaporation rate were as high as 70 percent within the first ten hours of the spill. Although the lube oil is considerably more persistent, it did not significantly impact beaches.

Flotsam associated with the spill moved under the influence of local currents and, to different extents, the winds. Contents that were very buoyant (such as seat cushions and insulation), moved more downwind than items that had less freeboard and greater density.

Countermeasures and Mitigation:

Little oil spill mitigation or cleanup actions were taken because so little oil came ashore; although, some oily debris was recovered on shore.

NOAA Activities:

NOAA was notified of this incident on July 17, 1996, by the USCG who requested a trajectory analysis. Trajectories for the oil and the debris were produced and coordinated by the SSC. The debris' movement forecast also included advice as to where victims of the disaster might be located.

The NOAA vessel *Rude* was dispatched to the scene to help recover debris. As part of its survey, the *Rude* used a state-of-the-art multibeam shallow water bathymetric sounder system (SEABAT).

The SSC provided weather forecasts and trajectory analyses throughout the incident.

Name of Spill:	Coal Tar Spill
NOAA SSC:	Ken Barton
USCG District:	9
Date of Spill:	02/22/96
Location of Spill:	Detroit, Michigan
Latitude:	42°17′ N
Longitude:	83°06.3′ W
Spilled Material:	coal tar
Spilled Material Type:	4
Amount:	4,000 to 5,000 gallons.
Source of Spill:	facility
Resources at Risk:	fish
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	underwater recovery in cold weather
Shoreline Types Impacted:	none
Keywords:	none
Incident Summary:	

On February 5, 1996, approximately 5,000 gallons of coal tar were spilled by Great Lakes Steel into the Detroit River, adjacent to Zug Island. The FOSC was MSO Detroit. The cleanup contractor was Marine Pollution Control (MPC). Sheen was recovered by the USCG and sunken coal tar was recovered by MPC using a diver with vacuum hose and strong pump. MPC ran the recovered product through two fractionation tanks and a carbon filter before discharging the water back into the Detroit River.

Behavior of Spilled Material:

The coal tar sank to the bottom of the river and generated some surface sheens. The coal tar remained in the Detroit River alongside Zug Island during the cleanup operation. An unknown amount was recovered.

Countermeasures and Mitigation:

MPC employed a diver to maneuver the vacuum hose to recover the sunken coal tar. The product was delivered to shore for disposal and cleaned water was discharged back into the Detroit River.

NOAA Activities:

NOAA was notified of this incident on February 22, 1996, by MSO Detroit The SSC supported this incident by telephone and fax through February 26, 1996.

Name of Spill:	Log Spill, northern Lake Michigan
NOAA SSC:	Bill Sites
USCG District:	9
Date of Spill:	07/26/96
Location of Spill:	Lake Michigan
Latitude:	44°41.5′ N
Longitude:	086°20.0′ W
Spilled Material:	pine logs
Spilled Material Type:	N/A
Amount:	18,000 to 21,000 logs
Source of Spill:	tug and barge
Resources at Risk:	boaters
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	none

Incident Summary:

On May 22, 1996, approximately 18,000 to 21,000 logs with bark intact, 8 to 10 feet long, 8 to 10 inches around were spilled in northern Lake Michigan three miles west of Point Betsie off Frankfort, Michigan. The logs floated in the northern half of the lake and hit several recreational boats between May 22 and early August 1996. USCG District 9 conducted an overflight on July 26, 1996, after receiving several reports of log sightings off Sturgeon Bay, Wisconsin. USCG District 9 responded to this incident intermittently for several months. The RP (Woodlands Harvesting) was directed to recover all the logs.

Behavior of Spilled Material:

It is assumed that the logs floated in a counterclockwise manner from Point Betsie to the Sturgeon Bay, Wisconsin area over several months.

Countermeasures and Mitigation:

The logs were manually removed by the RP.

NOAA Activities:

NOAA was notified of this incident on July 26, 1996, by USCG District 9 who requested help to focus their search for the logs. The SSC went on-scene at USCG District 9 to assist. The USCG needed an analysis of prevailing lake current. NOAA collected local meteorological data from the previous three months to generate the analysis. The analysis showed weak wind-driven currents flowing, generally, in a counterclockwise direction from Frankfort, Michigan to Sturgeon Bay, Wisconsin. Areas of very weak, or non-existent, currents were indicated around the islands of northeast Lake Michigan. It is believed that logs could have been becalmed in this area for some time then remobilized on random currents.

Name of Spill:	M/V *H.M. Griffith*
NOAA SSC:	Bill Sites
USCG District:	9
Date of Spill:	07/30/96
Location of Spill:	Lake Superior, Whitefish Point, Michigan
Latitude:	46°55′ N
Longitude:	085°15′ W
Spilled Material:	coal
Spilled Material Type:	N/A
Source of Spill:	self-unloading bulk carrier
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	none

Incident Summary:

On July 29, 1996, the M/V *H.M. Griffith*, owned and operated by Canada Steamship Lines, Montreal, Quebec, loaded 31,858 tons of coal from the Superior, Wisconsin Midwest Energy Terminal. The *Griffith* is a 730-foot, 31,600 dead-weight-ton, self-unloading bulk carrier. The *Griffith* also carried 300 metric tons of an IFO 60 (fuel oil #6), 71 metric tons of an IFO 30 (#2), and 12 metric tons of lube oil representing about 113,000 gallons of oil.

At 1100, July 30, 1996, the *Griffith* was in Lake Superior about 20 miles northwest of Whitefish Bay bound for Nanticoke, Ontario, Canada when her Master contacted USCG MSO Sault Ste. Marie to report a fire in the #2 cargo hold, which is approximately 500 feet forward of the fuel tanks. For safety reasons the Master requested permission to jettison 500 tons of burning coal into Lake Superior in about 500 feet of water.

After consulting with MSO Sault Ste. Marie, USCG District 9, and NOAA, the *Griffith* dumped 3,000 tons of coal into 50 to 600 feet of water. The coal was dumped while the vessel was underway so it can be assumed that all the coal was not dumped in one spot.

MSO Sault Ste. Marie also notified Air Station Traverse City, USCG vessels *Katmai Bay* and *Buckthorn*, the U.S. Army Corps of Engineers (USACOE) Detroit District, and the Michigan Department of Environmental Quality. USCG helicopters and vessels stood by to render assistance or evacuate personnel from the *Griffith* if needed.

MSO Sault Ste. Marie inspected the M/V *Griffith* and its cargo before allowing her to proceed to her anchorage near Waiska Bay. The MSO inspection noted no structural damage, normal cargo hold temperatures, and only a minor distortion of the port self-unloading conveyor belt in hold #2. The coal-moisture content of 25 percent and sulfur content of .33 percent were within safe limits. At 0415 on July 31, 1996, the *Griffith* was allowed to depart for Nanticoke, Ontario where the coal would be discharged. The Master and crew closely monitored the temperatures and appearance of the cargo holds for any signs of abnormal heat.

Behavior of Spilled Material:

The coal sank to the bottom of Lake Superior.

NOAA Activities:

NOAA was notified of this incident on July 30, 1996, by USCG District 9. To come to a decision on the *Griffith's* request, the SSC was asked:

- ❒ How will the coal behave?
- ❒ Where will it go?
- ❒ What impacts could it have on the environment?

The three main areas of concern when dumping coal into the aquatic environment are:

(1) The toxic effects from the metals and PAH compounds from the coal into the water column.

(2) The toxic effect associated with the coal particulates in the water column, usually associated with coal powder.

(3) The impacts to benthic communities where the coal was deposited on the lake bottom.

NOAA reported that there were no significant biological resources near the spill; consequently, environmental impacts from this incident should be minimal.

NOAA advised that a majority of the coal would sink while the coal dust would float. Coal is not considered particularly harmful to the environment, especially in 500 feet of water and a good distance away from shore and water intakes. Any effects of the sinking coal or floating coal dust on the natural resources in the area were expected to be short-lived and very localized.

The SSC provided telephone and fax support to MSO Sault Ste. Marie on July 30 and in-person support to USCG District 9, Marine Safety Division (MSD) from July 30 to August 9. The support included weather forecasts, expected coal behavior, and resources at risk information.

References:

U.S. EPA. 1979. *Implications to the aquatic environment of polynuclear aromatic hydrocarbons liberated from northern Great Plains coal.* EPA-600/3-79-093. Duluth, MN: U.S. EPA Environmental Research Laboratory.

U.S. EPA. 1980. *Static coal storage -- biological and chemical effects on the environment.* EPA-600/3-80/083A. Duluth, MN: U.S. EPA Environmental Research Laboratory.

U.S. Fish and Wildlife Service. 1978. *Impacts of coal-fired power plants on fish, wildlife, and their habitats*. FWS/OBS-78/29. Ann Arbor, Michigan: U.S. Fish and Wildlife Service.

Research Planning Inc. Unpublished paper. *Potential impacts of 3,000 tons of coal dumped in Lake Superior*. Columbia, South Carolina: Hazardous Materials Respons and Assessment Division, NOAA.

Name of Spill:	British Petroleum Crude Asphalt
NOAA SSC:	Bill Sites
USCG District:	9
Date of Spill:	08/05/96
Location of Spill:	Toledo, Ohio, Maumee River, Grassy Island
Latitude:	41°42′ N
Longitude:	83° 27′ W
Spilled Material:	crude asphalt
Spilled Material Type:	4
Amount:	60 barrels
Source of Spill:	refinery
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	This was an airborne oil spill.
Shoreline Types Impacted:	mixed sand and gravel
Keywords:	low-pressure flushing, sorbent boom

Incident Summary:

On Monday, August 5, 1996, the British Petroleum (BP) Toledo Refinery vented about 60 barrels of atomized crude asphalt into the air via a low-pressure steam vent. The oil rained on a portion of Toledo, Ohio. The incident received some media play from CNN, the Windsor, Ontario news, and the local Toledo news. BP hired MPC to perform the cleanup. They washed boats and cars that had been oiled. The oil that fell in the Maumee River (estimated 30 to 50 barrels) floated to Grassy Island on a southeasterly wind. Approximately 1,500 feet of Grassy Island shoreline was oiled. MPC spent approximately two weeks conducting cleanup operations using low-pressure, high-volume, Lake Erie water flushing, together with hard and sorbent booms. A vacuum barge was used to clean up miscellaneous sheen. The FOSC was MSO Toledo, the SOSC was Ohio Environmental Protection Agency (OHEPA), and the RP was BP.

Grassy Island is an island of Maumee River dredge spoils, apparently managed by the U.S. Army Corps of Engineers, but owned either by the city of Toledo or the city of Oregon.

Behavior of Spilled Material:

The oil that fell into the Maumee River formed a slick and floated to the eastern shore of Grassy Island. Approximately 1,500 feet of shoreline were impacted by oil that stained rocks and driftwood. The remaining oil floated off with the low-pressure flushing technique and was recovered in sorbent booms and the vacuum barge.

Countermeasures and Mitigation:

The main issue arising from this spill was "how clean is clean?" The FOSC, RP, and SOSC disagreed. The NOAA SSC was called in to present a neutral, third party, unbiased opinion.

To resolve the disagreement, a team inspected the island on August 8, 1996. The team included MSO Toledo Chief of Port Operations, NOAA SSC, several representatives each from BP, OHEPA, and MPC. The RP, FOSC, SOSC, and NOAA met at BP Toledo after the inspection and came to a consensus on the criteria for cessation of the cleanup.

The group considered several factors including:

- ❒ Can the oil remobilize?
- ❒ Is there any threat of significant sheening or toxicity?
- ❒ Is there a potential for bird oiling?
- ❒ Are there any nesting, endangered, or threatened birds in the area?
- ❒ Are there any endangered or threatened species in the area?
- ❒ Are there any human health concerns?
- ❒ Are there any regulatory permits regarding the dredge spoils and their level of cleanliness, aesthetic value, recreational use, nature of the oiling, effectiveness of the cleanup method, or tradeoffs of other cleanup techniques?

All agreed that the cleanup method employed by MPC was effective and the best choice of the options. All agreed that the small bit of sheening in the area that had already been cleaned and signed off by MSO Toledo was insignificant. This area showed no oil available for remobilization, no ongoing exposure to natural resources, no residual oil on rocks and stray driftwood available to the environment, and no aesthetic or recreational use concerns.

MPC continued with their cleanup effort using the cleaned section (about 600 feet of the total 1,500 feet) as a benchmark for "how clean is clean."

Removal and disposal of debris were handled by MPC.

NOAA Activities:

NOAA was notified of this incident on August 8, 1996, by MSO Toledo. The SSC went on-scene to assist in the resolution of the "how clean is clean" issue. NOAA supported this incident for one day.

References:

NOAA and American Petroleum Institute. 1994. *Options for minimizing environmental impacts of freshwater spill response.* Seattle: Hazardous Materials Response and Assessment Division, NOAA. 131 pp.

Name of Spill:	Koch Sulfur Products
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	10/1/95
Location of Spill:	Wilmington, North Carolina
Latitude:	34°05' N
Longitude:	79°55' W
Spilled Material:	sulfuric acid
Spilled Material Type:	5
Amount:	109 barrels
Source of Spill:	facility
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	fringing salt marsh, salt marsh
Keywords:	chemical, lime, soda ash, neutralization

Incident Summary:

On October 1, 1995, a tractor trailer backed into an eight-inch transfer line at Koch Sulfur Products, Wilmington, North Carolina and released an estimated 4,594 gallons of 90 percent sulfuric acid

Behavior of Spilled Material:

The sulfuric acid flowed onto the lime rock pavement and into a tidally influenced saltwater marsh connected to the Cape Fear River.

Countermeasures and Mitigation:

Facility personnel used lime, sand, cement-kiln dust, marl rock, and soda ash to neutralize the material. A sand dike was placed across a stormwater drain pipe that led to the marsh area.

Other Special Interest Issues:

Because the marsh was tidally influenced, it was naturally flushed each tidal cycle. NOAA participated with the USCG MSO Wilmington in discussions of some of the response options. Options discussed were:

- ❒ partially reduce the flow of water from the marsh area by blocking one of the culverts, and
- ❒ increase flushing by artificially pumping additional river water into the marsh.

NOAA Activities:

NOAA was notified of this incident on October 1, 1995, by MSO Wilmington and participated via telephone and fax over several days while helping to decide the best methods to reduce the impact of the sulfuric acid on the marsh environment. NOAA chemists recommended site safety and appropriate testing methods to determine the acidity of the residues. Based on information resulting from NOAA-recommended sampling procedures, neutralization using lime and the natural pumping of the marsh area by tidal action was effective in increasing the pH to neutral values in the impacted areas.

References:

NOAA. 1992. *The CAMEO 4.0 Manual*. Washington, D.C.: National Safety Council. 440 pp.

NOAA. 1992. *Shoreline Countermeasures Manual For Regional Response Team III*. Seattle: Hazardous Materials Response and Assessment Division. 98 pp.

Virginia Institute of Marine Science. 1980. *Sensitivity of Coastal Environments and Wildlife to Spilled Oil, State of North Carolina*. Boulder, Colorado: Hazardous Materials Response Project, NOAA. 113 maps.

Name of Spill:	Abandoned Bunker Barges
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	10/6/95
Location of Spill:	Norfolk, Virginia
Latitude:	36°8' N
Longitude:	076°23' W
Spilled Material:	waste oil
Spilled Material Type:	4
Amount:	16,400 barrels
Source of Spill:	abandoned barges
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	responsibility for abandoned vessels
Shoreline Types Impacted:	none
Keywords:	Abandoned Barge Act

Incident Summary:

Three barges, T/B *Bunker Delaware,* T/B *Bunker 1000,* and T/B *VTL #1* , were moored at two locations in the southern branch of the Elizabeth River, Norfolk, Virginia. All the barges contained oily material; T/B *Bunker Delaware* contained the most oil, 14,000 barrels. The barges, owned by the Bunker Group of Virginia, did not have current certificates of inspections and were not gas-free. The parent company of the Bunker Group is believed to be Peter Frank; however, Mr. Frank claimed that the Bunker Group was no longer in business, had no employees, and had no funds.

During September 1995, MSO Hampton Roads' marine inspectors concluded that the T/B *Bunker Delaware* was in poor condition; it was listing five degrees and had holes, soft spots, and broken valves. In addition, none of the barges were under anyone's control; no one watched them or maintained any type of security.

Countermeasures and Mitigation:

On September 22, 1995, the USCG declared the barges a "substantial threat of discharge of oil." A Letter of Federal Interest and an Administrative Order to clean, gas-free, and remove the barges were sent to the owner. On September 26 the owner replied that he was unable to comply with the Administrative Order, citing lack of funds. On September 27 a letter of Federal Assumption was sent to the owner. A local contractor boomed the barges, and the USCG Atlantic Strike Team (AST) and contractor personnel took samples from each barge for analysis.

On October 6 the USCG's contractor, International Marine Services (IMS), began removing oily material from the T/B *Bunker Delaware.* During the next 10 days, waste oil in the barge's 12 tanks was removed and the tanks were cleaned. An estimated 600,900 gallons of waste oil and oily water were removed. The tanks were declared gas free on October 16, 1995.

On October 16, 1995, about 285 gallons of oily material on the T/B *Bunker 1000* was removed. A cleaning and gas-free certification were completed on October 21. During the next several days, an estimated 64,000 gallons of oily material were removed from the T/B *VTL #1* and the tanks were cleaned and gas freed.

Other Special Interest Issues:

Who is responsible for assessing and removing harmful materials from "abandoned" barges? The USCG On-Scene Coordinator (OSC) has authority to remove oily material from vessels discharging or threatening to discharge anything that would be harmful to the environment. However, if a vessel is on private property it is not necessarily considered "abandoned" especially if it was moored with the permission of the owner of the facility. Similarly, once the oily material has been removed and there is no longer a threat to the environment, the ownership of the barge does not change and security of the barge remains that of the owner; destruction or sale of the barge by the Government is not an easy option. These issues are not necessarily resolved by the Abandoned Barge Act.

NOAA Activities:

NOAA was notified of this incident on October 1, 1995, by MSO Hampton Roads. Analysis of samples taken from the abandoned barges was a high priority during this response. If it was discovered that the material onboard was not an oily material that could be categorized as a "waste oil," but rather contained high levels of chemicals such as polychlorinated biphenyls (PCBs), the safety of site workers and the funding mechanism for the cleanup operation would have to be reconsidered.

NOAA participated with MSO Hampton Roads in several meetings before removal was started and by telephone during the removal operations. The goals of the sampling program and the details of sample results were discussed during these meetings. For example, sample analysis on the T/B *Bunker Delaware* indicated waste oil in all tanks with waste oil and some traces of benzene in #3 and #4 port tanks only. The level of benzene concentration in these tanks was specifically documented as part of the safety program, but the other appropriate reason for the testing was to determine levels of benzene that were needed to categorize the waste for disposal and/or resale purposes.

NOAA supported this response for 10 days.

References:

Abandoned Barge Act of 1992. Public Law 102-587, title V, subtitle C, Secs. 5301-5305, Nov. 4, 1992, 106 Stat. 5081 (Title 46, Sec. 4701 et seq.)

NOAA. 1992. *Shoreline Countermeasures Manual For Regional Response Team III*. Seattle: Hazardous Materials Response and Assessment Division, NOAA. 98 pp.

Virginia Institute of Marine Science. 1980. *Sensitivity of Coastal Environments and Wildlife to Spilled Oil, State of Virginia*. Boulder, Colorado: Hazardous Materials Response Project, NOAA. 104 maps.

Name of Spill:	Craney Island Fuel Farm
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill :	01/17/96
Location of Spill:	Norfolk, Virginia
Latitude:	36°53.3' N
Longitude:	076°20.8' W
Spilled Material:	JP-5 jet fuel
Spilled Material Type:	2
Amount:	3,000 barrels
Source of Spill:	tank facility
Resources at Risk:	marsh
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	fringing salt marsh, mudflat
Keywords:	sorbent boom, sorbents

Incident Summary:

On January 17, 1996, a Navy fuel depot crew started transferring jet fuel, JP-5, from one tank to another to make room for an incoming shipment. During the transfer, valves were misaligned and the fuel was inadvertently pumped into tank 276, which was already full. For approximately two hours, the JP-5 fuel overflowed tank 276.

It was initially reported that approximately 1,000 gallons of JP-5 had been spilled into the primary fuel farm containment area. This large containment area is drained by an extensive culvert and special drainage system. Initial investigation by MSO Hampton Roads showed that Navy personnel were responding to the incident. No product was observed in the containment area's culverts and drainage canals. No product was expected to reach navigable waters.

Behavior of Spilled Material:

On January 18, 1996, the Navy reported that more than 75,000 gallons of JP-5 had been spilled. The actual amount was difficult to assess because it was in the extensive drainage system, piping, and culverts and was not visible. On January 25, 1996, it was estimated that more than 127,000 gallons of JP-5 had been released. All the product was held within the containment system. Oil in this drainage system was not visible, did not evaporate, and during periods of heavy rain occasionally overflowed within the large containment areas oiling vegetation, such as high marsh grasses. None of the oil escaped into navigable waters.

Countermeasures and Mitigation:

Navy personnel used vacuum trucks to remove over 80,000 gallons of product during the recovery effort. Contaminated soils in the large containment area were scheduled for removal and treatment at the land farm on the Craney Island facility permitted for treatment of contaminated soils.

Other Special Interest Issues:

When it rained during the weeks following the spill, some of the oil on the water in the drainage system overflowed within the containment area oiling tall marsh grasses. Red-winged blackbirds, attracted to this habitat, became oiled when moving through this vegetation. By January 25, 1996, under the supervision of the U.S. Fish and Wildlife Service (USFWS), nearly 200 dead red-winged blackbirds were collected in this area.

NOAA Activities:

NOAA was notified of this incident on January 25, 1996, by USFWS representatives who requested help coordinating their inspection of the Craney Island fuel facility with the USCG and Navy responders. On January 26, the NOAA SSC, MSO Hampton Roads, USFWS representatives, and Navy responders met to schedule an assessment on-scene. At this meeting, actions necessary to prevent further impacts on red-winged blackbirds were agreed upon. Navy public works personnel, using specialized equipment in the soft soils, cut or knocked down oiled grasses and removed the attraction to the blackbirds.

References:

NOAA. 1992. *Shoreline Countermeasures Manual For Regional Response Team III*. Seattle: Hazardous Materials Response and Assessment Division. 92 pp.

Virginia Institute of Marine Science. 1980. *Sensitivity of Coastal Environments and Wildlife to Spilled Oil, State of Virginia.* Boulder, Colorado: Hazardous Materials Response Project, NOAA. 104 maps.

Name of Potential:	*T/B 106*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Potential Spill:	1/19/96
Location of Spill:	Fort Eustis, Virginia
Latitude:	37°46.7′ N
Longitude:	075°58.5′ W
Spilled Material	gasoline
Spilled Material Type:	2
Amount:	potential 455 barrels
Source of Spill:	tank barge
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	none

Incident Summary:

On January 19, 1996, the tug *Triumph* reported that her tow, *T/B 106*, had grounded with 20,000 gallons of gasoline onboard, near the James River Light #36 near Fort Eustis, Virginia. T/B 106 was subsequently refloated without causing environmental damage or pollution.

NOAA Activities:

NOAA was notified of this incident on January 19, 1996, by MSO Hampton Roads. NOAA provided weather information and an estimate of expected environmental impact if the tank barge was damaged and gasoline released. NOAA also participated in discussions of response strategies. This was a period of severe weather in the area, A frontal passage with strong winds, potentially 40 to 45 knots, with strong wind shifts was predicted. The long-range wind prediction was for winds from the northwest at 25 to 30 knots.

The recovery of gasoline, especially in a wide-river system, is difficult. The danger of the release of gasoline into one of the most significant areas in the region for the propagation of shellfish was also noted. NOAA advised that the high rate of evaporation of any potential spilled gasoline combined with the severe weather suggests that significant quantities of gasoline would not reach the downriver industrial, populated, and bridge crossings.

References:

NOAA. 1992. *Shoreline Countermeasures Manual For Regional Response Team III*. Seattle: Hazardous Materials Response and Assessment Division. 98 pp.

NOAA. 1993. *ADIOS (Automated Data Inquiry for Oil Spills) User's Manual*. Seattle: Hazardous Materials Response and Assessment Division, NOAA. 50 pp.

Virginia Institute of Marine Science. 1980. *Sensitivity of Coastal Environments and Wildlife to Spilled Oil, State of Virginia.* Boulder, Colorado: Hazardous Materials Response Project, NOAA. 104 maps.

Name of Spill:	T/B *409* and Tug *M. Jenne Dudley*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	1/19/96
Location of Spill:	Chesapeake Bay, Virginia
Latitude:	37°46.7′ N
Longitude:	075°58.5′ W
Spilled Material:	#6 fuel oil
Spilled Material Type:	2
Amount:	potential 23,000 barrels
Source of Spill:	tank barge
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	none

Incident Summary:

On January 19, 1996, the tug *Jenne Dudley* reported that her tow, tank barge *PPT 409*, had run aground three miles south of Tangier Island, near Tangier Island Light, in Chesapeake Bay, with 23,000 barrels of #6 fuel oil onboard. T/B *PPT 409* was subsequently refloated with no damage or pollution.

NOAA Activities:

NOAA was notified of this incident on January 19, 1996, by MSO Hampton Roads. NOAA provided weather information and an estimate of the expected environmental impact if the #6 oil was released, and participated in a discussion of response strategies. The weather in the area was severe with strong winds potentially 40 to 45 knots and strong wind shifts predicted. The long-range wind prediction was winds from the northwest at 25 to 30 knots.

The release of a persistent oil-like #6 in this environmentally sensitive area of Chesapeake Bay is one of the worst-case scenarios developed for the USCG Training Center and has been used during exercises in the Fifth Coast Guard District. The trajectory of the oil in this area has been well studied by NOAA's Modeling and Simulation Studies Branch (MASS). MASS created a hypothetical movie that was used during this response to demonstrate the movement of oil spilled in this area.

This case was complicated by a possible MEDEVAC when a crew member, with a history of heart problems, experienced arm pain. (He was not removed from the tug and subsequently reported no problems.)

References:

NOAA. 1992. *Shoreline Countermeasures Manual For Regional Response Team III*. Seattle: Hazardous Materials Response and Assessment Division. 99 pp.

NOAA. 1993. *ADIOS (Automated Data Inquiry for Oil Spills) User's Manual.* Seattle: Hazardous Materials Response and Assessment Division, NOAA. 50 pp.

Virginia Institute of Marine Science. 1980. *Sensitivity of Coastal Environments and Wildlife to Spilled Oil, State of Virginia.* Boulder, Colorado: Hazardous Materials Response Project, NOAA. 104 maps.

Virginia Institute of Marine Science. 1980. *Sensitivity of Coastal Environments and Wildlife to Spilled Oil, State of Maryland.* Boulder, Colorado: Hazardous Materials Response Project, NOAA. 118 maps.

Name of Spill:	F/V *Captain Zack*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	1/23/96
Location of Spill:	Hatteras, North Carolina
Latitude:	35°06.1′ N
Longitude:	075°37.9′ W
Spilled Material	diesel
Spilled Material Type:	2
Amount:	15 barrels
Source of Spill:	fishing vessel
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	hard sand beach
Keywords:	abandoned fishing vessel

Incident Summary:

The 40-foot F/V *Captain Zack*, was taken in tow during extreme weather January 23, 1996. The vessel took on considerable amounts of water and the USCG would not allow the partially submerged vessel to enter Hatteras Inlet. The USCG anchored the vessel 8 nautical miles southeast of Hatteras Inlet and asked the owner to refloat the vessel before it would be allowed into the inlet. The on-scene weather was northeast winds 15 to 20 knots with three- to four-foot seas.

Behavior of Spilled Material:

The owner of the *Captain Zack* reported 650 gallons of diesel fuel onboard and that two of the three fuel tanks had been sealed. The unsealed fourth tank was nearly empty.

Countermeasures and Mitigation:

Salvors and the owner were unable to reach the vessel on January 24 due to bad weather. On January 25 the salvors were still unable to proceed to the vessel's last reported location and a USCG overflight could not see the vessel.

NOAA Activities:

NOAA was notified of this incident on January 23, 1996, by both MSO Hampton Roads and MSO Wilmington. Each MSO requested a trajectory for the abandoned fishing vessel and the environmental impact of the potential 650 gallons of diesel fuel. NOAA weather analysis predicted a continuation of winds gusting to 20 knots from the south, and 4- to 5-foot seas. The forecast was for winds gusting to 25 knots from the southwest with building seas.

NOAA advised that the currents in the area normally run parallel to the shore and to the southwest. NOAA suggested that the vessel, if it was no longer anchored, could move

ashore the evening of January 24 with the strong southerly and southwesterly winds. NOAA advised that the potential 650 gallons of diesel fuel would not impact the shore unless the vessel grounded and broke up almost on the beach.

References:

NOAA. 1992. *Shoreline Countermeasures Manual For Regional Response Team III*. Seattle: Hazardous Materials Response and Assessment Division. 99 pp.

NOAA. 1993. *ADIOS (Automated Data Inquiry for Oil Spills) User's Manual.* Seattle: Hazardous Materials Response and Assessment Division, NOAA. 50 pp.

Virginia Institute of Marine Science. 1980. *Sensitivity of Coastal Environments and Wildlife to Spilled Oil, State of North Carolina*. Boulder, Colorado: Hazardous Materials Response Project, NOAA. 113 maps.

Name of Spill:	F/V *Shauna Louise*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	1/19/96
Location of Spill:	Hatteras Inlet, North Carolina
Latitude:	35°011.5′ N
Longitude:	075°46.0′ W
Spilled Material Product:	diesel
Spilled Material Type:	2
Amount:	2 barrels
Source of Spill:	sinking fishing vessel
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	none

Incident Summary:

The 67-foot F/V *Shauna Louise* was abandoned the morning of January 19, 1996, during extreme storm conditions. At 0830 the vessel was 35°07′ N and 075°48′ W and drifting at three knots along the shoreline towards 230° true. The winds were 40 knots from the south with 8- to 10-foot seas.

The vessel foundered in the afternoon of January 19 approximately 300 yards offshore off Okracoke Island and west of Hatteras Inlet. Debris was seen along the shoreline and in the surf zone.

Behavior of Spilled Material:

The vessel carried 5,000 gallons of diesel fuel in two tanks. Very light rainbow sheen was observed approximately 100 yards off shore and one and one-half mile from one of the fuel tanks that broke loose from the wreckage of the vessel. No fuel oil moved through the heavy surf or landed on the hard-sand beach along Okracoke Island.

Countermeasures and Mitigation:

One of the intact fuel tanks washed up on Okracoke Island and was removed by IMS. No fuel was found in the recovered tank. The other fuel tank was not found.

NOAA Activities:

NOAA was notified of this incident on January 19, 1996, by MSO Hampton Roads and MSO Wilmington. Each MSO requested a trajectory for the abandoned fishing vessel and the environmental impact of the potential 5,000 gallons of diesel fuel. NOAA's weather analysis predicted a frontal passage with very strong winds, 40 to 45 knots, with heavy rain. Following the frontal passage, the winds were expected to be southwesterly between 25 and

30 knots during the afternoon and early evening. By late evening the winds were expected to be from the northwest at 25 to 30 knots and were expected to continue into the next day.

NOAA advised that the currents in the area normally run parallel to the shore and to the southwest. This current direction was the initial path of the abandoned vessel. NOAA suggested, however, if the vessel had windage that it could move ashore the afternoon of January 19 with the anticipated southerly and southwesterly winds. NOAA also advised that the potential 5,000 gallons of diesel fuel would not impact the shore unless the vessel grounded within one-quarter mile of the beach.

References:

NOAA. 1992. *Shoreline Countermeasures Manual For Regional Response Team III*. Seattle: Hazardous Materials Response and Assessment Division. 99 pp.

NOAA. 1993. *ADIOS (Automated Data Inquiry for Oil Spills) User's Manual.* Seattle: Hazardous Materials Response and Assessment Division, NOAA. 50 pp.

Virginia Institute of Marine Science. 1980. *Sensitivity of Coastal Environments and Wildlife to Spilled Oil, State of North Carolina.* Boulder, Colorado: Hazardous Materials Response Project, NOAA. 113 maps.

Name of Potential:	T/B *563* and tug *Charleston*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Potential Spill:	2/1/96
Location of Spill:	Chesapeake Bay, Maryland
Latitude:	37°46.7′ N
Longitude:	075°58.5′ W
Spilled Material:	#6
Spilled Material Type:	2
Amount:	potential 15,000 barrels
Source of Spill:	tank barge
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	fringing salt marsh, tidal mudflat
Keywords:	potential

Incident Summary:

On February 1, 1996, the tug *Charleston* reported that her tow, the T/B *563*, had grounded with 15,000 barrels of diesel fuel onboard five nautical miles east of Tangier Island, in the Chesapeake Bay. T/B *563* was subsequently refloated with no damage or pollution.

NOAA Activities:

NOAA was notified of this incident on February 1, 1996, by MSO Baltimore who asked for weather information, suggestions for response strategies, and an estimate of trajectory if the diesel fuel was released. NOAA advised that the winds were expected to be light and variable with seas less than one foot. Later that evening, snow was in the forecast with visibility reduced to less than one mile. On February 2 winds were forecast to be from the northeast at 10 knots or less, increasing from the northeast at 10 to 15 knots in the afternoon. Snow, sleet, and rain with visibility less than one mile was also expected. The trajectory of the potential spilled oil during the time when the winds were light and variable was based on the tidal excursion. Any product released during the initial several hours of the ebb tide would move south, possibly as far as several miles. There was some risk to Watts Island. If the oil was released later, during a flood tide, the oil could move initially as far north as Cedar Island Marsh. The predicted northeasterly winds, however, would help hold some of the oil away from the marsh. NOAA also discussed the fate and effect of diesel oil weathering over time with MSO Baltimore.

References:

NOAA. 1992. *Shoreline Countermeasures Manual For Regional Response Team III*. Seattle: Hazardous Materials Response and Assessment Division. 99 pp.

NOAA. 1993. *ADIOS (Automated Data Inquiry for Oil Spills) User's Manual*. Seattle: Hazardous Materials Response and Assessment Division, NOAA. 50 pp.

Virginia Institute of Marine Science. 1980. *Sensitivity of Coastal Environments and Wildlife to Spilled Oil, State of Virginia.* Boulder, Colorado: Hazardous Materials Response Project, NOAA. 104 maps.

Virginia Institute of Marine Science. 1980. *Sensitivity of Coastal Environments and Wildlife to Spilled Oil, State of Maryland.* Boulder, Colorado: Hazardous Materials Response Project, NOAA. 118 maps.

Name of Spill:	Collision *Saudi Makkah* and USS *Jacksonville*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Potential Spill:	5/17/96
Location of Spill:	Norfolk, Virginia
Latitude:	36°30′ N
Longitude:	075°35′ W
Spilled Material:	#6 fuel oil
Spilled Material Type:	2
Amount:	none
Source of Spill:	container vessel
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	fringing salt marsh, tidal mudflat
Keywords:	none

Incident Summary:

On May 17, 1996, MSO Hampton Roads responded to a collision between the Saudi Arabian flag roll on/roll off container ship, *Saudi Makkah*, and the U.S. Navy (USN) submarine, USS *Jacksonville*. The collision occurred approximately 20 miles southeast of Cape Henry, Virginia; both vessels sustained damage. The *Saudi Makkah* was damaged on the port side; a dent in the bow and a 21-foot crease that was open to the sea in the aft steering. The USS *Jacksonville* sustained damage to the starboard diving plane and the rudder. After being inspected by USCG and USN personnel, both vessels proceeded to the port of Hampton Roads under their own power. The *Saudi Makkah* was moored at Norfolk International Terminals and the USS *Jacksonville* at Pier 23 on the Norfolk Navy Base.

NOAA Activities:

NOAA was contacted by MSO Hampton Roads on May 17, 1996, and was asked to provide weather and a trajectory forecast if oil was released as a result of this collision. NOAA provided a 24-hour forecast that indicated winds from the east at 5 to 10 knots during the day and winds from the southeast at 10 knots at night. The winds were expected to continue from the southeast at 10 knots the next day.

NOAA reported that the oil that might be spilled would move to the south along the Virginia shoreline. The onshore winds (east/southeast) would slowly move any oil towards the shoreline with an impact anticipated in North Carolina. On May 19, however, the offshore wind forecast would tend to hold the oil off shore. There would be very little oil threat to Chesapeake Bay from any release of oil at the collision site.

References:

NOAA. 1992. *Shoreline Countermeasures Manual For Regional Response Team III*. Seattle: Hazardous Materials Response and Assessment Division. 98 pp.

NOAA. 1993. *ADIOS (Automated Data Inquiry for Oil Spills) User's Manual.* Seattle: Hazardous Materials Response and Assessment Division, NOAA. 50 pp.

Virginia Institute of Marine Science. 1980. *Sensitivity of Coastal Environments and Wildlife to Spilled Oil, State of Virginia.* Boulder, Colorado: Hazardous Materials Response Project, NOAA. 104 maps.

Name of Spill:	T/V *Anitra*
NOAA SSC:	Ed Levine
USCG District:	5
Date of Spill:	05/09/96
Location of Spill:	Big Stone Anchorage, Delaware Bay
Latitude:	35°57.6' N
Longitude:	75°11.4' W
Spilled Material:	Nemba and Kabinda (Angolan) crude oils
Spilled Material Type:	2
Amount:	42,000 gallons
Source of Spill:	tank vessel
Resources at Risk:	**Birds:** diving coastal birds, waterfowl, shorebirds, wading birds, gulls, terns, raptors, rookeries, foraging areas, migration stopover areas, nesting beaches, migratory routes, critical forage areas **Fish:** anadromous fish, nursery areas, estuarine fish, demersal fish **Mollusks:** oysters, clams, seed beds, abundant beds, harvest areas, high-concentration sites **Crustaceans:** horseshoe crab high-concentration sites **Recreation:** beaches, marinas, boat ramps, high-use recreational boating and fishing areas, state parks **Management Areas:** wildlife preserves, reserves **Resource Extraction:** commercial fisheries, bivalve aquaculture sites
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	tilling oil into sand
Shoreline Types Impacted:	exposed fine-sand beaches, fine-sand beaches, marshes, salt marsh, saltwater marshes, sand/ gravel beaches, sheltered marshes
Keywords:	endangered species, shallow water recovery, skimmers, tourism losses, Tri-State Bird Rescue

Incident Summary:

On May 9, 1996, the 846-foot T/V *Anitra*, carrying 41.9 million gallons of crude oil, reported approximately 200 gallons of oil bubbling from below her waterline. The vessel was anchored at Big Stone Anchorage in Delaware Bay. The on-scene weather was light winds, air temperature 49°F, with overcast skies and calm seas.

The DBRC's two skimmers, *Del River* and *Del Bay*, and the National Response Corporation (NRC) skimmer *Patriot* response vessels, dispatched to the scene, boomed off the vessel and began skimming operations. Initially, it was believed that the oil was leaking from the sea chest, indicating the possibility that cargo was leaking into the ballast water piping. Observers on an overflight the next morning reported a steady stream of product extending from the vessel's stern to sea in a south-southeast direction for 3.5 miles, followed by a 3.8-mile sheen. After the first day, the estimate of oil spilled was raised to approxi–mately 10,000 gallons; after 10 days the estimate was 42,000 gallons. Diver surveys were conducted

to identify the source of the leak. Approximately 600 barrels of an oil/water mixture were recovered by skimmers.

Shoreline impact inside Delaware Bay occurred on the New Jersey side (approximately two miles of Higby and Sunset beaches in Cape May) by the third day after release. The ocean beaches of New Jersey were impacted several days later, from Cape May to Atlantic City.

The USCG COTP Philadelphia and New Jersey DEP formed a Unified Command with the RP.

Media coverage was high (the Governor was present at press conferences) due to proximity to the Memorial Day weekend. Avoiding beach closures was a major goal of the response. The other concern for the response was protecting the endangered piping plover and threatened least tern that nest on the beaches.

Major efforts were made to remove the oiled sand and sediment as rapidly as possible. At one point over 400 workers were employed. Cleanup consisted of manual raking and, in several instances, tilling. Workers used shop-vacs at a number of locations to vacuum up the tarballs from the sand.

Behavior of Spilled Material:

Both Nemba and Kabinda crude oils are light products having a 38.5 and 32.9 API, respectively. The oil initially spread into thin films as observed during the May 10 overflights. Over time, a combination of wind and waves weathered and tore the films into smaller patches (tarballs from pea- to marble-sized) that scattered over a much wider area. An increase in sea state tended to overwash the tarballs and break up any associated sheens. A lack of visible sheen associated with the tarball field is not an indication that the oil sank. Using both visual and remote sensing techniques, the resulting tarball field was difficult to track because the tarballs were widely dispersed.

NOAA developed a trajectory analysis that indicated a necessarily large uncertainty due to the delay and limited nature of the information provided. This analysis indicated that the Seven Mile Beach area was threatened. The trajectory analysis uncertainty indicated for May 14, 1996, increased due to the changes in the weather since the last trajectory. Therefore, the tarballs were likely to be dispersed over a much wider area. Although climatological currents indicated a southerly flow outside Delaware Bay, shelf-waves transiting the area are not uncommon and would lead to local, non-climatological currents. The uncertainty lines in the original analysis showed some impact potentially to the north but this anomalous northerly current pattern may not persist. Because observational information was limited, the potential threat zone included areas south of Cape Henlopen and north of Cape May. Forecast on-shore winds might continue to bring tarballs ashore through May 11. Any remaining oil would continue to move with the along-shore current. Offshore winds forecast on May 12 could move any unbeached tarballs slightly offshore.

Trajectory analysis is difficult at best. This is particularly true for oil that has spread out enough to become widely scattered tarballs. If, in addition, when the input or reconnaissance data is intermittent, uncertainty bounds become very large.

Initial areas impacted were within Delaware Bay on the New Jersey shoreline. These areas were coarse-sand and gravel beaches, areas of spring bird migration stopover, and horseshoe crab spawning areas. After several days, the oil migrated out of Delaware Bay and impacted sand beaches and marsh areas on the coast of New Jersey.

Estimates on the amount of oil spilled started at about 200 gallons and soon rose to 1,000 gallons. After about ten days of tarballs stranding on the New Jersey beaches the estimate was raised to 40,000 gallons. During the first few days of the incident, when the oil was still floating, skimmers recovered approximately 10,000 gallons of oil. An undetermined amount of oil in the form of tarballs was removed from the shorelines.

As this oil weathered it formed tarballs that became less buoyant as they incorporated sediment. The remaining spilled oil dissipated offshore as a scattered tarball field.

Countermeasures and Mitigation:

Once the oil was reported, the DBRC dispatched response vessels to boom the tanker and skim floating oil. The tanker performed inspections, diver surveys, and tests to determine the source of the leak. The sea valve was identified as the cause. Once this was remedied, the ship completed lightering, took on bunkers, and was allowed to depart the anchorage. The NRC *Patriot* followed *Anitra* to collect any oil released that may have clung to her.

Unsuccessful attempts were made to boom several inlets on the New Jersey coast. Marshes and marinas inside the inlets had small amounts of oil migrate through them.

Open-water recovery was performed by large skimming vessels inside Delaware Bay and by Lori skimmers in shallow water just off the New Jersey beaches.

Shoreline cleanup was mostly manual with rakes and shovels. In some areas shop-vacs were used to vacuum oil from the sand beaches. Tilling was employed on several sections of upper beaches.

Removed oily sand was disposed of in an asphalt plant.

Other Special Interest Issues:

The effects of this spill to tourism and recreation areas were of high concern due to the proximity to the Memorial Day weekend. The New Jersey beach towns that were impacted are financially dependent on beach tourism for the majority of their income. Beaches were never closed during this incident.

Wildlife impacts and rehabilitation were the other key issues faced by the Unified Command. Delaware Bay is a major migratory stop-off point for the spring migration (millions of birds arrive at the end of May) and the endangered piping plover and threatened least tern nest on New Jersey beaches. Tri-State Bird Rescue cleaned about 20 oiled piping plovers. There were no reports of dead wildlife.

Effects to human health and safety were an issue for the workers due to heat stress. Some days the temperature was over 90 degrees. Work crews were monitored for heat stress.

A test plow/tilling of a high tarball concentration area along the high-tide line in Ocean City, New Jersey was conducted. NOAA informed the Unified Command that this was a temporary solution, in that once the tide began to rise to the levels where the oil was laid down they may observe frothy oil/water and/or more tarballs. The tilling was done to remove the oil from the surface so birds and people would not come in contact with it and to attempt to increase natural degradation. Nevertheless, the oil would probably remain for weeks to months, unless physically removed.

Media interest throughout the incident was very high. The Governor of New Jersey and the Commissioner of DEP held numerous press conferences with the COTP. The incident was covered by the television, radio, and newspapers.

NOAA Activities:

NOAA was notified of this incident on May 13, 1996, by COTP Philadelphia.

The COTP sent samples of oil from the vessel and tarballs for analysis to determine weathering and toxicity. The two reference oils received on May 21, 1996, were very similar in composition. The Kabinda and the Nemba were both high-alkane (waxy) crude oils with a low abundance of aromatic hydrocarbons (AH). The high wax content made the oils readily susceptible to biodegradation. The tarball sample exhibited a significant reduction in the toxic AH components due to a combination of evaporation (weathering) and water-in-oil emulsification.

NOAA delivered weather forecasts and provided the USCG with some warning of current reversals and possible areas of impacts. Trajectory analysis performed four days after the initial release indicated that oil had moved out of Delaware Bay and could possibly impact Cape May, New Jersey and Cape Henlopen, Delaware.

The SSC provided a Tarball Information Sheet for use by the general public and media and participated in incident debriefs where the pros and cons of response options were discussed.

The SSC supported this incident sporadically as needed by the USCG by telephone and fax. The response lasted 50 days.

References:

Captain of the Port Philadelphia Area Contingency Plan

Name of Spill:	F/V *Lady Luck*
NOAA SSC:	Ed Levine
USCG District:	5
Date of Spill:	08/11/96
Location of Spill:	Cape May, New Jersey
Latitude:	38°48.4′ N
Longitude:	73°19.0′ W
Spilled Material:	diesel fuel
Spilled Material Type:	2
Amount:	180 barrels (8,000 gallons)
Source of Spill:	fishing vessel
Resources at Risk:	**Marine Mammals:** whales, dolphins, migration routes **Fish:** summer flounder wintering site **Mollusks:** scallops, harvest areas, high concentration sites **Recreation:** high-use recreational fishing areas **Resource Extraction:** commercial fisheries
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	evaporation, NOAA National Marine Fisheries Service Laboratory

Incident Summary:

At approximately 0900 on August 11, 1996, the 71-foot commercial F/V *Lady Luck* sank in 230 feet of water about 70 miles east of Cape May, New Jersey. The weather at the time was calm winds, temperature 80°F, visibility at 12 miles.

The seven people onboard were rescued before the vessel sank. The boat had about 7,500 gallons of diesel fuel onboard when it went down. Initially a 2-mile long by 200-foot wide slick was observed from the point of sinking. At 1745 an overflight from USCG Group Cape May indicated the sheen had reduced to 0.5 long by 0.25 nautical mile wide, drifting in a southerly direction.

Behavior of Spilled Material:

The oil moved south from the release site and evaporated before impacting land. Due to the distance from shore and short-term persistence of the product, no response efforts were mounted.

NOAA Activities:

NOAA was notified of this incident on August 11, 1996, by the USCG Group Cape May who requested a trajectory analysis to see if land impacts could be predicted. The SSC contacted the NMFS Laboratory at Sandy Hook, New Jersey to address any possible fisheries concerns because the area is known for dredging scallops, long-line tile fishing, and bottom fluke

(summer flounder). The NMFS recommended that the USCG post the position of the wreck in the next "Notice To Mariners" so fishing vessels will not ruin gear on the sunken vessel.

The accident site was approximately 70 miles offshore and no detectable landfall from the oil was expected. The fuel tank was not extensively damaged during the sinking and the surface pollution was the result of leaking through vents or small compression cracks in the tank. NOAA reported that a surface sheen might form and result in a continuous slick extending from a fraction of a mile to several miles depending on the weather. This localized surface sheen could persist for a number of days.

Diesel spills usually form large areas of silver or rainbow sheen, with smaller streaks of dark or "sooty" bands where concentrations are heavy. The edges of the slick typically feather into streaks or streamers and dissipate over a few days or even hours for small spills when moderate to strong winds occur.

Typical currents for the area of the accident are a fraction of a knot, to the south-southwest, but high variability is a characteristic of this region, which is along the inner edge of the Gulf Steam where spin-off eddies are common.

The area was under the influence of a large high-pressure region that covered most of the Northeast. Winds at the accident site were light. The high-pressure region was expected to move east during the next two days followed by a frontal passage with associated afternoon squalls.

NOAA supported this incident for about one hour.

References:

USCG MSO Philadelphia, Polrep One, Minor Spill, Spill Amount Unknown, Potential Amount Approx. 7500 Gal. Diesel Fuel, Spill Resulting From F/V *Lady Luck* Sinking. PIN:05P-04-241-96, NRC Case No. 356200. 11 August, 1996.

Name of Spill:	Mystery Spill - Tampa Bay
NOAA SSC:	Bradford L. Benggio
USCG District:	7
Date of Spill:	10/03/95
Location of Spill:	Upper Tampa Bay, Florida
Latitude:	27°55.5′ N
Longitude:	082°25.7′ W
Spilled Material:	#6 fuel oil
Spilled Material Type:	4
Source of Spill:	unknown
Resources at Risk:	**Habitat:** intertidal sessile organisms **Mollusks:** bivalves **Birds:** brown pelican
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest(s):	none
Shoreline Type(s) Impacted:	seawalls
Keywords:	none

Incident Summary:

A spill of heavy #6 fuel oil was reported on September 28, 1995. The oil coated approximately 1.7 miles of shoreline in upper Tampa Bay. The majority of impacts were to man-made structures and seawalls. The source of the oil was never determined.

Behavior of Spilled Material:

The oil was reported as being heavy, dark #6 fuel oil that was somewhat weathered. It coated 1.7 miles of shoreline in a band that averaged a meter and was 1/4-inch thick.

Countermeasures and Mitigation:

Local contractors conducted cleanup of the impacted area.

NOAA Activities:

The NOAA was notified of this incident on October 3, 1995, by MSO Tampa who requested a hindcast to assess where this oil might have originated. Weather and tides were evaluated to determine where the oil was spilled. NOAA trajectory analysts could not pinpoint a source but did determine that the source was most probably near the impact area, possibly a passing vessel that discharged the product.

References:

NOAA. 1994. *Shio. Tide computer program (prototype)*. Seattle: Hazardous Materials Response and Assessment Division, NOAA.

Name of Spill:	Barge *Patricia Sheridan*
NOAA SSC:	Bradford L. Benggio
USCG District:	7
Date of Spill:	10/12/95
Location of Spill:	Charleston Harbor, South Carolina
Latitude:	32°34.3' N
Longitude:	079°48.3' W
Spilled Material:	dredge spoils and 300 gallons of diesel
Spilled Material Type:	5, 2
Source of Spill:	barge
Resources at Risk:	**Fish:** territorial fin fishes **Crustaceans:** crabs **Habitat:** benthic infauna
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest(s):	none
Shoreline Type(s) Impacted:	none
Keywords:	NAVSUPSALV

Incident Summary:

MSO Charleston was notified on October 12, 1995, that the hopper barge *Patricia Sheridan* had intentionally grounded due to an extreme list, supposedly developed by a shift in the cargo. The barge was transiting from New York to Corpus Christi with a load of dredge spoils. The barge was also carrying approximately 300 gallons of diesel fuel. Upon grounding, the barge came to rest on a sand bottom in 36 feet of water. The barge was resting on its port side with a 45-degree list. The barge has three holds. During the grounding two hatch covers came off the #2 hold, releasing some of the dredge spoils. The total cargo was approximately 12,000 tons of mud with 30 percent in the #1 hold, 30 percent in the #3 hold, and 40 percent in the #2 hold. This initial release, estimated to be 40 percent of the #2 hold and continued exchange of seawater into all compartments, created a visible plume of mud at the grounding site.

This dredge spoil from New York Harbor had been tested and found to have as high as 140 parts per trillion (ppt) of dioxin. Average dioxin concentration for the mud was reported to be around 25 ppt. Due to this dioxin concentration, the cargo had been classified as not suitable for ocean dumping. Based on estimates of amount spilled and dioxin concentration, the total amount of dioxin input to the environment was well below the EPA Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) reportable quantity of one pound. State of South Carolina and federal resource trustees felt, however that this amount of dioxin, a listed hazardous substance, did pose a threat to natural resources and water quality standards.

Salvors hired by the RP developed a plan to refloat the barge by pumping out water from the barge's holds. This salvage plan was reviewed by NAVSUPSALV. Due to rough seas at the grounding site, work around the barge, including assessment of damage, was impossible or very limited. Divers were able to conduct a limited survey on October 20 and noted possible damage to the forward rake end of the barge. The salvage plan called for

pumping off the water very rapidly to reduce stress on support members of the barge. Once the salvage operations began, the pumping could not be stopped without risking worker safety and breakup of the barge.

Resource trustees and representatives from the State of South Carolina, USFWS, Department of the Interior, Department of Commerce, EPA, NOAA, USCG, and the RP worked together to address concerns associated with pumping water and possibly more contaminated mud into the ocean. Early in the incident a sample of water was taken from the plume near the barge and analyzed for dioxin. This sample was filtered prior to the analysis, however, and did not indicate dioxin levels associated with the suspended particulates. The RP developed a monitoring/sampling plan that allowed for an estimation of how much dioxin and other potential contaminates of concern would enter the environment during the salvage operations. Once the salvage operations were complete, another sampling plan was developed to assess the dioxin levels in bottom sediments and water at the grounding location.

Following salvage and refloating operations, and bottom sample results, resource trustees requested that removal of the spilt dredge spoil be conducted and that core and biological samples be taken to determine the effectiveness of the removal. The primary concern was for the dioxin congener 2, 3, 7, 8-TCDD. Dredging of the grounding-impacted area took place from January 22, 1996, to February 29, 1996. Removed spoils were transported by railcar for landfill disposal, but the railcars leaked so the material was transferred to lined trucks.

Additional sediment cores and biological samples were then collected and analyzed. Elevated levels of dioxin existed near the grounding site, but all other samples indicated low-risk dioxin levels. Approximately six months later another round of samples was taken. After examining the analyses for both the sediment and biological samples, the trustees felt that the existing levels were relatively clean and the cleanup had been accomplished to the level that could be pragmatically expected. The sample results provided the trustees with a measure of the effectiveness of the removal action and the response was considered finished by April 1996.

Behavior of Spilled Material:

The spilled dredge spoil that contained high levels of dioxin appeared largely confined to the area immediately surrounding the grounding site. Some of the material was carried downcurrent in a plume, but apparently dissipated over time or was undetectable to above background levels. Sample analyses indicated that dredging had apparently successfully returned the majority of the impact zone to background levels.

Countermeasures and Mitigation:

Dredging the entire impact zone removed the spoils to levels close to background. This was confirmed by sediment and biota sampling and analyses.

Other Special Interest Issues:

Throughout this cleanup, the question remained of whether this response was justified under emergency removal actions or whether it should have been an action under other than CERCLA guidelines (non-critical removal) or non-CERCLA action (permit violation under the Clean Water Act).

NOAA Activities:

NOAA was notified of this incident on October 13, 1995, by MSO Charleston, who asked the SSC to participate in several initial conference calls and discussions with resource trustees, the USCG and the RP. The SSC and support team members discussed dioxin concerns with NOAA and other federal and state resource trustees.

NOAA provided estimates of the spoil plume trajectory and extent of bottom impacts. This was compared with side scan and sampling data provided by the RP to identify the area to be dredged and subsequently sampled.

Several RP sampling proposals were reviewed by the SSC and support team at the request of the OSC. These reviews were coordinated with resource trustees involved with the incident.

The SSC helped plan for salvage by calculating dioxin dilution coefficients for pumping off the barge, once refloated. Weather forecasts were provided as requested during the operation.

References:

NOAA Hotline # 184, 7 Reports

Research Planning Institute. *Sensitivity of coastal environments and wildlife to spilled oil: State of South Carolina. An atlas illustrating the sensitivity of the coastal environment to spilled oil.* Seattle: Ocean Assessments Division, NOAA. 50 maps.

Name of Spill:	Savannah Toluene Diisocyanate Incident
NOAA SSC:	Bradford L. Benggio
USCG District:	7
Date of Spill:	10/25/95
Location of Spill:	Chatham County, Georgia
Latitude:	N/A
Longitude:	N/A
Spilled Material:	toluene diisocyanate
Spilled Material Type:	5
Source of Spill:	railcar container
Resources at Risk:	N/A
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest(s):	caution
Shoreline Type(s) Impacted:	none
Keywords:	none

Incident Summary:

On October 25, 1995, a container on a railcar released a small amount of toluene diisocyanate (UN#2078). The car was loaded with seventy-six 55-gallon drums of the chemical. The incident was reported to MSO Savannah.

Countermeasures and Mitigation:

Local hazardous material teams responded in level A protection without incident.

Other Special Interest Issues:

This incident points out an important caution. Although each MSO is equipped with Computer-Aided Management of Emergency Operations (CAMEO™ software) and other response tools, these tools could be dangerous if misused by non-experts. For example, CAMEO does not warn responders that 10 percent of the population is hypersensitive to this chemical and serious injury or even death could result from an exposure to it. It is advised that when dealing with chemical response issues and concerns that a chemist experienced with emergency response be consulted and any output or information provided by models or reference materials be reviewed and evaluated by a competent expert.

NOAA Activities:

NOAA was notified of this incident on October 25, 1995, by MSO Savannah who requested information about toluene diisocyanate. The SSC told MSO that toluene diisocyanate has a fairly low vapor pressure (1 millimeter @ 176°F), the IDLH is 2.5 ppm, and an association with fire could produce gas. NOAA stressed the need for appropriate respiratory protection because this material has a very pungent odor and could cause serious inhalation concerns for about 10 percent of the population who are extremely allergic to very small quantities if inhaled. Most people will not be seriously affected. A similar incident with this chemical resulted in the death of a responder who was not properly protected.

References:

NOAA. 1993. *The CAMEO™ 4.0 Manual*. Washington, D.C.: National Safety Council. 440 pp.

Name of Spill:	T/B *TMI-11*
NOAA SSC:	Bradford L. Benggio
USCG District:	7
Date of Spill:	03/11/96
Location of Spill:	Flagler Beach, Florida
Latitude:	29°34.54' N
Longitude:	080°34.34' W
Spilled Material:	caustic soda solution
Spilled Material Type:	5
Amount:	1.9 million gallons
Source of Spill:	tank barge
Resources at Risk:	**Habitat:** Oculina Banks hard bottom and small corals **Mollusks:** bivalves **Reptiles:** sea turtles (endangered) **Marine Mammals:** Wright whales (endangered)
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest(s):	none
Shoreline Type(s) Impacted:	none
Keywords:	endangered species

Incident Summary:

The T/B *TMI-11* sank during a storm 33 miles east of Flagler Beach, Florida at 1830 March 11, 1996. The barge was loaded with 1.9 million gallons of 50 percent dilute caustic soda solution. The barge came to rest in 100 feet of water on a sand bottom.

The RRT IV was convened to discuss options for responding to the incident and the possibility of allowing a controlled release of the cargo. The Department of Commerce RRT representative suggested that a controlled discharge limiting the pH to an upper limit of 10, 100 feet downstream from the discharge point would be acceptable. This suggestion was based on what was known about potential resources at risk in the area, the buffering capacity of the surrounding sea water, and the expected behavior of the heavier-than-water caustic soda solution. The NOAA SSC and the SSC support team, including experts in the fields of chemistry, biology, resources at risk, and trajectory analysis, reviewed this proposal and felt that it was a reasonable and realistic option. The endangered species office of NMFS was also consulted about any endangered or threatened species in the offshore waters that could be a concern. They concurred with the proposed discharge, but stipulated that adequate monitoring must be provided during the discharge to provide real-time information that could be used to adjust pump rates and maintain the pH criteria agreed upon.

The salvage vessel returned on-site on April 8 to begin discharge operations with a USCG observer onboard. The equipment proved to be inadequate for the proposed pumping operation, however, and the vessel returned to port.

Diver surveys were conducted on April 11 and confirmed leakage from the barge, but pH values around the barge were normal.

The OSC requested the SSC and RP go to the scene to evaluate operations. The SSC reported on-scene April 20 and accompanied the RP aboard a vessel to the sinking site offshore where a salvage vessel was already setting moorings over the *TMI-11.* Survey dives made on the barge confirmed that extensive structural damage had occurred and that the barge was not worth salvaging. Samples were collected from the barge yielding pH profiles for the tanks as well as for the surrounding waters. One interesting discovery was that a large amount of precipitate was being formed in the tanks where pH was extremely high. Tests were run on the precipitate and it was determined that it would go back into solution when diluted with sea water. The RP conducted a video survey of the bottom around the barge and reported that only hard-packed sand bottom existed near the barge. This video was later made available to resource trustees to review. The salvage vessel returned to port and the RP began to develop discharge plans. The SSC continued to evaluate proposals submitted by the RP and coordinate trustee concerns and input.

The RP requested bids for a bigger salvage vessel and began planning for larger pumps that could move the caustic and the formed solid out of the tanks to a mid-water depth of 50 feet. Models were run and evaluated and discharge criterion was changed to allow pH of ten, 100 meters from the discharge in the water column, but not to exceed ten on the bottom beyond 100 feet.

The new equipment was on-scene July 19 and discharge operations began the next day with a USCG Strike Team observer to monitor the operations and assist as necessary. Pumping was completed on July 24. Monitoring results were forwarded to the RRT IV representative for review. The pH did not exceed the discharge criteria and all tanks were left with a pH in the eight to nine range. The barge was then holed and opened to allow natural flushing to finish the job. No resource damage was reported during the discharge operations.

Behavior of Spilled Material:

The caustic, which is heavier than water, was fairly stratified inside the barge tanks. It was feared that if discharged it might sink and lie on the bottom, killing all benthic infauna. This is why the plan was developed to discharge at a mid-water depth and at a controlled rate. This allowed the currents to spread the plume and buffer the solution before causing injury to bottom resources.

Countermeasures and Mitigation:

The material was discharged in a controlled manner that allowed buffering by the surrounding seawater. The method used was to pump the material straight up to a mid-water depth (50 feet) and monitor pH at the discharge point and down current in the water column and along the bottom.

NOAA Activities:

NOAA was notified of this incident on March 11, 1996, by the OSC, but did not go on-scene until April 20. The SSC provided on-scene support from April 20 through April 26, 1996. The SSC went on-site to look at the initial salvage operations, help evaluate the situation, and make recommendations to the OSC. The SSC and the SSC support team evaluated all RP proposals at the request of the OSC. The SSC handled coordination of NOAA trustee

interests, evaluated potential resources at risk, supplied weather forecasts for salvage operations, and evaluated chemical and physical behavior of the caustic material.

References:

NOAA Hotline #194, 12 Reports

Name of Spill:	Barge *Apex 3512*
NOAA SSC:	Ilene Byron
USCG District:	8
Date of Spill:	10/11/95
Location of Spill:	Norco, Louisiana
Latitude:	90°25′ N
Longitude:	29°59.5′ W
Spilled Material:	heavy fuel oil
Spilled Material Type:	5
Amount:	4,600 barrels
Source of Spill:	barge
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	innovative cleanup techniques
Shoreline Types Impacted:	river bottom
Keywords:	sorbents

Incident Summary:

On October 11, 1995, the tow of the M/V *Sondra B* collided with the tow of the M/V *Theresa F* near Mississippi River Mile Marker (MM) 126. *Sondra B* was pushing five tank barges containing .5 API oil; *Theresa F* was pushing one empty ocean-going, bulk-solid barge. After the collision, the Theresa *F* pushed up on the right descending bank and the *Sondra B* pushed up on the left descending bank at MM 125 to evaluate damage. Extensive damage was sustained by the empty bulk-solid barge and one of the tank barges, *Apex 3512*. *Apex 3512* discharged approximately 4,600 barrels of slurry oil from the forward tank. At the time of the collision the weather was clear and the current in the channel was approximately two knots.

During preliminary surveys on October 11 and 12, large pockets of oil were found where the barge was pushed against the bank. The currents in this area are slight and the bottom topography levels out after a 45-degree, 35-foot slope from the bank. Sheening was seen over the area. The area was marked with buoys by representatives of the RP and the State of Louisiana.

Behavior of Oil:

This product was a heavy fuel oil and immediately sank to the bottom of the Mississippi River. Some of he product was found in about 70 feet of water and sheens were seen over pockets of the oil. These sheens were used to locate the oil during recovery operations. Near the accident where currents are stronger, or downriver in deep troughs, no oil was located. Between 1,900 and 2,400 barrels of oil were recovered

Countermeasures and Mitigation:

Surveying operations using various operational techniques and different oil movement theories were attempted throughout the response. On October 14 a hydrographic survey

using Digital Geographic Positioning System (DGPS) was done in the area of MM 126. The results of the survey showed there were no big troughs where oil could accumulate around the barges that were pushed against the bank. Over 700 drops using sorbent pads at the end of a chain, and over 100 drops using a ponar bucket were used to locate the submerged oil. Pumps dropped to filter air through the sediment in an attempt to create sheening did not locate oil. A chain drag to bring sheen to the surface was also attempted with no success In addition to the oil found where the barges eventually came to a stop, one small patch of oil was found in the middle of the channel.

Three large pockets of oil were found with sorbent pad drops where the barges where pushed against the banks. Divers, with the use of a submersible hydraulic pump, were able to recover 500 to 1,500 barrels of product. From each spot, the divers did a 200-foot radius search to locate additional pockets. There was no visibility on the bottom of the Mississippi and when felt by the divers, the product was not unlike the muddy bottom of the river. When the divers lost the patch of oil they were vacuuming as communicated by the surface they would switch operations to "roughing up" the bottom to create a sheen. Sheening would indicate a new patch of oil to recover. It is difficult to estimate the movement of the oil on the bottom of the river, but oil was found next to the barge a week after the accident indicating little movement. Efficient dive operations began on October 13 and continued to October 19. The divers used a submersible Marflex hydraulic pump to recover the product to a hopper barge adjacent to their working barge.

On the morning of October 20, the USCG, Louisiana DEQ, and RP met to discuss future plans. They agreed that sampling to locate oil was complete but the RP must still determine the exact amount spilled and recovered.

The state, RP, and USCG also discussed protocols to be used if there is a similar accident on the Mississippi.

Other Special Interest Issues:

This was first time oil has been recovered from the bottom of the Mississippi River. Difficulties encountered were no visibility, depth, and currents. Innovative diving operations led to successful recovery of the product. Recovery operations at their most efficient level had 92 percent pure product being recovered off the bottom.

NOAA Activities:

NOAA was notified of the incident on October 11, 1995, by the USCG MSO New Orleans who requested on-scene support. NOAA provided the FOSC with on-scene scientific support from October 11 through October 20, 1996.

The SSC helped develop surveying and sampling methods for locating the sunken oil.

References:

OSC Report of Major Pollution Incident from Tank Barge *Apex 3512*, at Mile 126, Lower Mississippi River, on 11 October 1995, 06 May 1996

Name of Spill:	West Cameron Block 198
NOAA SSC:	Ilene Byron
USCG District:	8
Date of Spill:	12/15/95
Location of Spill:	Cameron, Louisiana
Latitude:	29°20′ N
Longitude:	93°20′ W
Spilled Material:	crude oil
Spilled Material Type:	2
Amount:	740 barrels
Source of Spill:	platform
Dispersants:	Y
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	dispersant use pre-approval
Shoreline Types Impacted:	none
Keywords:	Corexit 9527

Incident Summary:

On December 15, 1995, crude oil leaked from an offshore production platform located in West Cameron Block 198 approximately 35 miles south of Cameron, Louisiana. The spill was caused by a valve malfunction.

By noon December 16, the RP, state, and USCG officials decided to use dispersants. That afternoon, the dispersant application was completed in about an hour using two aircraft contracted by the RP.

Behavior of Oil:

Early attempts to fly over and assess the spill were hampered by bad weather and poor visibility, but an early-morning overflight by a USCG Falcon airplane from Corpus Christi, Texas on December 16 discovered at least 4,200 gallons of the crude oil contained in a slick 35 miles offshore. The slick was approximately two miles across and five miles long.

Countermeasures and Mitigation:

By noon December 16, Chevron, state and USCG officials decided to use dispersants to expedite response and minimize environmental impact. Pre-approved by federal and state officials in January 1995, use of dispersants on offshore oil spills near Louisiana and Texas is permitted in Gulf of Mexico waters deeper than 10 meters and more than three miles offshore.

This is the first time aerial dispersants have been used in the Gulf of Mexico under the new dispersant policy. Its use has allowed officials to potentially minimize the effects of an offshore spill within a matter of hours, whereas traditional response efforts have taken days to deploy equipment and months to fully mitigate spill effects on the environment.

The dispersant application started at approximately 1530 on Saturday, December 16 and was completed by 1630 using two contract aircraft under Chevron's control. One aircraft applied the dispersant as directed by the other "spotter" airplane, which guided the application aircraft to the heaviest concentrations of oil.

One sortie with seven passes over the slick was accomplished using 500 gallons of dispersant. Reports from the RP indicated dispersant operations were effective. A USCG Falcon jet flew over the area several hours after the dispersant had been spread and noted a difference from the morning's overflight in the appearance of the slick. The slick appeared to be broken up and divided in two orange patches. Due to poor weather, there were no overflights on December 17. A December 18 overflight found no remaining oil.

NOAA Activities:

NOAA was notified of this incident on December 15, 1995, by MSO Port Arthur who requested a trajectory, weather information, and the possible fate and effects of the spilled oil. The MSO also asked for advice on the request of the RP to use dispersants. On December 16 the SSC was contacted by the USCG MSD who requested that the SSC come to the command center in New Orleans to supply scientific support for RRT and command briefings.

NOAA supported this response for four days.

References:

NOAA Hotline #185, 2 Reports

NOAA. 1993. *ADIOS™ (Automated Data Inquiry for Oil Spills) User's Manual.* Seattle: Hazardous Materials Response and Assessment Division, NOAA. 50 pp.

RRT VI Dispersant Pre-Approval Plan

Name of Spill:	*Buffalo 292*
NOAA SSC:	Ilene Byron
USCG District:	8
Date of Spill:	3/18/96
Location of Spill:	Galveston, Texas
Latitude:	29°22′ N
Longitude:	94°48′ W
Spilled Material:	IFO 380
Spilled Material Type:	4
Amount:	5,000 barrels
Source of Spill:	barge
Resources at Risk:	**Marine Mammals:** bottlenose dolphins **Birds:** waterfowl, diving birds, wading birds, shorebirds, gulls, and terns **Fish:** Gulf menhaden, spotted seatrout, black drum, red drum, striped mullet, and southern flounder **Mollusks:** oysters **Crustaceans:** shrimp, stone and blue crabs **Recreation:** state park, marinas, boat ramps
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	economic impacts, closing of the Houston Ship Channel, PORTS, TABS
Shoreline Types Impacted:	marshes, exposed tidal flats, mixed sand and shell beaches, rip rap, piers, and spoil bank
Keywords:	containment boom, Corexit 9500, Corexit 9527, skimmers, IR, sorbent boom, sorbent pompoms, vacuum trucks

Incident Summary:

The barge *Buffalo 292* suffered a major structural failure in the early afternoon of March 18, 1996, and discharged approximately 5,000 barrels of IFO 380 approximately one mile north of Pelican Island. Weather on-scene was windy with gusts to 60 knots. Evening northwest winds blew a majority of the product into the Gulf of Mexico.

Behavior of Oil:

IFO 380 is an intermediate fuel oil exhibiting properties similar to a #6. It has a high viscosity and pour point, and tests showed it was not dispersible with either Corexit 9527 or Corexit 9500. The oil remained buoyant and an offshore tarball field was visually tracked for three weeks as it traveled off Galveston Bay in Houston (Galveston's area of operation) and impacted at Matagorda Island (Corpus Christi's area of operation).

Countermeasures and Mitigation:

This spill was in two parts: the inland spill, which affected the Galveston area; and the offshore oil, which led to scattered tarball impact on Corpus Christi beaches. A unified command center was established in Galveston and an estimated 500 federal, state, and local government employees and contract workers responded. Spill priorities are in the Area Committee Plan and, with input from the state resource managers on-scene, protective booming was put in place the evening of the incident in the Galveston area and lightering of the vessel was completed within 30 hours of the incident. About 34,800 feet of hard boom and 12 skimmers were deployed. As the oil was tracked down the coast, protective booming was put into place. Sparse and sporadic tarballs were manually recovered from Matagorda and Mustang islands. Very light impact occurred on Padre Island. An additional command post was established in Corpus Christi on March 31.

Four offshore skimming vessels were able to recover floating product four days after the spill, 60 miles from land. The oil was located for the skimming vessels in various ways. Evening overflights by the USCG Falcon jet equipped with AirEye dropped flares near the oil for the skimmers to locate. Hand-held infrared (IR) camera operators were put in the crows' nests of the skimming vessels and were able to keep them working overnight. When a low encounter rate of oil made skimming operations offshore inefficient 10 days after the spill, 12 fishing vessels were deployed for manual tar patty pickup on the water. In the first evening, 35 ten-gallon bags were filled by the vessels' crews both manually and using nets and hooks. These fishing vessels followed the tarball patch until it impacted Corpus Christi-area beaches. The vessels were guided by a helicopter.

There were 25 oiled birds observed in the Galveston area; 10 were recovered. They included ducks, laughing gulls, Virginia rail, and a loon.

Other Special Interest Issues:

The city of Galveston was concerned about economic impacts because this spill occurred during college spring break, a high tourist season.

The Houston Ship Channel was closed briefly but was reopened with a safety zone in effect. This spill was rich in information used for understanding the movement of the oil. The incident occurred within a mile of a NOAA Physical Oceanographic Real-Time System. (PORTS) station and the higher than predicted tides were easily seen by the real-time terminal located at MSO Galveston. The Texas Automated Buoy System (TABS) was able to give NOAA modelers the currents within the first hour of the spill. The currents had been up-coast during the first half of the spill (an unusual condition by historical standards) and the modelers' anticipated switch back to a down-coast flow was observed by the TABS within two hours of its occurrence. Additional data were received by three Minerals Management Service (MMS) drifting satellite buoys deployed by NOAA. Remote sensing from the USCG AirEye was able to locate the oil evenings when visual observations were not possible due to heavy weather.

NOAA Activities:

NOAA was notified of the incident on March 18, 1996, by the USCG MSO Houston, who requested on-scene support. NOAA provided the FOSC with on-scene scientific support from March 18 through April 6, 1996. This support was provided by a scientific team managed by the SSC.

The SSC team was an intregal part of the planning section of the USCG's Unified Command System. The SSC also had a direct link to the FOSC and immediately brought any significant matters directly to his attention.

The SSC closely worked with all the state and federal trustees to facilitate the consensus of cleanup methods and "how clean is clean."

NOAA's major activities were:

- ❒ developing trajectories;
- ❒ accompanying other spill responders on overflights;
- ❒ predicting weather;
- ❒ analyzing the dispersability of spilled product;
- ❒ participating in developing shoreline assessments and cleanup guidelines that led to "how clean is clean" guidelines and sign-off procedures. and
- ❒ managing information and data related to these issues.

References:

Hall, Christopher J. 1996, Information Management Report for the *Buffalo 292* Spill. May 6, 1996. Seattle: Genwest Systems for Hazardous Materials Response and Assessment Division, NOAA.

NOAA Hotline #193, 2 Reports

Name of Spill:	*Buffalo 286*
NOAA SSC:	Ilene Byron
USCG District:	8
Date of Spill:	5/26/96
Location of Spill:	La Porte, Texas
Latitude:	29°34.4' N
Longitude:	94°55.5' W
Spilled Material:	IFO 380
Spilled Material Type:	4
Amount:	1,000 barrels
Source of Spill:	barge
Resources at Risk:	**Marine Mammals:** bottlenose dolphins **Birds:** waterfowl, diving birds, wading birds, shorebirds, gulls, and terns **Fish:** Gulf menhaden, spotted seatrout, black drum, red drum, striped mullet, and southern flounder **Mollusks:** oysters **Crustaceans:** shrimp, stone and blue crabs **Recreation:** State Park, marinas, boat ramps
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	similar accident, same class barge, same company occurred in March
Shoreline Types Impacted:	marshes, exposed tidal flats mixed sand and shell beaches, rip rap, piers, spoil bank
Keywords:	containment boom, skimmers, Corexit 9580, sorbent boom, sorbent pompoms, vacuum trucks

Incident Summary:

The single-hulled barge *Buffalo 286* suffered a major structural failure on May 26, 1996, and discharged approximately 1,000 barrels of IFO 380 from damaged tanks into Galveston Bay, Texas. The #3 port and starboard wing tanks were damaged with 5,000 barrels of product divided equally between them. The barge carried 16,000 barrels of product. Weather onscene was southeast winds at 15 knots.

Protective booming was in place at the Houston Yacht Club, Little Cedar Bayou, parts of Atkinson Island, and sensitive areas along the shoreline between Morgans Point and Eagle Point in accordance with the Area Committee Plan.

The USCG directed the towing vessel to transit into the Bayport Ship Channel and position on the north bank to minimize the extent of oil impact. On May 27 the barge was against the north side of the channel.

Behavior of Oil:

IFO 380 is a heavy intermediate fuel oil exhibiting properties similar to a # 6. It has a high viscosity and pour point. The oil remained buoyant but in some places along Atkinson

Island and Morgans Point it caught in the surf zone and mixed with sand. This sand-oil mixture continued to wash ashore for a week.

Within hours of the spill, the barge was in a protected area and boomed, thus minimizing the oil released outside the Bayport Ship Channel. Floating oil was collected by 16 skimmers.

The oil on the gravel beaches penetrated the beach up to two inches and formed an incipient pavement. Waves created by boat traffic broke this oil up into tarballs. The Shoreline Cleanup Assessment Team (SCAT) recommended immediate removal of these tarballs. There was evidence of oil penetration along the fine-grained sand pocket beaches and the team recommended that this oil be removed as well. There was an initial problem of removing too much clean sediment during cleanup operations but this situation was rectified by the team. The site supervisors were instructed to have workers remove as little clean material as possible and to stress scraping, rather than digging.

Countermeasures and Mitigation:

The COTP reopened the Houston Ship Channel after an overflight. The Bayport Ship Channel remained closed for two days and a safety zone was established between Morgans Point and an area north of the entrance to Clear Lake.

Oil impacted north-end shorelines of the Bayport Ship Channel, Boggy Bayou, Wilson Street Bayou, Morgans Point, and shorelines south of Morgans Point, Hog Island, and Atkinson Island. Cleanup was done manually.

The Texas General Land Office (TGLO) Bird Rehabilitation trailer was staged at Sylvan Beach. There were five oiled birds treated at this site. No additional wildlife impacts were reported

The SCAT, with representatives of NOAA, USCG, TGLO, and the RP surveyed Boggy Bayou in the Bayport Ship Channel, western sides of Hog and Atkinson islands, the Five Mile Cut shoreline, and the dredge spoil shoreline near Bulkhead Reef. The team found free-floating oil in Boggy Bayou and the lower portions of some of the vegetation were coated with oil. The oil penetrated about one foot into the vegetation. Rainbow sheen on the water pooled on the exposed mud flats in the bayou.

The team recommended herding the free-floating oil to a collection point at a culvert at the north end of the bayou. Workers were instructed to stay off the vegetation to prevent trampling and mixing the oil into the sediment.

Another SCAT Team led by the RP included personnel from TGLO, Texas Natural Resource Conservation Commission (TNRCC), and the USCG surveyed Wilson Cut/Sandy Point. There was free-floating oil in the creek. The shoreline consisted of vegetated banks, erosional clay banks, bulkheads, and riprap. All of these shoreline habitats were oiled.

The shorelines of Bayridge Park and Bay Shore Park are complex and composed of man-made coastal structures and intervening pocket beaches of mixed sand and gravel (shell). Portions of the coastal structures were coated and stained with oil (10-20% cover). Tarballs,

tar patties, and incipient pavements were observed on the pocket beaches. The heavily oiled vegetation was cut and removed.

Cleaning operations of the *Buffalo 286* were completed on May 29. The barge was cleared by the FOSC for transit to Newpark Shipyard. The Clean Channel II trailed the barge en route. Clean Channel I and II began decontamination May 29. Clean Channel II remained off Morgans Point to recover any floating oil missed by earlier skimming.

Corexit 9580 was used to decontaminate two barges, two assist tugs, and two USCG boats at the Baytank Facility. The vessels were in the water and the area was double boomed. The Corexit was applied with a brush in a 50/50 water and Corexit mixture by workers in john boats. The mixture effectively removed the oil from the sides of the vessels. After application an oil-water-Corexit mixture was seen floating in the water and recovered with sorbents.

Other Special Interest Issues:

In March, a similar accident occurred. The barge *Buffalo 292* suffered a major structural failure and discharged about 5,000 barrels of IFO 380 in this general area. The oil impacted Matagorda Island in the Gulf of Mexico.

NOAA Activities:

NOAA was notified of this incident on May 26, 1996, by the USCG MSO Houston who requested on-scene support.

NOAA personnel pre-assessed initial areas of oiling for shoreline types in preparation for beach impact. Samples of spilled oil and samples of reference oil from the barge were secured for analysis.

NOAA participated in overflights of the area. Sheens in Wilson Creek/Sandy Point (the first cut south of Morgans Point) and widely scattered silver sheens with a few tarballs were observed. Trapped, wind-driven black oil was observed along the north side of the Bayport Ship Channel, with silver and rainbow sheens on the west end of the channel. Recoverable floating oil was observed west of Atkinson Island and a skimming vessel was dispatched to collect the oil.

The SSC assisted in reviewing a plan to apply Corexit 9580 to clean oiled vessels.

The SSC left the scene the afternoon of June 2, but reviewed all maintenance and cleanup plans. NOAA provided the FOSC with on-scene scientific support from May 26 through June 2, 1996.

References:

NOAA Hotline #193, 126 Reports

Name of Spill:	Southern States Asphalt
NOAA SSC:	Bill Sites
USCG District:	8
Date of Spill:	07/25/96
Location of Spill:	Paducah, Kentucky
Latitude:	37°01.2' N
Longitude:	088°08.4' W
Spilled Material:	asphalt
Spilled Material Type:	4
Amount:	20 to 25 barrels
Source of Spill:	barge
Resources at Risk:	**Fish:** threadfin shad, shiners, darters, carp, buffalo, catfish (blue and channel), bluegill, longear, redear, warmouth, black crappie, white crappie, largemouth bass, spotted bass, sauger bass, white bass, carp, and catfish **Shellfish:** mapleleaf and threeridge mussels **Recreation:** high-use recreation area, boating and fishing, recreational harvesting of mussels
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	unusual recovery technique
Shoreline Types Impacted:	none

Incident Summary:

On May 5, 1996, about 25 barrels of heated asphalt meant for Ashland Oil Company's storage tanks were spilled into Lake Barkley in the Cumberland River. The spill was caused by a burst transfer hose.

The barges typically tie up to "mooring cells" in the river when they perform transfer operations. The mooring cells are large, round concrete structures 10 to 12 feet in diameter, anchored on the river bottom. They are designed for barges to tie up to and are common in many rivers in the South. Ashland Oil Southern States Asphalt claimed responsibility for the spill and began cleanup operations. The case was closed.

On July 21, 1996, the Executive Officer (XO) of MSO Paducah was fishing in Lake Barkley when he noticed tarballs and some oil sheens. The XO noted that some of the tarballs had short asphalt streamers attached to them. MSO Paducah decided to re-investigate the incident.

On July 22, 1996, a dive team surveyed the area of the spill around the mooring cells and found new product and old product. The new product was 3 to 18 inches thick; the old product was crumbly and covered with approximately six inches of sediment.

The new product could be cut and rolled up like taffy, removed from the water, and placed in polypropylene sacks. The old product could not be cut because it crumbled when handled. During the week of July 22-26, tarballs with short streamers were seen, but no

sheens were observed. MSO Paducah opened the Oil Spill Liability Trust Fund for the response.

Samples of the product were taken for laboratory analysis; no pollutant levels of concern were present.

MSO Paducah with representatives of the Kentucky EPA (the state natural resource trustee), the U.S. Army Corps of Engineers, Ashland Oil, and others met on July 26 to discuss the issues and develop a plan. They agreed to conduct a thorough investigation of the spill location using the dive team. The "how clean is clean" criteria were agreed upon. It was also decided that as much of the new taffy-like product as possible would be recovered and the older crumbly product would be left alone. On July 29 a dive team made a systematic survey of the spill area. Cleanup operations continued through August 2.

Behavior of Spilled Material:

The asphalt sank to the bottom of the lake. Most of the new product was recovered by the dive team.

Countermeasures and Mitigation:

The dive team manually removed as much of the new asphalt as possible. The sunken asphalt was recovered by an underwater dive team. The team rolled up the asphalt-like taffy, carried it to shore, and bagged it for disposal.

NOAA Activities:

NOAA was notified of this incident on July 25, 1996, by MSO Paducah who requested guidelines for "how clean is clean." The SSC told MSO that the product should remain on the bottom of the lake with occasional releases of oil/tar that will float to the surface and the primary impacts will be to bottom-feeding organisms at the spill site. This was a lake bottom spill so there was very little risk to the lake shorelines. Scattered tarballs may drift to shore, but impacts should be mostly aesthetic.

NOAA supported this response by telephone and fax from July 25 to August 5.

References:

USCG MSO Paducah POLREP's 231315Z JUL 96, 242030Z JUL 96, and 262045Z JUL 96.

Name of Spill:	Samedon Oil
NOAA SSC:	Ilene Byron
USCG District:	8
Date of Spill:	8/9/96
Location of Spill:	Sabine River, Texas
Latitude:	29°49′ N
Longitude:	93°38′ W
Spilled Material:	medium crude oil
Spilled Material Type:	3
Amount:	35 barrels
Source of Spill:	pipeline
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	Y
Shoreline Types Impacted:	fresh-to-brackish marsh
Keywords:	in-situ burning

Incident Summary:

On August 9, 1996, at the Cameron Meadows Lease in the Sabine River, a two-inch pipe nipple broke off a flowline going to a header manifold. The accident was caused by internal corrosion. A leak at the bottom of a four-inch bulk line was also discovered in the same area. The area is a fresh-to-brackish marsh surrounded by 100-foot wide canals and spoil banks ranging from four to six feet above mean water level.

Behavior of Oil:

The 100- by 300-foot area with a water depth of 4 to 12 inches sustained oiling 1/16-inch thick. The marsh is heavily vegetated with Spartina, rosocain, sciripus, typha, and marsh alder.

Countermeasures and Mitigation:

Cleanup crews in airboats performed mechanical cleanup of oil in open areas.

Because the marsh area was very difficult to access, an in-situ burn was also performed. This area has been burned previously as a marsh management technique.

Other Special Interest Issues:

The GST was onscene with PM-10 meters and found no higher than normal readings.

A control site was left for follow-up study.

NOAA Activities:

NOAA was notified of this incident on August 9, 1996, by MSO Port Arthur to discuss the spill. An in-situ burn had been discussed, but the RP was only requesting mechanical

cleanup. On August 10 the RP requested an in-situ burn and the SSC was contacted to advise. The RRT VI Guidelines for Inshore/Nearshore Burn were faxed to the scene and discussed The checklist was completed by the RP and the local state representative from DEQ water quality. The SSC recommended the burn to the USCG based on conversations with the state representative onscene and the completed checklist.

References:

RRT VI Guidelines for Inshore/Nearshore In-Situ Burn

Name of Spill:	Occidental Chemical
NOAA SSC:	Bill Sites
USCG District:	8
Date of Spill:	09/06/96
Location of Spill:	Muscle Shoals, Alabama
Latitude:	34°47.5′ N
Longitude:	87°37.3′ W
Spilled Material:	potassium hydroxide
Spilled Material Type:	5
Amount:	15,000 gallons
Source of Spill:	facility
Resources at Risk:	**Fish:** small and largemouth bass, assorted species of sunfish, slackwater darter (endangered) **Mollusks:** pink mucket, pearly mussel (*Lampsilis abrupta* federally endangered), 30 different species of mussels, varicose rocksnail, rustic rocksnail, ornate rocksnail, mussel bed, **Birds:** heron **Mammals:** mink, nutria, muskrats, and river otter **Recreation:** high-use fishing area
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	endangered species, RIDS, Cameo™

Incident Summary:

On September 6, 1996, Occidental Chemical in Muscle Shoals, Alabama spilled approximately 90,000 gallons of 50 percent concentration caustic potash/potassium hydroxide solution. Approximately 15,000 gallons reached the Tennessee River just east of the Wilson Dam. The remainder of the spilled solution was contained and recovered. The entire area was cordoned off, eliminating all traffic.

The spill was caused by a pump that had filled a storage tank beyond its capacity. The tank overflowed into the secondary containment, then overflowed that structure and spilled approximately 15,000 gallons into the Tennessee River. Portions of the secondary containment also failed, allowing more product to leak into the river. The pump was shut off and the RP fortified the secondary containment to trap the remaining product. A small fish kill was observed shortly after the spill, but it is not known whether the fish kill was caused by the potassium hydroxide. No additional fish kills were observed by the FOSC through the morning of September 7, 1996.

Behavior of Spilled Material:

The liquid caustic potash/potassium hydroxide entered the river, sank to the bottom, and probably moved downstream. It is assumed that at least some of the product flowed through the Wilson Power Dam. The solution was heavier than water (specific gravity 1.52 at 16°C) and was expected to remain along the river bottom, most likely pooling in deep

spots and slowly dispersing out. The product was expected to dilute to background levels within approximately 24 hours. None of the product spilled into the river was recovered.

USCG MSO Paducah was notified of the spill and acted as the FOSC until the evening of September 6, 1996, when EPA Region 4 assumed the FOSC role. Also on-scene were the USCG GST, the Alabama Police, the Alabama Department of Environmental Management, and the Tennessee Valley Authority (TVA). The TVA monitored the water for pH and took several samples.

Countermeasures and Mitigation:

The pump was shut off and the secondary containment was reinforced by the RP to contain the remaining potassium hydroxide. The RP pumped the spilled material into ditches that they sealed off to create reservoirs for storage and recovery. Vacuum trucks were used to remove the chemical from the ditches and the containment area around the overflowed tank. Approximately 75,000 gallons of the spilled material were recovered.

NOAA Activities:

NOAA was notified of this incident on September 6, 1996, by MSO Paducah who requested information on the toxicity of potassium hydroxide and possible countermeasures to use to cleanup this material. The SSC responded with CAMEO™ Response Information Data Sheets (RIDS) for potassium hydroxide including a general description, first-aid recommendations, and non-fire response recommendations.

NOAA suggested that water intakes near the spill be shut down for about 24 hours or until pH levels returned to normal. The SSC also suggested that public access to the river in the general area of the spill be restricted and that there be no fishing, boating, or swimming for several hours or until pH levels returned to normal. Workers should be protected from harmful effects of the potassium hydroxide by wearing gloves and having large amounts of fresh water on hand to flush their skin.

The NOAA SSC provided support to MSO Paducah via telephone and fax for one day.

References:

NOAA Hotline #200, 4 Reports

NOAA. 1993. *The CAMEO™ 4.0 Manual.* Washington, D.C.: National Safety Council. 440 pp.

Name of Spill:	F/V *Pioneer*
NOAA SSC:	Scott Stolz
USCG District:	11
Date of Spill:	10/30/95
Location of Spill:	Santa Cruz Island, California
Latitude:	34°05.4' N
Longitude:	119°57.1' W
Spilled Material:	diesel fuel
Spilled Material Type:	2
Amount:	2,000 gallons
Source of Spill:	non-tank vessel
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	none

Incident Summary:

On October 29, 1995, at about 2040, MSO Los Angeles/Long Beach received a call that the fishing vessel *Pioneer* had capsized approximately one and one-quarter nautical miles north of the west end of Santa Cruz Island in the Santa Barbara Channel. The vessel was taken in tow but sank during transit in about 39 fathoms of water with approximately 2,000 gallons of diesel fuel onboard. At the time, the weather was clear, winds 0 to 5 knots from the southeast, with calm seas. Oil sheen measuring about one by two nautical miles was observed at the sinking site.

NOAA Activities:

NOAA was notified of this incident at 0800 on October 30, 1995, by MSO Los Angeles/ Long Beach who requested trajectory and weather information. The SSC contacted the Channel Islands National Marine Sanctuary and NOAA Damage Assessment Center to apprise them of the situation. NOAA informed the MSO that the oil, depending on its persistence and the direction of the wind, could impact the northwest tip of Santa Cruz Island.

An overflight later that day indicated that the sheen had dissipated but, from the air, it looked as if oil had impacted the shoreline near Frazier Point on Santa Cruz Island. However, shore walks by on-site biologists noted no impacts. Follow-up calls indicated the USCG was no longer concerned.

References:

NOAA. 1993. *ADIOS™ (Automated Data Inquiry for Oil Spills) User's Manual.* Seattle: Hazardous Materials Response and Assessment Division, NOAA. 50 pp.

Name of Spill:	El Cajon Train Derailment
NOAA SSC:	Scott Stolz
USCG District:	11
Date of Spill:	02/03/96
Location of Spill:	Cajon Junction, California
Latitude:	unknown
Longitude:	unknown
Spilled Material:	diesel fuel, polyethylene glycol, fuel oil, lube oil, trimethyl phosphite, liquid petroleum distillate n.o.s., liquid plastic, butyl acrylate, denatured alcohol, calcium chloride, glycol
Spilled Material Type:	2, 5
Amount :	4,000 gallons locomotive oil, 22,000 gallons hazardous materials
Source of Spill:	train derailment
Resources at Risk:	soil health and safety
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	water supply, railway and highway closure, political and media interest.

Incident Summary:

On February 1, 1996, a runaway Burlington Northern Santa Fe freight train, 4 locomotives and 49 cars, derailed on the south main track near the intersection of interstates I-15 and 138 in Cajon Junction, California. The train was carrying 178,000 pounds butyl acrylate, 158,000 pounds trimethyl phosphite, 191,000 pounds methyl ethyl ketone, 193,000 pounds denatured alcohol, one train car of petroleum distillates, and one train car of glycol. Also onboard were fiberboard, tires, fuel oil, lubrication oil, and diesel oil. Weather at the time was clear and calm.

The locomotives and 46 of the cars were derailed compressing the train from over 3,000 feet to about 500 feet. The train landed in a wash next to the railline and an unknown amount of hazardous materials was released. An unknown number of burning cars ignited material in the wash, scorching about a half mile of the wash bed. There were small pockets of free product as well as contaminated soil located in the wash and around the piled-up train cars. The fire also caused a large, visible smoke plume. The plume resulted in the closure of the highways, the temporary evacuation of more than 200 people, and the establishment of a one-half mile exclusion zone. The pile-up of railcars and resulting fire caused complications in suppressing the fire, identifying remaining hazards, sampling soil and water, and removing debris.

Response organizations included USEPA, who acted as the FOSC; California Department of Forestry (Fire Prevention), the incident command because of the fire suppression response; California Department of Fish and Game (CDFG), because of their trustee mandate; and California Regional Water Quality Control Board, because of the concern for the effects to area water supplies. Other federal responders included the U.S. Forestry Service and USFWS because of the fire response and proximity to Mormon Rocks National Park; Pacific

Strike Team (PST), requested by the FOSC; and National Transportation Safety Board, for train derailment resulting in fatalities. The level of federal involvement was limited to investigative duties and oversight of the RP's actions. Other responders included California EPA, California Occupational Safety and Health Administration (OSHA), California Mojave Desert Air Quality Management District, and San Bernadino County Environmental Health Services and Fire Department's Hazardous Materials Division. The RP, Burlington Northern Santa Fe, played a large part in the response, with a variety of rail salvage and hazardous material responders and their contractor, Environmental Solutions Inc.

An answer to the "how clean is clean" issue for soil had to be determined. Soil samples were taken from the accident site and compared to background samples. Soil sampling in established grids downstream from the site was begun. Heavily contaminated soil was removed and placed in plastic-lined covered bins.

Response personnel within the hot zone were hindered in their efforts because they were required to use Level B personal protective equipment (PPE). The heavy equipment operators worked using 30-minute self-contained breathing apparatus (SCBA). A PPE downgrade was requested by the RP but sufficient reduced risk could not be demonstrated using what data they had collected. A sampling program that better characterized the work area was developed.

Work continued with heavy equipment pulling apart train car wreckage and separating debris. Fires occurred as smoldering flammable materials were exposed. When these fires became too hot, or too close to the ongoing operations, the equipment would pull back and fire suppression operations would be conducted by waiting fire teams.

New roadways and level areas were constructed in preparation for the hauling out, decontamination, cutting up, and removal of the rail cars.

Work was halted for some time when a tanker car of unidentified material was pulled from the pile and began venting smoke plumes and flames. The exclusion zone was increased and survey teams were sent in. The concern was that this was a chemical that may pose an explosive risk; it was not and work resumed.

The railway track was repaired and reopened on February 4.

Work was put on hold when the tanker car containing the butyl acrylate began "rumbling" and its temperature started rising, causing concern that the product could be undergoing a chemical polymerization, a condition that could cause an explosive detonation of the tanker car. The half-mile exclusion zone was established and Interstate 15, State Road 138, and the three area railways were closed. Specialists from Rohm and Haas, the chemical's manufacturer, were brought onsite and thermal sensing instruments were obtained. The temperatures were observed remotely through the day, rising from about 110°F to as high as 177°F. At some time a whitish foam-like substance escaped from some area on the tank. Experts caused a "controlled opening" of the tank using small shaped charges to eliminate any chance of an over-pressure detonation of the tank. The tank was already of questionable integrity due to its extended exposure to the extreme temperatures of the fire. The tank was opened without incident. About 600 gallons of product had drained and the

product that remained seemed to have solidified in the tank. Air sampling was conducted on the roadways and they were reopened at midnight February 5.

The butyl acrylate tank car remained relatively unchanged throughout the response. An estimated 1,200 to 1,700 gallons of chemical flowed from the holes into soil-diked holding pools. Responders wearing Level B personal protection equipment (PPE) worked around the car until a method of emptying or removing the product could be developed to minimize risk to the environment.

The site exclusion zone was downgraded on February 8 from Level B PPE to Level C. The downgrade occurred only after all tanker cars had been accounted for, sampling data for soil and air inside the hot zone had been analyzed, and specific safety and monitoring procedures decided upon. Shredders and other heavy equipment continued to tear the remaining debris into transportable pieces. Two of the locomotives were not salvageable and were torn and torched apart for removal as scrap. The RP estimated that all material would be removed by February 12.

Water sampling continued for the duration of this incident. Some holes were drilled to determine the level of the water table and a continuous sampler was established to give warning of any plume advancement.

The CDFG and the Regional Water Quality Control Board will determine the final levels of site remediation.

Other Special Interest Issues:

There are drinking-water wells in the area, the closest only one and one-half mile away. A drinking-water well for the city of San Bernadino is about seven miles away. Keeping contaminants out of these wells became a major concern during this incident.

NOAA Activities:

NOAA was notified of this incident on February 3, 1996, by the FOSC who requested on-scene support. The SSC participated in the command and planning meetings and provided toxicology, health and safety, and site-specific weather information. NOAA reviewed the sampling and analysis plan for soil and groundwater and recommended cleanup levels.

After studying the list of chemicals onboard the train, NOAA told the FOSC that the methyl ethyl ketone's main hazard is flammability; the ethyl glycol is highly soluble in water and may dissolve in underground water; and burning tires produce copious amounts of thick, black smoke that contains soot, hydrocarbon particulates, and sulfur dioxide.

Even after the fire is extinguished, the spilled chemicals could pose a health hazard to exposed personnel. NOAA advised workers to stay upwind to minimize inhalation exposure and suggested that respiratory, skin, and eye protection should be provided and the level of PPE should be determined by air sampling.

The final decision on decontamination procedures had not been made when the SSC left the site. One option being considered was off-site decontamination.

Work at the site continued through February 12. The fire was no longer a large concern and the work site was downgraded to Level C inside the exclusion zone. A decontamination area was set up with a plastic-covered drainage area and a standby pump truck.

NOAA supported this incident on-scene until February 8 and by phone through February 12.

References:

NOAA Hotline #188, 11 Reports

Name of Spill:	U.S. Navy Pipeline
NOAA SSC:	Scott Stolz
USCG District:	11
Date of Spill:	03/07/96
Location of Spill:	San Diego, California
Latitude:	unknown
Longitude:	unknown
Spilled Material:	JP-5 jet fuel
Spilled Material Type:	1
Amount:	350-500 gallons
Source of Spill:	Pipeline
Resources at Risk:	**Birds:** various birds **Habitat:** eelgrass beds, shoreline vegetation **Marine Mammals:** dolphins **Recreation:** boats and marinas, boat ramps, high-use recreational boating areas
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	claims for damages
Shoreline Types Impacted:	coastal structures, piers, riprap, sand/gravel/riprap beach

Incident Summary:

On March 7, 1996, MSO San Diego was notified of an oil sheen covering the Southwestern Yacht Club. The discharge had come from a U.S. Navy (USN) underground pipeline carrying JP-5 jet fuel at the Point Loma Fuel Pier. The oil was coming from the northwestern shoreline of Shelter Island Yacht Basin, near the San Diego Yacht Club. Weather at the time was fair, mostly cloudy, with winds at about four knots, calm seas, air temperature 68°, and water temperature 58°. The first responders boomed the area and used sorbents to absorb the oil. The USN response contractor used vacuum trucks and two skimmers for cleanup. The CDFG, Office of Oil Spill Prevention and Response (OSPR), and Sea World Wildlife Recovery personnel were on-scene to clean oiled birds. There were about 30 oiled birds, mostly duck varieties, found; 10 birds died. The USN's contractors excavated contaminated soil and repaired the pipeline.

Behavior of Spilled Material:

The JP-5 bubbled out of the ground near a shore dropoff, flowed downhill, and into the water. There it spread out in a large sheen, somewhat contained in the Yacht Basin, that later flowed out and dissipated with the ebb tide.

Countermeasures and Mitigation:

Skimming was ineffective. Sorbents collected some product, but most of it evaporated. Vegetation on the shoreline, California ice plant, is non-threatened and prolific. Most was removed during excavation, but is expected to grow back quickly. The primary focus of this response was on the few injured birds.

Other Special Interest Issues:

Media interest was high for such a small event. USN dolphins in nearby pens were not affected by the spill. The USN expects numerous third-party claims for oiled sailboats and yachts.

NOAA Activities:

NOAA was notified of this incident on March 7, 1996, by MSO San Diego. The SSC arrived on-scene about 1400. The SSC provided the FOSC information on the flammability and exposure limits of the JP-5. NOAA also told responders that, with the weak winds and the ebb tide, any sheen expected near the entrance of the harbor would exit the harbor and head south with the ebb. Any oil left outside the harbor would move to the east toward North Island.

The SSC also reported that about half the JP-5 should evaporate within three hours of the spill and, unless the wind and waves increased, significant amounts of oil will enter the water column.

Name of Spill:	Asylum Slough Oil Spill
NOAA SSC:	Scott Stolz
USCG District:	11
Date of Spill:	04/12/96
Location of Spill:	Napa, California
Latitude:	unknown
Longitude:	unknown
Spilled Material:	#2 marine diesel and lube oil
Spilled Material Type:	2
Amount:	100 gallons
Source of Spill:	non-tank vessel
Resources at Risk:	**Habitat:** vegetation **Birds:** waterfowl
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Shoreline Types Impacted:	mixed sediment spoil bank with vegetation, pier face, and riprap, inland slough with vegetated low banks and brackish intertidal marshes

Incident Summary:

On April 3, 1996, the 90-foot derelict F/V *Maraha* sank during a heavy rain storm in Asylum Slough located on the Napa River near Napa, California. Diesel fuel and oil from on-board tanks and engines discharged into the water. In addition, about 16 drums and smaller containers floated from the vessel and washed ashore. About 200 containers of unknown contents were discovered during a vessel inspection.

There was a threat of release of the hazardous materials identified onboard. They were:

- 1,375 gallons of liquid paint waste,
- 770 gallons of liquid waste paint related materials,
- 200 pounds of sodium hydroxide solid,
- 115 gallons of sodium hydroxide liquid, and
- 25 gallons of liquid chromic acid.

Behavior of Spilled Material:

Oil impacted mixed sediment shorelines at the dredged end of the slough during initial discharge, and sheening from minute pockets of product continued to occur from banks, debris, and vegetation.

Countermeasures and Mitigation:

EPA FOSC was activated under CERCLA authority for the hazardous materials and Oil Pollution Act of 1990 funds were opened for the oil discharge. Sorbent and containment booms were deployed to contain the spill. The vessel continued to discharge oil and on April 8 the vessel was salvaged to eliminate the continued discharge and remove the various unknown hazardous materials. On April 12, EPA assumed site control from CDFG. The USCG PST was deployed for vessel salvage and cleanup assistance.

The vessel was raised using cranes and cleanup of the vessel and shoreline continued. All containers were removed from the vessel, segregated into proper waste streams, and overpacked for disposal. Oiled debris was removed from the shoreline and passive collection was instituted. Vessel spaces and tanks were steam cleaned to prevent future discharges.

Oiled debris was removed, some cleaning of banks by small boat was performed, sorbents were deployed for passive collection of sheening, and natural wave action and tidal flushing of slough waters continued.

NOAA Activities:

NOAA was notified of this incident on April 13, 1996, by EPA FOSC who requested support onscene. The SSC arrived the next day and provided advice on countermeasures, cleanup, and "how clean is clean" issues. The SSC was on-scene until April 17.

Name of Spill:	Heritage Platform (Exxon)
NOAA SSC:	Scott Stolz
USCG District:	11
Date of Spill:	05/02/96
Location of Spill:	Santa Barbara, California
Latitude:	034°21.0' N
Longitude:	120°16.8' W
Spilled Material:	Hondo crude
Spilled Material Type:	3
Amount:	50 to 200 barrels
Source of Spill:	platform
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	Clean Seas

Incident Summary:

On May 1, 1996, as the platform Heritage restarted operations, oil was forced through the platform's gas-flame exhaust pipe. Some product was ignited as it was released but did not continue burning on the open seas. Weather was foggy with winds east-southeast at 10 to 12 knots, seas 1 to 2 feet with swells 4 to 6 feet.

Platform personnel deployed containment boom and secured the source. Clean Seas was contacted. They brought skimming vessels on-scene and began open-water cleanup operations. When visibility allowed, Exxon and the USCG conducted overflights and estimated the volume of spilled material was between 50 and 200 barrels. Clean Seas collected larger concentrations of oil with skimmers and towed booms. During night operations, oil was corralled in booms and skimmed. The cause of this incident is being investigated by MMS and the Channel Islands National Marine Sanctuary was notified. This response lasted through the day with minimal night operations and, on the first overflight May 3, no oil could be found.

Behavior of Spilled Material:

Oil formed a non-continuous slick 5 to 8 miles long and 100 yards wide, with varied percent coverage. It moved 17 miles due west from the platform in the first 16 hours, then slowed. During the overflight, oil was described as dark brown, but in a thin emulsion. It remained in the open water, making no shoreline impacts. About 200 barrels of an oil-water mixture were collected.

NOAA Activities:

NOAA was notified of this incident on May 2, 1996, by MSO Los Angeles/Long Beach who requested on-scene support. The SSC provided weather and trajectory information. The SSC remained on-scene one day.

U.S. Coast Guard District 13

Name of Spill:	Ilwaco, Washington Tire Fire
NOAA SSC:	Gary Petrae, Sharon Christopherson
USCG District:	13
Date of Spill:	03/14/96
Location of Spill:	Fort Canby State Park, Baker Bay, Washington
Latitude:	46°17.6' N
Longitude:	124°03.2' W
Spilled Material:	Pyrolytic oil
Spilled Material Type:	2, 5
Amount	300 to 400 gallons
Source of Spill:	roadfill material
Resources at Risk:	**Fish:** salmonids, herring, bottomfish **Birds:** waterfowl, shorebirds, diving birds, gulls, bald eagles, other raptors, foraging areas **Habitats:** supratidal marsh, sheltered intertidal marsh, sheltered intertidal flats, and river **Crustaceans:** Dungeness crabs **Recreation:** hiking, recreational fishing areas, state parks **Management Areas:** state park
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	Pyrolytic oil appeared and behaved like a very aromatic medium-weight machine oil, but was later classified as a hazardous material. Washington State Department of Transportation was the RP.
Shoreline Types Impacted:	eroding upland, supratidal marsh, and sheltered intertidal marsh
Keywords:	endangered species, sorbent boom

Incident Summary:

In December 1994 after heavy rains, a native soil slide occurred on the SR100 Loop between Fort Canby State Park and Ilwaco, Washington. In the summer of 1995 rebuilding efforts began. Road reconstruction was completed in October 1995 using recycled 2- to 6-inch tire chips as lightweight fill material. On November 3, 1995, the road was reopened.

The pavement began to crack in late December 1995. On January 3, 1996, steam and heat were seen emanating from the roadway and the surface temperature was recorded at 122°F. On January 5 the surface temperature was 165°F. On January 17 weekly air and groundwater seep monitoring began. On February 12 the toe of the slope was sealed in an attempt to smother the fire by preventing oxygen uptake. On or about March 14 an oil-like substance was seen seeping out of the toe of the slope with the groundwater.

The oil flowed across the platform created by the original slide through an eroded ditch and into the supratidal area. It was estimated that 300 to 400 gallons of this pyrolytic oil seeped from the hill before it was contained late on March 14. Approximately 200 to 300 gallons of

this oil entered the intertidal zone, contaminating a 3,000- to 3,500-square foot area of the extreme supratidal and a small section of an intertidal marsh and drainage channel. Multiple coffer dams and sorbents applied at the toe of the slope effectively stemmed the flow of oil into the intertidal and prevented the migration of the oil already there.

These techniques continued to effectively prevent oil migration into the intertidal zone until a more efficiently engineered system of a steep dirt road, dike pumps, and on-site storage capacity was completed on March 23. This new system was designed to allow more efficient recovery of oil seepage and the expected greater oil release when the tire-chip fill was excavated. After this system was in place with a back-up trench between the dike and the intertidal zone, the threat of an oil spill into Baker Bay was eliminated. When the hill was opened on March 27 to expose the pool of oil, a short-term surge in flow rate was successfully contained by this system. This system also proved effective at containing and facilitating recovery of the oil released and the fire water used when the fill was completely excavated. The fire suppression water contained was pumped back up the embankment to be reused, thus ensuring an adequate source of water and minimizing the discharge of water-soluble pyrolytic by-products into the environment. Intermittent water samples were collected from the coffer dams, an interception trench outside the dike, and from the intertidal drainage channel to monitor the level of these contaminants.

Smoke and vapors of undetermined composition were emanating from these cracks and from the side of the hill during the entire response to the oil release. Coincident with the oil-seepage remediation activities at the toe of the slope, responders continually assessed the nature of the smoke and vapor at the road surface. This area was taped off and designated an exclusion zone. Air monitoring was done for volatile organics and air samples were drawn from the cracks. As monitoring and sample analysis dictated, PPE requirements (air-purifying respirators) and exclusion zone extents were modified to address the indicated level of risk.

Behavior of Spilled Material:

The oil, generated by the pyrolysis of the chipped tires, pooled in a depression at the toe of the hill. The pyrolysis started soon after the road was completed. By March the oil pooled in sufficient quantity to seep out of the toe of the hill where the new dirt cover met the dirt from the original slide. Approximately 200 to 300 gallons flowed into the supratidal zone where it pooled in an intertidal channel and marsh. Because the original discharge occurred during a period of lower high tides, the oil was not mobilized to other areas of the marsh. A 3,000- to 5,000-square foot area of the extreme supratidal just below the upland platform created by the slide was contaminated. This consisted of intertidal grasses covered intermittently with seagrass wrack, boards, timber, tree snags, and other debris.

The oil was a product of the pyrolytic breakdown of the tire material. It had the physical characteristics of a very highly aromatic medium-weight machine oil. However, there was a high concentration of toxic water-soluble compounds from the materials used in tire construction. Analysis of the oil and leachate indicated exotic compounds derived from the thermal breakdown of synthetic rubber and not typically found in petroleum oils. Several of the compounds identified appeared to contain nitrile functional groups that might have been derived from an acrylonitrile-copolymer used in the manufacture of synthetic rubber for tires. The density of the product oil was approximately 0.935 at 20°C. The product also

contained a significant amount of asphaltene-like particulates derived from the tire rubber and carbon-black used in manufacture; this fraction was estimated at 5 to 10 percent by weight. When compared to petroleum oil, the asphaltene-like particulates, or flocculates, appeared larger. The leachate was found to contain elevated levels of copper, nickel, and cyanide.

Countermeasures and Mitigation:

Crews used low-impact, non-intrusive manual techniques to immobilize and remove the oil that contaminated the intertidal. These techniques included staying out of the oiled sediments; walking on supported boards and plywood; using sorbent pads, boom, and oil snare; and manually removing timber snags from the upland side to expose the oil. Approximately 20 gallons of oil migrated from this supratidal area within an intertidal channel for 150 meters. This oil was immobilized and removed with sorbent pads, boom, sweep, and snare. The entire area of impacted intertidal was surrounded by a perimeter of sorbent sausage boom and oil snare boom staked out and anchored to the shoreline northeast and southwest of the contaminated area.

At the toe of the slope on the platform created by the slide, crews used several coffer dams to contain and remove the oil immediately after the spill was discovered. These immediate response techniques, which stopped the flow of oil into the intertidal, proved effective until they were replaced by the more efficient and substantial engineered dike system. After the initial release into the intertidal, no pyrolytic oil escaped the containment.

Other Special Interest Issues:

In addition to the remediation of the oil spill and the management of the human health concerns from the smoke and vapors, planning was conducted for the eventual excavation of the tire-chip-filled hillside. The primary issues involved were assessment of the actual location and amount of oil pooling in the hill, the site and location of the subsurface fire, and the nature and extent of the threat of increased fire when the tire chips were exposed to air.

NOAA Activities:

NOAA was notified of this incident on March 14, 1996, by MSO Portland and asked to provide scientific support on-scene. The NOAA SSC arrived on-scene late that night.

Initially, NOAA provided assistance by assessing the nature of the impacts, the extent of oiling, and recommending cleanup and protocol techniques. A set of specific protocols for each type of oiled area was provided to the USCG Unified Command. Information on the resources at risk in Baker Bay was provided, including an estimate of the nature of the toxicity from pyrolytic oil. Samples of the oil were taken and analyzed for physical characterization and general chemical composition. The SSC also provided advice and recommendations on monitoring protocols for water-soluble pyrolytic by-products in leachate and water suppression water to minimize environmental impacts.

NOAA provided assistance on the health and safety issues of the pyrolysis products. Initially NOAA's Safety and Health Officer provided off-site consultation and assistance with the Site Safety Plan. Later, when the nature of the threat was better understood and the on-scene resources judged insufficient, he reported on-scene to prepare an updated site

safety plan, consult on the development and implementation of the required air monitoring program, and assist in training.

NOAA also provided information and consultation on the nature of the threat of fire and fire suppression countermeasures during the excavation of the hillside.

NOAA supported this response for 15 days.

References:

NOAA. 1994. *Shio. Tide computer program (prototype).* Seattle: Hazardous Materials Response and Assessment Division, NOAA. Software.

NOAA Hotline #192, 22 Reports.

Research Planning Institute. 1991. *The sensitivity of coastal environments and wildlife to spilled oil in the Columbia River. An atlas of coastal resources.* Seattle: Ocean Assessments Division, NOAA. 26 maps.

Name of Spill:	Port of Newport Pier
NOAA SSC:	Sharon K. Christopherson
USCG District:	13
Date of Spill:	01/21/96
Location of Spill:	Newport, Oregon
Latitude:	44°37'32" N
Longitude:	124°02'05" W
Spilled Material:	bunker oil
Spilled Material Type:	4
Amount:	10-20 barrels (300-barrel potential)
Source of Spill:	facility
Resources at Risk:	**Birds:** waterfowl, diving ducks, black brants, bald eagles, peregrine falcons, gulls, and cormorants, **Fish:** herring (eggs/larvae) **Management Areas:** aquarium and Hatfield Marine Science Center **Habitat:** mudflats **Mollusks:** clams
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	source control, heavy weather
Shoreline Types Impacted:	riprap, cement pier face, sand and gravel
Keywords:	high-pressure hot-water washing

Incident Summary:

On the morning of January 22, 1996, the USCG MSO in Portland was notified by Group North Bend that an unknown quantity of black oil had spilled from a pier in Newport, Oregon. The pier was owned by Port of Newport and used to load logs onto deep draft ships. A USCG overflight observed black oil in the water in the immediate vicinity of the pier, patches of sheen in the main channel, and oiled rip rap to the west and east of the pier. The source of the oil was not known at that time, but was suspected to be a barge incorporated into the pier structure.

Sorbent boom was initially deployed around the western portion of the pier/barge the morning of January 22. Hard boom was in place by late afternoon. Its effectiveness was marginal, however, due to strong tidal currents that caused the oil to entrain. A second release of approximately 20 gallons of black oil was seen discharging from the tidal exchange pipe the afternoon of January 22. Contractors plugged this pipe using a pneumatic plug. Over the course of the response, oil continued to weep from several small areas of the concrete hull.

A unified command was formed to manage the spill response consisting of the USCG, Oregon Department of Environmental Quality (ODEQ), and the Port of Newport. On January 25, the Port of Newport notified the FOSC that they had expended all their emergency funds and could no longer meet response contractual agreements. The FOSC then assumed direction of all response activities, although the Port of Newport continued to provide their local facilities and expertise as requested.

Shoreline assessment was conducted jointly by the USCG, NOAA, ODEQ, and the Port of Newport. Periodically, representatives from USFWS, NMFS, and Oregon Department of Fish and Wildlife also participated. A cleanup plan outlining specific cleanup recommendations and criteria for "how clean is clean" for each shoreline type was developed early in the response. Before signing off each segment as completed, the joint shoreline assessment team re-surveyed the segment and provided recommendations to the FOSC on any additional actions needed to protect the environment. Active shoreline cleanup was conducted between January 23 and February 5.

Source control was complicated because it was difficult to identify the source of the oil. The pier was constructed from two concrete-hull, self-propelled barges purchased by the Port Authority from the USACOE and sank in place (bow to bow) to serve as a pier in 1949. Over the years, the western-most barge has shifted and now tilts toward the water. The stability of the pier was increased by installing six-inch cables from the barge to the shore and filling the cargo holds with rock rubble. Pipes were installed through the hull into the cargo holds to allow water flow with the changing tidal levels. Approximately seven feet of a soil and sand mixture was placed on top of the barge to level the surface and an eight-inch asphalt cap installed. January 24 the contractors excavated through the asphalt cap and dirt fill to the hatch covers of cargo holds No. 3 and No. 4 located above where the oil was weeping out of the cement side of the barge. Rock was excavated from each of these holds until the waterline was exposed. No oil was found in No. 4 hold, but a pocket (void) formed by rock was located on the starboard side of hold No. 3 that contained water and black oil. Further excavation was halted due to the concern that continued removal of the rock could further compromise the stability of the barge. Meetings with the FOSC, ODEQ, Port of Newport, and two engineering firms were held January 29 and February 2 to discuss barge stability. The outcome of these meetings was that rock excavated from the holds was not to be removed, but was to be stored on top of the barge to minimize changes in the center of gravity. The Port of Newport was to develop a formal engineering plan for the stabilization of the barge.

It was difficult to determine where the oil was originating from. The Port of Newport no longer had access to the vessel plans and considerable effort was required before copies of the plans were located and obtained January 29 from the Smithsonian Institute in Washington, D.C. These plans showed one centerline fuel tank with a capacity of 155,000 gallons in the No. 4 hold along with two wing ballast tanks. Two additional small slop tanks were located forward of the machinery spaces. Since excavation had shown no oil in the No. 4 hold centerline tank, it was believed the fuel may have come from the No. 4 starboard of No. 4 port wing ballast tanks. Oil was offloaded from the pocket in hold No. 3 using a vacuum truck. The openings into the two wing ballast tanks were cleared and a considerable amount of oil found in the starboard tank. Between January 29 and February 9, a total of 11,300 gallons (270 barrels) of black oil was recovered from the No. 4 starboard ballast tank and No. 3 hold. After all the oil was removed, the pneumatic plug in the No. 3 hold pipe was removed and the pipe permanently capped. All response actions were completed on February 10, 1996. A COTP order was issued restricting any loading operations at the pier until the Port of Newport provided sufficient evidence that all repairs and stability issues were satisfactorily addressed.

Behavior of Oil:

The product spilled was a Bunker C fuel oil with surprisingly little indication of weathering. Gas chromatography-mass spectrometry analysis showed some loss of the lighter and more water-soluble normal alkanes, n-C10 through n-C15, as well as naphthalene. This is consistent with a product sealed in a wing ballast tank. Once released into the environment, this product would undergo minimal evaporation and would be expected to be quite persistent.

The product stored in the starboard wing ballast tank apparently leaked into the No. 3 cargo hold through some breach in their common bulkhead before January 22. The No. 3 cargo hold was open to the outside through a pipe installed to allow equalization of water level during tidal action. During the rising tide, the floating oil in the No. 3 cargo hold reached the opening of the pipe and oil was discharged east into the Yaquina River during the second half of the flood tide. The tide began to ebb around 0400 and carried the oil west toward the entrance to the river. Southwest winds pushed the oil in along the riprap shoreline adjacent to the pier and minimized the distance it traveled. As a result, shore impacts were limited to approximately 300 yards of riprap and sand/gravel west of McLean Point and another 100 yards of riprap immediately east of McLean Point. In addition, 150 yards of the pier face was heavily stained. Oiled logs and debris were stranded at the high-tide line as far west as the Newport Marina.

Concern was raised early in the response that oil might impact the water intakes for the Hatfield Science Center and Aquarium located southwest of the pier on the other side of the Yaquina River. In addition to numerous research projects, these water intakes supplied a pen being used to rehabilitate the killer whale, Keiko, of "Free Willy" fame. The risk to the intakes was low because they were located nine feet below low water and therefore protected from floating oil. Chemical analysis of the oil indicated that the oil was not expected to sink and was very unlikely to be dispersed into the water column. State and federal researchers at the science center were kept informed of response activities.

Countermeasures and Mitigation:

Shorelines impacted by the spill included riprap composed of one- to four-foot diameter boulders, a sand and gravel beach, and the concrete pier face. Cleanup was conducted in accordance to the Cleanup Plan approved by the unified command. Hard boom was deployed to minimize remobilization of oil from the impacted shorelines. Cleanup techniques included manual pickup and removal, high-pressure hot-water flushing, and passive absorption using lines of pompom snares. Cleanup activities occasionally had to be interrupted due to logistics of getting equipment or worker safety because of high winds (40 to 60 knots), icing, sleet, and high water due to flooding.

All stranded oiled debris was manually collected and removed. High-pressure hot-water washing was used on 25 yards of heavily coated pier face (around the protruding stern of the barge). Lighter stained areas along the outside of the pier were wiped down to prevent sheening and left to weather naturally.

Heavily impacted riprap immediately west of the pier was cleaned using high-pressure hot-water flushing. Care was taken to minimize pushing the remobilized oil deeper into the riprap by restricting flushing activities to a zone within four feet of the waterline during a

rising tide. A continuous cold-water deluge carried the remobilized oil away from the rocks into the water where it was manually collected using pompom snares. Riprap farther west was less heavily impacted and was not high-pressure washed. Localized areas of heavier oil coating were flagged for manual scrapping or wiping. Lines of pompom snares were then deployed in the rocks to passively trap any remobilized oil. These were maintained until heavy sheening was controlled. Herring populations typically spawn along these shorelines at this time of year. The fertilized eggs attach to the rocks and marine vegetation, where the larvae hatch.

A sand and gravel beach west of the pier was impacted by a four-foot wide band of surface oil along the high-tide line. This zone was characterized by patchy spotting of small gravel and heavier coating of an abandoned cement slab buried in the oil. Cleanup consisted of manually wiping the cement slab and staking out lines of pompom snares to passively absorb any remobilized oil. Small localized areas where significant oil penetration had occurred were flagged for excavation and removal.

South and east of the spill site were extensive mud flat areas that support winter populations of waterfowl including black brants, cormorants, and gulls. These areas are rich in clams, mollusks, and other invertebrates. Bald eagles and peregrine falcons forage in the area. Fortunately, no oil was observed in these areas.

Other Special Interest Issues:

In researching the vessel plans early in the response, it was discovered that 22 barges of this similar design were sold for coastal development projects on both coasts of the United States. The potential remained for a similar scenario of metal deterioration and release. MSO Portland has a report summarizing the location and final disposition of the remaining barges.

NOAA Activities:

NOAA was notified of this incident on January 24, 1996, by MSO Portland who asked the SSC to provide cleanup recommendations for the response. The NOAA SSC met with the FOSC in Portland the morning of January 25, and then deployed to Newport to provide on-scene assistance. From January 25 to February 6 the SSC provided operational weather reports, a worst-case scenario trajectory forecast, information on potential resources at risk, and coordinated joint shoreline assessments. The SSC helped develop plans, including the Shoreline Cleanup Plan, How Clean is Clean Criteria, and Oiled Wildlife Rehabilitation Plan. The SSC also assisted in developing the diving survey plan to evaluate the stability of the pier, hull integrity, and potential subsurface oil contamination in adjacent nearshore areas. This dive survey was conducted February 6 and the videotape reviewed by members of the Unified Command. No evidence of subsurface oiling was found. In addition, there was no evidence of extensive cracking in the barge hull or undercutting of the ledge the barge is resting on.

At the request of the FOSC, the NOAA SST prepared a long-term environmental assessment of the risk posed by the barge given different alternative response options. This risk assessment included trajectory analyses, predicted persistence and weathering characteristics of the oil, and resources at risk. This risk analysis indicated a moderate level of risk to mud flats and waterfowl in the upper reaches of the Yaquina River and Yaquina

Bay by even a low-level chronic release of Bunker C due to the persistence, slow weathering characteristics, and potential for remobilization. Depending on the tidal cycle, river flow rate, and winds, small quantities of bunker oil could accumulate and be distributed through the bay and upper portion of the river.

The NOAA SSC was released from the scene at 1500 on February 6, 1996.

References:

NOAA. 1993. *ADIOS (Automated Data Inquiry for Oil Spills) User's Manual.* Seattle: Hazardous Materials Response and Assessment Division, NOAA. 50 pp.

NOAA. 1994. *Shio. Tide computer program (prototype).* Seattle: Hazardous Materials Response and Assessment Division, NOAA.

NOAA Hotline 191, 8 Reports.

Torgrimson, Gary M. 1984. *The On-Scene Spill Model: A User's Guide.* NOAA Technical Memorandum NOAA OMA-12. Seattle: Hazardous Materials Response and Assessment Division, NOAA. 87 pp.

U.S. Coast Guard Polreps/ 1996. POLREPS for USCG Case MC 96001008, FPN 13-6015, Portland: United States Coast Guard, Marine Safety Office. 18 Reports.

U.S. Coast Guard District 14

Name of Spill:	Chevron Pipeline Spill
NOAA SSC:	Sharon K. Christopherson
USCG District:	14
Date of Spill:	05/14/96
Location of Spill:	Pearl Harbor, Hawaii
Latitude:	21°23.2' N
Longitude:	157°58.1' W
Spilled Material:	#6 fuel oil
Spilled Material Type:	4
Amount:	1,000 barrels
Source of Spill:	pipeline
Resources at Risk:	**Habitat:** mangroves, submerged aquatic vegetation, fresh water marsh **Birds:** shorebirds, wading birds, foraging areas, nursery areas **Fish:** bait fish **Reptiles:** sea turtles **Recreation:** recreational fishing areas **Management Areas:** Arizona Memorial **Resource Extraction:** power plant water intake
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	Effects to tourism, closure of recreational fishing area, operational problems (sunken oil)
Shoreline Types Impacted:	fresh water marsh, brackish marsh, sheltered mangroves, sand/gravel beaches, coarse sand beaches, tidal mudflat, piers, seawalls, riprap
Keywords:	endangered species, hot-water high-pressure washing, International Bird Rescue and Research Center, sorbent pom poms

Incident Summary:

On May 13, 1996, approximately 1,000 barrels of #6 fuel oil was spilled from a leak in Chevron's black oil pipeline into the Waiau fresh water tributary, located west of Hawaiian Electric Company's (HECO) power plant in Pearl City, Oahu. The oil flowed from the fresh water tributary into the East Loch of Pearl Harbor. Before the leak, oil was being transported from the Chevron Hawaii Refinery through the company's 22.6-mile long pipeline to the Chevron Marine Terminal. Initial analysis indicated that the leak was caused by external corrosion of the pipeline. The pipeline was inspected by U. S. Department of Transportation (Office of Pipeline Safety) between May 23 and May 31. Following replacement of the damaged section of pipeline and internal inspection of its entire length, the pipeline was returned to service on May 25 at 80 percent of its pre-spill operating pressure with approval from federal and state agencies.

Following the Hawaii Area Response Plan, a unified command consisting of the USCG, Hawaii Department of Health, the U.S. Navy (USN), and Chevron was established to manage the spill response. Primary landowners within the impacted area (USN,

National Park Service, HECO) and federal and state natural resource trustees participated in the operations and planning sections of the incident command structure. Upon their recommendation, protective booming was deployed at the entrances to Middle Loch, West Loch, Aiea Bay, Halawa Stream, and around the intakes to the Pearl Harbor Wildlife Refuge early in the spill response. Throughout the response, there were no reports of oiling or impacts to wildlife in these areas.

The dock and seawalls around the Arizona Memorial Visitor's Center were heavily oiled on the May 14, resulting in the shutdown of the visitor's center and shuttle boat service to the Arizona Memorial until May 18. This disruption in tourist access to the Arizona Memorial received national medial coverage.

Heavily contaminated areas including the shoreline fronting the power plant, the USN piers and docks on the east side of East Loch, the north end of Ford Island, and pocket beaches along the Waipio Peninsula, were boomed to minimize remobilization of the oil. By the end of the third day of the response, nearly all the free-floating oil was recovered or stranded on shore. Efforts then shifted to shoreline and pier cleanup.

Shoreline cleanup was organized by geographical zones. Each zone was surveyed jointly by a team of USCG, NOAA, state, Chevron, appropriate public landowners, and appropriate natural resource managers. The primary landowner impacted by this spill was the USN; however, the National Park Service (Arizona Memorial Visitor Center) and the HECO (Waiau Power Plant) were included in surveys of their properties. The USN OSC's representative was instrumental in coordinating the input of the various USN Commands impacted by the spill during these surveys. Depending on the resources involved, natural resource managers included NMFS, USFWS, and Hawaii Department of Land and Natural Resources. Specific cleanup recommendations were made for each zone and "how clean is clean" criteria identified. Prior to signing off each area, the joint assessment team re-inspected the zone and made recommendations to the Unified Command of any additional response activities necessary to protect the environment.

Active cleanup activities continued until September 21. At this time, additional passive cleanup activities were recommended by the joint assessment team in the fresh water wetlands adjacent to the HECO power plant to ensure adequate protection of resident and migratory birds. The final sign off by the unified command for all response activities occurred November 18, 1996.

Behavior of Oil:

The #6 fuel oil spilled was a blend of residual oil and light cycle oil with an API gravity of 9.1 and a sulfur content of 1.98 percent. Analytical analysis of the source oil indicated the oil was an aromatic bunker with a low wax concentration. Total volatile compounds were in the range of 800 to 1,300 ppm, with PAHs comprising approximately 10 percent by weight. This bunker would be expected to be very persistent due to the high abundance of alkylated aromatic hydrocarbons, which are resistive to biodegradation.

The oil released sometime during the evening of May 13 initially sank to the bottom of the fresh water stream and wetland next to the spill site. Much of the oil remained on the bottom in this area and was recovered. As a result of the density difference between fresh water and salt water, the oil that entered the marine waters of the East Loch of Pearl Harbor rose to the surface. The trajectory of the oil was primarily affected by winds from the northeast (Kona winds) as tidal circulation within the Loch is generally weak. The oil traveled southeast towards the eastern shore of the Loch and southwest around Ford Island and along the Waipio Peninsula. Shoreline oiling occurred along portions of the East Loch, Ford Island, the western shores of the Pearl City and Waipio Peninsulas, and towards the harbor mouth. No oil was observed outside Pearl Harbor. The submerged oil in the fresh water stream and adjacent wetland pooled or collected in depressions in these sediments. Sometimes small globules broke away from these pooled areas and rose to the surface

Concern was initially expressed regarding the potential for oil sinking in the marine waters of Pearl Harbor. Visual observations had noted oil globules distributed in the upper water column of the fresh water stream discharging into Pearl Harbor. These globules then appeared to rise to the surface and spread out in sheen at some distance from the point of discharge. The location of this occurrence varied with the state of the tide, wind conditions, and volume of fresh water discharge. The boom deployment in front of the HECO power plant was modified several times during the response in an attempt to keep this area of surfacing oil contained. Several qualitative surveys involving the collection of surface sediment oil samples (using weights wrapped in sorbent material dropped from small boats) and visual observations by a diver were conducted in the Waiau flats in front of the HECO power plant to look for sunken oil. All results were negative.

A salinity study was conducted in front of the HECO power plant on May 20 to characterize the fresh water lens in the back portion of East Loch created by the fresh water stream discharges. The data showed a definite input of fresh water in the back portion of Pearl Harbor that resulted in a vertically stratified water column. The salinity gradient was steeper within the containment booms, presumably because the boom prevented mixing of the incoming low-salinity stream water with the higher-salinity ocean water. Within the boom, the salinity ranged from 33 ppt to as low as 29.4 ppt in the top meter of the water column. Outside the boom, in the deeper water just off the Waiau Flats, the salinity was 33 ppt in the upper 3.5 meters of the water column overlying the colder oceanic saline water of 34 ppt.

Submerged oil was also seen in the lower intertidal and immediately adjacent subtidal areas of heavily impacted, coarse-grain sandy beaches, especially along the Waipio Peninsula. These relatively discrete areas appeared to result when oil stranded on the sand beaches and picked up sufficient sediment to cause it to sink when demobilized by tides and waves. These bands of submerged oiled were typically one- to three-feet wide patches deposited in the nearshore area just below the lowest tide elevation. Buried oil layers were also observed in the upper intertidal of sections of the Waipio Peninsula and north shore of Ford Island. While some of this oil was identified as being from this spill, chemical analysis indicated that at least part of the buried oil found was the result of other earlier spills.

Countermeasures and Mitigation:

The submerged oil in the fresh water stream, impoundment areas feeding into the cooling system, and the channel discharging into Pearl Harbor at the HECO power plant was recovered manually by workers using vacuum hoses wading or working from small skiffs. Due to the near-neutral buoyancy of the oil, regardless of how carefully workers moved, the fine sediment and pooled oil were easily stirred and suspended into the water column. This required halting recovery activities until the water cleared. This technique was very slow and labor-intensive, but resulted in a significantly higher percentage of oil recovery. As the quantity of submerged oil decreased and became more difficult to locate, a compressed air lance was used to stir up the mud and release the last of the oil into filters and booms downstream. This finishing technique was primarily used in the impoundment area situated at the entrance to the cooling water system of the power plant. Throughout the response, a series of filters (packed with absorbent snare) and coffer dams were installed downstream to slow the migration of suspended or submerged oil into Pearl Harbor. Suspended oil that reached the harbor resurfaced due to the increased salinity and was contained by two tiers of hard boom deployed in front of the power plant.

Divers conducted a video survey of the cooling water system of the HECO power plant to determine the extent of the contamination. A significant quantity of oil was apparently pulled in at the time of the spill by the plant's pumps. In response to the survey, divers were contracted to re-enter the main tunnels of this system to remove pooled oil using vacuum suction hoses.

It was initially thought that the thick vegetation of the fresh water marsh next to the stream and impoundment areas at the HECO power plant had acted as a boom and protected the interior of the marsh. Oil collected along the edge of the marsh was manually vacuumed. Three weeks into the response, heavy rains increased the natural flushing of the marsh and submerged oil migrated from the marsh boundary. The thick vegetative mat was four to five feet thick and made it very difficult to locate depressions where the oil might pool or collect. Several techniques, including aerial photography, visual surface observations from a nearby tower, and manual prodding using poles to push sorbent material into the bottom, were largely unsuccessful in determining the extent of contamination. Historical photographs of the area taken before the marsh was established indicated the location of a deeper channel that originated immediately opposite of where the oil entered the stream during the initial spill. Fire hoses were used to direct water flow into this channel to flush the oil out. In consultation with state and federal biologists, transects were cut into the marsh to locate and facilitate removal of the pooled oil. As workers continued to find significant quantities of oil, 80 percent of the marsh was cut before recovery operations were completed.

A small area of oiled brackish marsh at the mouth of Waiau Stream east of the power plant was also cut at the request of the USFWS to protect the endangered Hawaiian stilt that forages in the area.

Heavily oil-coated concrete docks, piers, and seawalls at numerous USN facilities on the east side of East Loch, Ford Island, and Pearl City Peninsula were cleaned using hot-water high-pressure flushing. Cleanup of the Arizona Memorial Visitor's Center,

identified by the joint shoreline assessment team as the highest priority, was completed on May 18. Cleaning the remaining man-made structures was completed in early July.

Oil-coated rocks and construction debris used to stabilize eroding banks along Ford Island and Pearl City Peninsula were cleaned using a limited amount of low-pressure high-volume flushing of pooled oil and manual wiping of heavily coated surfaces with pompoms and other sorbents. Once the heaviest accumulations were removed, passive absorption using snare booms and tidal action was employed until the oil ceased remobilizing. High-pressure flushing was not normally recommended in these areas due to the potential for driving the underlying oiled, fine-grain sediments into the shallow subtidal zone.

Sand and gravel beaches in front of the HECO power plant, northeast Ford Island, and the southern end of Waipio Peninsula were heavily coated with oil. Several of the sand and gravel pocket beaches on Waipio Peninsula were fronted by uncontaminated lower intertidal/shallow subtidal vegetated reefs Cleanup of these shorelines was accomplished by manually removing asphalt pavement and saturated sand and gravel from the high tide line. Once the heaviest contamination was removed, contaminated coarse-sand and gravel was tilled or manually agitated during the rising tide to release small globules of buried oil recovered manually using snare boom. This process was continued until no more oil globules were released. Foot traffic in the lower intertidal vegetated reef flats was minimized, and when active cleanup was completed no additional mechanical damage or oiling of this area was noted.

The prop roots of mangroves along sections of the west shore of Pearl City Peninsula were coated with oil up to the high-tide mark. Man-made and organic debris typically stranded along the high-tide line in the mangroves also became coated with oil. The oil on the prop roots began drying, became tacky, and was coated with sediment flushed in by the tide within the first week of the spill. Snare boom (sorbent pom poms) were deployed along the face of the mangroves to minimize remobilization of oil. Small areas of heavily coated leaves where the canopy touched the water surface were clipped and removed. Within days, only minimal amounts of sheen were observed around the mangroves. Surveys of the mangroves were complicated by the dense growth, shallow water, and extremely soft sediments along the seaward edge. Eventually, a limited number of transects were cut into the mangroves from their landward boundary to facilitate assessment and recovery of oiled debris from along the high tide line.

The question of whether to cut and remove the oiled mangroves up to the high-tide line was brought up several times during the spill response. The mangrove is not native to Hawaii and is considered an undesirable weed by some. While mangroves provide habitat for invertebrates and juvenile fish, they also compete with native plant species for habitat and are gradually replacing many of the shrubs and trees used by local bird species within Pearl Harbor and other shallow-water bays. Based on recommendations from NOAA and resource trustees, cutting the mangroves was not approved as a response action by the Unified Command because there was no evidence that oil was being remobilized. Oil remaining on the prop roots had weathered to a very thin, tacky layer unlikely to impact wildlife; very few birds actually use the intertidal zone of the mangroves. The Unified Command did require the removal of the remaining oiled debris stranded at the high-tide line. These areas were found to be

stickier and less weathered than the prop roots, and potentially posed a threat to the environment. The joint shoreline assessment group suggested that removal of mangroves along the Pearl City Peninsula and replacement with native plant species should more appropriately be discussed as a possible habitat restoration project during the Natural Resource Damage Assessment negotiations.

Other Special Interest Issues:

Monitoring for oiled wildlife was conducted during the three weeks following the spill by the International Bird Rescue and Research Center (under contract to Chevron), with the Hawaii Department of Land and Natural Resources and the USFWS. The moorhen, coot, and endangered Hawaiian stilt are known to use both fresh water wetland and tidal mudflats in the Waiau area; however, none were seen with oil on them. The coot and the moorhen were not observed in this habitat during this monitoring effort. Throughout the spill response, the black-crowned night herons frequented both of these areas and the migratory shorebirds feeding on the mud flats also showed no signs of oiling.

The Arizona Memorial Visitor's Center was closed May 14 in response to the National Park Service's concerns of possible public exposure to fumes and to minimize remobilization of oil while cleanup of the adjacent dock and seawalls was conducted. Active cleanup was completed and the Visitor's Center re-opened on May 18.

A gravel causeway at the northeast corner of Ford Island used by the USN in the construction of a bridge connecting Ford Island to the mainland was coated with oil during the spill. This area was included in the original joint shoreline assessment and cleanup recommendations made to the Unified Command, which included low-pressure flushing, passive absorption with snare boom, and monitoring until there was no further remobilization of oil. Due to a number of legal concerns associated with the construction contract, permits, and future liability issues, the USN opted to replace the contaminated gravel with clean.

Throughout much of the spill response, an international naval exercise involving the United States and a number of other countries was in progress. This exercise included berthing and multiple deployments of large numbers of large military vessels in and out of Pearl Harbor. The USN OSC provided not only a traffic control system to minimize problems between the exercise and response vessel movements, but also coordinated the scheduling of cleanup of USN docks with ship movements, the temporary opening of protective booms for USN traffic in and out of Middle Loch and West Loch, security clearances for cleanup crews in restricted areas, and access to Ford Island using the USN ferry system for response personnel.

NOAA Activities:

NOAA was contacted on May 14, 1996, by MSO Honolulu who asked for an initial spill trajectory, information on oil weathering characteristics, operational weather forecasts, and a summary of environmental resources at risk. At the request of the unified command, NOAA conducted the initial chemical characterization of the oil relating to its behavior, weathering, persistence, and toxicity.

The SSC was dispatched to the scene on May 15. During the first three weeks of the spill response, NOAA coordinated the joint shoreline assessment team that recommended protection priorities, cleanup strategies, and "how clean is clean" criteria for specific shoreline habitats and segments. To help reach these recommendations, the NOAA SST prepared issue papers summarizing the environmental trade-off of the different cleanup strategies, the potential effects of #6 fuel oil on subsistence fishing and selected sensitive environments, and mitigation strategies for fresh water marshes and mangroves. The SSC participated in the snorkel survey and the salinity study to better assess the potential threat posed by submerged oil in Pearl Harbor. At the request of the operations section chief, the SSC worked with the individual operations field supervisors to implement and fine tune site specific cleanup strategies.

The SSC was released on June 7, but continued to provide assistance and recommendations on shoreline cleanup issues. At the request of the FOSC, the SSC returned to Honolulu on June 17 to meet with the Joint Shoreline Assessment Team to discuss additional cleanup recommendations for the fresh water marsh at the HECO power plant, the north shore of Ford Island, and the mangroves along Pearl Island Peninsula. After a series of shoreline surveys and meetings, a consensus was reached on additional cleanup required for each site and a proposed schedule for completion. The SSC continued to provide advice via telephone as requested until the completion of active cleanup on September 21.

References:

Chevron. 1996. *A Public Report on May 14, 1996, Waiau Oil Spill.* Kapolei, Hawaii: Chevron Products Company.

NOAA Hotline 195, 31 Reports.

NOAA. 1993. *ADIOS (Automated Data Inquiry for Oil Spills) User's Manual.* Seattle: Hazardous Materials Response and Assessment Division, NOAA. 50 pp.

NOAA. 1994. *Shio. Tide computer program (prototype).* Seattle: Hazardous Materials Response and Assessment Division, NOAA.

Torgrimson, Gary M. 1984. *The On-Scene Spill Model: A User's Guide.* NOAA Technical Memorandum NOAA OMA-12. Seattle: Hazardous Materials Response and Assessment Division, NOAA. 87 pp.

United State Coast Guard. 1996. POLREPS for USCG Case MC 96007102, FPN 14-6037, Honolulu: United States Coast Guard, Marine Safety Office.

U.S. Coast Guard District 17

Name of Spill:	Tesoro Tank Spill
NOAA SSC:	John W. Whitney
USCG District:	17
Date of Spill:	12/05/95
Location of Spill:	Nikiski, Alaska
Latitude:	60°41' N
Longitude:	151°26'W
Spilled Material:	North Slope crude
Spilled Material Type:	3
Amount:	40 barrels
Source of Spill:	facility and pipeline
Resources at Risk:	seaducks and overwintering birds
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	CISPRI, sorbent boom

Incident Summary:

As the result of a frozen flow valve, an onshore Tesoro tank transferring North Slope crude overflowed into a diked area just before noon on December 5, 1995. Workers at the scene were unaware that the storm-water drain valve had been left open. This valve led to a pipeline that discharged 200 to 300 meters offshore onto the seafloor. This release was discovered by a commercial helicopter pilot who spotted the sheen shortly after the initial overflow had occurred. Weather during the spill was extremely cold with temperatures to -20°F, with only slight winds.

Behavior of Spilled Material:

The oil escaped from a pipeline for approximately three hours before it was discovered. It never formed a coherent slick because the strong tidal currents in Cook Inlet caused it to form stringers and ribbons over an eight-mile spread. The flood tide carried the oil roughly 12 miles north of Nikiski around the East Forelands and extended past Boulder Point; the return ebb moved the slick westward. By the second ebb the next morning, the slick was in the mid-channel rip zone where it disappeared from the surface. No impacts to the shoreline or wildlife were reported. An unknown amount of the oil released into the water was collected with sorbent boom. It is believed that most of the oil was naturally dispersed into the water column.

Countermeasures and Mitigation:

Cook Inlet Spill Prevention and Response Inc. (CISPRI) was immediately notified, and by afternoon, its standby vessel, the *Banda Seahorse*, was on-scene. Due to the continuous release and the strong flooding tidal current, the oil was in stringers and sheen spread over eight-miles. In the one or two hours before darkness the response boats were only able to drag viscous sweep and sorbent boom. By noon, December 6, observers were unable to see any sheen on the water. Tesoro, the RP, established a full incident command system (ICS) at

the command post in Nikiski, and USCG Marine Safety Detachment (MSD) Kenai personnel handled the entire spill.

NOAA Activities:

NOAA was notified of this incident on December 5, 1995, by CISPRI. The SSC provided tidal current data, a trajectory, and a prediction of the oil's fate to the USCG. The release occurred at roughly the slack before a flood tide; in the past ten years, several spills have occurred in this location with that tidal situation. As a result, the SSC could accurately predict the oil's movement northward around the East Forelands and its return on the ebb tide, moving westward in the process. No shoreline impacts were predicted, and it was suggested that the remnants of the oil would move into the mid-channel rip zone that would probably disperse the last traces of the oil. The SSC supported this incident for one day by phone and fax.

References:

NOAA. 1987. USCG District 17. F/V *Glacier Bay* Spill Report. In: Oil and Hazardous Materials Response Reports FY 87. Seattle: Hazardous Materials Response and Assessment Branch, NOAA.

NOAA. 1993. Oil and Hazardous Materials Response Reports. October 1991-September 1992. Seattle: Hazardous Materials Response and Assessment Division, NOAA. pp 151-153.

Name of Spill:	M/V *Citrus*
NOAA SSC:	John W. Whitney
USCG District:	17
Date of Spill:	02/16/96
Location of Spill:	St. Paul Island, Alaska
Latitude:	57°14.7' N
Longitude:	170°10.2'W
Spilled Material:	heavy oil, like Bunker C
Spilled Material Type:	4
Amount:	500 gallons (estimated)
Source of Release:	non-tank vessel
Resources at Risk:	**Birds:** winter concentration area of mostly king eiders
Other Special Interest:	bird cleaning and rehabilitation
Keywords:	IBRRC

Incident Summary:

On February 17, 1996, the USCG began receiving reports of hundreds of oiled birds coming ashore on the northeast point of St. Paul Island. Most of the affected birds were king eiders; however, some oldsquaw ducks, guillemots, thick-billed murres, and crested auklets were also affected. Most of the birds found were carcasses being scavenged by bulls and Arctic foxes, but some living birds were also found. A spill source was not immediately evident and the USCG conducted a C-130 overflight in the area with negative results. Early beach surveys detected no sheens, oil, or tarballs. On February 20, the USCG sent out two pollution investigators and one USFWS biologist to further evaluate the situation.

The USCG obtained an oil sample from the dead birds for Central Oil Identification Laboratory (COIL) analysis and fingerprinting. Another USCG group fanned out to sample foreign and domestic fish processors in the southeast Bering Sea. Meanwhile, oiled birds, both dead and alive, continued to come ashore with the number reaching over 800 by February 22. On February 23, the USFWS and the Alaska Department of Fish and Game (ADFG) recommended the initiation of a bird capture and rehabilitation operation, which the unified command accepted, contracting the International Bird Rescue Research Center (IBRRC) of California.

A bird-collection facility was set up on St. Paul Island and a bird rehabilitation facility in Anchorage was established for cleaning and rehabilitation. An estimated 1,500 birds were affected; 950 carcasses were collected. Of the 186 birds taken to Anchorage, 73 percent survived the cleaning, rehabilitation, and return to St. Paul. Meanwhile, an oil match was made with the M/V *Citrus*, a 305-foot Japanese fish processor. The *Citrus* had been just off the northeast corner of St. Paul Island February 15-17 where it apparently pumped roughly 500 gallons of heavy oil overboard, which must have drifted northeast into a floating flock of offshore king eiders. By March 7, bird rescue operations on St. Paul had ceased, IBRRC had 132 birds on-site in Anchorage, and criminal charges had been filed against the owner and master of the *Citrus*. For the cleaning, rehabilitating, and returning injured birds to St. Paul, the USCG has recorded a total cost of $312,000, for which the RP will be responsible.

NOAA Activities:

NOAA was notified of this incident on February 16, 1996, by the USCG. Since no actual spill was initially identified, NOAA's involvement was minimal. Weather reports were updated regularly and discussions about possible trajectory hindcasts were held. NOAA attended many meetings with the USFWS and ADFG and the Unified Command.

Once the M/V *Citrus* was identified as the RP, the USCG asked NOAA to run a possible hindcast trajectory based on the vessel's location on the morning of February 17, using the weather records for St. Paul. The trajectory showed the oil moving northeast away from St. Paul Island about 10 to 15 nautical miles in two days. This is the time most of the bird oiling is believed to have occurred.

Name of Spill:	Mystery Chemical Spill
NOAA SSC:	John W. Whitney
USCG District:	17
Date of Spill:	05/11/96
Location of Spill:	Unalaska, Alaska
Latitude:	55°50′ N
Longitude:	166°30′ W
Spilled Material	lead-based paint
Spilled Material Type:	5
Amount:	less than one gallon
Source of Release:	55-gallon drum
Resources at Risk:	salmon fry and hatchery
Other Special Interest:	none
Keywords:	none

Incident Summary:

On May 13, 1996, approximately 1,000 fish fry at a hatchery on the Iluliuk River near Unalaska, Alaska were found dead. The community had held a cleanup day on the previous Saturday when a group of students and their teacher found an old, rusty, unmarked 55-gallon drum in the river 150 feet downstream from the fish hatchery. While trying to remove the drum, less than a gallon of its contents escaped into the river. The city hired Magone and Co, a local salvor, to remove the drum. The material in the drum was described as "green gooey stuff" and was coating about two square yards on the bottom of the river at 50 percent coverage. Samples of the material on the bottom of the river and from the drum were sent to Columbia Laboratories in Anchorage where the "green gooey stuff" was identified as old, lead-based paint.

Behavior of Spilled Material:

When the old drum was first disturbed, toxic paint volatiles trapped in the drum escaped into the water column. The high spring flood tide carried this toxic slug upriver to the hatchery water intake where it was responsible for killing the salmon fry. This one-time toxic slug rapidly diluted to background levels.

Countermeasures and Mitigation:

Using a herring pump, Magone vacuumed the material from the bottom of the river. No responsible party was identified for the incident because the old drum could have been a World War II relic.

NOAA Activities:

NOAA was notified of this incident on May 11, 1996, by MSO Anchorage. NOAA checked the tide tables and confirmed that the barrel removal coincided with a spring flood tide that made the upriver transport of the toxic volatiles possible. NOAA recommended that samples of the material on the bottom of the river and in the drum be tested for volatiles and metals.

NOAA supported this incident for seven days.

Name of Spill:	Mendenhall Wetlands
NOAA SSC:	John W. Whitney
USCG District:	17
Date of Spill:	06/08/96
Location of Spill:	Juneau, Alaska
Latitude:	58°20' N
Longitude:	134°25'W
Spilled Material:	Diesel #2
Spilled Material Type:	2
Amount:	200-400 gallons
Source of Release:	home fuel tank
Resources at Risk:	wetlands
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent pads

Incident Summary:

A homeowner discovered a release from his buried home heating oil tank on June 8, 1996, after an apparent tank failure. When this release actually occurred is unknown. The home and tank are 20 feet from the edge of the Mendenhall wetlands. The escaping diesel #2 contaminated a small portion of the upper intertidal zone of this marsh. The tank was last filled on May 20 and had a capacity of 500 gallons. Heavy contamination is approximately 25 by 75 feet in marsh grass, and run off continued down a narrow drainage channel to Gastineau Channel. The free product was cleaned up with sorbent pads, and the oiled vegetation and contaminated soil were removed from the site. The leaking tank was emptied and removed. The contractor hired by the potentially responsible party (PRP) recommended that any further ground disturbance or excavation would cause more harm than good and that in-situ biologically enhanced treatment should be undertaken. This treatment involved adding a garden-variety slow-release, high-nitrogen fertilizer to stimulate bacterial degradation of soil hydrocarbons and promote vascular plant regeneration, and by placing 6- to 12-inch diameter transplants from adjacent wetlands on four foot centers in the excavated area. The Unified Command, composed of the state and the USCG, approved the plan and initiated it on July 15, 1996.

Behavior of Oil:

The diesel never reached the open waters of Gastineau Channel, but was absorbed into the ground and onto the vegetation in the upper intertidal zone of the marsh. As a result only sheens were apparent in a 25- by 75-foot area. About 200 to 400 gallons of diesel escaped from the tank. There are no estimates of how much diesel was recovered.

Countermeasures and Mitigation:

Sorbent pads were used to collect the free oil. The oiled vegetation and contaminated soil were removed from the site. Nutrient enhancement and adjacent marsh transplantation were then employed to reestablish the marsh growth.

NOAA Activities:

NOAA was notified of this incident on July 11, 1996, when MSO Juneau asked the SSC to comment on the proposed marsh rehabilitation plan prepared by the contractor for the PRP. After consultations with experts, the SSC condoned the rehabilitation plan, but added caveats regarding elevation and oxygenation. NOAA told MSO that it is very important to get back to the original elevation because marsh grass regrowth is very sensitive to elevation; and gentle tilling and aeration of the soil is important for oxygen uptake.

Acronyms

ADDS	aeral dispersant delivery system
ADFG	Alaska Department of Fish and Game
ADIOS™	Automated Data Inquiry for Oil Spills
AH	aromatic hydrocarbon
ARTES	Alternative Response Technologies Evaluation System
AST	Atlantic Strike Team
BAT	Biological Assessment Team (NOAA)
CAMEO™	Computer-Aided Management of Emergency Operations
CDFG	California Department of Fish and Game
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CISPRI	Cook Inlet Spill Prevention and Response Inc.
COIL	Central Oil Identification Laboratory (USCG)
COTP	Captain of the Port (USCG)
C/V	cargo vessel
DBRC	Delaware Bay and River Coop
DCM	dangerous cargo manifest
DEP	Department of Environmental Protection
DEQ	Department of Environmental Quality
DGPS	Digital Geographic Position
DRAT	District Response Advisory Team
EPA	Environmental Protection Agency
EPIRB	Emergency Position Indicating Radio Beacon
EST	Eastern Standard Time
FOSC	Federal On-Scene Coordinator
F/V	fishing vessel
GST	Gulf Strike Team
HAZMAT	Hazardous Material Response and Assessment Division (NOAA)
HECO	Hawaii Electric Company

IBRRC	International Bird Rescue and Research Center
ICP	Incident Command Post
ICS	Incident Command System (USCG)
IDLH	immediately dangerous to life and health
IMS	International Marine Services
IR	infrared
MASS	Modeling and Simulation Studies Branch (HAZMAT, NOAA)
MDS	Marine Safety Division (USCG)
MIO	Marine Inspection Office (USCG)
MM	mile marker
MMS	Minerals Management Service
MPC	Marine Pollution Control
MSO	Marine Safety Office (USCG)
M/V	motor vessel
NAVSUPSAL	Navy Superintendent of Salvage
NJDEP	New Jersey Department of Environmental Protection
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmosphere Administration
NPDES	National Pollutant Discharge Elimination System
NRC	National Response Corporation
NY	New York
ODEQ	Oregon Department of Environmental Quality
OSC	On-Scene Coordinator
OSPR	California Office of Oil Spill Prevention and Response
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyls
PORTS	Physical Oceanographic Real-time System
PPE	personal protection equipment
ppm	parts per million
ppt	parts per thousand
PSNH	Public Service of New Hampshire
PST	Pacific Strike Team
RIDS	Response Information Data Sheets
RP	responsible party
RRT	Regional Response Team
SCAT	Shoreline Cleanup Assess,emt Team

SEABAT	state-of-the-art multibeam shallow water bathymetric sounder system
SFPP	Santa Fe Pacific Pipeline
SO_2	sulfur dioxide
SOSC	State On-Scene Coordinator
SOP	safe operating procedures
SSC	Scientific Support Coordinator (NOAA)
SST	Scientific Support Team
TABS	Texas Automated Buoy System
T/B	tank barge
TGLO	Texas General Land Office
TNRCC	Texas Natural Resource Conservation Commission
T/V	tank vessel
TVA	Tennessee Valley Authority
USACOE	United States Army Corps of Engineers
USCG	United States Coast Guard
USN	United States Navy
USFWS	United States Fish and Wildlife Service
XO	Executive Officer