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Oil and Hazardous Materials Response Reports

October 1993-September 1994

February 1995

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

Contents

*District 14 had no reportable spills.

INTRODUCTION

Between October 1, 1993 and September 30, 1994, NOAA's Hazardous Materials Response and Assessment Division Scientific Support Coordinators and scientific staff were notified of 126 spill incidents. These 126 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 96 oil spills, 13 chemical spills, 11 spills of unknown material, 5 miscellaneous spills, and 1 search and rescue operation. In addition to the spills listed, NOAA assisted the U.S. Coast Guard with 54 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

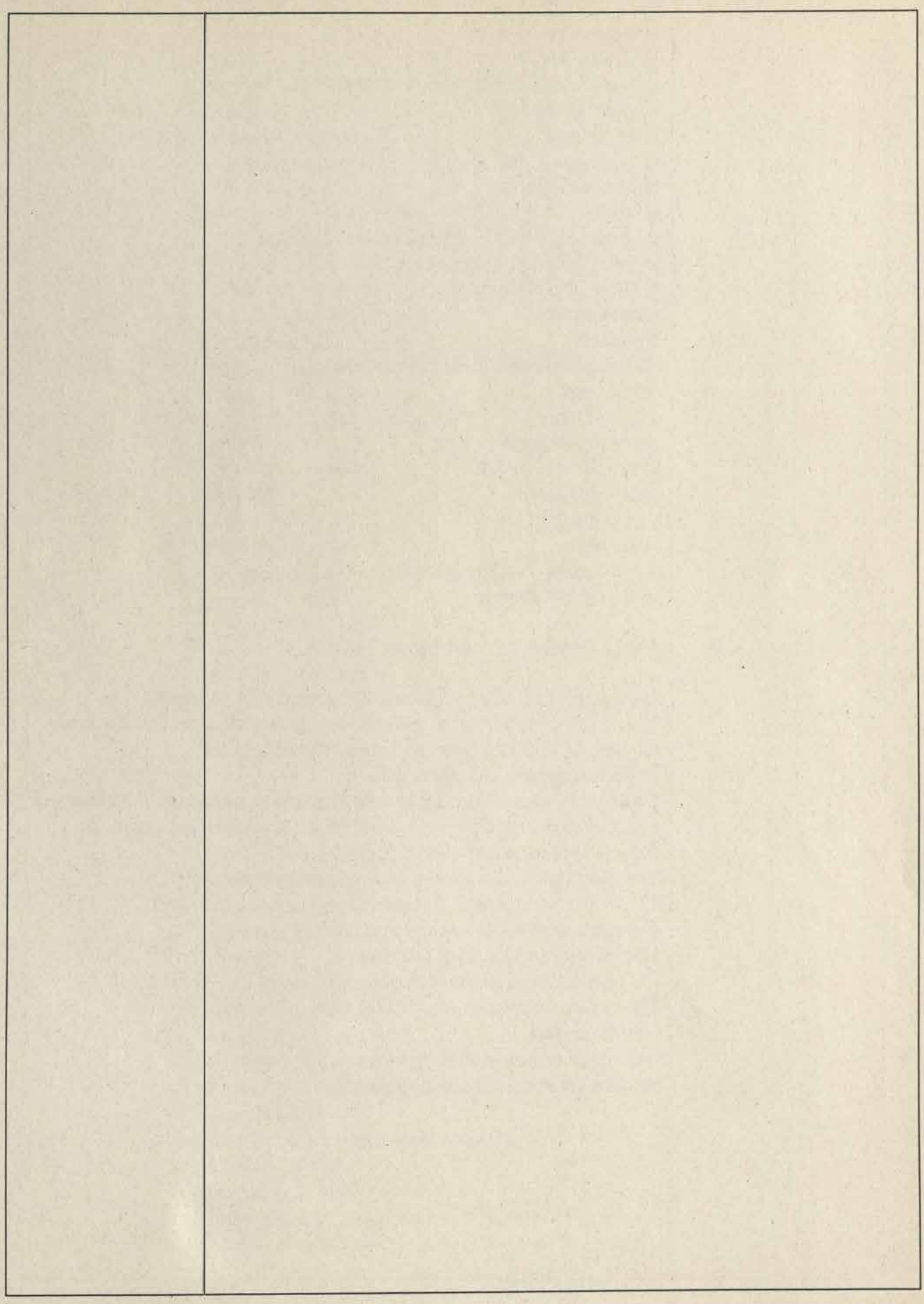
	Resource Extraction ~~Subsistence, officially~~ designated harvest sites, commercial fisheries, power plant water intakes, drinking water intakes, industrial water intakes, intertidal and subtidal mining leases, fish/shrimp/bivalve/plant aquaculture sites, log storage areas Cultural Archaeological sites, 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**

air activated pumps
bioremediation
Center for Disease Control
Clean Bay Inc.
containment boom
Corexit 9527
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 Laboratory Pacific flyway potential spill propane cannons remote sensing reoiling 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 94 Spills
October 1, 1993—September 30, 1994

Date of Incident	No.	Report Name/Hotline Number	Commodity Involved	USCG District	NOAA Involvement
01 Oct 93	1	*Gulf Stream off Florida	formic acid	7	phone
14 Oct 93	2	*Virginia Beach, VA	mystery	5	phone
14 Oct 93	3	Dam Neck Beach Dam Neck, VA	mystery	5	1 onscene
15 Oct 93	4	*Chinese F/V Eastern Samoa	diesel		phone
16 Oct 93	5	F/V *Helen Euphane* West Ocean City, MD	diesel	5	phone
20 Oct 93	6	*Navy vessel San Diego, CA	diesel	11	phone
21 Oct 93	7	Tug *Jenna B* Norfolk, VA	diesel	5	phone
02 Nov 93	8	Cape Fear abandoned tank/drums Wilmington, NC	chemical	5	phone
03 Nov 93	9	*Train derailment Louisville, KY	chemicals	2	phone
08 Nov 93	10	*ICWW Louisiana Louisiana	LA crude	8	phone
08 Nov 93	11	*Tug Barge New York	diesel	1	heads up
09 Nov 93	12	Allied Signal Company Hopewell, VA	cyclohexane	5	1 onscene
17 Nov 93	13	Lafayette River Norfolk, VA	fuel oil	5	1 onscene
28 Nov 93	14	Dredge Alaska/139 West Hampton, NY	diesel	1	1 onscene
01 Dec 93	15	M/V *Saudi Durvik*/140 Hampton Roads, VA	IFO	5	1 onscene
02 Dec 93	16	*Barge leak ICWW Louisiana	LA crude	8	heads up
6 Dec 93	17	Macy's/141 New Rochelle, NY	#4 oil	1	1 onscene

Date of Incident	No.	Report Name/Hotline Number	Commodity Involved	USCG District	NOAA Involvement
10 Dec 93	18	Land spill Alaska	diesel	17	phone
13 Dec 93	19	*burned F/V Florida Keys	#2	7	phone
14 Dec 93	20	Hilton storm drain Wilmington, NC	oil	5	phone
15 Dec 93	21	*Cooking oil spill Puerto Rico	cooking oil		phone
21 Dec 93	22	*CONOCO Well Blowout/142 Lake Calcasieu, LA	light crude/ natural gas	8	phone
21 Dec 93	23	Barge fire Charleston, SC	P-xylene	7	phone
26 Dec 93	24	McGrath Lake Spill/143 Ventura, CA	crude oil	11	3 onscene
05 Jan 94	25	Barge Bouchard 35 East River, NY	unleaded gas	1	phone
06 Jan 94	26	*Cahahoga River Cleveland, OH	chemical	2	phone
07 Jan 94	27	*Morris J. Berman* Spill/144 San Juan, PR	#6 oil	7	9 onscene
10 Jan 94	28	M/V *Ann Ping 6*/145 Longview, WA	#6 oil	13	3 onscene
11 Jan 94	29	*Tanker New York	crude oil	1	phone
20 Jan 94	30	Santa Clara River Pipeline/146 Santa Clarita, CA	oil	11	1 onscene
20 Jan 94	31	*mystery slick Santa Clara River, CA	black soot	13	phone
22 Jan 94	32	*Clark Oil accident St. Louis, MO	gasol	2	phone
27 Jan 94	33	Pachecho Slough/147 Concord, CA	oil and/or gasoline	11	2 onscene
27 Jan 94	34	*Isla de Culebra Puerto Rico	#6		phone

Date of Incident	No.	Report Name/Hotline Number	Commodity Involved	USCG District	NOAA Involvement
28 Jan 94	35	*F/V *Captain Shannon*/148 Key Largo, FL	diesel	7	phone
02 Feb 94	36	Portside Marina Morehead City, NC	#2	5	phone
03 Feb 94	37	T/V *White Sea* Kull Van Kill, NY	#6	1	phone
05 Feb 94	38	Beacon Marina Solomons Island, MD	#2	5	phone
05 Feb 94	39	*Towncreek Marina Mystery Beaufort, NC	#2	5	phone
08 Feb 94	40	Petro Express Baltimore, MD	oil	5	phone
10 Feb 94	41	Baltimore Mystery Baltimore, MD	bilge slop	5	phone
10 Feb 94	42	Mistryski Power Plant/149 Detroit, MI	#6 mix	9	? onscene
14 Feb 94	43	NW Environ. Solvent/150 Seattle, WA	toulene, xylene water mixture	13	1 onscene
27 Feb 94	44	*grounded F/V New London, CT	diesel	1	phone
27 Feb 94	45	*Tanker sunk off Guam	diesel		phone
05 Mar 94	46	Evans Seafood Chrisfield, MD	kerosene	5	phone
05 Mar 94	47	Oil Transport Inc. Chesterfield, VA	diesel	5	phone
06 Mar 94	48	**June C.* Rockaway Inlet, NY	diesel	1	phone
12 Mar 94	49	*Little Wendy D* Dry Tortugas, FL	diesel	7	phone
14 Mar 94	50	Gatlin Oil Bayboro, NC	diesel, gas, lube oil	5	phone
15 Mar 94	51	*Barge *Cynthia M* Kearny, NJ	caustic soda	1	phone
19 Mar 94	52	*barge grounding East River, NY	diesel	1	phone

Date of Incident	No.	Report Name/Hotline Number	Commodity Involved	USCG District	NOAA Involvement
22 Mar 94	53	LPG Vessel *Isomeria*/151 Norvolk, VA	bunker C	5	1 onscene
29 Mar 94	54	*Bogue Sound Morehead City, NC	waste oil	5	phone
30 Mar 94	55	Guadalupe Dunes Oil Leak Guadalupe, CA	oil	11	
31 Mar 94	56	Conoco Refinery/156 Westlake, LA	ethylenedichloride	8	2 onscene
05 Apr 94	57	*Olympic National Park Washington	tarball	13	phone
12 Apr 94	58	Mystery Spill Assateague Island, VA	unknown	5	phone
12 Apr 94	59	Wickland Oil San Pablo, CA	slop oil	11	phone
12 Apr 94	60	*USCG Buoy Tender *Fir* NOAA Pier Seattle, WA	unknown	13	phone
14 Apr 94	61	Guadalupe Dunes Guadalupe, CA	diluent	11	5 onscene
14 Apr 94	62	Batts Neck Road Kent Island, MD	heating oil	5	phone
15 Apr 94	63	F/V *Rapture of the Deep* Hatteras Village, NC	waste oil	5	phone
15 Apr 94	64	Barge *Liberty Trader*/152 Norfolk, VA	chemicals	5	4 onscene
16 Apr 94	65	F/V *Starlight* Morehead City, NC	diesel	5	phone
19 Apr 94	66	White Marsh Run Perry Hall, MD	heating oil	5	phone
20 Apr 94	67	*chemicals lost overboard Chile	arsenic		phone
21 Apr 94	68	*NASA accident Houston, TX	NO2	8	phone
25 Apr 94	69	T/B 27 Yorktonw, VA	#6	5	phone
28 Apr 94	70	*Tokyo Senator* Norfolk, VA	thioureadioxide	5	1 onscene

Date of Incident	No.	Report Name/Hotline Number	Commodity Involved	USCG District	NOAA Involvement
29 Apr 94	71	*failed tanks Laredo, TX	chemicals	8	phone
01 May 94	72	*T/B *Roseanne Doucet* Fisher Island, NY	diesel	1	phone
10 May 94	73	T/V *Panda*/153 Newport, RI	#6	1	4 onscene
19 May 94	74	Skagway Harbor Skagway, AK	diesel	17	phone
22 May 94	75	T/V *Eastern Lion*/154 Valdez, AK	oil	17	1 onscene
25 May 945	76	Platform Hondo Santa Barbara, CA	crude oil	11	fax/phone
31 May 94	77	Recreational vessel fire Chesapeake Island, MD	diesel	5	phone
31 May 94	78	Conoco Refinery Westbank, LA	ethylene dichloride	8	1 onscene
02 Jun 94	79	*grounded F/V Muttole River	diesel	8	phone/fas
02 Jun 94	80	M/V *Manzanita* Ocean City, MD	#2	5	phone
02 Jun 94	81	T/B 564/155 North Landing, VA	JP-5	5	1 onscene
03 Jun 94	82	*T/V Mantinia Puerto Rico	#6		phone/fax
06 Jun 94	83	Newport News Mystery Newport News, VA	waste oil	5	phone
08 Jun 94	84	*work boat sunk Kauai, HI	diesel	14	phone/fax
10 Jun 94	85	*mystery slick Gulf Stream	unkonwn	7	phone
16 Jun 94	86	Custom House Mystery Hampton, VA	diesel	5	phone
17 Jun 94	87	Ocean City Mystery Ocean City, MD	diesel	5	phone
17 Jun 94	88	*lightering operation Long Island, NY	Nigerian crude	1	phone/fax

Date of Incident	No.	Report Name/Hotline Number	Commodity Involved	USCG District	NOAA Involvement
18 Jun 94	89	*mystery Charlotte, NC	unknown	7	phone/fax
21 Jun 94	90	F/V *Penny Marshall* Belhaven, NC	diesel	5	phone
22 Jun 94	91	Star Terminal Providence, RI	gas	1	phone
39 Jun 84	92	*tar balls Gulf of Mexico	mystery	8	phone/fax
02 Jul 94	93	*F/V *Forum Chemist*/157 Gulf of Mexico	potential	7	onscene
07 Jul 94	94	GIWW Well Blowout & Fire/158 Intracoastal City, LA	natural gas	8	1 onscene
07 Jul 94	95	*fishing boat Marshall Island	SAR	13	phone
10 Jul 94	96	*well fire Louisana	gas	8	phone
15 Jul 94	97	*sunken vessel Lake Erie	#6	2	phone
15 Jul 94	98	chronic release San Luis Obisbo, CA	crude oil	11	phone
19 Jul 94	99	USS *Wasp* Shackleford Banks, NC	JP-5	5	phone
20 Jul 94	100	T/V *Kentucky*/159 Paulsboro, NJ	oil	1	2 onscene
20 Jul 94	101	Quarles Petroleum Fredericksburg, VA	unknown	5	phone
27 Jul 94	102	T/B Jamaica Bay Newark Bay, NJ	#2	5	phone
30 Jul 94	103	Frisco Beach Mystery Frisco, NC	tarballs	5	phone
02 Aug 94	104	*mystery slick Cap Hatteras	unknown	5	phone
02 Aug 94	105	*mystery slick Virginia	unknown	5	phone
02 Aug 94	106	*mystery Oregon Coast	unknown	13	phone/fax

Date of Incident	No.	Report Name/Hotline Number	Commodity Involved	USCG District	NOAA Involvement
08 Aug 94	107	U.S. Navy spill Bremerton, WA	diesel	13	phone/fax
10 Aug 94	108	Columbia River/160 Astoria, OR	unknown	18	1 onscene
11 Aug 94	109	R/V Columbus Isla/161 Looe Key, FL	diesel	7	1 onscene
17 Aug 94	110	River Rouge Spill/162 Detroit, MI	sewage/tallow	9	1 onscene
17 Aug 94	111	Moon Engineering Mystery Portsmouth, VA	diesel	5	phone
17 Aug 94	112	Pier #2 Mystery Baltimore, MD	black oil	5	phone
23 Aug 94	113	Pulaski Highway Baltimore, MD	unknown	5	phone
27 Aug 94	114	downed F-14 Pamlico River, NC	JP-5	5	phone
30 Aug 94	115	F/V aground Long Beach, CA	diesel	13	phone/fax
01 Sep 94	116	Tug Barge Annahootz Port of Anchorage	diesel	17	phone
06 Sep 94	117	Tug *Snapper* New Bern, NC	diesel	5	phone
16 Sep 94	118	Dundalk Outfall Mystery Dundalk, MD	oil	5	phone
20 Sep 94	119	dredge Sugar Island East River, NY	#2 fuel oil	1	phone
22 Sep 94	120	Fulchers Point Pride Seafood Neuse River, NC	#2	5	phone
22 Sep 94	121	*Endicott well blowout Endicott Oil Field, AK	Endicott crude	17	phone
23 Sep 94	122	Mystery slick Strait of Juan de Fuca Washington coast	unknown	13	
26 Sep 94	122	*mystery slick Providence, RI	unknown	1	phone

Date of Incident	No.	Report Name/Hotline Number	Commodity Involved	USCG District	NOAA Involvement
26 Sep 94	124	*storm sewer Toledo, OH	asphalt	2	phone
26 Sep 94	125	*Mystery spill Providence River, RI	unknown	1	phone

* indicates spills for which no report is necessary

FY 94 Drills and Scenarios

October 1, 1993—September 30, 1994

Drill Description	Area	Type	Date Requested	Date Sent
Area Plan	Midway Island	OSSM	9/13/93	11/5/93
Area Plan	Midway Island	OSSM	9/13/93	11/5/93
Area Plan	East Florida	OSSM	9/13/93	10/22/93
Area Plan	East Florida	OSSM	9/13/93	10/27/93
Drill	South Carolina	OSSM	9/12/93	10/22/93
Drill	Ohio River	ADIOS	11/16/93	11/17/93
Drill	Hampton Roads, Virginia	OSSM	11/16/93	11/26/93
Drill	Monterrey, California	OSSM	12/15/93	1/14/94
Drill	Galveston, Texas	OSSM	1/11/94	1/25/94
Drill	San Francisco Bay	OSSM	1/19/94	2/1/94
Drill	Oceanside, California	Verbal	1/9/94	1/9/94
Drill	Portland, Oregon	Write up	3/1/94	3/8/94
Drill	Massachusetts	OSSM run	3/2/94	3/8/94
Drill	Long Island Sound	Verbal	3/11/94	3/11/94
Drill	Lower Cook Inlet	OSSM	3/11/94	3/16/94
Drill	Ambrose Channel	OSSM	3/14/94	3/16/94
Drill	Lake Ontario	Pathfinder	3/15/94	3/17/94
Drill	Washington Coast	OSSM	3/14/94	3/17/94
Short Fall	Northern California	OSSM	3/28/94	4/19/94
Short Fall	Northern California	OSSM	3/31/94	4/19/94
Drill	Rosario Strait	OSSM	4/6/94	4/29/94
Drill	Puget Sound	OSSM	4/6/94	4/29/94
Drill	Puget Sound	OSSM	4/6/94	4/29/94
Area Plan	Virginia/North Carolina	OSSM	4/11/94	4/26/94
Area Plan	Chesapeake	OSSM	4/11/94	5/5/94
Area Plan	North Carolina	OSSM (recp)	4/11/94	5/25/94
Drill	Florida Keys	OSSM	4/28/94	5/6/94
Drill	Maine	OSSM	5/2/94	5/6/94
Drill	Rhode Island	OSSM	5/2/94	5/10/94
Drill	Hawaii	OSSM	5/9/94	5/13/94
Drill	Wisconsin	verbal	5/16/94	5/16/94
Area Plan	Virginia	OSSM	5/19/94	6/22/94
Area Plan	Virginia	OSSM	5/19/94	6/22/94
Area Plan	North Carolina	OSSM (recp)	5/19/94	7/1/94
Area Plan	North Carolina	OSSM (recp)	5/19/94	7/1/94
Area Plan	North Carolina	OSSM (recp)	5/19/94	7/1/94
Drill	Washington	verbal	6/1/94	6/14/94
Drill	Puget Sound	OSSM	6/1/94	6/17/94
Short Fall	California	OSSM	6/13/94	6/30/94
Short Fall	California	OSSM	6/13/94	6/30/94
Short Fall	California	OSSM	6/13/94	6/30/94
Drill	Maine/Canada	OSSM	6/13/94	6/24/94

Drill Description	Area	Type	Date Requested	Date Sent
Grass Study	Puget Sound	OSSM	6/27/94	6/30/94
Drill	Lake Erie	OSSM/WAC	6/27/94	9/19/94
Spill Investig	Ohio River	verbal	6/27/94	7/6/94
Area Plan	California	OSSM	6/28/94	8/12/94
Drill	California	OSSM	7/1/94	7/5/94
Lighering area	New York	OSSM/TAT	7/5/94	8/30/94
Drill	New York	OSSM	8/1/94	8/8/94
Drill	California	OSSM	8/24/94	9/12/94
MSO Drill	Boston Harbor	OSSM	9/6/94	9/14/94
Shell Drill	New York Harbor	OSSM	9/12/94	
ADIOS	Gulf of Mexico	MMS traj	9/12/94	

U.S. COAST GUARD DISTRICT 1

Name of Spill:	Dredge *Alaska*
NOAA SSC:	Ed Levine
USCG District:	1
Date of Spill:	11/28/93
Location of Spill:	West Hampton, New York
Latitude:	40°46.2'N
Longitude:	72 °44'W
Spilled Material:	diesel fuel
Spilled Material Type:	2
Amount:	2,380 barrels
Source of Spill:	Dredge
Resources at Risk:	Fish: striped bass, Atlantic herring, tautog, winter flounder, summer flounder, bluefish, black sea bass, Atlantic menhaden, spot, sea trout, scup, mackerel, squirrel hake Mollusks: surf clams, hard-shell clams Crustaceans: blue crabs Birds: shorebirds, waterfowl, gulls, and terns Shoreline: medium- to coarse-grain sand beaches, marshes, sand beaches, manmade structures
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	successful salvage operations
Shoreline Types Impacted:	medium- to coarse-grain sand beaches
Keywords:	potential spill

Incident Summary:

On November 28, 1993, the dredge *Alaska*, carrying 100,000 gallons of diesel fuel, went hard aground off West Hampton Beach two miles east of Moriches Inlet (Long Island) during an early winter storm. The tug *Hoosier State* carrying 5,000 gallons of diesel, sent to pull the dredge free, capsized and lost 150 to 200 gallons of hydraulic oil. The tug 's captain was killed.

The weather at the time of the incident was winds from the south-southeast 30 to 40 knots with seas 8 to 12 feet. The National Weather Service forecasted diminishing winds overnight to 15 to 20 knots and shifting from the south to southwest to west by morning. An ocean buoy had recorded 21 foot seas 20 miles south of Fire Island Inlet during the afternoon of November 28. Seas were expected to gradually decrease overnight.

When the *Alaska* went aground, the tide was low (0.05 feet), but the tide on the morning of November 29 was 3.27 feet and salvage operations were effective. The responsible party removed the dredge and salvaged the tugs involved in the incident with no loss of oil.

NOAA Activities:

NOAA was notified of the incident on November 28, 1993, by the United States Coast Guard (USCG) Captain of the Port (COTP) Long Island Sound. NOAA provided weather forecasts, spill trajectory analyses, and resources-at-risk information to the COTP and notified Fire Island National Park.

The Scientific Support Coordinator (SSC) informed the USCG that the biggest threats were to the marshes and birds inside Moriches Bay and the possibility of buried oil on the outer beaches.

References:

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

NOAA Hotline 139, 3 Reports

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:	Macy's
NOAA SSC:	Ed Levine
USCG District	1
Date of Spill:	12/6/93
Location of Spill:	New Rochelle, New York
Latitude:	40°54' N
Longitude:	74°46.5' W
Spilled Material:	#4 oil
Spilled Material Type:	3
Amount:	167 barrels
Source of Spill:	department store
Resources at Risk:	Birds: waterfowl, shorebirds, gulls, Mollusks: oysters, mussels, clams Recreation: state park
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	first non-vessel/non-facility related spill
Shoreline Types Impacted:	coarse-gravel beaches, coastal structures, consolidated seawalls, piers, riprap, sheltered seawalls, sheltered tidal flats, tidal mudflat
Keywords:	containment boom, ground truth, high-pressure washing, reoiling, shallow-water recovery, sorbent boom, sorbent pompoms, vacuum trucks, volunteers, weir/pump skimmer

Incident Summary:

The USCG received a report of oil emanating from an unknown source at an outfall in Echo Bay, New Rochelle, New York at 1500 on December 6, 1993. USCG investigators identified Macy's Department Store, located in a mall less than one mile from the outfall, as the source and responsible party. Approximately 7,000 gallons of #4 oil had flooded the basement of the store and entered a storm sewer that flowed into Echo Bay. Macy's was reluctant to assume responsible party status for the incident, but eventually consented to do so.

The USCG hired a cleanup contractor who boomed the outlet and downstream area. Oil was contained close to the source, but some oil entered a nearby marina.

Weather at the time of the incident was moderate, with an air temperature of 40°F, water temperature of 49°F, winds out of the northwest at 15 to 20 knots, and calm seas.

Behavior of Spilled Material:

The oil was very black, emitted a lot of sheen, and readily adhered to the rocky shoreline and seawall. The shoreline in the area is mostly manmade seawall and riprap. The tide range in the bay is about seven feet, and at low tide there is an exposed tidal flat. There was a "bathtub" ring about four-feet wide along the seawall and riprap, and oil laying on the mud of the tidal flat. The oil on the tidal flat refloated with the rising tide, but the oil

stranded on the seawall was well attached and not expected to be removed naturally. There was a considerable amount of sheening.

Countermeasures and Mitigation:

A large quantity of oil remained in the sewer pipe and the fire department pumped water into the sewer to flush it out. Vacuum trucks with weir skimmers were positioned at the outfall to capture the flushed floating oil. Sorbent and hard booms were strung at three locations out from the origin. These actions proved successful; very little sheen escaped the containment area.

The seawall was cleaned by high-pressure washing and manual wiping. Sorbent boom and pompoms strung on the riprap were used to absorb oil released from crevasses. Final cleanup of any remaining oil was performed manually on some rocky shoreline areas and floating docks. Open-water oil recovery was completed on December 11.

Clams and mussels were in the mudflat and attached to the seawall/riprap. Some ducks and swans were oiled, captured, and cleaned by Wildlife Rescue, Inc. Approximately 80 birds were reported oiled in the area.

Other Special Interest Issues:

A diplomat's residence was near the impacted area and special permission was needed to access the property to check for oiling. Permission was granted and no oil was seen.

Several local newspapers came onscene to take photographs and get first-hand accounts of the incident.

NOAA Activities:

NOAA was notified of the incident on December 6, 1993, by the USCG Marine Safety Office (MSO) New York. The SSC went onscene to perform a shoreline evaluation and give cleanup recommendations.

References:

NOAA Hotline 141, 1 Report

Name of Spill:	*Bouchard 35*
NOAA SSC:	Ed Levine
USCG District:	1
Date of Spill:	01/05/94
Location of Spill:	East River, New York
Latitude:	40°48'N
Longitude:	73°48'W
Spilled Material:	unleaded gasoline
Spilled Material Type:	1
Amount:	100 barrels
Source of Spill:	barge
Resources at Risk:	Birds : gulls, wintering areas Recreation: marinas, boat ramps Resource Extraction: power plant water intakes, industrial water intakes
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	coastal structures, consolidated seawalls, consolidated shores, mixed sediment beaches, piers, riprap
Keywords:	evaporation

Incident Summary:

At 1730 January 5, 1994, the barge *Bouchard 35* collided with its tug *Evening Tide* in the East River near the Whitestone Bridge at the western end of Long Island Sound. The collision occurred while the tug was repositioning on the barge and resulted in an 18-inch crack in the #3 port tank. The barge was carrying 17,000 barrels of unleaded gasoline and approximately 100 barrels were lost. The crack was above the waterline and was successfully plugged within a few hours of the incident.

Weather onscene was winds from the west at 20 to 25 knots, air temperature 21°F, water temperature 35°F, and one- to two-foot seas.

The USCG dispatched two boats to survey the incident. An Alco-Sensor test was administered to barge and tug personnel; results were negative. The USCG established a safety zone between the Whitestone and Throggs Neck bridges. Environmentally sensitive areas and water intakes were identified. No oil was seen on the water's surface during an overflight the next morning.

Behavior of Spilled Material:

Since the spill occurred during the night, no reports of slicks were received. However, reports of gasoline odors were recorded by USCG personnel onscene. The spill was expected to remain between the two bridges and dissipate/evaporate overnight. Due to the elevation of the bridges over the water, no explosion or fire hazard existed. New York City Fire Department personnel in a boat onscene concurred with this assessment.

Countermeasures and Mitigation:

Notifications were made to water intakes. The barge was boomed by cleanup contractor personnel. No recovery efforts were attempted.

NOAA Activities:

NOAA was notified of the incident on January 5, 1994, by the USCG MSO New York who requested a trajectory analysis and fate and effects of gasoline. The SSC told the Federal On-Scene Coordinator (FOSC) that 90 percent evaporation/dissolution would occur within four hours and any remaining oil would have a tidal excursion of one and a half and two miles and stay within the area bounded by the two bridges. The SSC advised that most of the shoreline in the area is manmade and harbor structures, with several areas of mixed grain and sand beaches. There are two islands containing bird nesting areas just outside the area of anticipated impacts. NOAA supported this incident by phone and facsimile for several hours.

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:	T/V *White Sea*
SSC:	Stephen Lehmann
USCG District:	1
Date of Spill:	02/03/94
Location of Spill:	Kill Van Kull, New York
Latitude:	40°38′ N
Longitude:	74°03′ W
Spilled Material:	#6
Spilled Material Type:	4
Amount:	none
Source of Spill:	tank vessel
Resources at Risk:	industrialized area
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	potential spill

Incident Summary:

While at the Stapleton Anchorage in New York Harbor, the inbound 688-foot tank vessel *White Sea*, reported damage and a potential spill of her 7,000 barrels of #6 fuel oil. The vessel had sustained a three-meter crack in her #2 port tank, cause unknown, and reported that some product had escaped.

The vessel was successfully patched and off-loaded with no substantial loss of oil.

NOAA Activities:

NOAA was contacted and provided resources at risk, weather, and trajectory information to the On-Scene Coordinator (OSC) verbally and through a briefing package.

References:

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

Research Planning Institute. 1985. *Sensitivity of coastal environments and wildlife to spilled oil: New York Harbor and Hudson River. An atlas of coastal resources.* Seattle: Ocean Assessments Division, NOAA. 37 maps.

Name of Spill:	Barge *Cynthia M*
NOAA SSC:	Ed Levine
USCG District:	1
Date of Spill:	3/15/94
Location of Spill:	Kearny, New Jersey
Latitude:	74°06'N
Longitude:	40°44'W
Spilled Material:	caustic soda (sodium hydroxide)
Spilled Material Type:	5
Amount:	3,571 barrels (1,875,000 pounds)
Source of Spill:	barge
Resources at Risk:	Terrestrial Mammals: mustelids, rodents, intertidal feeding areas Birds: waterfowl, 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, nursery areas, estuarine fish Mollusks: high concentration sites Crustaceans: nursery areas, high concentration sites Recreation: high-use recreational areas Management Areas: reserves Resource Extraction: industrial water intakes
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	effects to human health and safety, destruction of marshes or tidal flats, habitat loss, wildlife impact
Shoreline Types Impacted:	brackish marshes, coastal structures, consolidated seawalls, consolidated shores, developed upland, extensive intertidal marshes, extensive wetlands, fine-sand beaches, fringing wetlands, marshes, mixed-sediment beaches, piers, riprap, sand/gravel beaches, sheltered fine-grained sand beaches, sheltered marshes, sheltered seawalls, sheltered tidal flats, supratidal marshes, tidal mudflat, vegetated riverbank,
Keywords:	water monitoring, salvage

Incident Summary:

On March 15, 1994, the barge *Cynthia M* was found listing 70 degrees to port while tied to a pier at the Kuehne Chemical Company south of Kearny, New Jersey. The 202-foot *Cynthia M*, with a capacity of 340,000 gallons, was loaded with 310,000 gallons of a 30-percent solution of caustic soda. Her list was suspected to have been caused by open valves that allowed free communication of liquids between internal tanks.

The weather onscene was winds from the southwest at 15 to 20 knots. The tidal excursions for the Hackensack River were estimated to be between three-quarters of a mile and one mile.

The port side of the barge was completely submerged from center line to rail, resting solidly on the bottom. The USCG, New Jersey Department of Environmental Protection and Energy, and New Jersey Marine Police went to the scene and assessed the situation. Initially, the capsizing of the vessel and its subsequent loss of cargo were the greatest concerns. On March 16 it was estimated that approximately 150,000 gallons of cargo had been lost into the Hackensack River and Newark Bay. The caustic soda escaped from a vent on deck that had submerged because of the vessel's list. At 1235 water testing of pH near the barge showed readings of 12; by 1535 the readings were 9, indicating that pH was returning to normal levels.

The responsible party hired a marine salvor to raise the barge, and state and federal agencies monitored the water pH until it returned to normal.

The USCG was onscene about two weeks monitoring the spill response and salvage.

Behavior of Spilled Material:

The caustic soda dissolved into the water causing sheening, like heat on a road surface causes waving of images. Only areas in the immediate vicinity of the barge were impacted.

The vessel reportedly lost her entire cargo, 310,000 gallons of caustic soda. No recovery was possible because the chemical immediately dissolved when it went into the water.

Countermeasures and Mitigation:

Prop wash from boats maneuvered in the area was used to enhance mixing and dilution and water pH was monitored.

NOAA Activities:

NOAA was notified of the incident at 0735 on March 15, 1994, by the USCG. The SSC told the responders that sodium hydroxide (liquid) was heavier than water and would dissolve in water, producing heat. It is also corrosive to metals and tissue (skin); therefore, protection of personnel must be considered. Immediate environmental concerns of the pollutant entering the water were a localized fish kill, possible impacts on birds, and the destruction of marsh habitat. The addition of a weak acid to neutralize the pH balance was considered. NOAA recommended the use of prop wash or fire hoses to increase dilution of the plume and help mix the chemical into the water column.

NOAA supported the response for one day.

References:

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

Name of Spill:	Star Terminal
SSC:	Stephen Lehmann
USCG District:	1
Date of Spill:	06/22/94
Location of Spill:	Providence, Rhode Island
Latitude:	41°47′ N
Longitude:	71°24′ W
Spilled Material:	gasoline
Spilled Material Type:	1
Amount:	1,200 barrels
Source of Spill:	tank farm
Resources at Risk:	human health and safety
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	none

Incident Summary:

During a transfer operation at the Star Terminal tank farm, a valve gave way, releasing 50,000 gallons of unleaded gasoline into a bermed area. The Providence Fire Department responded and applied a thick blanket of protein foam. The USCG, Rhode Island Department of Environmental Management, and Rhode Island Emergency Management Agency (RIEMA) were notified and cleanup contractors were hired.

At a meeting with the responsible party, State OSC, RIEMA, FOSC, and contractors, concerns about making evacuation decisions based solely on the ALOHA results (the inputs to which were from a water/oil interface model, extrapolated to a ground-containment problem) were expressed along with the recommendations of the Agency for Toxic Substances and Disease Registry (ATSDR). ATSDR recommended that HNU readings be taken in the areas of population (the tank farm is in an industrial area). In addition, that the HNUs be set on continuous and that the action level be a one part per million reading for a full five minutes.

The FOSC requested the U.S. Environmental Protection Agency (EPA) Technical Assistance Team conduct air monitoring as recommended by ATSDR. Action level readings as specified above were not found.

NOAA Activities:

NOAA was notified of this incident on June 22, 1994, at the request of the RIEMA. The RIEMA representative was interested in running the ALOHA program for gasoline vapors to determine the need for local evacuation. Because these actions were being considered by state officials, the USCG asked that NOAA be involved.

NOAA attempted to provide aquatic toxicity information on protein foam. There was no direct data on this type of foam; however, it was determined that a temporarily increased

biological oxygen demand would be the primary impact if the foam reached the water but it would not be harmful.

References:

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

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

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

Research Planning Institute. 1983. *Sensitivity of coastal environments and wildlife to spilled oil: Rhode Island. An atlas of coastal resources.* Seattle: Ocean Assessments Division, NOAA. 21 maps.

Name of Spill:	Dredge *Sugar Island*
NOAA SSC:	Ed Levine
USCG District	1
Date of Spill:	09/20/94
Location of Spill:	East River, New York
Latitude:	40°44'N
Longitude:	73°58'W
Spilled Material:	#2 fuel oil
Spilled Material Type:	2
Amount:	190 barrels
Source of Spill:	dredge
Resources at Risk:	Terrestrial mammals: mustelids, rodents Birds: waterfowl, shorebirds, wading birds, gulls, terns Fish: anadromous fish, estuarine fish, demersal fish Recreation: city park Resource extraction: power plant water intakes, industrial water intakes
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	coastal structures, consolidated seawalls, consolidated shores, mixed sediment beaches, piers, riprap, sheltered impermeable banks
Keywords:	evaporation, sorbent boom

Incident Summary:

On September 20, 1994, starting at approximately 0300, the dredge *Sugar Island* discharged almost 8,000 gallons of #2 fuel oil into the East River between Governors Island and Roosevelt Island, New York. The release occurred during an internal fuel transfer when the vessel overfilled a tank. Oil was discharged until about 0430 when the mistake was discovered. Oil spread along the East River.

On the day of the release the weather was 72°F, visibility about eight miles, winds at five knots from the south, and calm seas.

The responsible party notified the USCG and cleanup contractors. The vessel moored in Flushing Bay (near LaGuardia Airport) and was circled with sorbent boom.

The USCG sent out a Pollution Investigation Team in vessels and on several overflights. Oil was observed throughout the East River from Governors Island to the White Stone Bridge, mostly as light sheen.

Duration of the response was one day.

Behavior of Oil:

The oil quickly spread over the surface of the river into unrecoverable sheen. The oil was released on an ebb tide and during the subsequent flood tide was forced through Hell Gate (with very strong currents). Turbulent mixing caused much of the oil to dissipate. The ADIOS weathering model predicted over 70 percent combined dissolution and evaporation within the first 24 hours. However, real-world observations suggest that the actual rate was much higher due to the warm weather and turbulent mixing.

The entire length of the East River was affected.

Of the approximately 8,000 gallons of oil discharged, none was recovered. The entire slick was allowed to naturally evaporate and dissipate.

Countermeasures and Mitigation:

Several environmentally sensitive areas were identified in the New York Area Plan; however, no protection strategies were deployed due to the rapid dissipation of the product.

Other Special Interest Issues:

No wildlife impacts were reported.

During the initial release, the odor of the fuel oil was quite noticeable along the river, but due to the rapid reduction in concentration, this soon became unimportant. No reports were received by the USCG, probably due to the early hour of the release. Effects to human health and safety were not an issue.

Media interest was light. However, there was a report on National Public Radio's national news edition that evening.

NOAA Activities:

The NOAA SSC was notified and asked to provide trajectory analysis and oil weathering predictions. By consulting the Shio Tide Program, viewing tidal currents in the area, and time of release, the SSC predicted oil extending from Governors Island up the East River past Wards Island. The ADIOS run for #2 fuel oil predicted 70 percent loss due to combined evaporation and dissipation. The SSC reported results to the Command Post and was further requested to go onscene to assess the situation. Observations from a USCG vessel showed oil rapidly spreading and dissipating. Oil was observed as very light silver sheen in non-recoverable quantities.

Duration of NOAA support was one-half day.

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.

United States Coast Guard Captain of the Port New York Area Contingency Plan.

Name of Spill:	Old Mill Creek Mystery Spill
SSC:	Stephen Lehmann
USCG District:	1
Date of Spill:	09/26/94
Location of Spill:	Providence River
Latitude:	41°42′ N
Longitude:	71°21′ W
Spilled Material:	unknown, suspected diesel
Spilled Material Type:	unknown
Amount:	unknown
Source of Spill:	unknown
Resources at Risk:	Habitat: tidal flats, salt marshes Fish: spawning Atlantic herring
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest:	N
Shoreline Types Impacted:	none
Keywords:	potential spill

Incident Summary:

On September 26, 1994, a sheen of unknown origin was reported in a sensitive area south of Conimicut Point in the Providence River moving toward the Old Mill Creek.

An afternoon overflight indicated a sheen south of Conimicut Point and ground observers reported a strong diesel odor.

Countermeasures and Mitigation:

Contractors deployed boom across the mouth of the Old Mill Creek. No cleanup was necessary.

NOAA Activities:

NOAA was notified of this incident on September 26, 1994, by MSO Providence. NOAA provided resources at risk, tidal, current, and weather information. The SSC notified the Department of the Interior and U.S. Fish and Wildlife Service. At the request of the MSO, a hindcast trajectory analysis was initiated to estimate the possible source of the slick. Given the previous evening's winds and currents, the origin appeared to be the shipping lane on the southeast side of the channel.

References:

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

Research Planning Institute. 1983. *Sensitivity of coastal environments and wildlife to spilled oil: Rhode Island. An atlas of coastal resources.* Seattle: Ocean Assessments Division, NOAA. 21 maps.

U.S. COAST GUARD DISTRICT 2/9

Name of Spill:	Mistryski Power Plant
NOAA SSC:	John W. Whitney
USCG District:	9
Date of Spill:	02/09/94
Location of Spill:	Detroit, Michigan
Latitude:	42°18′ N
Longitude:	83°5′ W
Spilled Material:	#4 fuel oil
Spilled Material Type:	3
Amount:	<900 gallons
Source of Spill:	facility, pipeline
Resources at Risk:	Birds: waterfowl, wintering concentration Resource Extraction: municipal water intake
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest:	Oil/ice interactions and adverse weather municipal water intake closure
Keywords:	sorbents

Incident Summary:

On February 9, 1994, there was a pipeline leak at the Mistryski Power Plant along the Detroit River in Detroit, Michigan. The power plant is approximately two miles downriver of the Ambassador Bridge in Detroit. The leak was continuous and occurred from approximately 2230 on February 9 to 0330 on February 10 and was described as flowing at the rate of a fire-hose discharge. Oil had broken through a corroded portion of a 10-inch supply line, ran into a storm sewer, and then traveled about 100 feet to enter the river. When the incident occurred, the Detroit River was 95 percent ice-covered.

Originally the released product was thought to be a #6 oil, but laboratory analysis proved it was a #4 fuel with density of 0.93. The original estimate of 10,000 to 30,000 gallons proved a conundrum as only about 300 gallons was observed in the river. Later volume refinements had the number at officially less than 900 gallons and most likely around 300 gallons. The City of Detroit assumed responsibility for the spill and immediately hired Marine Pollution Control. Only a limited response was possible due to the ice. A portion of the spilled oiled was recovered by removing the oil-stained ice accessible from the shorelines. The Detroit City Laboratory performed the first analysis on the oil, determining that it was a #4 rather than a #6, and that it was a "floater." The City immediately hired Tri-State Bird Rescue to assess the threat to nearly 5000 birds in the oiled area and to establish a rehabilitation center, if necessary.

The Joint U.S./Canada contingency plan was invoked and a unified command was formed among the USCG, the City of Detroit, the State of Michigan, and the Canadian Coast Guard (CCG). All activities took place at the MSO Detroit office.

The active response lasted for only four days. On the fifth and sixth days, the temperature rose into the 40s and the wind shifted to from the east allowing more of the oil-stained ice to migrate to the shoreline where it could be removed. The increased

temperatures caused an ice jam that flushed all the remaining oiled ice down the Trenton Channel into still-frozen Lake Erie. Only two oiled birds died as a result of the spill.

Behavior of Oil:

The major factors controlling the movement and the behavior of the oil were the ice on the Detroit River and the continuous release over approximately five hours. The majority of the oil was captured in the broken ice matrix that became concentrated at the Dingle Park ice jam. Oil making it through the ice jam caused considerable sheening and some shoreline ice staining along the entire eastern channel and banks of the Detroit River. Most impacted areas were the industrialized shorelines along the river because the Dingle Park ice jam kept most of the oil from moving south to the more sensitive bird habitat shorelines of the southern Detroit River. An estimated 300 to 400 gallons of product were actually released, approximately half of which was recovered by working with sorbents and ice-lifting cranes from the shoreline.

Countermeasures and Mitigation:

Once discovered the pipeline feeding the spill was immediately shut down and a boom was placed around the river outfall. Due to the heavy ice coverage, no open-water recovery was possible and all recovery operations were from the shoreline. Being highly industrialized, the river was reasonably accessible from the shoreline, and the contractor crane lifted much of the oil-stained ice into large plastic totes.

Other Special Interest Issues:

The municipal water intake, which was about five miles downstream from the spill source, was initially closed by the City of Detroit. After the laboratory analysis indicated that the oil was a "floater" and it was determined that the eight-foot deep intake would not be threatened, the intake was reopened.

NOAA Activities:

NOAA was notified of this incident on February 9, 1994, and the SSC arrived onscene February 11. NOAA participated in daily overflights charting locations of the oil and the ice. Daily weather reports were provided. NOAA provided oil sample analysis that, after a weather delay in shipping, confirmed the results of the Detroit laboratory. The City of Detroit sought NOAA's advice regarding the reopening of the water intake facility. NOAA attended all informational and strategic meetings. The SSC's advice was actively sought throughout the four-day duration of NOAA support.

References:

NOAA Hotline 149, 7 reports

Research Planning Institute. 1985. *Sensitivity of coastal environments and wildlife to spilled oil: Lake Erie System. An atlas of coastal resources*. Seattle: Ocean Assessments Division, NOAA. 66 maps.

Name of Spill:	*Cleveco* Barge
NOAA SSC:	Ken Barton
USCG District:	2
Date of Incident:	07/12/94
Location of Spill:	Euclid, Ohio
Latitude:	41°47.6′ N
Longitude:	81°36.1′ W
Spilled Material:	#6 fuel oil
Spilled Material Type:	4
Amount:	164,000 gallons
Source of Spill:	sunken barge
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning	N
Other Special Interest	none
Shoreline Types Impacted:	none
Keywords:	NAVSUPSAL

Incident Description:

On July 12, 1994, the National Response Center received a report of sheen in Lake Erie, nine miles north of Euclid, Ohio. USCG MSO Cleveland determined the source to be the sunken barge *Cleveco*. Records indicated that the 260-foot barge sank during a blizzard in December 1942. The barge was in tow from Toledo, Ohio to Cleveland, Ohio carrying 1,013,325 gallons of #6 fuel oil. In 1961, the Army Corps of Engineers supervised a salvage operation to raise the barge from its original location, move it clear of the shipping lanes, and resink it in 70 feet of water. Records show that the barge, currently resting keel up, could still contain up to 800,000 gallons of product in five of her six tanks. The COTP federalized the incident after divers observed an ounce of oil leaking out of a one and a half inch valve every 13 minutes. This leak was plugged on July 16 and an inspection of all exposed valves on the hull was conducted. These valves were installed in the hull during the initial salvage in 1961 to pump air into the tanks in order to raise the barge.

The U.S. Navy Supervisor of Salvage (NAVSUPSAL) was requested to oversee the operations to determine how much oil remained on the barge. These operations began on August 8 and ran until August 17. Divers drilled into the hull and sounded the five tanks using various methods. Oil was found in tanks 2 through 6. No oil was found in the forepeak tank or in tank 1. Samples of the sediment on each side of the barge were also obtained to determine if any oil from the barge had contaminated the lake bottom. No oil was observed in these samples. Oil recovery and containment equipment were onscene for immediate action if there was a release of oil during the operations. Weather constraints and equipment difficulties caused some delays during these operations.

In early September sheens were again observed near the barge. A diver's investigation determined that a small crack had developed in one of the valves and around a weld seam in the hull. These were patched and no other oil was observed leaking from the

barge. Additional sheens observed were attributed to the release of oil clinging to the hull from the previous NAVSUPSAL operations.

NAVSUPSAL presented the volumetric analysis and salvage report to the COTP MSO Cleveland on November 9. They recommended future salvage and oil recovery operations. These recommendations included entombing the hull in an impermeable shell, raising the barge, and leaving the barge in place and pumping off the remaining oil. It was decided that the best course of action would be to remove the oil in place and a statement of work and request for bids is being prepared. Operations for the recovery of the oil from the barge are expected to begin in July 1995.

NOAA Activities:

NOAA was notified of this incident on July 14, 1994. Planning began immediately for a worst-case release of the product. A meeting with local, state, and federal resource agencies was held where it was determined that before any underwater survey operations were begun, a detailed response strategy plan would be developed. At this meeting the SSC provided oil spill risk maps designed to give a relative risk profile for oil beaching at selected spots along the shore. The maps also provided rough estimates of arrival time from a release of the submerged fuel oil. These maps, based on climatological wind data for central Lake Erie, were used as a basis to determine the need for protection strategies for areas at risk.

Environmentally and economically sensitive areas from Lake Erie islands to the west and the Ohio/Pennsylvania shoreline to the east were identified by an ad hoc committee of USCG, NOAA, Ohio Department of Natural Resources, Ohio Environmental Protection Agency (OHEPA) and the U.S. Fish and Wildlife Service (USFWS). The SSC and personnel from OHEPA conducted two overflights on USCG H-65 helicopters to assess these areas. The SSC and the Assistant Port Operations Officer from the MSO also conducted site visits to the areas considered at highest risk to identify detailed protection strategies. On recommendations from this committee containment boom was pre-staged throughout the zone and the USCG Vessel of Opportunity Skimming System (VOSS) was moved to Cleveland.

NOAA provided weather forecasts during periods of on-water operations.

The SSC attended several meetings during the planning of dive operations and provided information to the USCG on diving in hazardous environments. NOAA helped analyze the recommendations from NAVSUPSAL on recovery of the sunken oil. A sample of the oil was analyzed to confirm that the oil was #6 fuel oil.

References:

National Climatic Center. 1990. Climatic Summaries for NDBC Buoys and Stations Update 1. February 1990. NSTL, MS: National Data Buoy Center, National Weather Service, NOAA.

NOAA. 1991. NOAA Diving Manual. Washington, D.C.: U. S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of Undersea Research. 421 pp + appendices.

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: Lake Erie System. An atlas of coastal resources*. Seattle: Ocean Assessments Division, NOAA. 66 maps.

Roberts, Paulene. August 29. 1994. Chemistry Report: IES/RCAT94-37, Chemical Characterization of the T/B *Cleveco*. Baton Rouge, LA: Institute for Environmental Studies, Louisiana State University.

U.S. Navy Supervisor of Salvage. November 9, 1994. T/B *Cleveco*, Salvage Plan Review.

Name of Spill:	U.S./Canada Detroit River Mystery Spill
NOAA SSC:	Kenneth Barton
USCG District:	9
Date of Spill:	08/17/94
Location of Spill:	Rouge River, Detroit, Michigan and the Canadian shoreline of the Detroit River and Lake Erie from Amherstburg, Ontario to Colchester, Ontario.
Latitude:	42°17.8′ N
Longitude:	83°09.5′ W
Spilled Material:	animal fat material and raw sewage (human waste)
Spilled Material Type:	5
Amount:	unknown
Source of Spill:	municipal outfall (presumed)
Resources at Risk:	Birds: shorebirds, wading birds, diving birds, waterfowl, raptors, gulls and terns, Fish: freshwater and anadromous fish Mammals: muskrat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	potential spill

Incident Summary:

At 1300 on August 17, 1994, the USCG was notified by the CCCG that an animal fat substance was being washed up on the Canadian shoreline. At 1400 the USCG initiated an assessment of the U.S. shoreline along the Detroit River. A vehicle was dispatched to the Rouge River for a shoreline investigation. The USCG set up a command post at MSO Detroit and contacted local, state, and federal agencies. Michigan Department of Natural Resources (MDNR) was designated by the Michigan State Police as the lead state agency for the investigation. After the USCG discovered similar material in the Rouge River, the CCG requested that the USCG invoke the U.S./Canada Great Lakes Contingency Plan.

The U.S. EPA assumed the lead as FOSC after being notified by the USCG that the incident might involve an inland-based facility. The EPA opened the Oil Spill Liability Trust Fund and contracted Marine Pollution Control to investigate and respond to the reported material in the Detroit River system. No recoverable material was detected the next day and efforts were focused on investigating potential sources. MDNR was the lead agency for this investigation. Samples were collected from the Canadians for analysis and possible fingerprinting.

A Unified Command structure was set up and joint operations were undertaken between all U.S. and Canadian agencies.

By Friday, August 19, 80 percent of the Canadian shoreline had been cleaned. Further contamination, however, was possible as some of the floating product was still being

driven ashore by southwest winds. Shoreline assessment and cleanup activities continued through the weekend.

On Monday, August 22, cleanup was nearly complete. Additional overflights and shoreline assessments by the USCG and MDNR showed no contamination of the U.S. shoreline. Investigations by MDNR into potential responsible parties led them to focus on the Hubbell-Southfield municipal outfall as the possible source. Since fingerprinting the material was difficult and the outfall serviced a very large geographic area, it was reasoned that determining the responsible party would be very difficult. It was also surmised that the material could have built up on the walls of the outfall over time and been released during the combined sewer overflow event during the previous weekend storms.

On August 25, after holding a final U.S./Canada meeting, the response to the incident was concluded.

Behavior of Spilled Material:

The material released was a non-homogenous substance consisting of a white greasy solid described as animal fat or tallow. The substance also contained materials such as hair, human waste, and solid garbage and had a strong odor. The material floated. The pieces ranged from pea- to football-sized. One large piece weighed more than 100 pounds.

The solid, dirty-white material began washing up on the Canadian shoreline late on Sunday, August 14, after a strong frontal passage with associated heavy rains passed through the Detroit metropolitan area on Saturday. The material was released into the Rouge and Detroit rivers. Strong west winds were responsible for pushing the material towards the eastern shoreline of the river. A counterclockwise gyre at the mouth of the Detroit River contributed to the shoreline impacts along the northern shore of western Lake Erie. Southwest winds contributed to the fouling of the shoreline throughout the next week.

Countermeasures and Mitigation:

The material was manually removed and bagged for disposal as it beached.

Other Special Interest Issues:

The origin of the animal fat and waste was believed to have been from within one or more municipal outfalls. It was surmised that the material built up on the walls of the outfall(s) over time and may have broken free during an unusually large release of the combined sewer overflow during a heavy rainstorm.

Pathfinder model runs in hindcast mode accurately predicted where the material beached.

Sampling and fingerprinting the animal fat material was very difficult. Due to the lack of homogeneity of the material and unknown human health risks, several popular

Canadian beaches were closed during a holiday weekend to accommodate cleanup operations.

NOAA Activities:

NOAA was notified of this incident on August 17, 1994, by the Environment Canada Regional Environmental Emergencies Coordinator. The CCG and Environment Canada had been responding to this incident since Sunday afternoon when the animal fat material began washing up on the beaches. When attempts to locate a Canadian source were unsuccessful, a U.S. source was suspected. Environment Canada asked the SSC to run the Pathfinder trajectory model in hindcast mode to determine the source of the pollutant. The SSC contacted the USCG to provide this information to them and to indicate a willingness to assist in the response. Once it was determined that the pollutant was emanating from the River Rouge area the EPA took over as FOSC. The SSC provided trajectory information, weather forecasts, resource at risk information, and health and safety concerns to Canadian and American officials. NOAA also provided guidance to Environment Canada on fingerprinting the pollutant and the inherent difficulties of this activity.

The SSC remained in contact with the FOSC and Environment Canada by phone and fax throughout the event. NOAA support continued for approximately five days.

References:

NOAA Hotline 162, 5 Reports.

Research Planning, Inc., August 17, 1994. Resources at Risk for Lake Erie, U.S. and Canadian Shoreline. Columbia, SC: Research Planning Inc.

Schwab, D. J., J. R. Bennett, E. W. Lynn. 1984. *"Pathfinder"—A trajectory prediction system for the Great Lakes.* NOAA Technical Memorandum ERL GLERL-53. Ann Arbor, MI: Great Lakes Environmental Research Laboratory, NOAA. 37 pp.

U.S. Environmental Protection Agency Polreps No. 1-4

U.S. COAST GUARD DISTRICT 5

Name of Spill:	Dam Neck Beach Minor Mystery Spill
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	10/14/93
Location of Spill:	Dam Neck, Virginia
Latitude:	36°51.7 N
Longitude:	075°52.4 W
Spilled Material:	waste oil
Spilled Material Type:	2
Amount:	unknown
Source of Spill:	unknown
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	logistics problems
Shoreline Types Impacted:	fringing salt marsh, tidal mudflat
Keywords:	sorbent boom, sorbent, FLIR

Incident Summary:

On October 13, 1993, the USCG MSO Hampton Roads received notification from the Navy's USS *Recovery* of a mystery oil slick approximately 50 yards wide and 1 mile long. This observation was corroborated by the USCG Cutter *Cowslip* and the fishing vessel *Bobbi Lee*. These ships described the slick as a 2-mile square of thick, black emulsion four miles east of Rudee Inlet.

Behavior of Oil:

The oil moved with the tide and wind and beached near Sandbridge, Virginia on the morning of October 14. The USCG Air Station used the forward looking infrared radar (FLIR) system to locate a potential source for the oil slick, without success.

Countermeasures and Mitigation:

International Marine Services (IMS) cleaned the beach and a seawall using manual equipment on October 14 and 15. Nearly 2,000 plastic garbage bags of oil were recovered during beach cleanup operations.

Other Special Interest Issues:

Coordinating with the USCG Air Station to recommend area search patterns has become one of the tasks of the NOAA SSC as a member of the OSC planning staff.

NOAA Activities:

NOAA was notified of the incident on October 13, 1993, by MSO Hampton Roads and reported on-scene. NOAA coordinated with the Commonwealth of Virginia's Department of Environmental Quality (DEQ) to identify resources at risk and plot a potential trajectory

for the mystery slick. NOAA supplied MSO with a trajectory that suggested the mystery slick would go ashore around Sandbridge Beach on the morning of October 14. The SSC, in coordination with the USCG Air Station, located areas to be included in the FLIR search pattern.

References:

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:	F/V *Helen Euphane*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	10/16/93
Location of Spill:	West Ocean City, Maryland
Latitude:	38°19.55′ N
Longitude:	075°04.55′ W
Spilled Material:	diesel
Spilled Material Type:	2
Amount:	unknown
Source of Spill:	fishing vessel
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent pads

Incident Summary:

On October 16, 1993, the USCG Station Ocean City notified MSO Baltimore of a sunken vessel moored at a pier in Ocean City, Maryland. By October 17 it became clear that the release of fuel oil from the sunken F/V *Helen Euphane* was complicated by 100 gallons of paint and 20 gallons of lube oil stored onboard.

Behavior of Oil:

By October 17 the vessel was boomed; however, strong currents and subsequent entrainment caused considerable sheen outside the boom area.

Countermeasures and Mitigation:

On October 17 USCG Station Ocean City deployed an additional 500 feet of ocean boom around the vessel to prevent loss of more oil into the surrounding environment. By October 18 the contractor began to dewater the vessel to allow access to fuel tank fill lines so that the tanks could be stripped and the waste oil and slop removed from inside the containment area. On November 8 the paint, paint cans, 55-gallon drums of oil, and oil-saturated sorbents were removed from the vessel. More than 20 drums of sorbent and oil-soaked materials were removed from the vessel. The vessel had been temporarily refloated to conduct this level of cleanup; however, on November 16 it sank to the bottom and was surrounded by containment boom. No pollution was seen within this boomed area.

NOAA Activities:

NOAA was notified of this incident on November 8, 1993, by MSO Baltimore and participated with the MSO staff by telephone during discussions with the State of Maryland on when cleanup operations could be stopped on the F/V *Helen Euphane*. These "how clean is clean" discussions centered on the continuing demand for USCG resources to supervise a

response that apparently was not going quickly. The oil and paint on the vessel, at this point, had been removed and only residual sheen could be observed. The support staff's recommendation to the OSC was that the bulk oil and paint materials should be removed from the vessel and the precautionary boom around her could be removed within a week. The responsibility to salvage the vessel was outside the requirements of the MSO if no further pollution was anticipate.

References:

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:	Tug *Jenna B*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	10/23/93
Location of Spill:	Southern Branch, Elizabeth River, Norfolk, Virginia
Latitude:	36°50.5 N
Longitude:	076°16 W
Spilled Material	#2 diesel
Spilled Material Type:	2
Amount:	potential 200 barrels
Source of Spill:	tug vessel
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent pads, hot water, steam

Incident Summary:

On October 23, 1993, the 143-foot tug *Jenna B* sank at a pier next to the boundary of the Norfolk Naval Shipyard.

Behavior of Oil:

The initial notification to MSO Hampton Roads described a large tug with the main deck submerged, 40 to 50 gallons of diesel in the water, and oil staying within the slip.

Countermeasures and Mitigation:

The USCG MSO Hampton Roads was able to remove much of the material along the pier area using sorbent pads. All contaminated sorbents and debris were removed and the cleanup was completed on November 17. The discovery of opened sea valves caused the investigators to try to determine if the tug had been deliberately sunk. On November 17 investigators determined that deterioration of the hull above the screw had caused the flooding.

NOAA Activities:

NOAA was notified of this incident on October 25, 1994, by MSO Hampton Roads and participated at the in discussions on "how clean is clean." The use of aggressive cleanup techniques, such as vegetation and steam cleaning, were discussed, but during the several days of the cleanup operations it became obvious that natural processes would remove most of the oil contamination from shore and pier structures.

References:

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:	Cape Fear Abandoned Tank/Drums
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	11/2/93
Location of Spill:	Hanover Towing, Wilmington, North Carolina
Latitude:	34°05′ N
Longitude:	79°05′ W
Spilled Material:	unknown chemical
Spilled Material Type:	5
Amount:	unknown
Source of Spill:	tank and drums
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	categorizing unknown contents
Shoreline Types Impacted:	none
Keywords:	none

Incident Summary:

On November 2, 1993, MSO Wilmington received a report of a 1,000 gallon tank and two 55-gallon drums washed up at Hanover Towing, Wilmington, North Carolina.

Countermeasures and Mitigation:

Specialized Marine, Inc., a hazardous waste contractor, was able to determine on-scene that the tank and drums had been breached and contained river water. No further specialized activities were required for the drums or their contents.

Other Special Interest Issues:

Abandoned drums can be categorized as "waste oil" and removed at reasonable expense and effort while abandoned drums categorized as "unknown" require considerably more effort and expense to determine more appropriately the categorization for their contents to a particular waste stream. In this case, the experienced hazardous materials contractor was able to use professional experience and basic field tests to appropriately categorize the waste stream for these abandoned drums.

NOAA Activities:

NOAA was notified of this incident on November 2, 1993, by MSO Wilmington and participated by telephone in discussions with the MSO staff about the procedures for handling and sampling 55-gallon drums and abandoned tanks with unknown contents. The SSC worked with the MSO staff to select an appropriate contractor holding a basic ordering agreement (BOA) with the USCG who would be able to conduct the sampling, transportation, and disposal of the drums based on an on-scene categorization of the appropriate waste stream.

References:

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:	Allied Signal Company
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	11/9/93
Location of Spill:	Gravelly Creek, Hopewell, Virginia
Latitude:	37°18′ N
Longitude:	77°16′ W
Spilled Material:	cyclohexane
Spilled Material Type:	5
Amount:	5,400 pounds
Source of Spill:	processing tank
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	risk analysis
Shoreline Types Impacted:	none
Keywords:	Centers for Disease Control, evaporation, sorbent pads

Incident Summary:

A processing tank at Allied Signal Company, Hopewell, Virginia failed at 1930 November 8, 1993. The processing tank failure resulted in a release of cyclohexane into Gravelly Creek, a tributary of the James River. The potential amount of the release was 5,400 pounds.

Behavior of Material:

Approximately 600 gallons of cyclohexane was believed to have entered Gravelly Creek; the remainder of the release was pooled around the processing tank. Cyclohexane is a flammable liquid solvent used for lacquers, resins, paints, varnishes, and as a paint remover. It is insoluble in water. Some of the cyclohexane moved and mixed within the water column in Gravelly Creek towards the James River. The sampling plan showed that on the first day of the incident concentrations of cyclohexane entering the James River did not exceed 50 parts per million.

Countermeasures and Mitigation:

Allied's Facility Response Team contained the remaining material in the processing tank, stopping any further release. The response team then removed the spilled material from the ground at the tank site with vacuum systems and sorbent pads. The amount of cyclohexane that entered Gravelly Creek and mixed into the water column could not be removed manually.

Other Special Interest Issues:

Effects on human health and safety downriver of the chemical release were considered by the emergency response team to be negligible because of the small quantity that had entered the James River at Gravelly Creek. This estimate was based on technical discussions between Centers for Disease Control (CDC) and the assembled group and was confirmed by

sampling results. Similarly, immediate effects on wildlife were considered minimal downriver from the actual spill location. No wildlife injuries or fish kills were reported as a result of this release.

NOAA Activities:

NOAA was notified on November 9, 1993, by MSO Hampton Roads and participated at the Unified Command established at the MSO in Norfolk. As part of this team, NOAA contacted the CDC to coordinate discussions on the effects to human health and safety from the release of cyclohexane. This material has approximately the same vapor pressure as gasoline and would evaporate and dissolve into the water column. MSO Hampton Roads reviewed the sampling plan developed by Allied Signal to determine whether additional recovery actions should be directed.

References:

Budavari, S., M. J. O'Neil, A. Smith, and P. E. Heckelman. 1989. *Merck Index: An Encyclopedia of Chemicals, Drugs, and Biologicals Eleventh Edition.* ISBN 911910-28-X. Rahway, NJ: Merck & Co., Inc. 2303 pp.

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

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

Sax, N. Irving. 1984. *Dangerous Properties of Industrial Materials, Sixth Edition*. New York: Van Nostrand Reinhold Company.

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:	Lafayette River Minor Mystery Spill
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	11/17/93
Location of Spill:	storm drain, Norfolk, Virginia
Latitude:	36°53'.N
Longitude:	076°17' W
Spilled Material:	#2 fuel oil
Spilled Material Type:	2
Amount:	unknown
Source of Spill:	unknown
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	repeat spill, tracing sewer system
Shoreline Types Impacted:	fringing salt marsh, tidal mudflat
Keywords:	sorbent boom, sorbent pads, vacuum trucks

Incident Summary:

On November 17, 1993, a storm sewer outfall leading into the Lafayette River, Norfolk, Virginia was found to contain approximately 1,000 gallons of waste oil from an unknown source. The oil was traced back through the city's sewer system approximately eight blocks where the oil sheen stopped.

Behavior of Oil:

The oil was contained in the sewer system by placing boom at the outfall on the Lafayette River and establishing an underflow dam with resources of the City of Norfolk. Incoming tide held the oil at the mouth of the outfall and drove some of the oil into the sewer system. Very little oil entered the Lafayette River. The USCG and their contractor had containment in place before the tide changed.

Countermeasures and Mitigation:

MSO personnel, the NOAA SSC, and City of Norfolk personnel coordinated efforts and agreed to have an underflow dam system constructed at the mouth of the outfall to act as a collection point for the oil. The City of Norfolk provided the resources to construct the underflow dam while the USCG contractor, IMS, removed the oil material using a vacuum truck and sorbent booms and pads. Using these containment systems IMS removed more than 3,500 gallons of waste oil and water on the first day and over 500 gallons of oily material on the second day.

Other Special Interest Issues:

A similar mystery spill impacted this area of the port approximately two months before this incident.

MSO Hampton Roads investigators traced the sewer system to a tank cleaning operation eight blocks from the outfall. The joint investigation with USCG, City of Norfolk Fire Investigators, and Norfolk's environmental investigators included participation with the Environmental Task Force established by the Commonwealth's Attorney General's Office and the Federal Bureau of Investigation. Approximately two months after this incident the SSC participated with this Environmental Task Force to discuss this incident, plan how similar investigations might be conducted, and to discuss the NOAA's role in support of these efforts.

NOAA Activities:

NOAA was notified of this incident on November 17, 1993, by MSO Hampton Roads and reported to the spill site where the SSC helped the MSO staff coordinate response recommendations with the City of Norfolk's environmental staff.

References:

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:	C/V *Saudi Diriyah*
NOAA SSC:	Gary Ott
Date of Spill:	12/1/93
Location of Spill:	Elizabeth River, Norfolk, Virginia
Latitude:	36°53' N
Longitude:	076°20'W
Spilled Material:	#4 fuel oil
Spilled Material Type:	4
Amount:	214 barrels
Source of Spill:	vessel
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	protection priorities, impact on birds
Shoreline Types Impacted:	fringing salt marsh, tidal mudflat
Keywords:	sorbent boom, sorbent pompoms

Incident Summary:

At 2335 on December 1, 1993, USCG MSO Hampton Roads received a call from the tug *Harriet Morgan*. While attempting to move the M/V *Saudi Diriyah*, she gashed the port side of the vessel tied up at Lamberts Point Dock. The tug reported that heavy black oil was coming out of the hole. The ruptured tank had a potential capacity of 42,000 gallons of #4 oil. By 0127 December 2 MSO monitors reported that oil was no longer coming from the vessel. The vessel was boomed off by 0315.

Behavior of Oil:

No. 4 fuel oil is essentially a mix of #2 and #6 fuel oils. Approximately 20 to 30 percent of the product evaporated over the first few days, leaving a highly viscous (>10,000 centistokes [cst]) residue. Tide levels were going from spring to neap, so each high tide was a little lower and the stranded oil was not completely refloated.

On the first day, the oil was transported about three miles downstream and the easterly component of the wind shifted a major portion of the oil toward the western side of the river.

Countermeasures and Mitigation:

An overflight was conducted at 0900 December 3 by the NOAA SSC and a representative of the vessel's owner. At that time, two extensive oil pooling areas existed in the South Branch Elizabeth River: one near the entrance, the other just north of the Railroad Bridge. These consisted of light sheen and mousse. Additional spotty light sheen was observed in the South Branch south of the Railroad Bridge. Light sheen and mousse were observed in the East Branch. Spotty light sheen was observed in the West Branch. Light sheen was visible near the southeast corner of Craney Island, and light sheen and mousse were observed in the channel near the Coal Terminal. Streamers of light sheen were visible at Moon Research

(Port Norfolk). Some streamers of light sheen were also observed near the entrance to Scott Creek.

Other Special Interest Issues:

Resources at Risk: Most of the shoreline along the Elizabeth River is developed, dominated by seawalls and riprap structures. However, along the side rivers and creeks, the shoreline is dominated by fringing marshes. There are few tidal flats. The biological resources identified at greatest risk were birds, especially wading birds (such as herons and egrets) and waterfowl. There was a heron nesting area at Algonquin Park, inside the Highway 337 bridge over the Lafayette River. Wintering waterfowl were present throughout the area, though they were more likely to be in the more open areas than the restricted channels. Overflights observed and reported the distribution and number of waterfowl near slicks or in adjacent areas threatened by slicks.

Protection Priorities: The Lafayette River and Craney Island Creek were identified as protection priorities. These were areas of extensive wetlands and bird use. Lafayette River also has a heron nesting area. The western branch of the Elizabeth River was the next priority, because it had the more extensive wetlands and tidal flats. Although there were fringing marshes throughout the area, there were some areas with extensive marshes, including the northern shoreline at the entrance to the Lafayette River, the embayment adjacent to Virginia Gardens, and up the river beyond the second bridge crossing. Of greatest concern were the large numbers of wintering waterfowl in the region, the most since 1985. There were specific areas where these waterfowl were concentrated:

- ❒ At the entrance to the Lafayette River at Julian's Neck, where residents feed them, were 300 to 500 canvasbacks, scaups, widgeon, and mallards;
- ❒ At Craney Island Creek;
- ❒ More than 500 mallards were located in the South Branch of the Elizabeth River at Jones Creek where ducks feed on spillage from grain elevators; and
- ❒ Up the Western Branch of the Elizabeth River, near Lilly Creek, were buffleheads, canvasbacks, mallards, and other species.

Most of these waterfowl were diving ducks that spend most of their time on the water. They were difficult to capture because they dove when approached. The exception is the mallard, a dabbling duck. NOAA identified these waterfowl as a priority for protection.

During this spill event, 7 oiled seagulls were reported and reports of 10 to 15 more oiled seagulls were not confirmed. The Science Museum at Virginia Beach agreed to collect and treat oiled animals.

NOAA Activities:

NOAA was notified of this incident on December 1, 1993, by MSO Hampton Roads and participated on-scene with the MSO staff as a member of the Unified Command. NOAA remained on-scene for nearly a week as a participant in both the planning staff and with the

OSC's Command Staff. NOAA provided the OSC's staff management services, including visuals of the trajectory of the spilled oil; weather forecasting and planning; on-scene observations of the spilled oil, including visuals; coordinated decisions on planning and responding to oiled wildlife; and interface with the scientific community.

NOAA conducted a meeting December 3 to discuss plans for shoreline evaluation when the oil made landfall. Shoreline evaluation techniques were to be taught to six Shoreline Evaluation Teams. The tasks of these teams were to determine:

- ❒ where there is oil on the shoreline;
- ❒ if there is enough oil for the contractor to pick up; and
- ❒ if there is oiling that will require further assessment.

On December 4, NOAA helped the USCG and the vessel's owner train the Shoreline Evaluation Teams. Topics for the training included proper completion of the Shoreline Evaluation Forms, standards for marking the status/operations maps, and site safety. The teams categorized the oiled shoreline by four criteria:

1. Oil observed, cleanup action required;
2. No oil observed, no cleanup action required;
3. Oil observed, requires further assessment; and
4. Oil observed, cleanup not practical/possible.

Following the training the teams were dispatched to begin their evaluation in the harbor. Two of the teams performed the surveys from small boats in the East and South branches of the Elizabeth River. In the South Branch between the entrance and the Railroad Bridge, a 6- to 10-inch band of oil began at the entrance and extended south for one mile along the western side on the bulkhead, then continued another mile along the eastern side of the facilities' piers and bulkheads. This oil required cleanup contractor removal. There were approximately ten additional isolated locations identified for contractor cleanup outside the South Branch area.

Three areas were identified by the teams as sites requiring a more detailed assessment:

1. Bayview Beach, an erosional sandy beach in the City of Portsmouth;
2. Tidewater Yacht Basin; and
3. An inlet in the City of Chesapeake on the eastern side of the South Branch (the site of a gasoline spill two weeks prior).

On December 5, NOAA, USCG, USCG Strike Team, City of Portsmouth, vessel's owner, Commonwealth of Virginia, and Old Dominion University conducted a detailed shoreline

assessment of the three areas. They made the following observations and recommendations:

1. Bayview Boulevard Marsh Site

   This area had a broken 6- to 12-inch wide band (approximately 90 percent coverage) for 300 to 400 yards at the high-tide line. At the west end of the beach under the bridge (Culpepper Rentals), the oil was thicker, 1-meter wide band (80 to 90 percent coverage). Farther west in Hull Creek, marsh grasses were oiled. The recommendation to the City of Portsmouth and vessel owner was to have an environmental wetlands specialist determine the area of the oiled marsh grass at this site. If the oil causes a loss of marsh grass and affects the stability of this erosional beach, the grass may need to be replanted later. The Commonwealth of Virginia requested that this site become a higher priority for cleanup.

2. Tidewater Yacht Basin Site

   The assessment team observed only bulkhead oiling and some oiled sandy beach at this location. No oiled marsh grasses were observed. No additional recommendation was made.

3. Chesapeake Marsh Inlet Site

   This inlet is located between the Crown and Mobil Oil terminals on the eastern side of the South Branch. Oiled fringing marshes were observed; however, during their investigation, the team noted that the wind (gusting to 30 knots) and high-tide were washing the marsh. They recommended that no cleanup be done within the marsh proper, but that loose oil on the adjacent beaches should be removed.

NOAA discussed "how-clean-is-clean" issues and the process for determining when the cleanup would be completed. Documents prepared for the recent spill in Tampa, Florida (August 1993) concerning criteria for cleaned sandy beaches, seawalls, and other manmade structures were also provided for consideration. Based upon these documents and conferences, representatives from the Commonwealth of Virginia, the vessel's owner, USCG, and NOAA completed a planning document that helped document "how clean is clean" for this incident.

References:

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.

National Shipping Company of Saudi Arabia. 1994. *Wildlife Rescue Program for the Saudi Diriyah Oil Spill, Elizabeth River, VA,* Wayne, NJ: Woodward-Clyde Consultants.

National Shipping Company of Saudi Arabia. 1994. *Salt Marsh Survey for the Saudi Diriyah Oil Spill, Elizabeth River, VA.* Wayne, NJ: Woodward-Clyde Consultants.

NOAA Hotline 140, 24 reports

NOAA. 1992. *Shoreline Countermeasures Manual For Regional Response Team III*. Seattle: Hazardous Materials Response and Assessment Division. 93 pp.

Name of Spill:	Hilton Storm Drain Discharge
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	12/14/93
Location of Spill:	Cape Fear River, Wilmington, North Carolina
Latitude:	34°14′ N
Longitude:	077°57′ W
Spilled Material	black oil
Spilled Material Type:	2
Amount:	unknown
Source of Spill:	vessel, possibly the tug *Dolphin*
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	COIL investigation
Shoreline Types Impacted:	none
Keywords:	sorbents boom, sorbent pads, Elastol™

Incident Summary:

On December 14, 1993, MSO Wilmington began working with the City of Wilmington on the response and investigation of oil in a storm drain that emptied into the Cape Fear River in downtown Wilmington, North Carolina. The source of the spill could have been a release of oil into the Cape Fear River on December 10, 1993, from the tug *Dolphin*.

Behavior of Oil:

Oil was trapped in the sewer system (the sewer system was tidally influenced) by high westerly winds and an incoming tide.

Countermeasures and Mitigation:

Hard and sorbent booms were placed around the storm drain outfall. The City of Wilmington Fire Department attempted to flush the oil out of the storm sewer system by forcing high-pressure water into the sewer's updrain of the outfall.

Other Special Interest Issues:

On December 15 the idea that the source of this spill was not from the storm sewer, but from a diesel spill into the Cape Fear River that then flowed into the sewer system, became an active subject of investigation. The USCG Central Oil Identification Laboratory (COIL) matched the oil from the Tug *Dolphin* and the oil in the sewer system.

MSO Wilmington explored the use of Elastol™ as a tool to help remove oil from the sewer system.

NOAA Activities:

NOAA was notified of this incident on December 14, 1993, by MSO Wilmington. The SSC participated in discussions of strategies to remove the oil from the sewer system. The use of Elastol™ was considered as a potential technique. NOAA prepared the checklist for the use of chemical agents that was required by the Regional Response Team (RRT) III's Dispersant Employment and Evaluation Plan (DEEP). However, this option was not pressed by the acting OSC after a series of negative questions about the operation was raised by the USCG District.

References:

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.

Regional Response Team (RRT) III. 1992. Dispersant Employment and Evaluation Plan (DEEP), Philadelphia.

Name of Spill:	Portside Marina Minor Mystery Spill
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	2/4/94
Location of Spill:	Bogue Sound, Morehead City, North Carolina
Latitude:	34°42.5' N
Longitude:	076°43.5' W
Spilled Material:	#2 fuel oil
Spilled Material Type:	2
Amount:	unknown
Source of Spill:	unknown
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent pads

Incident Summary:

On February 5, 1994, 50 to 75 gallons of #2 fuel oil from an unknown source was reported in the area of Portside Marina, Bogue Sound, Morehead City, North Carolina. Neither an obvious source nor responsible party was found and MSO Baltimore initiated cleanup activities.

Behavior of Oil:

The oil did not move from its location near Portside Marina.

Countermeasures and Mitigation:

USCG contractors using sorbent booms and pads removed most of the spilled material. All contaminated sorbents were removed and the cleanup closed on February 5, 1994.

NOAA Activities:

NOAA was notified of the incident by MSO Wilmington on February 5, 1994, and participated with the MSO and the State of North Carolina in "how clean is clean" discussions. MSO asked the SSC to estimate how long it would take for natural processes to remove the oil stains. MSO also wanted to know if these stains would be present in spring when the tourist season began. NOAA suggested that the oil would naturally disperse before the beginning of the tourist season.

References:

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:	Beacon Marina Minor Mystery Spill
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	2/4/94
Location of Spill:	Beacon Marina, Solomons Island, Maryland
Latitude:	38°19′ N
Longitude:	076°28′ W
Spilled Material:	#2 fuel oil
Spilled Material Type:	2
Amount:	unknown
Source of Spill:	unknown
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	effects on tourism
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent pads, tourism

Incident Summary:

On February 4, 1994, 50 to 75 gallons of #2 fuel oil from an unknown source was reported in the area of Beacon Marina, Back Creek, tributary to the Pautuxent River, Solomons Island, Maryland. Neither an obvious source nor responsible party was, found, consequently USCG MSO Baltimore initiated cleanup activities.

Behavior of Oil:

The oil did not spread from its location near Beacon Marina.

Countermeasures and Mitigation:

USCG contractors using sorbent booms and pads removed most of the spilled material over the next several days. All contaminated sorbents were removed and cleanup was completed on February 25, 1994.

NOAA Activities:

NOAA was notified of the incident on February 5, 1994, by MSO Baltimore. The SSC participated by telephone with the MSO and the State of Maryland DEQ in discussions on "how clean is clean." MSO requested NOAA make an estimate on how long it would take natural processes to remove the oil stains or if these stains would be present in spring when tourist season will begin. NOAA suggested that this amount of oil would be naturally dispersed and removed from the marina structures before the beginning of the tourist season.

References:

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:	Petro Express
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	2/8/94
Location of Spill:	Wagners Point, Baltimore, Maryland
Latitude:	38°13′ N
Longitude:	076°34′ W
Spilled Material:	black oil
Spilled Material Type:	4
Amount:	unknown
Source of Spill:	unknown
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent pads

Incident Summary:

MSO Baltimore received a report of oil in a drainage ditch between BP Oil and FMC Corporation with drainage from a third facility—Petro Express. All facilities denied release of the spilled product; however, BP Oil initiated a "good faith" response and had contractors remove the oiled material from the three inches of ice and snow in the ditch.

Behavior of Oil:

The oil was in the drainage ditch between two facilities with access to a third facility. The drainage ditch lead into Curtis Bay. At the time of the release, oil and ice in the ditch appeared to be stable.

Countermeasures and Mitigation:

BP Oil's contractor used sorbent boom and pads to remove the oil mixed with the ice in the drainage ditch.

NOAA Activities:

NOAA was notified of this incident on February 8, 1994, by MSO Baltimore. The SSC helped develop a sampling strategy to discover the source of the spilled product. Samples of the spilled product were sent to COIL. Results of their testing showed a possible match with oil from the Petro Express property.

References:

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:	Baltimore Minor Mystery Spill
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill	2/10/94
Location of Spill:	Seagirt Marine Terminal, Baltimore, Maryland
Latitude:	39°5′ N
Longitude:	076°36.8′W
Spilled Material	bilge slops
Spilled Material Type:	4
Amount:	unknown
Source of Spill:	unknown
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	**none**
Shoreline Types Impacted:	none
Keywords:	sorbent boom

Incident Summary:

MSO Baltimore's staff from the Officer in Charge of Marine Inspection Office reported oil in the water between the M/V *MSC Lauren* and Seagirt Marine Terminal dock on February 10, 1994. The weather was cold, 32°F, overcast with northerly winds 10 to 15 knots.

Behavior of Oil:

The black-colored oil mixed with the icy slush and moved under the pier at the Seagirt Marine Terminal. Because the cold weather, ice, tide, and wind held the oil under this structure, the sorbent boom effectively prevented the material from moving away from the area.

Countermeasures and Mitigation:

Sorbent booms were deployed and maintained in position to capture residual sheen until February 14.

NOAA Activities:

NOAA was notified of this incident on February 10, 1994, by MSO Baltimore and was asked to help investigate the potential source of the bilge slops. The SSC did not go on-scene but provided requested information (resources at risk, weather updates, and trajectories) by phone and facsimile. Because there was limited information as to when the oil was released or how long it had been in the water, NOAA's estimate for the potential release locations in the Baltimore Harbor could not narrow down specific potential release locations.

References:

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:	Evans Seafood Abandoned Fuel Lines
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	3/5/94
Location of Spill:	Somers Cove, Chrisfield, Maryland
Latitude:	37°59′ N
Longitude:	075°52′ W
Spilled Material:	kerosene
Spilled Material Type:	2
Amount:	unknown
Source of Spill:	facility
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent, pads

Incident Summary:

On March 5, 1994, the repair and replacement of bulkheads at Sayers Cove Marina and Evans Seafood resulted in a release of an unknown quantity of light petroleum products into Somers Cove. The source of the oily material could not be readily identified.

Behavior of Oil:

The oil flowed into Somers Cove where the northwest winds held it, permitting cleanup operations.

Countermeasures and Mitigation:

MSO Baltimore's contractor collected much of the oil using sorbent pads and sorbent boom then, with help from the Evans Seafood contractor, began excavation of contaminated soil around the abandoned pipes leading from the Exxon facility. On March 16 enough of the abandoned lines had been uncovered, fuel lines drained, and contaminated soils removed for the response to be considered completed.

NOAA Activities:

NOAA was notified of this incident on March 5, 1994, by MSO Baltimore. The SSC participated by telephone with the MSO staff and the State of Maryland to discuss sampling strategies for the investigation of this incident. MSO Baltimore, NOAA, and the State of Maryland agreed to sample two locations in the water and several locations along the three pipelines between the old Exxon fuel farm and Evans Seafood. These lines appeared to have been cemented over, but not capped.

References:

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:	Oil Transport Inc. Fuel Truck
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	3/5/94
Location of Spill:	Chesterfield, Virginia
Latitude:	37°22′ N
Longitude:	077°21.5′ W
Spilled Material:	diesel
Spilled Material Type:	2
Amount:	170 barrels
Source of Spill:	fuel truck
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	vegetated riverbank
Keywords:	sorbent boom, sorbent pads hot water/steam flushing, vacuum trucks

Incident Summary:

Vandals reportedly opened a valve on a 7,500-gallon fuel truck parked in the Oil Transport Inc. lot during the early morning hours of March 5, 1994. Approximately 7,000 gallons were released into a drainage ditch leading to a lagoon called the "Barge Pit" that leads to the James River. The USCG MSO Hampton Roads and Chesterfield Emergency Services established an on-scene command post with the State Department of Emergency Services, the local fire department, and IMS.

Behavior of Oil:

A USCG helicopter overflight at first light located the visible diesel sheen moving down the small creek, into the James River, and then south.

Countermeasures and Mitigation:

The tributary entrance to the James River was boomed by the local fire department by 0740 on March 6, 1994. Low water flow resulted in good performance of the boom with little entrainment. A series of booms, sorbent booms, sorbent pads, and vacuum trucks was used to remove and contain spilled oil product.

NOAA Activities:

NOAA was notified of this incident on March 6, 1994, by MSO Hampton Roads and participated at the MSO in the Unified Command Post. NOAA coordinated with the Commonwealth of Virginia Department of Environmental Services to identify resources at risk, long-range booming strategies, and "how clean is clean" issues. The response was completed without the use of aggressive cleanup techniques on March 9.

References:

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:	Gatlin Oil
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	3/14/94
Location of Spill:	Bayboro, North Carolina
Latitude:	35°08.5′ N
Longitude:	076°50′ W
Spilled Material:	#2 diesel, gasoline, lube oil
Spilled Material Type:	2
Amount:	480 barrels
Source of Spill:	facility
Resources at Risk:	Habitat: sheltered marsh
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent pads

Incident Summary:

MSO Wilmington received notification on March 14, 1994, of a fire and oil spill from Gatlin Oil. Oil was reported outside the facility and in drainage ditches leading to North and South Prong creeks. The North Carolina Department of Environmental Management reported that the fire and spill may have been the result of vandalism. Based on the amount of tankage, the maximum potential release was estimated at 80,000 gallons.

Behavior of Oil:

The majority of the product discharged was pooled outside the facility in ditches and on the soil. The final estimate was 20,000 gallons released with about 1,000 gallons remaining in the ditches around the facility.

Countermeasures and Mitigation:

The Pamlico County Fire Department diked all the ditches from the fire scene. Because of this action, no oil pollution reached the tributaries leading to navigable waterways.

NOAA Activities:

NOAA was notified of this incident on March 14, 1994, by MSO Wilmington and participated by telephone with the MSO staff in discussions about resources that could be at risk if dikes placed by the fire department were breached. Although no endangered species were identified, the sheltered marsh habitat along North and South Prong creeks was identified as important habitat that should be protected.

References:

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:	M/V *Isomeria*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	3/22/94
Location of Spill:	Elizabeth River, Norfolk, Virginia
Latitude:	36°46'N
Longitude:	076°18' W
Spilled Material:	#6 fuel oil
Spilled Material Type:	4
Amount:	64 barrels
Source of Spill:	vessel
Resources at Risk:	Birds: wintering waterfowl, herons, egrets, ducks Crustaceans: crab Resource Extraction: water intakes
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	biological resources, protection priorities,
Shoreline Types Impacted:	fringing salt marsh, tidal mudflat
Keywords:	sorbent boom, sorbent pads, vacuum trucks

Incident Summary:

On the evening of March 21, 1994, the vessel *Isomeria* completed delivering her cargo at Atlantic Energy on the south branch of the Elizabeth River, Norfolk, Virginia and began receiving bunkers of #6 fuel oil. At about 0200, March 22 the vessel notified the USCG that oil was leaking from a crack on the port side of the forward fuel tank. The release rate was described as similar to the flow from a garden hose. The crack was near the anchor hawse pipe, about 20 to 30 feet above the waterline. At the time of the notification, an estimated 130,000 gallons of fuel oil had been loaded in the tank above the crack. The leak slowed to a trickle by late morning. Estimates of the amount of oil in the water ranged from 1,300 gallons to 12,500 gallons.

Behavior of Oil:

On the night of March 21, #6 fuel oil spilled from the M/V *Isomeria* into the South Branch of the Elizabeth River near the confluence of St. Julian Creek. Observers on a USCG overflight noted that the southern extent of the floating oil was at the Gilmerton Bridge and the northern extent was at green buoy 15, just north of a large concrete plant. The tidal excursion in this area is typically about two miles. Boom was put into place at the Gilmerton Bridge, the mouth of Milldam Creek, and the mouth of St. Julian Creek. Winds had driven much of the oil to the west bank of the South Branch of the Elizabeth River.

There had been strong north-northeast winds overnight and thunderstorms in the area. On the first day of the incident winds backed to the northwest, and continued to back to the west, and on the second day backed to the southwest.

It was expected that this oil spill would be very similar to a spill four months earlier, even though it was a heavier type of oil. The *Isomeria*'s oil was more viscous and sticky, and less

likely to sheen early in the spill. During the falling tides the oil coated shoreline structures and marsh vegetation; however, on the next rising tide the oil was lifted from the substrate. The oil accumulated in thick bands at the high-tide line. The tide during this period was moving toward spring conditions, so the high tides were increasing in height each day. In some locations the oil stranded higher with each tide.

Countermeasures and Mitigation:

Shell Oil Company acted as the spill manager for the vessel's owner. In this role, Shell hired IMS as their primary contractor, and hired several other oil-spill contractors to maximize the resources they could apply to this response.

The large response staff used harbor boom to protect St. Julian Creek and to hold the oil along the west shoreline of the Elizabeth River. Sorbent boom and sorbent pads were used to contain and remove the oil where possible. Around the *Isomeria* the contractors deployed several layers of boom and used vacuum trucks to remove the contained oil. Sorbents were also used to remove the oil that had been collected in an abandoned canal that was behind the pier used by the *Isomeria*. Hand equipment was used to remove stranded oil from the shoreline.

Other Special Interest Issues:

The biological resource at greatest risk from this heavy oil spill was birds, especially waterfowl. At that time of year, large numbers of both wintering and migratory waterfowl were likely to be seen throughout the area. Ducks concentrated at Jones Creek where they feed on spillage from grain elevators. Old Dominion University staff was also contacted to identify other concentration areas being used that week. Wading birds such as herons and egrets could have been present along mud flats and marsh habitats, where they can feed along the shoreline edge. Crabs were buried in muddy river and creek bottoms, or in deep water. Shellfish and finfish resources were at low activity levels during the response and were at minimal risk of exposure to #6 fuel oil.

Most resources were concentrated up side creeks rather than in the main river channel; thus St. Julians Creek was the highest priority for protection. There are four water intakes in the South Branch (Virginia Power South Branch Intake and three locations of wells owned by Tarmac Mid-Atlantic Inc.). Other intakes identified were located along the main stem and western branch of the Elizabeth River.

Neither the *Isomeria* nor the facility, Atlantic Energy, was required to have oil spill response plans. However, the use of the spill management team by Shell Oil brought a skilled and aggressive response organization that interacted efficiently with the spill management team established by MSO Hampton Roads by the end of the first day.

NOAA Activities:

NOAA was notified of the incident on March 21, 1994, by MSO Hampton Roads. The SSC participated at the scene with the planning staff and the OSC's Command Staff. NOAA provided information management services including visuals of the trajectory of the spilled oil, weather forecasts, on-scene observations of the spilled oil with visuals of these

observations, coordination of the rescue of oiled wildlife, coordination of the shoreline evaluation of the extent of the spilled oil, and interaction with the scientific community.

The SSC coordinated the shoreline assessment that was completed the morning of March 24. The assessment team included the Commonwealth of Virginia, USCG, NOAA, Shell Oil Environmental Division, and Entrix. The assessment was conducted on land and by small boat. The southernmost extent of shoreline oiling was on the east bank of the Elizabeth River 100 yards south of the Gilmerton Bridge at a location best described as a barge slip. No oil was found at the booms protecting Milldam and St. Julian creeks or in the creeks themselves. The northernmost extent of shoreline oiling was at Hess Oil on the east bank of the Elizabeth River. A band of oil one to two inches wide was found at both the northernmost and southernmost extents of shoreline oiling. The greatest concentration of oil was found along one-half mile of shoreline on the west bank of the Elizabeth River south of Atlantic Energy. Less than one mile of shoreline along the Elizabeth River was affected by oil.

NOAA also coordinated preparation of the recommended criteria for shoreline cleanup that was distributed on March 23. These criteria included the manual removal of oil and oily debris on sandy beaches and noted that the area of affected shoreline was small and accessible during low tide. The criteria also recommended that oiled material should be picked up using rakes and shovels and placed in plastic bags. Patches of oil at the high-tide line should be removed. The criteria noted that the main concern during cleanup operations would be avoiding physical damage to marsh areas and vegetation. Removal of live vegetation would not be permitted and cleanup crews would not be permitted to enter marsh areas.

References:

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.

NOAA Hotline 151, 16 reports.

Shell Oil Company, May 16, 1994. *Oil Spill Response to M/V Isomeria Incident*. Wilmington, DE: Entrix, Inc.

Name of Spill:	Assateague Island Minor Mystery Spill
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	4/12/94
Location of Spill:	East of Assateague Island, Virginia
Latitude:	37°58.3′ N
Longitude:	07°41.8′ W
Spilled Material:	unknown
Spilled Material Type:	unknown
Amount:	unknown
Source of Spill:	unknown
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	FLIR

Incident Summary:

On April 12, 1994, a mystery oil slick was reported to MSO Baltimore by USCG Group Eastern Shore. The spring weather was overcast, winds 15 knots, and calm seas at one to two feet.

Behavior of Oil:

The mystery slick's initial description received from the USCG Cutter *Highpoint* was that it was 2 miles long by 400 yards wide. A subsequent overflight by USCG helicopter reported that the slick was a 100- by 100-yard silver and blue sheen with tarballs mixed in a 10-square-yard area. The use of FLIR was discussed as a tool for determining the source of this release.

Countermeasures and Mitigation:

No oil landed on shore structures.

NOAA Activities:

NOAA was notified of this incident on April 12, 1994, by MSO Baltimore and participated by telephone with the staff established at the MSO. The SSC did not go on-scene, but provided requested information (resources at risk, weather updates, and trajectories) by phone and facsimile. NOAA's weather and oil spill trajectory forecast for the next several days suggested that the slick would probably dissipate before it reached shore. NOAA recommended that since enough information had been gathered about this mystery slick the use of the FLIR system was not necessary.

References:

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:	Batts Neck Road
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	4/14/94
Location of Spill:	Kent Island, Maryland
Latitude:	38°59′ N
Longitude:	076°20′W
Spilled Material:	#2 heating oil
Spilled Material Type:	2
Amount:	7 barrels
Source of Spill:	fuel oil tank
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent, pads

Incident Summary:

On April 14, 1994, MSO Baltimore received notification from the State of Maryland that 275 gallons of #2 heating oil had drained from a house on Kent Island into a drainage ditch that leads to Chesapeake Bay.

Behavior of Oil:

The ditch was oiled for one-half mile, but none of the oil entered Chesapeake Bay.

Countermeasures and Mitigation:

MSO Baltimore's contractor used sorbent pads and booms to remove most of the oil and some contaminated soils.

NOAA Activities:

NOAA was notified of the incident on April 14, 1994, by MSO Baltimore and participated by telephone with the MSO staff to discuss "how clean is clean." The discussion became complicated because the State of Maryland's on-scene staff was experienced in the cleanup of underground storage tanks and contaminated soils, but had little experience in a spill covering over one-half mile of a creek's shoreline.

References:

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 *Rapture of the Deep*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	4/15/94
Location of Spill:	Hatteras Village, North Carolina
Latitude:	35°10′ N
Longitude:	075°40′W
Spilled Material:	waste oil
Spilled Material Type:	4
Amount:	2 barrels
Source of Spill:	vessel
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent pads

Incident Summary:

On April 15, 1994, the F/V *Rapture of the Deep* moored at Hatteras Harbor Marina, Hatteras Village, North Carolina, discharged approximately 100 gallons of waste oil into Pamlico Sound.

Behavior of Oil:

The oil was held in the harbor along the pier by southwest winds of 15 to 20 knots.

Countermeasures and Mitigation:

The pollution response trailer from USCG Station Oregon Inlet was used to provide the initial response equipment. The MSO Hampton Roads contractor was able to use sorbents within the containment established by the USCG Station. An estimated 40 gallons of product were recovered.

NOAA Activities:

NOAA was notified of this incident on April 15, 1994, by MSO Hampton Roads and participated by telephone with the MSO in discussions on "how clean is clean." On this occasion, the stiff winds, considerable current in the harbor, and the quickness with which the initial release was contained by Station Oregon Inlet equipment made the cleanup with sorbent materials very effective.

References:

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:	Barge *Liberty Trader*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	4/15/94
Location of Spill:	Port of Hampton Roads, Norfolk, Virginia
Latitude:	36°56′ N
Longitude:	076°24′ W
Spilled Material:	1,1,1-trichloroethane, CO_2, compressed nitrogen, aerosol canisters, and potassium hydroxide
Spilled Material Type:	5
Amount:	unknown
Source of Spill:	container 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:	none

Incident Summary:

Early evening on April 15, 1994, the Coast Guard was alerted that the barge *Liberty Trader*, under tow by the tug *Alert*, had containers on fire and there were hazardous materials onboard. The hazardous materials included two containers filled with 55-pound paper drums of potassium hydroxide and a third container loaded with small aerosol cans including 200 pounds of nitrogen and 2,000 pounds of 1,1,1-trichloroethane.

The Atlantic Strike Team (AST) was requested on-scene and arrived later that evening. The U.S. Navy responded with tugs, and fire fighting operations began that evening. An overflight by the AST early the next morning showed fires still burning inside some of the containers; fire water from the tugs was not reaching the hot spots. The containers for these materials were not on fire.

Behavior of Materials:

All the hazardous materials were located on the bottom tier of containers (resting on the weather deck). The fire was located in bays 4 and 5, which held primarily refrigerated food stuffs and bales of waste paper or wood.

1,1,1-trichloroethane is a common, essentially non-flammable chlorinates solvent, but in a fire it will produce toxic and irritating chemicals such as phosgene and hydrochloric acid. There were 2,400 pieces, assumed to be aerosol cans, of solvent intended for use as an electronic or auto parts degreaser.

Potassium hydroxide is a strong, corrosive base that will readily dissolve into water, producing heat that can ignite combustible materials.

Countermeasures and Mitigation:

The tug *Alert* maintained a position pointing the bow into the wind in the main harbor area of Hampton Roads. While the barge was in this holding pattern, the fire burned primarily from the fourth bay into the fifth and eventually began to encroach into the sixth bay.

The fire-fighting scene was located in the middle of the harbor, overlapping two different fire department jurisdictions. Neither the fire departments nor the USCG had vessel fire-fighting capabilities. Initial fire-fighting efforts by the Navy through the first evening seemed to reduce the fire significantly; however, a pre-dawn overflight on April 16 indicated that fire remained within the interior of the cargo bay holding balled waste paper. This cargo might burn for days unless the contents were individually removed and extinguished one at a time.

At first light on April 16, an assessment-by-vessel conducted by a local hazardous materials contractor, state emergency response personnel, and the USCG AST showed that the fires were still burning inside some of the containers and that fire-fighting streams from the Navy tugs were not reaching these hot spots. Air monitoring around the barge did not indicate any hazardous release of vapors and both the overflight and vessel assessments reported that the hazardous materials containers did not appear to be involved in the fire.

Morning fire-fighting operations were augmented by air drops of sea water from a U.S. Army National Guard helicopter. This provided enough water to the center of the containers to greatly reduce the fire while the Navy tugs maintained water streams from the sides. However, further fire fighting would require the use of elevated booms and high-flow pumps that could put high volumes of water into the center of the container stack.

In the evening the barge was brought to Moon Engineering. The Portsmouth Fire Department was able to control the fire and individual containers were removed by crane and taken to remote areas of the terminal where the fires were overhauled one container at a time. This operation took several days. The fire damage to containers and the heavy weight of cargo and containers due to the addition of fire-fighting water slowed the offloading of the containers. For example, at 0800 on April 17, the containers that contained burning paper rolls that were stacked on top of the hazardous materials container were too heavy for the crane because of the added weight of fire-fighting water. It was necessary to remove the contents of these containers by hand and clam-shell crane while they remained in place over the hazardous material containers.

Fire fighting continued through April 17 and containers were removed and overhauled through the night and into April 18 when the container with trichloroethane was removed. This was the only hazardous materials container that bore any indication of fire damage on the outside. The hazardous cargoes were inspected and found to be intact and without observable fire damage.

Other Special Interest Issues:

By noon April 16, before the fire reached the hazardous materials containers, the unified command was involved in the analysis of several fire-fighting options. The capacity to get

high-flow snorkel fire-fighting equipment in position to fight this fire was considered in the following categories:

- ❒ continue fighting the fire in the "stream" (out in the harbor, transporting heavy equipment on barges or large vessels);
- ❒ grounding the vessel and building a ramp for access by heavy equipment;
- ❒ taking the vessel to a container facility and providing access by heavy equipment; and
- ❒ taking the vessel to a repair facility and providing access by heavy equipment.

Vessel fires and hazardous materials response on vessels are best done at a safe haven. First preference for a safe haven is a well-equipped facility (e.g., container facility for container vessels, bulk transfer facility for bulk carriers). Second preference is to be located at any other available industrial facilities. The least desirable (for safety of crew and responders, as well as efficiency of response operations) is open waterways. On April 16 the owner of the *Liberty Trader* arranged with Moon Engineering, a vessel repair facility, for the right to bring the barge alongside so that the local municipal fire fighters could bring appropriate snorkel fire-fighting equipment to the scene.

NOAA Activities:

NOAA was notified on this incident on April 15, 1994, by MSO Hampton Roads. The SSC went on-scene as a member of the Unified Command staff. The SSC's first task was to participate in an assessment of risks of the fire to the hazardous materials listed on the dangerous cargo manifest (DCM). NOAA provided an on-scene chemist to participate in technical discussions while these risk analyses were being conducted. As the risk assessment was put into perspective when the fire was identified as not impinging on the same locations as the hazardous materials, other tasks came into consideration. These tasks include information management, analysis of fire-fighting options, analysis of safe haven options, sampling strategies for hazardous vapors when the fire was in the harbor as well as when the barge was permitted to dock at a pier, and planning for the safety of overhaul operations as the containers were taken from the barge.

The SSC also participated as the facilitator during the debrief of the incident on April 22, 1994. This debrief was prepared for the OSC as part of the incident documentation and in preparation for the general debrief of the incident that was hosted by the OSC on April 26.

References:

Incident Debriefing, April 22, 1994.

NOAA Hotline #152, 2 Reports

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:	F/V *Starlight*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	4/16/94
Location of Spill:	Shackleford Banks, Morehead City, North Carolina
Latitude:	32°41.2′ N
Longitude:	076°39.8′ W
Spilled Material	diesel
Spilled Material Type:	2
Amount:	8 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:	none
Keywords:	none

Incident Summary:

On 2230 hours on April 16, 1994, the F/V *Starlight* grounded at Shackleford Banks approximately 50 yards off the beach in the surf line. The owner contracted for salvage; however, the USCG took responsibility for response to the release of the vessel's fuel. The weather at the time of the grounding was wind 215 degrees at 30 knots with eight-foot seas.

Behavior of Oil:

The vessel had 800-gallon capacity in the fuel tanks and 350 gallons of diesel was recovered. The odor of diesel could be detected by the salvage crews, but quantities of diesel fuel were not observed in the high surf.

Countermeasures and Mitigation:

No boom could be deployed around the vessel due to the rough surf.

NOAA Activities:

NOAA was notified of this incident on April 17, 1994, by MSO Wilmington and participated with the MSO and the staff of North Carolina Environmental Protection by telephone in an assessment of resources that could be affected by the release of diesel fuel in high surf on a sandy coast. The assessment of this group was that the shoreline impact would be difficult to measure during this emergency phase of the incident.

References:

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:	White Marsh Run
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill :	4/19/94
Location of Spill:	Perry Hall, Maryland
Latitude:	unknown
Longitude:	unknown
Spilled Material	#2 heating oil
Spilled Material Type:	2
Amount:	71 barrels
Source of Spill:	fuel storage tank
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	freshwater marshes, vegetated riverbank
Keywords:	sorbent boom

Incident Summary:

An estimated 3,000 gallons of #2 heating oil was released from a 6,000-gallon fuel oil tank into the basement of the Country Plant Store. An estimated 2,000 gallons of this drained into an unnamed creek that runs into White Marsh Run.

Behavior of Oil:

Approximately two and one-half miles of upland waterway were oiled as a result of this release.

Countermeasures and Mitigation:

The contractor for the Maryland DEQ deployed sorbent boom along the creek and White Marsh Run to contain the fuel oil.

NOAA Activities:

NOAA was notified of this incident on April 19, 1994, by MSO Baltimore. The SSC participated in telephone discussions on "how clean is clean." A conference call with USCG MSO Baltimore, and the Maryland DEQ led to a series of recommendations that when removal of oil from the heavily oiled areas was completed, natural evaporation and flushing would be used to complete the cleanup.

References:

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:	T/B 27
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	4/25/94
Location of Potential Spill:	Yorktown, Virginia
Latitude:	37°13' N
Longitude:	76°26' W
Spilled Material	#6 fuel oil
Spilled Material Type:	4
Amount:	none
Source of Spill:	barge
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	potential spill

Incident Summary:

The tug *Elis* lost steering power during a shifting of T/B 27 at the AMOCO Oil Company Refinery dock, Yorktown, Virginia on April 25, 1994, resulting in minor damage to the front knuckle area of the barge. None of the 9,100 barrels of #6 oil on the barge was spilled.

NOAA Activities:

NOAA was notified of the incident on April 15, 1994, by MSO Hampton Roads NOAA provided a trajectory for the oil if there should be a spill from the damaged barge. NOAA suggested that the incoming tide would move the oil along the southern shore of the York River propelled by the wind. Initial response strategies would have been based on this trajectory until the tide changed later in the day.

References:

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:	*Tokyo Senator*
NOAA SSC:	Gary Ott
Date of Spill:	4/28/94
Location of Spill:	Norfolk, Virginia
Latitude:	36°51.5′ N
Longitude:	076°19.2′ W
Spilled Material:	thioureadioxide
Spilled Material Type:	5
Amount:	unknown
Source of Spill:	container vessel
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	injured firefighters
Shoreline Types Impacted:	none
Keywords:	none

Incident Summary:

On April 28, 1994, there was a fire aboard the German cargo ship *Tokyo Senator* as the vessel passed through Thimble Shoals Channel, Virginia. The *Tokyo Senator* was carrying zinc, lead, and arsenic in the starboard and forward sections of Bay 2. MSO Hampton Roads ordered the vessel to wait at the anchorage until an assessment of the danger to the vessel, her crew, or the public could be completed. The onboard carbon dioxide fire suppression system was activated and appeared to limit the spread of the fire. The Incident Response Team (IRT), a group of area fire fighters trained to fight fire aboard vessels, determined that the fire's hot spot was in the after port section of Bay 2, was stable, and the danger to the public or the crew from those materials on the DCM was minimal.

Countermeasures and Mitigation:

The *Tokyo Senator* continued to the pier in the early morning hours of April 29 where the fire was extinguished by the municipal fire department. During the first day, the fire damaged container was placed in a remote section of the terminal. During the second and third days, the cargo that had spilled into the hold—none of which was a regulated material—was cleaned by IMS, a hazardous waste contractor.

Other Special Interest Issues:

The initial hazard assessment by the IRT placed the fire in the category of a non-hazardous material incident. On the basis of this assessment, the response activities were treated as if routine; however, the container most involved by fire contained a urea-based compound—thioureadioxide (a non-regulated material used in urea-based fertilizers). This non-regulated, non-manifested cargo resulted in hazardous gas emissions and smoke inhalation that caused the hospitalization of 13 firefighters.

NOAA Activities:

NOAA was notified of this incident on April 30, 1994, by MSO Hampton Roads and participated at the MSO in incident response planning. NOAA participated with the MSO staff in the analysis of risk from the cargoes identified on the DCM. The incident response staff was disbanded the morning of April 30 after the IRT determined that the fire was almost out, the hot spot caused by the fire was not near any cargo listed on the DCM, and the municipal fire department was capable of any overhaul activities once the vessel was at the pier.

However, the report of firefighters being taken to the hospital and subsequent reports from the contractor after the vessel had sailed suggested that problems had surfaced after the MSO stood down. In the interest of learning from this incident, the MSO Hampton Roads staff conducted a debrief of the incident on May 6. Critical issues identified were:

- ❒ Hazard assessment activities by all involved parties should have been re-evaluated continually.

- ❒ An action plan for the opening of the hatches over Bay 2 should have been developed that allowed for the closure of the bay if the fire flared up or if some other significant event occurred while the fire scene was exposed to the atmosphere.

- ❒ An action plan should have been developed that allowed for the crane operator to place the container containing the fire in an appropriate location if the situation became unstable during the offloading of the fire-damaged container. Personnel had not been removed from the area under the lift of the fire-damaged containers during potential hazardous operations.

- ❒ Action and safety plans should have been developed for the overhaul of the fire-damaged container at a remote section of the container pier or during cleanup of the vessel's hold after the container was removed.

References:

Budavari, S., M. J. O'Neil, A. Smith, and P. E. Heckelman. 1989. *Merck Index: An Encyclopedia of Chemicals, Drugs, and Biologicals Eleventh Edition.* ISBN 911910-28-X. Rahway, NJ: Merck & Co., Inc. 2303 pp

Lewis, Sr, Richard J. 1992. *Sax's Dangerous Properties of Industrial Materials, Volume III: General Chemicals--Entries G - Z.* ISBN 0-442-01278-0. New York: Van Nostrand Reinhold. pp. 1773 - 3553.

USCG MSO Hampton Roads. 1994. "Hotwash" (debrief) of the *Tokyo Senator* incident, May 6, 1994.

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:	Recreational vessel fire and sinking
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill :	5/31/94
Location of Spill:	Chesapeake Island, Maryland
Latitude:	39°29′ N
Longitude:	075°54′W
Spilled Material	diesel
Spilled Material Type:	2
Amount:	10 barrels
Source of Spill:	recreational vessel
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	potential spill

Incident Summary:

On the night of May 31, 1994, a recreational power boat burned and sank at the mouth of the Bohemia River at Chesapeake Island, Maryland. The weather was clear, winds southwest 15 knots, seas calm, and temperature 82° F. On June 1 the vessel re-ignited and the local fire department again extinguished the fire using foam materials.

Behavior of Oil:

The fuel from the vessel and fire-extinguishing foam moved with the southwest winds, but had little impact on shoreside structures.

Countermeasures and Mitigation:

The USCG contractor removed 54 bags of oil-soaked sorbents and debris from the boat on June 1, 1994, and the vessel's fuel tanks were stripped by that afternoon.

NOAA Activities:

NOAA was notified of the incident on June 1, 1994, by MSO Baltimore and participated by telephone in discussions on the potential adverse environmental impact from the combination of fire-fighting foam and diesel oil. NOAA's discussion with the local fire department suggested that the type of foam used was the old type, a natural organic product that would degrade with time. Under the emergency conditions of this fire and release, the relatively small quantity of oil released, the biodegradability of the fire-fighting foam, and the lack of impact on shoreside structures suggested that the environmental impact of this release would be difficult to measure.

References:

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:	M/V *Manzanita*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	6/2/94
Location of Spill:	Ocean City, Maryland
Latitude:	38°20′ N
Longitude:	075°06′ W
Spilled Material:	#2 fuel oil
Spilled Material Type:	2
Amount:	1 barrel
Source of Spill:	vessel
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent pads

Incident Summary:

On June 2, 1994, MSO Baltimore was notified of a sunken boat at Island Marina, Ocean City, Maryland.

Behavior of Oil:

The oil was nearly all contained within the boomed area around the sunken vessel.

Countermeasures and Mitigation:

MSO Baltimore's contractor, Clean Harbors, used sorbent booms and pads to remove most of the material that was contained within the boom deployed by USCG Station Ocean City. By July 13, 130 gallons and 3 drums of oily debris had been removed and no further cleanup was considered feasible.

NOAA Activities:

NOAA was notified of this incident on July 6, 1994, by MSO Baltimore and participated by telephone with the MSO staff in discussions on the issues of "how clean is clean" and when the booms could be removed from around the sunken vessel.

References:

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:	Eastern Carriers, T/B *564*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill	6/2/94
Location of Spill:	Intracoastal Waterway, Great Bridge, Virginia
Latitude:	unknown
Longitude:	unknown
Spilled Material:	JP-5
Spilled Material Type:	1
Amount:	10 barrels (potential 1,400)
Source of Spill:	barge
Resources at Risk:	habitat, pocosin marsh fish: bass, sunfish birds: herons, great egrets, rails, red-winged blackbirds, grackles, shrew mammals: raccoon and muskrat reptiles: American alligator, rattlesnake, lizard
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	ICWW closed
Shoreline Types Impacted:	pocosin marsh, freshwater marsh
Keywords:	endangered species, sorbent boom, sorbent pads

Incident Summary:

At 0400 hours on June 2, 1994, the T/B *564* was at Standard Transpipe when the crew noticed strong JP-5 odors. At first light, JP-5 was observed at the Great Bridge Locks, Landing Bridge, and Centerville Turnpike Bridge—all locations along the transit of the T/B *564* on the Intracoastal Waterway (ICWW) from where it had loaded fuel in Hampton Roads. When or where the T/B *564* had been damaged and begun to spill JP-5 is unknown.

Behavior of Oil:

The JP-5 was seen along the transit path of the T/B *564*, with the largest amounts at each place the barge had paused, such as Great Bridge Lock, The spill was relatively small and very little oil was observed. The sheen dissipated within a few hours, well before the end of the first day.

Countermeasures and Mitigation:

A USCG contractor double-boomed the T/B *564* and boomed across several sensitive areas described in the Area Contingency Plan. Sorbent pads and booms were deployed to remove the JP-5 where possible.

Other Special Interest Issues:

The ICWW was closed to commercial and pleasure crafts for about 12 hours.

Threatened and endangered species were identified in the immediate vicinity of the spill and included a shrew (*Sorex longirostris fisheri*), rattlesnake (*Crotalus horridus atricaudatus*), lizard (*Ophisaurus ventralis*), tern (*Sterna forsteri*), and the great egret (*Casmerodius albus egretta*). NOAA reported that the JP-5 could be acutely toxic to fish, particularly where the amount of dilution by mixing is limited, especially in confined areas like those of the spill site.

NOAA Activities:

NOAA was notified of this incident on June 2, 1994, by MSO Hampton Roads and participated in the response in the Unified Command at the MSO. NOAA obtained the potential resources at risk in the unusual pocosin marsh structures in the area. Subsequent meetings with the Commonwealth's Department of Conservation and Recreation and the National Heritage Foundation began the process of including these agencies in the Area Contingency Planning structure.

NOAA identified the resources at risk as the shoreline of the ICWW canal bordered by tree stumps and snags. To the south, along the natural river channel, there is a transition to freshwater marshes. The water level at the time of the spill was high enough to prevent exposure of the substrate. NOAA identified JP-5 as a highly volatile type of oil, which also contains a large amount of acutely toxic compounds. The JP-5 does not have the smothering effects of the heavier oils on vegetation; rather, it tends to cause acute damage to plant tissue upon contact. If the oil stayed in contact with shoreline vegetation, particularly freshwater grasses, for hours to days, the vegetation in direct contact with the slick would likely be killed. NOAA predicted that as long as the water level stayed high and the roots were protected from contact with the oil, the plants would probably survive.

Farther to the south, where the freshwater marshes border the river, threatened and endangered plant communities were present. However, these communities are located within the marsh, rather than along the fringe where the oil was most likely to contact the vegetation. NOAA advised that these communities were not at risk.

References:

Commonwealth of Virginia, Department of Game and Inland Fisheries, Memorandum dated June 2, 1994.

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. 1983. *Sensitivity of coastal environments and wildlife to spilled oil: State of Virginia Part II. An atlas of coastal resources.* Seattle: Ocean Assessments Division, NOAA. 54 maps.

Name of Spill:	Newport News Minor Mystery Spill
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	6/6/94
Location of Spill:	James River, Newport News, Virginia
Latitude:	36-°8 'N
Longitude:	076°25' W
Spilled Material:	waste oil
Spilled Material Type:	2
Amount:	2 barrels
Source of Spill:	unknown
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	vessel sampling
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent pads

Incident Summary:

On June 6, 1994, a mystery spill at the northern basin of the Newport News Small Boat Harbor was reported to MSO Hampton Roads. No obvious source or responsible party was found so USCG MSO Hampton Roads initiated cleanup activities.

Behavior of Oil:

The majority of the oil remained concentrated in the northern basin of the Newport News small boat harbor.

Countermeasures and Mitigation:

USCG contractor, Petrochem used sorbent booms and pads to remove most of the spilled material over the next two days. All contaminated sorbents were removed and the cleanup was completed on June 7.

Other Special Interest Issues:

Oil samples from over 20 vessels in the small boat harbor were taken by the MSO Hampton Roads staff in an attempt to identify the source of the spill. The samples gathered were sent to COIL. No positive "hits" occurred and the identity of the responsible party remains unknown.

NOAA Activities:

NOAA was notified of the incident on June 6, 1994, by MSO Hampton Roads. The SSC participated at the MSO with the Commonwealth of Virginia's DEQ in discussions of "how clean is clean" and potential sources of the spilled oil. Because of the limited information

about the oil, when it was released or how long it had been in the water, NOAA was unable to pinpoint a release location.

References:

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:	Custom House Minor Mystery Spill
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	6/16/94
Location of Spill:	Hampton, Virginia
Latitude:	37°02'N
Longitude:	076-°20.5'W
Spilled Material:	diesel
Spilled Material Type:	2
Amount:	unknown
Source of Spill:	unknown
Resources at Risk:	none
Dispersants:	No
Bioremediation:	No
In-situ Burning:	No
Other Special Interest:	previous spill
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent pads, high pressure, hot water

Incident Summary:

A minor diesel spill was reported in Customs House Marina, Hampton River, Hampton, Virginia on June 16, 1994. The spill might have been related to the recent collision of the F/V *Michigan* and the Customs House Pier; however, the pollution investigation could not prove that this vessel was the source.

Behavior of Oil:

Light winds and the incoming tide held the oil near the Customs House Pier.

Countermeasures and Mitigation:

The MSO Hampton Roads contractor used sorbents booms and pads to remove most of the spilled material. All contaminated sorbents and oiled debris were placed in eleven 55 - gallon drums and removed from the scene by June 17.

Other Special Interest Issues:

This area has been affected by previous spills in which the marina manager had demanded the use of pressure washing and steam-washing methods. The in-place working relationship among the SSC, marina manager, and the State OSC made it possible to repeat the coordination that had developed during a previous spill. This time the marina manager understood that it would not be necessary to use high pressure and hot water to remove the remaining oil stain from the marina structures.

NOAA Activities:

NOAA was notified of this incident on June 17, 1994, by MSO Hampton Roads and participated at the MSO in "how clean is clean" discussions.

References:

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:	Ocean City Minor Mystery Spill
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	6/17/94
Location of Spill:	White Marlin Marina, Ocean City, Maryland
Latitude:	unknown
Longitude:	unknown
Spilled Material:	diesel
Spilled Material Type:	2
Amount:	unknown
Source of Spill:	unknown
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent booms, sorbent pads

Incident Summary:

USCG Station Ocean City responded to a minor diesel spill near the Isle of Wight Bay. No obvious source or responsible party was found and MSO Baltimore initiated cleanup activities.

Behavior of Oil:

The majority of the oil, about 200 gallons, was concentrated in White Marlin Marina with a sheen extending one-half mile to the north. The weather was foggy with light, two- to three-knot winds, calm seas, and a temperature of 75°F.

Countermeasures and Mitigation:

USCG contractors using sorbent booms and pads removed most of the spilled material over the next several days. All contaminated sorbents were removed and the cleanup competed on June 23, 1994.

NOAA Activities:

NOAA was notified of this incident on June 18, 1994, by MSO Baltimore and participated by telephone with the State of Maryland DEQ in discussions on "how clean is clean." The SSC was asked to estimate how long it would take natural processes to remove the oil stains from this public marina. NOAA said that if the sheen from the light fuel oil was removed, the coating and staining on shore structures would naturally disperse and be removed from the marina structures soon, but no definite date could be stated.

References:

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 *Penny Marshall*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	6/21/94
Location of Spill:	Pantego Creek, Belhaven, North Carolina
Latitude:	34°30 'N
Longitude:	077°21' W
Spilled Material	diesel fuel
Spilled Material Type:	2
Amount:	6 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:	none
Keywords:	sorbent boom, sorbent pads

Incident Summary:

On June 21, 1994, the F/V *Penny Marshall*, a 58-foot wooden trawler, was at the dock in Belhaven, North Carolina when a 500-gallon tank onboard released approximately 150 gallons of diesel fuel into the harbor.

Countermeasures and Mitigation:

The owner of the *Penny Marshall* contracted with IMS to remove the spilled oil and help salvage the vessel. More than 1,100 gallons of #2 fuel oil and water were removed from the area.

NOAA Activities:

NOAA was notified of this incident on June 22, 1994, by MSO Wilmington and participated by telephone in a discussion of resources at risk and "how clean is clean." More aggressive cleanup options, i.e., cutting vegetation and pressure washing, were discussed and discarded; it was decided that sorbent pads and booms were sufficient for this response.

References:

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:	T/V *Kentucky*
NOAA SSC:	Ed Levine and Steven Meador
USCG District	5
Date of Spill:	07/19/94
Location of Spill:	Paulsboro, New Jersey
Latitude:	30°51'N
Longitude:	75°15'W
Spilled Material:	Arabian light crude
Spilled Material Type:	2
Amount:	300 barrels
Source of Spill:	tank vessel
Resources at Risk:	Mammals: mustelids, rodents, intertidal feeding areas Birds: waterfowl, shorebirds, wading birds, gulls, terns, raptors Fish: anadromous fish, estuarine fish, demersal fish Mollusks: mussels, clams Recreation: marinas, boat ramps, high-use recreational boating areas, state parks Management Areas: national parks, refuges, wildlife preserves, reserves Resource Extraction: power plant water intakes, industrial water intakes
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	Delaware River closure
Shoreline Types Impacted:	brackish marshes, consolidated seawalls, developed upland, freshwater flats, freshwater marshes, fringing wetlands, marshes, mixed sediment beaches, piers, riprap, sand/gravel beaches, sheltered marshes, sheltered seawalls, tidal mudflat, vegetated riverbank
Keywords:	containment boom, FLIR, remote sensing, skimmers sorbent boom, sorbent pompoms, vacuum trucks

Incident Summary:

About 1155 on July 18, 1994, the T/V *Kentucky* was reported trailing a 400- by 6-foot blackish sheen on the Delaware River while docked at the Mobil Paulsboro, New Jersey refinery. Weather was light haze, visibility about five miles, temperature 95°F, winds 12 knots from the south, and calm seas.

The vessel arrived at the dock with some bottom damage; apparently she hit a submerged object. An estimate of 40 to 50 gallons of oil was initially thought lost. The vessel was boomed and lightering of suspected tanks (#3 port cargo tank and #4 port ballast tank) began. A diver's inspection reported a 2- by 10-foot breech of the hull in #3 port cargo tank above the bilge knuckle, and 30 feet of the bilge keel missing. At 2135 on July 19 it was reported that oil had breached the containment boom and 200 to 300 barrels were in the water. It was believed that offloading the cargo in the damaged tank upset the water-bottom, allowing the oil to escape.

Mobil response team personnel boomed the vessel. The Delaware Bay and River Cooperative (DBRC) launched two skimmers and boomed several pre-identified creeks nearby. Marine Spill Response Corporation (MSRC) responded with its skimming vessel, *Delaware Responder*. Three additional contractors were hired for the cleanup and a field command post was established at the Mobil refinery.

The USCG COTP Philadelphia assumed the FOSC role for this incident. USCG personnel were on-scene to monitor cleanup activities. The OSC requested two FLIR overflights (one during the night of July 19; the other the next morning) to help identify the extent of oil migration in the river. The FLIR spotted the oil and helped track its progress.

This response lasted about five days.

Behavior of Oil:

The product released was a very light Arabian crude. It spread on the river's surface into streamers of dark oil surrounded by large areas of sheen ranging from gray to rainbow. Due to the lightness of the product, there was a great deal of evaporation.

The maximum extent of the slick was approximately 15 miles (10 miles downriver and 5 miles upriver). Below Little Tinicum Island the oil was mostly on the Pennsylvania/ Delaware side of the river; above Little Tinicum Island the oil tended toward the New Jersey side. Most of the oil remained in the central channel due to very light winds, thereby minimizing shoreline impacts.

An estimated 300 barrels were spilled. On-water skimming operations recovered about 1,000 gallons. A greater-than-60 percent evaporation (calculated) was expected within the first 48 hours.

Countermeasures and Mitigation:

The vessel was immediately entirely boomed at the facility pier. Vacuum trucks were used to recover product contained at the site. The vessel offloaded its cargo to the facility over a 30-hour period.

Precautionary protection of sensitive areas was accomplished by DBRC booming pre-designated creek mouths with pre-staged boom or boom brought to the site. This booming strategy kept the creeks oil-free.

Open-water recovery was performed by three large skimmers and oil was recovered from the shoreline by several vacuum trucks. Recovered product was sent to the refinery for processing.

Shoreline cleanup was not necessary because the oil evaporated very rapidly and very little oil reached shore

Other Special Interest Issues:

The Delaware River was closed to vessel movement between the Walt Whitman and Delaware Memorial bridges for several hours at the onset of the response. Shortly thereafter the area was open for movement within the response zone only (moving from one pier to another). The waterway was opened to transit through the area after the USCG inspected hulls to ensure no vessels were trailing sheen. The waterway was completely reopened 10 hours later; however, all vessels were required to maintain a no-wake speed so they would not interfere with response efforts or disrupt booms.

No birds were found oiled nor were there fish kills noted.

Media interest was high at first but dwindled after the third day.

The EPA was conducting an oil-spill bioremediation experiment several miles downriver from the affected area. OIl from the incident did not interfere with the ongoing research.

NOAA Activities:

NOAA was notified of this incident at 0500 on July 20, 1994, by MSO Philadelphia who requested the SSC to report on-scene. The SSC arrived in Philadelphia at 0700 and was briefed and trajectories and weather forecasts were discussed. The Assistant SSC arrived on-scene at approximately 1600. The SSCs participated in two overflights; one at 1000 with the Delaware State Police, the other at 1500 with the responsible party. Overflight maps were created and the evaporation rate of the product was estimated. The SSCs coordinated findings and facts with the Damage Assessment Center representative on-scene, and attended morning meetings to discuss cleanup actions. The SSCs agreed with the "no cleanup necessary" recommendations made by the states and the responsible party.

NOAA remained on-scene two days.

References:

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

NOAA Hotline #159, 12 Reports

Research Planning Institute. 1985. *Sensitivity of coastal environments and wildlife to spilled oil: Delaware, New Jersey, and Pennsylvania An atlas of coastal resources*. Seattle: Ocean Assessments Division, NOAA. 59 maps.

Name of Spill:	*USS Wasp*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	7/19/94
Location of Spill:	Onslow Bay, Shackleford Banks, North Carolina
Latitude:	34°38 'N
Longitude:	076°39 'W
Spilled Material:	JP-5
Spilled Material Type:	1
Amount:	50 barrels
Source of Spill:	U.S. Navy ship
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 19, 1994, MSO Wilmington received a report of a 200- to 2,000-gallon JP-5 discharge from the *USS Wasp* into Onslow Bay, Shackleford Banks, North Carolina. The sheen was one-quarter mile wide by one-half mile long. The discharge came from a well deck, but it had been stopped. The Commanding Officer of the *Wasp* took the vessel more than 50 miles offshore where the 1,000 gallons of oil and water remaining on deck were washed overboard.

Behavior of Oil:

The JP-5 spread quickly in the open waters of Onslow Bay and quickly evaporated and dissipated into the environment.

Countermeasures and Mitigation:

The *USS Wasp* deployed a small boat in an attempt to boom the discharge; however, the amount spilled and the spreading of the JP-5 made recovery in the open water impossible.

NOAA Activities:

NOAA was notified of this incident July 19, 1994, by MSO Wilmington and participated by telephone with the MSO staff in discussions of trajectory and the fate and effect of JP-5 in the open waters of Onslow Bay. NOAA suggested that the 15- to 20-knot on-scene winds, would keep the slick off onshore structures and that the oil would dissipate before the end of the day.

References:

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:	T/B *Jamaica Bay*
NOAA SSC:	Ed Levine
USCG District	5
Date of Spill:	07/27/94
Location of Spill:	Newark Bay, New Jersey
Latitude:	40°42'N
Longitude:	74°07 'W
Spilled Material:	#2 oil
Spilled Material Type:	2
Amount:	12 barrels
Source of Spill:	tank barge
Resources at Risk:	Birds : shorebirds, wading birds, gulls, terns, raptors, rookeries, foraging areas Fish: anadromous fish, spawning streams, estuarine fish, demersal fish Recreation: marinas, boat ramps Resource Extraction: power plant water intakes, industrial water intakes
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	brackish marshes, coastal structures, consolidated seawalls, developed upland, extensive intertidal marshes, mixed sediment beaches, piers, riprap, sheltered marshes, sheltered seawalls
Keywords:	containment boom, evaporation, sorbent boom, vacuum trucks

Incident Summary:

At 1945 on July 27, 1994, a sheen caused by overfilling tanks was detected around the tank barge *Jamaica Bay* while docked at the foot of Delancy Street in Port Newark, New Jersey. The temperature was in the mid-70s and the sea was calm. The responsible party hired cleanup contractors to vacuum the oil out of the containment boom and the USCG monitored the recovery operations.

The response lasted one day.

Behavior of Oil:

Harbor containment boom at the dock, pre-positioned for the oil transfer operation, contained the oil. Only a slight amount of sheen escaped into the waterway.

Areas impacted were in the immediate vicinity of the pier.

About 500 gallons were spilled; the amount recovered was not determined.

Countermeasures and Mitigation:

Due to pre-booming of transfer operations, most of the oil was contained at the dock.

NOAA Activities:

NOAA was notified of the incident on July 27, 1994, by telephone and asked for trajectory and resources at risk information. Since the spill was at the entrance to both the Passaic and Hackensack rivers, the Meadowlands Refuge and Shooters Island were at risk. The Passaic River was at higher risk for oiling than Newark Bay. Water intakes for two power plants in the area were also threatened. The SSC provided tide and current information. To help identify the extent of oil spread, the SSC suggested the use of a FLIR overflight, but the USCG was unable to procure a FLIR-equipped helicopter.

NOAA's support lasted for several hours.

Name of Spill:	Frisco Beach Minor Mystery Tarballs
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	7/30/94
Location of Spill:	Frisco, North Carolina
Latitude:	34°49′ N
Longitude:	075°38 'W
Spilled Material:	tarballs
Spilled Material Type:	4
Amount:	unknown
Source of Spill:	unknown
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	sand beach
Keywords:	FLIR

Incident Summary:

On July 30, 1994, tarballs were reported covering more than one and one-half miles of beach near Pier 49 in Frisco, North Carolina. USCG resources that responded to this report included Group Cape Hatteras, USCG Airstation Elizabeth City, and MSO Hampton Roads.

Behavior of Oil:

The tarballs, which ranged from specks to over six inches in diameter, may have come in with the morning tide; however, no one could confirm at what time or on which day the tarballs actually came ashore. The USCG Air Station used the FLIR system, without success, in an attempt to locate a potential source for the tarballs.

Countermeasures and Mitigation:

A local cleanup contractor used hand equipment to pick up and bag the scattered tarballs. Impact or claims for tourism losses were not reported during this one-day response.

NOAA Activities:

NOAA was notified of this incident on July 31, 1994, by MSO Hampton Roads and participated by telephone in the investigation for the source of the tarballs. The SSC did not go on-scene, but provided requested information (resources at risk, weather updates, and trajectories) by phone and facsimile. Because of limited information as to when the oil was released or how long it had been in the water, NOAA's estimate for the potential release location could not be explicit. However, the SSC did provide information about appropriate areas to include in the FLIR search pattern.

References:

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

Name of Spill:	Moon Engineering Minor Mystery Spill
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill	8/17/94
Location of Spill:	Elizabeth River, Portsmouth, Virginia
Latitude:	36°53′ N
Longitude:	76°0.5′ W
Spilled Material:	diesel fuel
Spilled Material Type:	2
Amount:	unknown
Source of Spill:	unknown
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent pads

Incident Summary:

A mystery spill in the Elizabeth River, the Port of Hampton Roads, was reported to MSO Hampton Roads August 17, 1994. The mystery slick was 100 feet by 40 feet near Moon Engineering, Portsmouth, Virginia.

Behavior of Oil:

The westerly wind at 30 knots and the incoming tide held the oil into a relatively small area along Moon Engineering's pier 2.

Countermeasures and Mitigation:

The MSO Hampton Roads contractor removed much of the material beside the pier area using sorbent pads. All contaminated sorbents and debris were removed and the cleanup was completed on the same day.

NOAA Activities:

NOAA was notified of the incident on August 19, 1994, by MSO Hampton Roads and participated at the MSO in discussions on "how clean is clean." Moon Engineering's location has been oiled previously by other spills in which NOAA and the USCG determined the number of pilings under this pier system to be cleaned. On this occasion, MSO Hampton Roads elected to have their contractor conduct a rather limited wipe-down of impacted pilings.

References:

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:	Pier #2 Minor Outfall Mystery Spill
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	8/17/94
Location of Spill:	Clinton Street, Baltimore, Maryland
Latitude:	39°16′ N
Longitude:	76°34′ W
Spilled Material	black oil
Spilled Material Type:	2
Amount:	unknown
Source of Spill:	sewer outfall
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent pads

Incident Summary:

On August 17, 1994, MSO Baltimore received a report of a black oil slick near pier #2 at South Clinton Street, Baltimore, Maryland. The USCG contractor boomed the slick before it could move out into the harbor. Later, a contractor successfully removed the oil from the containment area.

Behavior of Oil:

MSO Baltimore traced the sewer line back to Hale Intermodal Transport Company at South Clinton Street.

Countermeasures and Mitigation:

MSO Baltimore's contractor, Clean Harbors, deployed approximately 650 feet of containment boom around pier #2. This boom and the use of sorbent boom and pads by A&A Environmental Services, hired by Hale Intermodal later in the day, successfully removed most of the oil from the containment area around pier #2.

NOAA Activities:

NOAA was notified of this incident on August 17, 1994, by MSO Baltimore and participated in investigating the potential sources of this mystery spill. The SSC provided requested information (resources at risk, weather updates, and trajectories) by phone and facsimile. NOAA forecast that the oil, if it was not contained, would move into the harbor; but, because the amount released was small, the area of shoreside impact would be relatively small. Heavy rain, forecast to continue until August 18, could disrupt cleanup activities.

References:

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 Maryland.* Boulder, Colorado: Hazardous Materials Response Project, NOAA. 118 maps.

Name of Spill:	Pulaski Highway Abandoned Drums
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill :	8/23/94
Location of Spill:	Service Road, Pulaski Highway, Baltimore, Maryland
Latitude:	39°12′ N
Longitude:	076°35′ W
Spilled Material:	unknown oil (possibly) chemical in drums
Spilled Material Type:	unknown oil/chemical
Amount:	unknown
Source of Spill:	abandoned drums on service road
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	potential spill

Incident Summary:

On August 23, 1994, MSO Baltimore was notified that thirteen 55-gallon drums, possibly containing contaminated waste oil, and an old home-heating oil tank were taken from a flat-bed trailer and abandoned on a service road in the 3500 block of the Pulaski Highway. Several of the drums were labeled "miscellaneous oils." A storm drain 100 feet away from the site fed into a tributary to the Patapsco River. These on-scene observations by OSC representatives suggested that the drums posed an immediate threat to the environment and should be removed.

Behavior of Oil:

All the material was contained in the drums and tank.

Countermeasures and Mitigation:

Clean Harbors, a hazardous waste contractor, determined that the material in the drums was indeed waste oil. The drums were overpacked and removed from the scene before the end of the day. The 275-gallon home-heating oil tank was drained and filled with sorbent material.

NOAA Activities:

NOAA was notified of this incident on August 24, 1994, by MSO Baltimore and participated by telephone in discussions with the MSO staff on the procedures for handling and sampling 55-gallon drums with unknown contents. The SSC worked with the MSO staff to select an appropriate contractor who held a BOA with the USCG and could conduct the sampling, transporting, and disposing of the drums.

References:

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.

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

Name of Spill:	F-14 downed, Naval Air Station Oceana
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	8/26/94
Location of Spill:	Big Porpoise Bay, Pamlico River, North Carolina
Latitude:	35°5'N
Longitude:	076°29 'W
Spilled Material:	JP-5
Spilled Material Type:	1
Amount:	27 barrels
Source of Spill:	aircraft
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent pads

Incident Summary:

On August 26, 1994, MSO Wilmington received a report of a downed F-14 in Big Porpoise Bay, a tributary of the Pamlico River. At the time of the report the aircraft, with about 1,000 gallons of JP-5 onboard, was burning; however, the pilots had been rescued by a Navy helicopter.

Behavior of Oil:

A southerly 10- to 15-knot wind and predominant southerly current were expected to cause the JP-5 to quickly dissipate. Product from the plane crash was not expected to impact any shore structures.

Countermeasures and Mitigation:

MSO Wilmington's cleanup contractor was able to remove JP-5 from the area using sorbent pads and boom. The cleanup was considered complete on September 8, 1994, following the salvage of the crashed airframe.

NOAA Activities:

NOAA was notified of this incident on August 27, 1994, by MSO Wilmington and participated by telephone in discussions with the Navy on the requirement that a contractor be hired to remove the oily material as well as salvage the airframe. NOAA recommended coordinating with the Navy's Superintendent of Salvage as one method for users of the aircraft test range to include provisions for hiring a cleanup contractor as part of the planning requirements for using the test range.

References:

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:	Tug *Snapper*
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill :	9/6/94
Location of Spill:	Neuse River, New Bern, North Carolina
Latitude:	34°59′ N
Longitude:	075°50′ W
Spilled Material:	diesel
Spilled Material Type:	2
Amount:	unknown
Source of Spill:	tug
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent pads,

Incident Summary:

On September 6, 1994, MSO Wilmington received a report of a six-mile long oil sheen in the Neuse River near Scott's Creek, New Bern, North Carolina. By September 9 MSO Wilmington's investigators had determined that the 84-foot steel-hull tug *Snapper* that had grounded in Scott's Creek and rolled over, releasing the oil, was the source of this spill. The owners of the tug refused to take responsibility for the incident.

Behavior of Oil:

Following the initial release into the Neuse River, the *Snapper* was boomed and recovery activities centered on the removal of oil from within this containment.

Countermeasures and Mitigation:

MSO Wilmington's contractor was able to remove much of the material using sorbent pads and boom. By September 13 the concentration of oil inside the *Snapper* was still too heavy to remove the boom around the vessel. On September 23 air sparging was used inside the *Snapper* in an attempt to release substantial amounts of oil trapped in spaces onboard.

NOAA Activities:

NOAA was notified of this incident on September 8, 1994, by MSO Wilmington and participated with the MSO in "how clean is clean" discussions.

References:

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:	Dundalk Outfall Minor Mystery Spill
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill	9/16/94
Location of Spill:	Colgate Creek, Dundalk, Maryland
Latitude:	39°16′ N
Longitude:	076°32′ W
Spilled Material	waste oil
Spilled Material Type:	4
Amount:	1 barrel
Source of Spill:	unknown
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	sorbent boom, sorbent pads

Incident Summary:

On September 16, 1994, an oil slick from an unnamed outfall tributary leading to Colgate Creek, Dundalk, Maryland was reported to MSO Baltimore. The weather at the time of the report was 75°F, clear skies, and light winds.

Behavior of Oil:

The heaviest accumulation of oil was around the outfall with thinner streaks running down the unnamed creek.

Countermeasures and Mitigation:

MSO Baltimore's contractor removed most of the floating product using sorbent pads. The sorbent boom, used initially to contain as much product as possible, remained in place until September 21.

NOAA Activities:

NOAA was notified of this incident on September 16, 1994, by MSO Baltimore. The SSC participated by telephone in discussions of "how clean is clean" and the use of aggressive cleanup techniques such as vegetation cutting and steam cleaning. The use of these aggressive techniques was not necessary because natural processes removed most of the contamination. The response was completed on September 21, 1994.

References:

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:	Fulchers Point Pride Seafood
NOAA SSC:	Gary Ott
USCG District:	5
Date of Spill:	9/22/94
Location of Spill:	Oriental Harbor, Neuse River, North Carolina
Latitude:	35°01' N
Longitude:	076°43' W
Spilled Material:	#2 fuel oil
Spilled Material Type:	2
Amount:	26 barrels
Source of Spill:	facility
Resources at Risk:	habitat
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	effects on tourism, investigation to determine source
Shoreline Types Impacted:	fringing salt marsh, tidal mudflat
Keywords:	tourism losses

Incident Summary:

On September 22, 1994, USCG MSO Wilmington received a report of a mystery spill into Oriental Harbor, a tributary of the Neuse River in North Carolina. The initial slick was 40 by 50 yards and up to 1/8 inch thick. On-scene weather was light northwest winds at 5 knots and temperature 60°F. The source of the release was not readily apparent; however, persistent investigation by MSO Wilmington began to focus on the fuel tanks of Fulchers Point Pride Seafood. The owner/operator of this facility initially refused responsibility for the release.

Behavior of Oil:

The oil slick was contained within the immediate harbor area. Continued seepage from the bank was contained using sorbent boom.

Countermeasures and Mitigation:

The slick was contained and removed by contractors under the supervision of MSO Wilmington. The seepage of oil from the shoreline area of the fuel tanks and piping belonging to Fulchers Seafood continued until the contaminated soil around the piping was removed.

NOAA Activities:

NOAA was notified on September 23, 1994, by MSO Wilmington and requested to participate by telephone with the MSO staff in the investigation of potential sources and "how clean is clean." NOAA and MSO Wilmington developed sampling strategies and collected evidence. Discussions on "how clean is clean" were complicated when the owner of the facility contracted for and removed the contaminated soil from the piping areas. At this point, with no additional oil being released into the water, the North Carolina

Department of Environmental Management assumed responsibility for the removal and cleanup of the leaking underground storage tanks.

References:

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 pp.

U.S. COAST GUARD DISTRICT 7

Name of Spill:	Barge *Morris J. Berman*
NOAA SSC:	Bradford L. Benggio
USCG District:	7
Date of Spill:	01/07/94
Location of Spill:	San Juan, Puerto Rico
Latitude:	18°28.3' N
Longitude:	066°05.4' W
Spilled Material:	#6 fuel oil
Spilled Material Type:	4
Source of Spill:	barge
Resources at Risk:	Birds: diving birds, gulls, terns, wading birds, shorebirds, raptors, waterfowl; endangered or threatened species including royal terns, common terns, roseate terns, least terns, brown pelicans, magnificent frigate birds, Caribbean coots, Bahamas ducks, osprey, peregrine falcons; fish and shellfish; Marine mammals: endangered West Indian manatee; hawksbill, green, and leatherback sea turtles Recreation: tourist beaches and hotels, recreational fishing Resource Extraction: commercial fishing Cultural: archaeological and historical sites
Dispersants:	Y
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest(s):	chemical shoreline cleaning agents, Heritage Resource Team
Shoreline Type(s) Impacted:	Fine-, medium-, and coarse-grained sand beaches, gravel beaches, beaches made up of combinations of the various grain sizes; natural beachrock, riprap, and bulkhead shorelines; sensitive wetland and mangrove areas
Keywords:	endangered species, bioremediation, Corexit 9580, ground truth

Incident Summary:

On January 7, 1994, the barge *Morris J. Berman* went aground in the surf zone off Escambron Beach in San Juan, Puerto Rico. After its towing cable parted, the barge grounded on a hard bottom consisting of rocky substrate with scattered coral.

The barge had a capacity of three million gallons but was reportedly only half full. The cargo, a heavy #6 fuel oil, began spilling and impacted nearby shoreline and shallow intertidal habitats immediately. No estimated leakage rate was available. Due to strong northerly winds, the surf at the grounding site was quite strong, creating a hazardous situation as waves pounded the deck of the vessel.

The responsible party initially assumed responsibility for the spill, but very quickly expended the ten-million dollar limit of their insurance policy. Full Federal funding of the spill occurred at 0600 on January 14 and it became a USCG-directed response.

The USCG Gulf Strike Team (GST) was brought on-scene and immediately began lightering operations for the barge. Skimming and lightering operations were effective and removed an estimated 17,700 barrels of oil from the water and leaking barge. Shoreline cleanup and assessment began almost immediately. Little progress was made, however, due to continued leaking of fresh oil from the barge. Cleaned areas became re-oiled and areas not yet cleaned became more heavily impacted. Protection strategies were employed for areas at risk that were not yet oiled. Intensive shoreline cleanup was postponed for the most heavily impacted areas until the sources of re-oiling could be stopped. Two shallow lagoons near the grounding site were most heavily impacted. Oil, in the form of large mats, accumulated on the surface and on the bottom of the lagoons. This submerged oil posed a major cleanup problem during the response. It was eventually partially removed by divers, vacuum transfer units, and a dredge. Waste and oily water from dredging operations were collected and separated in a series of swimming pools arranged to decant and filter the effluent from the dredge before returning the filtered water to the sea.

On January 15, the barge was refloated, towed to a scuttling site 20 miles northeast of San Juan, and sunk. This operation was carefully reviewed by the FOSC, NAVSUPSALV, the GST, and NOAA. The RRT was consulted and on-scene trustee representatives were given an opportunity to discuss the operation and voice their concerns. These groups reached a consensus that sinking the barge was the best alternative because continued re-oiling of the nearshore environment from the unrecoverable oil left onboard was delaying cleanup and preventing resource recovery. Resource concerns offshore were minimal and it was believed that the amount of residual oil left on the barge when it sank would be small and have little impact. Shorelines at risk from any oil released during the scuttling operations were predicted to be on northwestern Puerto Rico, Mona Island, and Hispaniola.

Shoreline cleaning continued in earnest and was more successful with the barge removed. Surface and buried oil along sand beaches was removed following cleanup guidelines. Beachrock, riprap, and seawalls were cleaned with pressure washing and chemical cleaners as approved. Some areas were left to clean themselves naturally due to inaccessability, low levels of human use, or high wave energy. Cleanup guidelines for oiled historical structures were developed and approved by trustees through the Heritage Resource Team. These structures and resources were then cleaned according to those guidelines.

On February 3, oil impacts along northwestern Puerto Rico were reported. A convergence zone at the northwest corner of the island concentrated debris and oil still being released from the scuttled barge. Impacts were primarily along 12 miles of shoreline, from Isabella to Borinquen. This oil was buried as oily sand layers and submerged as oil and sand mats in the protected areas or crenulate bays. A separate command post was established on the west end of the island and assessments and cleanup operations began immediately. Crews removed the stranded oil quickly to

prevent additional burial. Cleanup efforts were intensified in this area to minimize risks to nesting sea turtles, whose arrival was imminent.

All necessary cleanup guidelines and inspection criteria were in place by mid-February. With the exception of nearshore reef fish and benthic organisms near the barge's grounding site, there were very few visible impacts to biological resources. Seagrasses were oiled near the grounding site. Very few birds were grossly oiled and no substantiated reports of spill related mortalities to reptiles or mammals were received. The impacted shoreline was divided into 18 shoreline segments or zones. Most of these zones were cleaned and inspected following the "how clean is clean" guidelines, and approved by the FOSC by April 4. All other zones were signed off by April 25, with the exception of zone 18, which was completed on May 27. Once approved as clean, each zone entered a monitoring and maintenance phase to address any additional oiling that might occur.

Behavior of Spilled Material:

This oil was a highly viscous #6 fuel oil in the Group 5 range with an American Petroleum Institute (API) gravity of 9.5. The specific gravity of this oil when spilled was lower than the surrounding waters so it floated. The majority of the spilled oil created a slick that moved predictably to the west with the longshore currents. Prevailing winds tended to push the oil shoreward, heavily impacting the shallow lagoons and beaches near the grounding site. Subsequent tides refloated some of the beached oil and it continued to "bounce" westward in the form of sheens and tarballs.

The oil offshore was tracked by a USCG side-looking airborne radar (SLAR)-equipped aircraft that worked closely and coordinated with NOAA's on-scene personnel. SLAR imagery was used with visual overflight data to better assess movement and concentration of the oil.

This oil had a high concentration of heavy aromatics and was acutely toxic to large numbers of territorial reef fish and benthic organisms near the grounding site. This was evident in the fish kills and high numbers of mollusk and echinoderm mortalities that occurred in the early days of the spill.

Beached oil tended to coat surfaces and then harden as it weathered. Oil burial occurred in some sand beach areas when work crews could not remove the oil before subsequent high tides.

Several factors are worth noting that may provide some insight as to why this oil accumulated as submerged tarmats, patches, clumps, or tarballs in shallow nearshore areas. The barge had been loaded shortly before sailing at a nearby refinery. The heavy residual Group 5 was mixed with another product(s) as it was loaded onto the barge. Reports indicate that this oil was initially so viscous that it would not flow until heated to 120°F, so it was loaded at a temperature of 180°F. If the raw residual oil and the cutterstock were incompatible they may have separated when discharged. If the raw residual had a specific gravity equal to or greater than the surrounding water, the possibility would exist for part of the spilled product to sink, particularly in nearshore areas where it might pick up sand. Examination of separate samples of the raw residual

oil and the cutterstock used for blending may have offered information on the compatibility of the mixture, its likelihood to separate into individual fractions as it cooled and entered the water, and potential for sinking or becoming neutrally buoyant.

That this oil was spilled nearshore in a high energy surf zone is an important factor. This oil was well mixed throughout the water column due to wave action. This mixing caused the oil to pick up sand and become heavier. Calculations show that as little as two percent sand by weight could have been enough to cause this oil to sink. Whether the oil manifested itself in large mats, patches, clumps, or tarballs is most likely related to the physical forces, wave type, wave intensity, and duration of exposure that it was subjected to.

Refloating of some of the submerged oil was observed daily. The oil would tend to rise from the bottom in small globules (like a lava lamp), break free, surface, and create a sheen. This phenomenon was most noticeable during the afternoons in shallow lagoons. There are three theories to explain the mechanism by which this occurred:

- Downward sand migration through the oil that allowed portions of the submerged oil to become lighter and refloat is one idea. This theory was tested and observed in a jar containing seawater and the source oil mixed with sand. The oil/sand mixture would, over time, separate and allow the oil to refloat.

- Another mechanism whereby submerged oil might refloat is related to solar heating. This theory would support observations in the shallow lagoons where oil would refloat more frequently during the afternoon with increased sun angle and higher temperatures. This mechanism would probably be applicable only in shallow-water areas where a slight temperature differential would be effective.

- Another theory is related to increased water column mixing, i.e., turbulence. This effect could occur due to wave-induced currents related to sea breeze effects and would be more pronounced in the afternoon.

A combination of all three may be valid for specific conditions.

During the barge scuttling operation there was an anticipated and predicted discharge of oil. A large initial release occurred at the grounding site as the barge was refloated. This discharge impacted the previously hit areas near the grounding site. As the barge was towed to the predetermined scuttle site, it left a sheen trail that impacted some new areas farther east. This was because the vessel's track was immediately in a northeast direction. Following the sinking of the barge, an estimated 200 barrels of oil was observed on the surface at the scuttling site. This oil slick moved predictably westward and began to break up into tarballs and patches. A near-constant sheen continued to be observed at the scuttle site over the next several months. This was consistently a thin silver sheen extending one-quarter to one-half mile to the west. It is thought that this sheen resulted from a small constant leak of residual oil and oil left clinging to the barge.

Within two weeks of the barge scuttling, shoreline impacts were reported on the northwest end of Puerto Rico. This impact zone had been pinpointed in a trajectory

forecast made before the vessel was scuttled. Two new impact zones were designated covering the shoreline from Punta Cerro Gordo to Surfers Beach south of Punta Borinquen. Submerged oil mats were discovered in several protected areas and crenulate bays along the northwest coast. This oil was more emulsified than the submerged oil near San Juan. It is thought that this oil floated from the scuttle site, converged in these protected areas, and mixed with enough sand to cause it to sink. Cleanup crews were able to remove most of the submerged oil using vacuum/suction devices and submersible dredges.

Countermeasures and Mitigation:

Early in the response, the Area Contingency Plan was consulted for guidance on resource protection priorities and protection strategies. Various sites where sensitive shoreline or other resources were at risk were visited and ground-truthed for appropriate condition-specific protection strategies. Several protection strategies were added or altered from the area plan to fit the specific conditions existing at the time of the spill. These strategies were then implemented where needed prior to oil impacts, thereby preventing oiling of the more critical and sensitive areas.

The grounded barge was not boomed because of the intensity of the surf. Crews worked in extremely hazardous conditions to lighter oil from the *Morris J. Berman* to another barge. As time progressed, the oil became more viscous and difficult to pump making lightering ineffective. However, lightering efforts continued until the barge was prepared for towing to the scuttle site.

Scuttling of the barge was chosen as a response countermeasure and mitigation action. As the barge continued to leak oil at the grounding site, shoreline cleanup and recovery processes were showing little progress. Shorelines and other natural and socioeconomic resources in the area continued to be re-oiled by these recurring discharges. The sensitivity of these areas was heightened because this oiling was affecting one of Puerto Rico's prime tourist locations. It was felt that once the source of oil was removed, shoreline cleanup and resource recovery would progress rapidly

A naval munitions dump site located approximately 20 miles northeast of San Juan, with a water depth of 6,000 feet, was selected as the scuttle site. An option to tow the barge farther into even deeper water was reviewed, but appeared to offer no additional benefit. Rather, it was felt that other islands to the west of Puerto Rico would be at greater risk for tarball impacts the farther away from Puerto Rico the barge was towed. Options considered before the barge was disposed of were: use of dispersants on the residual oil, use of solidifiers, and offshore detonation of the vessel. After review, testing, and consultation, these options offered no benefit. Although some new areas were oiled as a result of the scuttle operation, impacts in these areas had been predicted and preparations had been made to protect resources and conduct cleanup operations quickly.

Floating oil was collected effectively inshore where skimming systems were being used. Offshore oil was collected by the MSRC vessel *Caribbean Responder*. Due primarily to sea conditions, collection of offshore oil met with limited success. Nighttime skimming

was attempted by a FLIR-equipped helicopter giving directions, but this proved unsuccessful.

Manual cleanup methods were used on accessible shorelines. Shovels, rakes, and sifting screens were used to remove oil from the sand; conveyor-driven separators were used in some areas. Sand, rocks, and gravel were washed with a chemical treatment then replaced, land farmed, or disposed of. Some mechanical cleanup was conducted with tillers and small bulldozers. Care was always taken to conduct cleanup operations in a manner that would cause the least additional impact to the resources. In several areas, trees were wrapped with visqueen as a protective measure. Of special concern were turtle nesting areas, beach dunes, and identified pre-Columbian archaeological sites. Initial guidelines required that no heavy equipment or vehicles operate in areas of archaeological sites. It was felt that most of the oiled shoreline was in active transport zones where sand was cyclically eroded or deposited by tides and storms and that any unearthing of artifacts would be unlikely. Equipment-use guidelines were therefore modified.

Chemical shoreline cleaners, along with hot-water, high-pressure washing, were evaluated for use on shorelines that were designated as "high-public use" and for which quick and more thorough cleaning was desired, and for low-energy areas where natural and mechanical cleaning would not be sufficient to prevent the formation of hardened tarmats or pavement. After testing and evaluating, the Caribbean Regional Response Team (CRRT) approved limited use of Corexit 9580 with a two-tiered monitoring plan. Prior to initial chemical use, a monitoring plan was implemented whereby bivalves, sea urchins, and snails were transplanted to the treatment area and left to be exposed to whatever impacts might result from the approved chemical treatment. They were then observed and compared to controls for signs of negative effects. The second aspect of this monitoring plan consisted of simple observations and monitoring for gross adverse effects, such as high organism mortality during all subsequent use of the cleaner. Pertinent information was recorded for all applications. If adverse effects were observed, operations were to be re-evaluated by the FOSC with guidance from the NOAA SSC and trustees. The selection of Corexit 9580 was based on effectiveness, toxicity data, and observed results during testing.

Many oil spill response agent vendors arrived on-site in attempts to demonstrate their product, or sent materials to the command post. NOAA helped the FOSC categorize and evaluate products for potential use should a specific cleanup need arise that called for their use.

The oiling of several historical resources and the potential for further damage from cleanup efforts led to the formation of the Heritage Resource Team. This team, with representation from Federal and commonwealth trustees, the USCG, and NOAA, worked together to evaluate and make recommendations to the FOSC for all response actions that might further impact historical structures, archaeological sites, or cultural resources.

Exacting measures were implemented to clean and protect oiled historical sites, including Fort San Geronimo, several historic walls, the Tajamar Ruins, and the Escambron Battery. As a protective measure, walls, subject to damage from responders,

were wrapped and taped. The Heritage Resource Team, consisting of representatives from the Institute of Puerto Rican Culture; the State Historic Preservation Office; the Department of the Interior (DOI), National Park Service; the FOSC; and NOAA, carefully evaluated cleanup methods ranging from dabbing or wiping masonry with oil-absorbent snares to high-pressure, hot-water washing and chemical treatments. The least intrusive and adequately effective method of cleaning was agreed upon and then implemented under close supervision and monitoring.

Recovery of submerged oil proved to be difficult and costly. An innovative decanting and filtering system using a series of three full-size swimming pools was used to separate oil, water, and sediment obtained from dredging operations in the two shallow lagoons near the grounding site. Diver-directed vacuum techniques and manual removal were conducted in other areas.

Other Special Interest Issues:

Chemical shoreline cleaning agents were reviewed, selected, and tested. The CRRT granted approval for limited use of Corexit 9580 in areas where natural or non-chemical cleaning methods where judged to be ineffective or too slow. The basis for selection of Corexit 9580 was related to its effectiveness and low toxicity.

One of the issues of special interest was the occurrence of other "mystery spills" impacting shorelines of St. Thomas, St. Johns, St. Croix, Culebra, Vieques, and the east and northeast coasts of Puerto Rico. Reports of these impacts began on January 21 and continued sporadically for about a month. Laboratory analyses showed that these impacts were not oil from the *Morris J. Berman;* nonetheless, assessments and cleanup operations had to be addressed for these areas. Local resources were used when available. Additional work crews were sent from San Juan to assist. It is assumed that these oilings occurred as a result of multiple illegal bilge washings or unreported oil discharges.

Resources at risk included shoreline habitat, the majority of which were sand or mixed sand and gravel beaches, and some rocky points and headlands. Additionally, some wetlands, mangroves, and small inlets had potential for impacts.

Biological resources at risk included several species of diving birds, gulls and terns, wading birds, shorebirds, raptors, and waterfowl. Of special concern were endangered or threatened species, including royal terns, common terns, roseate terns, least terns, brown pelicans, magnificent frigate birds, Caribbean coots, Bahamas ducks, osprey, and peregrine falcons.

Numerous species of fish and shellfish were at risk, primarily in the areas of heaviest oil concentration.

The endangered West Indian manatee, common throughout the spill area, was at risk from ingesting either floating oil or oiled vegetation.

The hawksbill, green, and leatherback sea turtles are common to the spill area and were at risk from ingesting floating oil. Additionally, oiled turtle nesting beaches were of

concern due to the toxic or thermal effects of oiled sand on the sensitive turtle eggs and hatchlings.

Socioeconomic resources at risk included major tourist beaches and hotels with associated activities such as boating, jet-skiing, casino gambling, shopping and sight seeing, commercial and recreational fishing, docks and marinas including the port facilities used extensively by the cruise ship industry. Numerous archaeological, historical, and cultural resources along the coast were at risk from oiling and cleanup efforts. Also, a major power plant intake located west of Balo Secoin was in the risk area.

Fish tainting was another issue addressed. Although there was never any evidence or reports of fish tainting, local fishermen claimed that their fish were not selling due to public concern that the fish might be tainted. Meetings were held to discuss this issue with the Commonwealth Department of Health, the U.S. Food and Drug Administration, the Department of Agriculture, Sea Grant, NOAA, and the USCG. It was debated whether precise laboratory analysis of fish tissue and bile was necessary, or whether simple organoleptic methods of inspection would suffice to determine an actual tainting problem. Also, the problem of how to report the findings to the public was discussed. These decisions were left to local health officials.

NOAA Activities:

NOAA was notified of the incident on January 7, 1994, by the USCG MSO San Juan who requested on-scene support. NOAA provided the FOSC with on-scene scientific support from January 7 through February 25, 1994. This support was provided in the form of a scientific team managed by the SSC.

Efforts were directed toward the actual and modeled movement and fate of the oil and protective and mitigating countermeasures with respect to shorelines, sensitive areas, and other valuable resources. Efforts were coordinated, usually in the form of working teams, to include representation and collaboration from local and Federal trustees as well as other members of the scientific community.

NOAA's major activities were: overflights and trajectory information; weather, tides, and currents; shoreline assessments; shoreline cleanup guidelines; "how clean is clean" guidelines and inspection processes; biological resource assessments; chemical shoreline cleaner tests and evaluations; environmental impact concerns related to barge scuttling; heritage resource concerns; product evaluations and reviews; and management of information and data related to these issues.

References:

Hall, Christopher J. 1994. Information Management Report, Barge *Morris J. Berman* Spill, San Juan, Puerto Rico, January 7, 1994. Two Volumes. March 28, 1994. Seattle: Genwest Systems for Hazardous Materials Response and Assessment Division, NOAA.

NOAA Hotline #144, 98 Reports

Name of Spill:	R/V *Columbus Iselin*
NOAA SSC:	Bradford L. Benggio
USCG District:	7
Date of Spill:	08/11/94
Location of Spill:	Looe Key, Florida Keys National Marine Sanctuary
Latitude:	24°32.7'N
Longitude:	081°24.5'W
Spilled Material:	diesel
Spilled Material Type:	2
Source of Spill:	research vessel
Resources at Risk:	Birds: shorebirds, wading and diving birds, nesting habitats Marine Mammals: West Indian manatee Terrestrial Mammals: key deer Reptiles: American crocodile Habitat: shallow water seagrass beds, corals Recreation: recreation areas, diving, swimming, boating, fishing, tourism resources Management Areas: wildlife refuges, Florida Keys National Marine Sanctuary
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest(s):	none
Shoreline Type(s) Impacted:	none
Keywords:	none

Incident Summary:

At 0040 on August 11, 1994, the USCG was notified that the University of Miami's 170-foot research vessel, the *Columbus Iselin*, had run aground on coral in the Looe Key National Marine Sanctuary. At 0530 MSO personnel on-scene reported a small amount of fuel leaking from the vessel. Observers on an 0845 overflight reported that the vessel was aground and a light sheen extended approximately one-half mile west of the grounding site.

An attempt to pull the vessel from the reef at 1300 was unsuccessful. It was thought that the ship's hull might be penetrated by a coral pinnacle. By late afternoon the FOSC, responsible party, contractors, and resource trustees from the marine sanctuary and the State of Florida convened at the command post and began planning salvage and response operations. Due to the uncertain condition of the vessel, it was decided to delay any attempts to refloat the ship until the following day, when response equipment would be on-scene. The vessel was boomed, anchored, and ballasted to remain firmly aground overnight. She was tended by a tug contracted by the responsible party and NOAA marine sanctuary boats. Contingencies for anchoring in a preferred location away from sensitive resources were developed in case of inadvertent refloating during the night. Fuel from damaged tanks was transferred into intact tanks to prevent any additional leakage.

By late morning on August 12, all response equipment was on-scene, with responders preparing to attempt refloating during the afternoon high tide. The vessel was successfully refloated at 1230, inspected by salvors and divers, and released by the FOSC to transit under power to Key West for temporary repairs. No further fuel leaks were observed during the refloating or inspections. The vessel was escorted by a tug and three vessels carrying pollution response equipment and completed the transit uneventfully at approximately 2100 that evening. No resource impacts were reported as a result of marine pollution from this incident. Assessments of the physically impacted coral reef from the grounding are ongoing.

Behavior of Spilled Material:

The sheens observed early in this incident behaved predictably, moving with currents and prevailing winds to the west and dissipating within about one-half mile of the source. It is estimated that no more than 200 gallons of oil were lost. It is suspected that most of the sheen was a result of pumping compartments that had been flooded with seawater and some residual fuel.

Countermeasures and Mitigation:

No pollution impacts were reported from this incident. Protective measures included booming the vessel and pre-staging response equipment if there were further discharges during the refloating operations.

Other Special Interest Issues:

This incident occurred within the boundaries of the Florida Keys National Marine Sanctuary, one of the most critically sensitive environments in Florida. Media interest was high during the incident.

NOAA Activities:

NOAA was notified of this incident on August 11, 1994, and asked to provide a worst-case trajectory and a resources-at-risk report. The SSC was asked to report to the command post established in Marathon, Florida.

The SSC indicated that the primary concerns were the potential for:

- ❒ physical damage to the reef structure as the result of grounding and subsequent salvage operations; and

- ❒ a larger spill or loss of the vessel on the shallow reef depending on the structural integrity and seaworthiness of the ship.

The SSC provided a trajectory analysis, resource at risk report, tides and weather information, and helped develop appropriate protection and contingency strategies. The SSC provided the FOSC with on-scene scientific support for the duration of the response.

References:

NOAA Hotline #161, 9 Reports

USCG POLREPS for FPN incident 07-4074, NOAA

Name of Spill:	*Little Wendy D*
NOAA SSC:	Bradford Benggio
USCG District:	7
Date of Spill:	3/9/94
Location of Spill:	Bush Key, Dry Tortugas National Park, Florida
Latitude:	24°37.5′ N
Longitude:	082°52.0′ W
Spilled Material:	diesel fuel
Spilled Material Type:	2
Amount:	1,404 gallons
Source of Spill:	non-tank vessel
Resources at Risk:	Birds: brown pelicans, sooty terns, brown noddys Habitat: seagrass beds, coarse-grained sand beaches mangroves, exposed seawalls, seagrass beds Shellfish: shrimp, lobster, stone crab, conch Fish: territorial reef species
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	salvage options

Incident Summary:

During adverse weather on March 3, 1994, the 60-foot wooden shrimping boat, *Little Wendy D*, was intentionally grounded in the Dry Tortugas National Park on a sand bottom in six feet of water. The National Park Service deployed sorbent boom around the vessel.

It at first appeared that the vessel's owner was going to make repairs and move his vessel; however, on March 9 the Park Service reported that the owner had stripped the vessel of valuables and electronic equipment and abandoned it.

On March 11 1,404 gallons of diesel fuel were offloaded from the vessel leaving only light residue in bilge spaces. The fuel tanks were completely emptied and filled with seawater. All sheen was contained and recovered by the sorbent boom. On March 12 the FOSC representatives departed.

Behavior of Spilled Material:

By March 15 it appeared that proper precautions had been taken concerning booming. The only remaining pollution threat was the residual fuel in the bilge, residual fuel in lines and hoses (estimated to be no more than two gallons), some lubricating oil on deck machinery, two propane tanks, some containers of roofing cement, and general loose debris on deck and in the cabin. The ADIOS model indicated little threat to the resources at hand.

Countermeasures and Mitigation:

Several teleconference calls were held with the USCG and DOI trustees to discuss salvage options for the vessel. The USCG agreed to totally remove any pollution threat but advised DOI that they could not, under the authority of the National Contingency Plan (NCP), use the Oil Pollution Fund to conduct salvage operations for a vessel that presented no pollution threat.

A salvage vessel from Ft. Lauderdale was expected on March 15, but was delayed en route. The NOAA SSC drafted a site safety plan that was approved by the FOSC representative and used by on-scene response personnel until the salvage vessel arrived.

The salvage vessel arrived on the night of March 16 and began operations the next morning. All loose items were removed from the vessel and additional boom was deployed. Machinery on deck was removed and the engine and surrounding bulkheads and deck were pressure-washed to remove any oil or oily residue. Some minor sheen was present during the cleaning and was contained and collected in the sorbent boom. The vessel was determined totally cleaned and free from oil pollution threat on March 19 and certified by on-scene DOI representatives. The vessel was left for final salvage disposition to be conducted by DOI.

NOAA Activities:

NOAA was notified of the incident on March 9, 1994, by the USCG. On March 15, the SSC and representatives of the FOSC went on-scene to assess the situation and remove any pollution threat from the vessel. They surveyed the vessel, noting hull damage on the bow where planking was separating. Concerns for the vessel's structural integrity and its stability were expressed because a port list was increasing noticeably.

NOAA met with a bird expert from the National Everglades Park on-scene to discuss protection strategies and other special concerns for the nesting birds nearby. This expert told the SSC that, because the birds of concern do not feed or bathe in the waters next to the grounded vessel, and due to the amount of fuel remaining onboard was small, there was no need to be concerned for the birds' safety. The NOAA SSC mapped the area where these birds were congregating and presented additional booming protection strategies to the FOSC representative.

References:

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

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U.S. COAST GUARD DISTRICT 8

Name of Spill:	Ethlyene dichloride
NOAA SSC:	Ilene Byron
USCG District:	8
Date of Spill:	03/31/94
Location of Spill:	Calcasieu River, Lake Charles, Louisiana
Latitude:	30°13.9′ N
Longitude:	93°5.4′ W
Spilled Material:	ethlyene dichloride (EDC)
Spilled Material Type:	5
Amount:	1,500 barrels
Source of Spill:	pipeline
Resources at Risk:	fish
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	acute or chronic problem
Shoreline Types Impacted:	none
Keywords:	none

Incident Summary:

On March 31, 1994, a barge was unloading ethlyene dichloride (EDC) at the Conoco Refinery on the Calcasieu River when a strong chemical smell was noticed. Investigation led to the discovery of a transfer pipeline failure and EDC on the ground and under a layer of water in an adjacent ditch. The ditch outflow to the Calcasieu River was blocked and recovery operations began. By May 31, approximately 630,000 pounds (1,500 barrels) of EDC had been recovered from the ditch. Conoco's contractor collected a sediment sample from the Calcasieu River. Analysis of this sample revealed a concentration of 11,800 parts per million of EDC prompting a new sampling plan for the river. On June 7, the U.S. Environmental Protection Agency (EPA) assumed the role of Federal On-Scene Coordinator (FOSC), a representative from the state was designated On-Scene Coordinator (OSC), and NOAA and the Gulf Strike Team (GST) were released from the scene. When NOAA left the scene, a river sampling program was underway using core sampling in deep areas and grab samples in shallower areas to collect sediments on the river bottom and determine the extent of contamination.

Behavior of Spilled Material:

EDC is heavier then water and has a low solubility. It was unclear if the EDC had filtered through sediment into the groundwater. Additional tests will be performed to cover the extent of the spill on land and to determine the source of the contamination seen in the river.

Countermeasures and Mitigation:

The U.S. Coast Guard (USCG) became involved when the contamination was seen in the river on May 31. Before then the responsible party had filled approximately 300, twenty-cubic yard containers of contaminated soil from the ditch. The responsible party had also pumped the contaminated liquid from the ditch to an on-site holding tank.

Other Special Interests:

It is unclear if this spill was an acute or chronic problem. The EDC is transferred to Vista Laboratory and sent straight into production. Vista Laboratory said no mass balances could be done to see the extent of the spill. From the sampling done in the river it was found to be a localized problem.

NOAA Activities:

NOAA was notified of this incident on June 3, 1994. The SSC was on-scene June 3 though 10. NOAA prepared a report describing the physical and chemical properties of EDC; its reactions with air, fresh water, and salt water; the environmental consequences of an EDC spill in a shallow coastal marine setting at low- and mid-latitude locations; the environmental consequences of an EDC spill in a deep offshore marine setting in a low- or mid-latitude area; the ultimate fate of EDC in mid- and low-latitude marine environments; and an EDC spill recovery plan to include post-spill monitoring. The report was distributed on-scene. NOAA's team on-scene also helped the RP develop a river sampling plan to determine the extent of contamination in the river.

The SSC worked with the Water Quality, Ground Water, and Hazardous Materials divisions of Louisiana's Department of Environmental Quality.

References

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Name of Spill:	Freighter *Forum Chemist*
NOAA SSC:	Ilene Byron
USCG District:	8
Date of Spill:	07/01/94
Location of Spill:	Gulf of Mexico, 35 miles south-southeast of SW Pass, Mississippi
Latitude:	28°22′ N
Longitude:	89°09′ W
Spilled Material:	potential for 85 tons of fuel oil potential for 250 tons of heavy oil potential for 25,000 liters of lube oil
Spilled Material Type:	1, 2, 4
Amount:	none
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:	potential spill

Incident Summary:

On July 1, 1994, the 659-foot freighter *Forum Chemist* reported an engine room fire, which could have been started when a broken fuel line to the diesel generator sprayed fuel on the hot exhaust manifold.

Tropical Storm Alberto in the Gulf of Mexico with a potential for 50-knot east winds onsite was of initial concern. By July 2, the storm had moved from the original forecast and 25-knot north winds were being forecasted.

The fire on the *Forum Chemist* was extinguished the evening of July 3, 1994. On July 4, the ship was surveyed by a marine chemist and approved for transit by tow. No pollution was sighted from the ship.

NOAA Activities:

NOAA was notified of this incident on July 2, 1994, by MSO New Orleans. The SSC reported to the Operations Center at the Federal Building in New Orleans. Weather forecasts were requested and given. Tropical Storm Alberto's path was plotted at the Operations Center and contingency plans were being developed to sink the ship if it threatened nearby oil rigs. The SSC reported on how the oil would behave if the ship was sunk. Because of rough sea conditions, protective booming could not be deployed.

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. Tides computer program (prototype). Seattle: Hazardous Materials Response and Assessment Division, NOAA.

NOAA Hotline #158, 8 Reports

U.S. COAST GUARD DISTRICT 11

Name of Spill:	McGrath Lake
NOAA SSC:	Jim Morris
USCG District:	11
Date of Spill:	12/25/93
Location of Spill:	McGrath Lake, Ventura, California
Latitude:	34°13.2' N
Longitude:	119°15.2 W
Spilled Material:	crude oil (API 16-17)
Spilled Material Type:	4
Amount:	1,800-2,000 barrels
Source of Spill:	pipeline
Resources at Risk:	Habitats: rare Southern Californian freshwater dune lake environment Birds: coots, ruddy ducks, northern shovelers, gulls, teals, western grebes, sandpipers, snowy plovers Recreation: beaches, state parks
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	use of an AQUAMOG, a machine designed to cut vegetation in shallow water environments
Shoreline Types Impacted:	exposed medium-coarse sand beaches, fringing wetlands, vegetated riverbank
Keywords:	containment boom, International Bird Rescue Research Center, propane cannons, shallow water recovery, siphon dams, skimmers, sorbent boom, sorbent pompoms, tule, vacuum trucks, vegetation cutting, volunteers, weed cutters, weir/pump skimmer

Incident Summary:

On the morning of December 25, 1993, a failure of a pipeline belonging to Berry Petroleum was reported. The failure occurred below the ground near a pipe junction on the east side of Harbor Boulevard just south of Ventura, California. Approximately 2,000 barrels of a heavy crude produced from a local field percolated through the ground to the west and underneath the road. The oil surfaced 50 yards west of Harbor Boulevard and entered a creek, traveled along this creek approximately 150 yards to the south where it entered McGrath Lake.

McGrath is a freshwater lake (approximately 800 by 100 yards) situated among medium-coarse grained sand dunes and located 100 to 200 yards inshore of the intertidal zone. The lake serves as a drainage basin for the surrounding agricultural fields and has no natural communication with the ocean. To control the lake level, water is routinely pumped out of the lake and into the Pacific Ocean through a pipeline running through the dunes and onto the beach. When the oil entered the lake, the pump was on and oil was discharged onto the sand beach and into the nearshore environment. Less than 100 barrels of oil entered the ocean; the majority was contained in the lake, the creek, or was saturated in the sediment.

The mouth of the Santa Clara River was bermed to prevent oil from entering the estuary. To control the amount of water flowing through the spill site, water was diverted from the creek to the Santa Clara River via pumps. Underflow dams and filter fences with sorbent pompoms were installed along the creek. The vegetated shoreline of the creek and the lake, consisting mostly of tules, was heavily coated with oil. Because all pumping operations had ceased, the water level in the lake was rising and began covering over already-impacted shoreline, affecting more habitat as it rose. After consulting with the Regional Water Quality Control Board (RWQCB), pumping the lake into the ocean began again and the water level was lowered to where it had been before the spill.

Behavior of Spilled Material:

For the first two days of the spill, oil entered the ocean as mostly sheen and scattered patches of oil. Offshore recovery operations were limited to a few days of attempted recovery of sheens and tarballs.

Approximately 12 miles of beach (from Ventura to Ormond Beach) were impacted with scattered tarballs that were transported by the long shore currents to the south, except for the first few days of the spill when there appeared to be a northerly current. The tarballs ranged from one to four centimeters in diameter and were most often associated with high-tide swashes. The tarballs often had thin protrusions, or legs, once they were stranded on the beach. These formations were given the colloquial title of "spiders." Cleanup crews were dispatched to nine designated beach segments to remove the tarballs. Most of the crews were given lawn rollers covered with plastic sheeting. This method proved effective in picking up cohesive tarballs associated with high-tide swashes. Shoreline cleanup crews spent three weeks cleaning tarballs from the sand beaches.

Countermeasures and Mitigation:

Oiled vegetation along the shore of the lake was removed manually by crews working in small work skiffs. Oil entered a creek densely populated with tules. The tules were cut above the root structure and removed by a unique piece of machinery known as the AQUAMOG. This equipment was specifically designed to cut and remove vegetation in shallow-water areas. The AQUAMOG is equipped with wheels that can be moved to the side allowing it to float. It was brought on-scene to cut and remove vegetation in the dense-growth areas of the creek where access by boats and work crews was difficult.

The free-floating oil in McGrath Lake was boomed and gathered for skimming. The movement of the oil on the lake was controlled by the direction of the wind and moved throughout the containment area during the day.

The local harbors were boomed initially after the oil was released into the ocean but were opened as the threat of oiling became less likely. The mouth of the Santa Clara River remained bermed for two weeks, but was then opened to allow the estuary to drain. Water had been accumulating and causing the estuary to swell beyond its normal size and was impacting the campgrounds at an adjacent state park.

Other Special Interest Issues:

The beaches impacted by the oil were closed to allow work crews to operate. These beaches are used by the local communities for general recreation and were reopened once the segments were deemed clean.

Approximately 140 assorted shorebirds and waterfowl were killed as a result of the spill; about 50 were rehabilitated and released. Wildlife collection, rehabilitation, and release were conducted by the California Department of Fish and Game (CF&G), USFWS, and International Bird Rescue Research Center. Propane cannons were used throughout the response (mainly at night) to haze birds attempting to land on McGrath Lake to protect them from further impacts .

This section of coastline is nesting habitat for the snowy plover (endangered) during the spring and summer months. Representatives from the USFWS conducted surveys to ensure none had begun to nest early.

NOAA Activities:

NOAA was notified on December 26, 1993, by the USCG MSD in Santa Barbara, California who requested the SSC to report on-scene.

The SSC arrived on-scene December 27 and participated daily in formulating the Action Plan, helped USFWS representatives voice their concerns to the FOSC, and contacted the National Marine Fisheries Service (NMFS) to discuss habitat issues pertinent to the spill (there were no impacts to marine mammals).

NOAA provided tidal information and situation update maps showing the nine beach segments and their status and produced a base map of McGrath Lake that was used by responders to develop strategies and disseminate information.

Throughout the response, NOAA provided daily weather forecasts and long-range forecasts to the FOSC. Long-range forecasts were critical to the responders owing to the concern over the lake level and the impact that increased runoff would have on operations.

NOAA remained on-scene until January 9, 1994.

References:

NOAA Hotline #143, 28 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. Tides computer program (prototype). Seattle: Hazardous Materials Response and Assessment Division, NOAA.

Research Planning Institute. 1980. *Sensitivity of coastal environments to spilled oil: Southern California.* Boulder: Hazardous Materials Response Project. 52 maps.

Name of Spill:	Santa Clara River Pipeline
NOAA SSC:	Jim Morris
USCG District:	11
Date of Spill:	01/17/94
Location of Spill:	Santa Clarita, California
Latitude: 3	4°25.5' N
Longitude:	118°5.1' W
Spilled Material:	San Joaquin Valley Crude - Blended (API 27)
Spilled Material Type:	3
Amount:	3,500 barrels
Source of Spill:	pipeline
Resources at Risk:	Habitats: vegetated riverine system, floodplain Fish: unarmored threespine stickleback (endangered) Management Areas: wildlife preserves, reserves
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	earthquake-caused spill
Shoreline Types Impacted:	vegetated riverbank
Keywords:	containment boom, drum skimmers, endangered species, filter fences, International Bird Rescue Research Center, shallow-water recovery, skimmers, sorbent boom, sorbent pompoms, vacuum trucks, vegetation cutting, watercress, weed cutters

Incident Summary:

The Northridge Earthquake of January 17, 1994, caused the rupture of a crude oil pipeline owned by ARCO/Four Corners near the city of Santa Clarita, California (approximately 35 miles north of Los Angeles). Approximately 3,500 barrels of San Joaquin Valley Crude exited the pipeline and traveled through a culvert to a drainage ditch and then into the Santa Clara River. The oil traveled downstream (west) roughly 15 miles to a point where the river runs underground. The impact site was located 35 miles inland of the Pacific Ocean in the U.S. EPA's zone.

The river vegetation was heavily impacted by the oil and large quantities of oil were entrapped in the expansive watercress beds. Cleanup crews were dispatched to cut thousands of square yards of vegetation to free up this oil. The freed oil, along with the cut vegetation, floated downstream to collection points. So much vegetation was cut that it overwhelmed the collection points and floated downstream to the terminus. At the river's terminus, two huge underflow dams were constructed using heavy machinery to protect against an increase in river flow should the area experience a significant amount of rainfall.

Questions were raised by the FOSC about the integrity of the dams that controlled the water flow and two sewage treatment plants that discharged their effluent into the Santa Clara River. The SSC contacted the emergency office of the Federal Emergency Management Agency (FEMA) that had been set up in response to the earthquake. FEMA was able to confirm that all the dams were sound and that they were still in the "catchment" mode and would not be discharging water into the river. The sewage treatment plants were

apparently operating in good order and were not discharging any hazardous effluent into the river.

The weather during the initial phases of the response was mostly fair and mild. However, with cleanup crews working on mud roads in the river valley, long-range forecasts were crucial for planning purposes. (In 1991 a similar spill occurred in this same location under very much the same conditions and a three-inch rainfall flooded the river, wiped out several containment berms, and ended operations.) On January 25 work was halted due to a half-inch of rain that fell in the area. The first dam at the terminus was breached in three places but heavy machinery was brought in to shore it up. Unpaved roads in the river valley became impassable because of the mud.

The main wildlife concern of the USFWS was the potential destruction of habitat for the endangered unarmored threespine stickleback. Survey teams from California's Department of Fish and Game and the USFWS designated stickleback-population areas along the river that were to be avoided during cleanup operations. These areas were also boomed off to prevent further impact.

A wildlife reserve was located less than ten miles downstream from the dams at the terminus and contingency plans were drafted to protect it.

Behavior of Spilled Material:

San Joaquin Valley Crude oil has an API of 27. When the oil entered the river it flowed downstream and left a sticky wet coating on everything that it touched. Trees, shoreline, watercress, other vegetation, and rocks all remained coated with a bathtub-like ring throughout the response.

The oil pooled in calm areas of the river, most notably the areas in and around watercress patches. Not only would the oil impact the vegetation but it would pool in large quantities among the roots. Initially it was thought that cutting the vegetation in the river should be kept to a minimum owing to the obtrusive nature of such an operation. However, when it was discovered that large quantities of oil could be freed up for collection if the watercress was cut, a massive manual cutting and removal project ensued. Once the vegetation was cut it acted very much like an absorbent pompom so that by the time it reached a collection site downstream it was totally saturated with oil.

Countermeasures and Mitigation:

Several different techniques were tried during this response to contain and collect the oil as it moved down the river. Some were effective, some met with limited success.

One technique involved setting up filter fences at a few locations along the river. By the time fences were installed in the upper reaches, however, most of the recoverable oil had already traveled beyond those collection points, thereby making them rather ineffective. Filter fences in the lower reaches, on the other hand, became so overwhelmed by the amount of debris and oil that resulted from the vegetation cutting project that they became difficult to keep unfouled and effective.

Diversionary booming coupled with drum skimmers and vacuum trucks were located at two points in the lower reaches. Early in the response, when there was less debris in the river and the stream flow was lower, this technique was quite effective.

The river's velocity and the shallow water depth made booming difficult. The river's depth in many sections was a foot or less. Six-inch harbor boom was used exclusively; if the boom touched the bottom, scouring occurred. Scouring allowed oil and oily debris to entrain. Decreasing the angle of the boom across the river was attempted several times and was only marginally successful in reducing the problem of scouring and entrainment.

Two underflow, earthen dams were located at the river's terminus across the flood plain in anticipation of an increased river flow should there be significant rainfall. These dams were approximately 5 meters (m) high by 8 m wide by 1,000 m long. To prevent the river from wandering out of the channel and across its floodplain (thereby impacting vast amounts of new vegetation) heavy machinery was used to "channelize" the river. Large earthen berms were constructed along the shoreline of the lowest reach of the river, forcing the flow of the river towards the terminus. Containment boom, vacuum trucks, and drum skimmers were located at the terminus to collect any free-floating oil.

Other Special Interest Issues:

The USFWS was concerned about transporting collected oily debris along sections of the river that did not offer easy access to mechanical recovery equipment (e.g., front-end loaders and dump trucks). Should heavy machinery be allowed to transit the riverbed and potentially damage habitat, or should cleanup crews make several round trips carrying 50-pound bags of debris? It was decided that a USFWS representative would remain on-scene to decide on a case-by-case basis.

NOAA Activities:

NOAA was notified of the incident on January 19, 1994, by the FOSC who requested NOAA support. The SSC reported on-scene that evening and was requested by the FOSC to remain in contact with FEMA and gather data on river flow and dam status, provide liaison for the USFWS, and attend evening planning meetings. Additionally, the SSC consulted with the U.S. Geological Survey regarding river-basin drainage information and sediment water-holding capacity to provide insight as to how rainfall would affect stream flow.

Owing to the weather-critical operations in the river, NOAA supplied daily weather forecasts.

A trajectory was provided with a caution issued because of the confined nature of a riverbed and the capabilities of NOAA's oil weathering model. The computer program ADIOS assumes that the oil has the ability to spread out on an open body of water. Thus, using ADIOS information to plot trajectories on a river where the oil may not spread out makes the evaporation rates suspect.

Daily status maps of the various river segments were produced, indicating the respective operations and resource allocations for each segment.

The SSC was on-scene for one week; NOAA continued supporting the cleanup operation with weather forecasts for six weeks.

References:

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

NOAA Hotline #146, 54 Reports

Torgrimson, Gary M. 1984. *The On-Scene Spill Model: A User's Guide*. NOAA Technical Memorandum NOA OMA-12. Seattle: Office of Oceanography and Marine Assessment. 87 pp.

Name of Spill:	Pacheco Slough, California
NOAA SSC:	Jim Morris
USCG District:	11
Date of Spill:	01/25/94
Location of Spill:	Pacheco Slough, Concord, California.
Latitude:	38°03′ N
Longitude:	122°06′ W
Spilled Material:	gasoline and diesel quality reformate (cutter stock)
Spilled Material Type:	1 and 2
Amount:	100-250 barrels
Source of Spill:	pipeline
Resources at Risk:	marsh
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	brackish marshes
Keywords:	Clean Bay Inc., containment boom, evaporation, sorbent boom, sorbent pads, vacuum trucks

Incident Summary:

On January 25, 1994, a pipeline, owned and operated by Santa Fe Pacific Pipeline, ruptured just west of the Pacheco Slough near Concord, California. The pipeline is used for several types of light products such as gasoline and diesel. A pinhole leak was the reason for the discharge and was most likely caused by third-party damage. The leak occurred in an industrial area, apparently during a transition period in which gasoline and a diesel cutter stock were moving through the pipeline, because both products were detected at the spill site.

The leak was located near a series of ditches that fed into a marsh next to Pacheco Slough. Pacheco Slough empties into and is located south of Suisun Bay. Some of the leaked product exited the marsh and went into Pacheco Slough via a culvert. Clean Bay Inc. was called to the site and promptly installed boom to prevent any more product from exiting the slough and affecting Suisun Bay. Most of the product was located in a series of ditches near the leak. Cleanup crews placed sorbent pads and booms in the ditches to collect as much spilled product as possible.

The RWQCB was on-scene to ensure that water quality standards were being met. Water exiting the ditches had to meet RWQCB drinking water quality standards before entering the marsh. A portable water treatment facility was brought on-scene to guarantee these standards.

Behavior of Spilled Material:

The light products formed sheens and collected in small pools of pure product in some areas within the drainage ditches. Sheens were noted in the open-water areas of the marsh and traveled from side to side as the light wind shifted throughout the day.

Countermeasures and Mitigation:

Booms were placed in Pacheco Slough near the culvert that leads to the marsh to prevent oil from getting into Suisun Bay. The culvert was closed off to prevent any further communication between the two bodies of water. The heavier concentrations of product were most effectively combated using sorbent pads and booms.

NOAA Activities:

NOAA was notified of the incident on January 26, 1994, by the USCG MSO San Francisco. The SSC reported on-scene that evening.

NOAA supplied base maps, a report on the resources at risk, and weather observations and forecasts for two days. NOAA departed the scene on January 28.

References:

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

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

NOAA Hotline #147, 4 Reports

Name of Spill:	United Arab Emirates
NOAA SSC:	Jim Morris
Date of Spill:	03/31/94
Location of Spill:	East coast of the United Arab Emirates near Fujaira in the Gulf of Oman
Latitude:	25°03′ N (approximate)
Longitude:	56°40′ E (approximate)
Spilled Material:	Iranian light crude (API 33)
Spilled Material Type:	2
Amount:	119,000 barrels
Source of Spill:	tank vessel
Resources at Risk:	Birds: diving coastal birds, shorebirds Recreation: beaches, boat ramps, diving areas Resource Extraction: subsistence, commercial fisheries
Dispersants:	N
Bioremediation:	Y (tested)
In-situ Burning:	Y (tested)
Other Special Interest:	none
Shoreline Types Impacted:	coarse-gravel beaches, coarse-sand beaches, coastal structures, exposed bedrock bluffs, exposed fine-sand beaches, exposed riprap, exposed rocky platforms, exposed rocky shores, mixed- sediment beaches, piers, riprap, wave-cut platforms
Keywords:	bioremediation, evaporation, exposed rocky shores, in-situ burning, International Tanker Owners Pollution Federation (ITOPF), low-pressure washing, seafood harvesting ban, tourism losses

Incident Summary:

On March 31, 1994, the tanker vessels *Seki* and *Baynuna* collided in the Gulf of Oman off the port city of Fujaira, United Arab Emirates (UAE). The *Seki* spilled 16,000 tons of Iranian light crude (API 33). The slick traveled to the west and impacted approximately 30 kilometers (km) of the east coast of UAE. No responsible party was determined so the incident was treated as a third-party spill.

The UAE government requested assistance from the United States through the USCG Liaison Officer, who, after assessing the situation, requested a team of advisors be sent to UAE to help that government clean up the spill. The three-member team was composed of representatives from the USCG Pacific Strike Team (PST), the EPA Office of Research and Development, and NOAA's, Hazardous Materials Response and Assessment Division.

The U.S. Advisory Team (USAT) arrived in UAE on the afternoon of April 13, 1994, and received a tour of the spill site by the USCG Liaison Officer and UAE environmental personnel.

Behavior of Spilled Material:

Iranian light crude is an extremely light oil and 35 to 40 percent of the oil was predicted to evaporate within the first five days of the spill.

The oil originally headed east, away from shore and out into the Gulf of Oman. The prevailing winds then dominated the oil's movement and the slick changed directions 180° and impacted the east coast of the UAE. When the USAT arrived on-scene, nearly all the oil had beached.

The shoreline types impacted were medium- and coarse-grain sand, cobble, boulder/riprap, and vertical rock walls. During the first couple of days of shoreline response, 3,500 cubic meters of oiled surface sand was removed manually from the beaches. However, during the ensuing days the sand beaches experienced a depositional period burying layers of fresh oil. The layers of oil were found as deep as 50 centimeters (cm) and ranged from 5 to 15 cm thick.

A major concern for the responders was that the beaches had experienced a depositional phase after being impacted by the oil. Lenses of thick oil were buried as deep as a half a meter on some beaches.

Countermeasures and Mitigation:

The largest concern for the responders was how to remove the heavy concentrations of oil buried in the sediment. The shoreline survey team, composed of the NOAA SSC, a representative from the CEDRE (France's Research and Documentation Center For Accidental Water Pollution), and occasionally a local government representative, identified approximately 25 km of impact within the UAE border (there were reports that the northern tip of the peninsula, Omani territory, had also been oiled) of which 14 km were sandy beaches. Roughly 6 to 8 km of these beaches had buried lenses of heavily oiled sediment. The clean sand overburden ranged from 10 to 50 cm. The lenses were approximately 10 to 15 m wide and from 5 to 10 cm thick.

The USAT had explained the pros and cons of various mitigation techniques to the UAE officials. The options discussed were:

- ❒ Beach flushing, either manually or by some type of mechanized system;
- ❒ Berm relocation;
- ❒ Sediment removal/treatment and replacement;
- ❒ Sediment removal and replacement; and
- ❒ Sediment removal without any renourishment of the beach.

Several beach-flushing tests were performed using high-pressure hoses and trenching to agitate the sand and free up the oil, causing it to flow into a series of trenches leading to a collection point in the lower intertidal zone. This system was not very successful because:

- ❒ Operating hoses manually limited the size of the swath and prevented effective mobilization of the oil;

- ❒ Collecting the oil in the lower intertidal area limited the amount of time that the operation could be performed; and

- ❒ Collecting the free-floating oil using trenches was not effective.

The next operation to be tested was an Excavator (a tracked vehicle with a bucket that has a 15-m reach) fitted with a series of hoses. The idea was that flushing could be conducted with this extension arm at the water's edge during a rising tide. The freed oil would then be allowed to flow with the long shore transport to a collection point. The collection point would consist of a shore-barrier boom that would herd the oil into a basin dug into the sand. A skimmer would then be used to remove the collected oil into a holding tank. At the time of the USAT's departure, this technique had not been effective because of undersized pumps.

A trial berm relocation was attempted on April 20. One hundred meters of heavily oiled sandy shoreline were bulldozed into the water at low tide. This method released large quantities of oil very effectively, but created a 2.5-km dark brown plume along the shoreline. Local fishermen complained about the plume and the technique was abandoned.

For the beaches that had a lesser degree of oiling, several techniques were tried including berm relocation, disking, and disking with nutrient enhancement.

Cobble beaches, boulder/riprap, and vertical rock walls that were heavily impacted posed less of a problem because the viable techniques were somewhat limited. Some of the techniques being discussed when the USAT departed were the application of Inipol, nutrient enhancement, and steam cleaning.

A 10- by 10-m test plot on a wave-cut platform with an armoring of well-rounded cobble was set aside for the use of Inipol. The substrate was heavily coated with oil. The Inipol was applied the day before the USAT's departure. A monitoring plan was drafted by the EPA and left with UAE officials.

Steam cleaning was approved in the small fishing harbor of Dadnah, where 200 m of riprap, a boat ramp, and fishing vessels were heavily impacted.

Other Special Interest Issues:

The effects on this section of the UAE coast concerned the local governments because of a budding tourism industry. Most of the impacted area was pristine coastline and a few of the resorts complained of a marked decrease in patronage. Fishing villages along the coast also suffered from this spill because the local government instituted a ban on all fish and seafood caught from these waters. Local fishermen complained that the fish caught had an oily taste.

While the USAT was on-scene, no impact to wildlife was reported. Considering the size of the spill, this was noteworthy.

A small test burn was conducted by the beach cleanup team in one of the collection trenches during a flushing test. Gasoline was poured onto the pooled product and ignited by hand. This technique did not prove to be effective because the oil was apparently too weathered to burn well.

NOAA Activities:

NOAA was notified of the spill by the USCG and requested to report on-scene. Representatives from NOAA, EPA, and the USCG arrived at the spill site the afternoon of April 13, 1994. The USAT's major functions at this spill were to observe and provide advice to the UAE government. The USAT attended planning and operational meetings daily. The USAT provided the responders with the following informational documents:

- ❒ an operations plan for cleaning the small fishing harbor in Dadnah;
- ❒ a Daily Site Information Form to be used by beach foremen to report on work progress at the daily meetings;
- ❒ a Shoreline Options Paper that rated the various beach types by their degree of oiling and explained various countermeasures that could be used and their pros and cons; and
- ❒ a Long-Term Strategic Plan to be used by the command to identify strategic goals.

Team member efforts were as follows;

The USCG, aside from being in charge of the overall operation of the USAT, was very influential in instituting an Incident Command System. When the USAT arrived there was no apparent organization and the responders were finding it difficult to obtain permission to conduct activities. The need for a centralized command system was great because this spill response spanned several nations and cultures. From the United Kingdom there was ITOPF, Oil Spill Service Center, and Warren Springs Laboratory. From France there was a representative from CEDRE. There were representatives from the UAE government, the Emirate of Fujaira, and the Port of Fujaira. The cleanup workers were Indian, Pakistani, and Bengali.

The USCG also explained the importance of cost documentation and provided necessary training to government officials.

EPA was very helpful in fielding questions from various vendors that purveyed mitigation products. Roughly 60 vendors called the command post or the U.S. Embassy trying to sell various cleaning and bioremediation agents. The EPA representative in charge of the Inipol test site wrote a monitoring plan to determine the product's effectiveness and worked with the UAE government to establish long-term analytical sampling protocols.

NOAA provided shoreline assessment maps from information obtained during surveys done in conjunction with CEDRE. The SSC also provided examples of documents from past spills on determining "how-clean-is-clean" and provided daily weather reports and tidal information to the command.

Before departing the country, the USAT debriefed the UAE's Minister of Health and the U.S. Ambassador in the capital city of Dubai. The USAT departed the scene on April 26, 1994.

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:	Guadalupe Beach
NOAA SSC:	Jim Morris
USCG District:	11
Date of Spill:	09/02/94
Location of Spill:	Guadalupe, California
Latitude:	34°58.5′ N
Longitude:	20°39.0′ W
Spilled Material:	diluent
Spilled Material Type:	2
Amount:	36,000 barrels
Source of Spill:	pipeline
Resources at Risk:	Birds: diving coastal birds, waterfowl, shorebirds, wading birds, gulls, terns, foraging areas, nesting beaches Fish: surf fish Crustaceans: sand crabs Recreation: beaches, high-use recreational fishing and surfing areas, state parks Management Areas: coastal conservancy, nature conservancy, wildlife preserves, reserves
Dispersants:	N
Bioremediation:	Y (application denied by the state because of insufficient information regarding the nutrient content of the excavation pit)
In-situ Burning:	N
Other Special Interest:	high public interest This project encompassed only one plume that lies in the intertidal zone and is under the direction of the USCG. The rest of the oilfield, which contains several plumes, will be part of a long-term remediation project that will come under the jurisdiction of the EPA.
Shoreline Types Impacted:	medium-coarse sand beaches
Keywords:	bioremediation, endangered species, propane cannons, sand replacement, seafood harvesting ban skimmers,

Incident Summary:

An oil production field leased and operated by the UNOCAL Corporation near Guadalupe, California, has for many years been the site of a constant release of a diesel-like substance known as diluent. The diluent, which is a mid-grade condensate product, had been injected into the production wells throughout recent decades to increase the yield from the oilfield. For economic reasons, the practice of injecting diluent into the wells replaced the use of steam during the 1950s. UNOCAL stopped injecting diluent by 1990. Either through poor injection practices or through a faulty pipeline system, diluent was released into the field in large quantities. Current estimates are that there may be as much as 8.5 million gallons of diluent located in various plumes throughout the 2,300-acre site. The diluent plumes are below ground, riding on top of the water table.

The Guadalupe site borders the Pacific Ocean and is located in the expansive dune fields south of San Luis Obispo and Pismo Beach. It is located just north of the Santa Maria River,

the border between San Luis Obispo and Santa Barbara counties. UNOCAL is in the process of closing down the field as part of their overall plan to abandon all operations in California.

The USCG MSO at Los Angeles/Long Beach, along with the State of California's Office of Oil Spill Prevention and Response, decided to respond to one plume in particular that was located in the intertidal zone and was the source of diluent releases into the nearshore environment during winter storms and high tides. The USCG COTP ordered UNOCAL to respond to the plume on July 15, 1994. UNOCAL prepared an Incident Action Plan that involved excavation of the contaminated sand, removal of all free product from the pit, and then backfilling the site with clean and/or treated sand. This particular plume was originally estimated to consist of 1.5 million gallons of diluent. UNOCAL in recent years has been using extraction wells to prevent the plume from migrating any farther into the intertidal zone. UNOCAL estimates that they have removed roughly 700,000 gallons of diluent using these wells. Recently, owing to the holding capacity of the sediment, the excavation operations were limited to only a few barrels of product a day. It was estimated that as much as 800,000 gallons of diluent still remain in the plume and the continued use of the excavation wells would not have been practicable.

The plume was cone-shaped and oriented east to west (with the narrow end of the cone pointed to the east, away from the ocean). The cone was approximately 800 feet from east to west and 800 feet from north to south at its widest point. It ranged from the supratidal zone (eastern edge) to the edge of the upper intertidal zone (western edge) during the summer months when the beach is in a depositional phase. (It is important to note that this beach exhibits dramatic seasonal changes from summer to winter. Two surveys conducted in 1992 showed that the winter beach was 40 to 50 m narrower than the summer beach.) The plume was buried under a sand layer that varies in depth across the intertidal zone. To the west (closer to the high-tide berm) the burial was only a few feet, whereas the eastern edge of the plume was buried to a depth of approximately 12 feet.

Only the western 40 percent of the plume (the area most likely to be impacted by winter storms) was to be excavated during this response. The rest of this particular plume will be part of the long-term remediation project that will be undertaken for the entire Guadalupe field by the EPA. The intent of this project was to remove the immediate threat of releases to the nearshore environment. The remainder of the field will be considered a long-term remediation site and will require an Environmental Impact Statement, under NEPA, as well as an Environmental Impact Report, which is required under state statute. This project, considered to be an emergency response, required neither of the two studies.

UNOCAL's plan included building a cofferdam around the section of the plume to be excavated using sheet metal pilings driven down below the water table. The pilings were 30- and 40-feet high and driven in so they were just a few feet above the existing grade of the beach. The cofferdam was roughly the shape of a rectangle (800 feet by 300 feet, with the longer axis running north and south) and was designed to encircle the excavation site to prevent any communication with the sea during the operation.

The excavation plan was conducted in four phases:

- ❒ The clean sand overburden was removed and placed in holding areas located on the beaches north and south of the excavation site (approximately 25,000 cubic yards).

- The contaminated sand was removed and taken to a stockpile area where it was thermally treated to remove the contamination. At the same time, UNOCAL also removed a slurry wall that was installed in 1990. The slurry wall had been installed in an earlier attempt to halt the westward migration of the plume, but had been ineffective.

- The pit that was created by the excavation was cleaned of all free-floating product (the excavation went below the water table, creating a lake inside the cofferdam) using weir skimmers.

- *The pit was to be back-filled with clean sand from the thermally treated sand or from some alternative source, and a high-density polyethylene (HDPE) barrier installed. The HDPE wall runs from north to south and is located at the eastern end of the excavation site. The barrier is intended to prevent any migration of the remaining plume into the cleaned excavation site. Once the pit is completely backfilled, the sheet-piling cofferdam will be removed.

The total amount of sand excavated was estimated at 150,000 cubic yards, of which 25,000 cubic yards was considered the clean overburden. Two thermal units were brought on-scene to treat the contaminated sand. The thermal units are designed to heat the sand to about 800°F and thereby thermally remove the hydrocarbon contamination. The sand exiting the thermal units was sampled and determined to be below the detection level for total petroleum hydrocarbons (TPH). The level of contamination approved by the Regional Water Quality Control Board is 30 parts per million of TPH.

Combined, the thermal units have a rated output of 150 tons per hour. There are approximately 1.4 cubic yards of sand per ton. This calculates to over two months of continuous treatment at optimum conditions. As of December 1994, there were 80,000 cubic yards of treated sand available for backfill and approximately 50,000 cubic yards yet to be treated.

The major issues regarding the impact to wildlife were the endangered snowy plover and brown pelican, and the threatened California least tern. Plovers and terns use this stretch of beach for nesting. The nesting season runs from mid-spring to late summer. The project was originally designed to take place between the nesting season and the winter storm period. The COTP received a Section 7 consultation from the USFWS for this project. The permit allowed accidental "take" but required that there be twenty-four hour wildlife observations to insure that there were no impacts. The largest concern was whether the birds would be affected when there was free-floating product in the excavation pit. Propane cannons were used to discourage birds from landing in the contaminated standing water in the pit.

None of the previous winter releases had resulted in major wildlife impacts. However, some sampling of surf fish immediately following a release showed that there had been some hydrocarbon contamination. Organoleptic testing was performed on fish caught in

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* At the time of this writing, the last phase is still in progress.

the area near the UNOCAL site and a control site near Morro Bay to the north. The fish caught near the plume had a detectable oily odor or taste and the County Environmental Health Department issued a warning to recreational fishermen.

These operations began in September 1994 and will continue into early 1995.

Behavior of Spilled Material:

Diluent is a cheap mid-grade product and was apparently not homogeneous over the decades that it was utilized in oilfield operations. According to a UNOCAL report, "diluent is the middle cut off the distillation process. It is very much like a light crude, except that the lighter materials such as propane and butane have been removed as have the heavier components, such as the oils that go into making asphalt or fuel oils." The product, in its original form, ranged from light to dark brown. When it was released into the surf zone in the winter it formed sheens that were not recoverable. The impacts to the neighboring shorelines were minimal. Reports stated that the only evidence of a release was a discoloration of the high tide swash line.

As the diluent was being released into the pit during the excavation, it formed into thick accumulations of nearly pure product. Foss Environmental from Long Beach, California provided weir skimmers for the operation. Skimming operations were underway for roughly two weeks and recovered approximately 815 barrels of diluent.

Countermeasures and Mitigation:

Open-water recovery operations took place in the "lake" that was formed during the excavation. Responders used weir skimmers to remove the free-floating product. The rest of the spilled material was removed from the site in the form of approximately 130,000 cubic yards of contaminated sand and was thermally treated.

Other Special Interest Issues:

There was a large amount of public concern over this operation. Many of the local public interest groups were arguing that the methodology chosen was far too obtrusive. They requested UNOCAL to use less invasive measures (i.e., in-situ, long-term remediation techniques). In several public meetings, the operational plan was defended by the members of the Unified Command as being the only alternative given the desire to remove the threat of contamination before another winter storm season. Owing to the strict control over the access to the site, two local monitors were chosen to be the public's "eyes on-scene" during the operation. These monitors were given access to the entire site as well as all Incident Command meetings and reported periodically to the public interest groups.

Additionally, there was much concern over the safety and health of the citizens of the town of Guadalupe. Guadalupe is a small, mostly Spanish-speaking farming community located five miles from the excavation site. UNOCAL assured the citizens that they would hold regular town meetings, publish periodic summaries on the work being performed in the local newspapers, and all communications with the community would be done in English and Spanish. UNOCAL also assured that they would, along with county officials and the

Regional Air Quality Control Board, be monitoring for any harmful pollutants in and around the area.

The operations took place on a section of coastline that is used for recreation, fishing, and surfing. About one mile of beach was closed during the cleanup. The land to the north of the site was managed by the California Coastal Conservancy; the land to the south of the site was managed by the Nature Conservancy. The Coastal Conservancy holds a future "right to lease" agreement for the section of beach that was affected by the plume. Recreational fishing was impacted when organoleptic testing of surf fish caught in the area showed signs of contamination. The County Office of Environmental Health issued a warning to the fishermen not to eat any fish caught in the surf around the UNOCAL lease site.

Before the pit was to be backfilled the Unified Command requested permission of the RRT to use a fertilizer called Max Bac. UNOCAL considered the fertilizer a "polishing" agent. After a conference call on October 27, the RRT agreed to allow the use of Max Bac. However, the State of California's representative to the conference call was not empowered to make the decision for the State. The State withheld its vote and requested additional information regarding the nutrient requirements of the pit. Since this information was not readily available, the Unified Command withdrew its request and the Max Bac was not applied to the site.

During the initial planning and initiation of the excavation, the issue of the effectiveness of the removal action was raised. The NOAA Trustee was concerned about the effectiveness of the excavation and requested that UNOCAL ensure that bioavailable diluent did not remain in the environment. After many discussions that included the SSC, NOAA Trustee, USFWS, UNOCAL, FOSC, and CF&G, the following plan of action was agreed:

1. UNOCAL agreed to share all data that was gathered prior to the beginning of the operations.

2. UNOCAL provided the trustees additional sand crab studies to be performed subsequent to the completion of the project.

3. UNOCAL and NOAA agreed to some form of monitoring to determine whether bio-available diluent was still present in the environment. Resolution of this issue is still pending.

NOAA Activities:

NOAA was involved with the operation since March 1994 when MSO Los Angeles/ Long Beach decided to undertake removal action of the intertidal plume. NOAA wrote to the Captain of the Port discussing the pros and cons of the operational plan. The letter detailed the need to remove the threat of contamination and explained that the option to excavate the beach was the preferred method given the stated time constraints.

The SSC arrived on-scene on September 1, 1994, and remained until September 19; however, while operations continued, NOAA provided advice and assistance on various topics as needed (e.g., water table migration, bioremediation).

During the operation the SSC was tasked to ensure that the requirements of the Section 7 permit were being met and assist in the dialogue between the Unified Command and the USFWS. The Unified Command also requested that NOAA help develop a plan that identified alternate sources of sand had it become unfeasible to use the thermally treated sand. The Unified Command was faced with an original completion deadline of October 15. A Sand Source Site Team (SSST) was formed and composed of representatives from UNOCAL, CF&G, USFWS, and geomorphologists from the California Coastal Conservancy and San Luis Obispo County. The team was organized and led by the SSC.

NOAA's on-scene personnel helped the SSST identify sites, discuss various options, and review sand-grain reports. The sand-grain reports indicated the overfill ratio of individual sources of sand. The overfill ratio of a particular source is the amount of sand that would need to be added to the beach to not only replace the sand that had been excavated, but to allow for the loss of the finer materials (if present) to wind and wave erosion. Alternate sources of sand would not typically be composed of the same materials in the same ratio as the sand on the beach. For example, a sand source with an overfill ratio of 1.5 would require one and one half times the amount of replacement sand as was originally removed. The theory is that once erosion had taken place there would be a 100 percent replacement of the proper-sized sand back on the beach.

The SSST presented a paper to the Unified Command discussing the various options along with their associated pros and cons. The team developed the following seven options for returning the sand to the pit:

1. leaving the pit open to allow for natural renourishment;

2. partially opening the cofferdam to allow natural renourishment;

3. dredging from offshore;

4. commercial sources;

5. scraping sand from other beaches;

6. borrowing from large sand dunes located on the UNOCAL-leased property; or

7. a combination of options 5 and 6.

The SSST recommended #7, contingent upon the permit process that would be required to remove sand from either of the two sites. Of course these options were only to be considered if the thermally treated sand could not be put back into the pit. Replacing the thermally treated sand, provided it could meet water quality standards, was the best option.

The Unified Command decided to allow the completion deadline to be pushed back as long as the integrity of the wall was not being compromised by winter storms. This allowed the maximum replacement of the thermally treated sand without using alternate sources. The options outlined by the SSST are being held in reserve as a contingency.

As part of a requirement for the permit issued by the California Coastal Commission, NOAA also outlined a plan to monitor the integrity of the beach after the operation was completed and to ensure that the mouth of the Santa Maria River was not migrating. In 1943 the mouth of the river had migrated to the North and swept through the area now being excavated. RPI suggested that UNOCAL hire a surveyor to establish permanent markers above the high-tide line and that the river mouth and the excavation site be surveyed every two months.

NOAA provided weather reports three times a week from the beginning of the operation until October 31. The Unified Command was particularly interested in long-range weather forecasts because of the operation's susceptibility to large winter storms. If given enough forewarning of a potentially large storm, the Unified Command was prepared to remove all the equipment from the pit and build a sand berm in front of the western wall of the cofferdam. If warranted, they were also prepared to remove the cofferdam completely and fill the pit with sand from sources outlined in the SSST report.

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 #163, 41 Reports.

Research Planning Institute. 1980. *Sensitivity of coastal environments to spilled oil: Southern California.*. Boulder: Hazardous Materials Response Project. 52 maps.

Sand Source Site Team. September 1994. Alternate sand-source options paper, Report to the Unified Command.

UNOCAL. July 1994. Report on options considered for remediation of the beach plume at the Guadalupe oilfield San Luis Obispo County, California.

U.S. Navy. 1992. *U.S. Navy Marine Climatic Atlas of the World. Version 1*. Asheville, NC: Naval Oceanography Command Detachment Asheville and NCBC, NOAA.

U.S. COAST GUARD DISTRICT 13

Name of Spill:	M/V *An Ping 6*
NOAA SSC:	David Kruth
USCG District:	13
Date of Spill:	01/10/94
Location of Spill:	Longview, Washington
Latitude:	46°07.0′ N
Longitude:	122°58.5′ W
Spilled Material:	# 6 fuel oil
Spilled Material Type:	4
Amount:	120 barrels
Source of Spill:	non-tank vessel
Resources at Risk:	blue heron
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	PES-51
Shoreline Types Impacted:	none
Keywords:	none

Incident Summary:

The motor vessel *An Ping 6* spilled approximately 5,000 gallons of #6 fuel oil while taking on fuel from a barge. The *An Ping 6* was at anchor in the Columbia River at the time of the incident. The responsible party estimated that 3,000 gallons ran off the vessel's deck and into the water. The heaviest sheens extended eight miles downriver. Active and passive shoreline cleanup continued for several weeks. Approximately 78 vessels, 12 floating homes, and 50 other floating structures were oiled and had to be cleaned.

Behavior of Oil:

The movement of oil in the spill area was dominated by river flow and southerly winds. Farther downriver, oil movement was more tidally influenced and during ebb tides tended to move at a faster rate. During the spill, flow rates at the Bonneville Dam were monitored for input into trajectory predictions (130,000 to 150,000 cubic feet per second during the spill). As a result of southerly winds, almost all shoreline impacts occurred on the Washington shoreline. The greatest impacts were to Fisher Island, Hump Island, and in the Fisher Slough. Sheens were seen as far as the Huntington Islands downriver from the spill site.

Due to the physical properties of the oil (specific gravity of 0.99, API of 11.3, pour point 30° F) it was predicted to be very persistent in nature, form tarballs, and become widely dispersed. Because of the high specific gravity of the oil, there was concern that the oil might incorporate river sediment and sink. The Washington Department of Ecology (DOE) did some bottom sampling for oil during the spill; however, no observable evidence of oil was found.

Countermeasures and Mitigation:

The majority of the free-floating oil traveled downriver spreading into broken patches of sheen. Protective booming was the primary countermeasure and approximately 8,400 feet of hard boom was used during the spill. Boom was used to protect sensitive priority areas and to collect oil in Fisher Island Slough. The majority of oil collected in the Fisher Slough was along the shoreline, under floating homes, trapped around boats, and in marsh areas. After containing the 2,000 gallons that remained on the deck, the vessel was also cleaned.

Other Special Interest Issues:

NOAA was asked by the FOSC to look at the potential environmental effects from using PES-51 a shoreline cleaner classified as a miscellaneous oil spill agent. The responsible party requested that it be allowed to clean boat hulls while still in the water. PES-51 was evaluated by NOAA based on chemistry, aquatic toxicity, effectiveness, and personal observations from two recent field tests. It was concluded that PES-51 fell somewhere in the middle ground of the effectiveness/toxicity equation for cleaners. PES 51 is consistently more toxic than other shoreline cleaning products with similar solubility (e.g., Corexit 9580). NOAA recommended evaluating a variety of products to obtain the best available balance between maximum effectiveness and minimum environmental impact. The responsible party eventually used PES-51 by applying it by rag and immediately wiping it off to minimize the amount reaching the water.

NOAA Activities:

NOAA was notified of the incident at 0900 on January 10, 1994, and was requested to provide assistance on-scene. The SSC provided technical information on the spill trajectory, weather forecasts, resources at risk, tides, currents, spill mapping, and shoreline cleanup recommendations. Of primary concern was the health of individuals living aboard floating homes in Fisher Slough after exposure to the strong oil vapors. These floating homes were surrounded by oil and residents were encouraged to leave until the vapors subsided.

Throughout the response, NOAA participated in helicopter mapping overflights and multi-agency shoreline surveys. Cleanup recommendations were provided for the more sensitive environments. The SSC worked closely with the trustee agencies to evaluate the tradeoffs between the need to contain and remove trapped oil in sensitive environments along the river and the impact these cleanup activities might cause to nesting populations and marsh habitats. Special attention was given to Fisher Island. Oiled willow trees overhanging the water were heavily oiled and were a threat to the nesting blue heron and other birds. Oiled willow branches were cut to prevent future contamination of wildlife.

NOAA tested samples of the spilled oil for oil chemistry and weathering properties. Gas chromatography-mass spectrometry (GC-MS) characterization suggested that this oil would be very persistent in the environment. Samples collected from Fisher Slough exhibited only a slight reduction in the alkanes and aromatic hydrocarbons after two and a half days of weathering. NOAA also performed a weathering experiment to address the possibility the oil might sink. After 264 hours of weathering, the oil did not sink. This experiment did not include the possibility of oil sinking from sedimentation.

References:

Hoff, Rebecca, ed. 1994. *Chemistry and environmental effects of the shoreline cleaner PES-51*. HAZMAT Report No. 94-2. Seattle: Hazardous Materials Response and Assessment Division, National Oceanic and Atmospheric Administration. 22 pp.

NOAA Hotline # 145, 17 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: Hazardous Materials and Response and Assessment Division, NOAA. 26 maps

Name of Spill:	Northwest Enviro Service
NOAA SSC:	Sharon K. Christopherson
USCG District:	13
Date of Spill :	02/15/94
Location of Spill:	Duwamish Waterway, Seattle, Washington
Latitude:	47°32.5′ N
Longitude:	122°20.1′ W
Spilled Material:	mixed waste solvents
Spilled Material Type:	5
Amount:	119 barrels
Source of Spill:	rail tank car
Resources at Risk:	wetland habitat, potentially salmonid fry in waterway
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	EPA/USCG boundary for spill response
Shoreline Types Impacted:	fresh/brackish water marsh
Keywords:	CERCLA response, solvents, waste oil, vacuum trucks

Incident Summary:

Valves on a portable railroad intermodal tank car parked on the Northwest Enviro Service facility in Seattle, Washington were deliberately opened by unknown persons the evening of February 14, 1994, releasing approximately 5,000 gallons of mixed waste solvents. The material ran into drains that emptied into a nearby marsh connected to the Duwamish Waterway through an underground drainage pipe and culvert. The spill was discovered by facility employees the following morning and reported to the National Response Center by 0945. Spilled material had spread into a nearby marsh, and by 1300 was observed escaping from a culvert near Terminal 115 into the Duwamish Waterway.

Containment and cleanup were begun by 1100 on February 15. By February 16 most of the free-floating product was recovered using vacuum trucks and absorbents. Cleanup of the contaminated soils at the original spill site and passive absorption of sheens tidally flushing out of the contaminated drainage pipe between the marsh and the Duwamish Waterway continued until February 21. The USCG pollution case was closed on February 23.

Behavior of Product:

The 5,000 gallons of product spilled consisted of less than 10 percent various waste solvents mixed with waste diesel/hydraulic oils and 30 percent water. The product was being formulated by Northwest Enviro Service for sale as a recycled high BTU fuel product for industrial boilers. Organic analysis of the mixture remaining in the rail tank car indicated xylene, toluene, 2 butanone (MEK) were present at concentrations around two percent, with lower concentrations of acetone, isobutanol, benzene, ethylbenzene, and r-methyl-2-pentanone (MIBK). Heavy metal contaminants also detected in the mixture included barium, cadmium, chromium, lead, mercury, and selenium. The material was bright red and floated in fresh water.

The material spread quickly through the adjacent marsh during the morning of February 15. The marsh was tidally influenced through at least one direct connection to the Duwamish Waterway or possibly tidally influenced changes on the water table level. During low tide, pockets of bright red material collected in the main drainage channel on the west side of the marsh and a smaller low lying depression along the southeast corner of the marsh. During the ebb, bright red product was flushed out through an underground drainage pipe and culvert leading from the marsh to the Duwamish Waterway near Terminal 115. Overflights conducted the first two days of the spill observed only light unrecoverable sheen extending down to the vicinity of Kellogg Island. The quantity flushed out with each ebb tide decreased to less than a gallon by the end of the second day, but sheens continued to be flushed out until February 21.

Countermeasures and Mitigation:

The valves on the tank car were secured upon discovery. Straw bales and boom were deployed at the drain leaving the spill site to prevent further migration into the marsh. Once the criminal investigation cleared the scene, the portable rail tank was moved and surrounding soil and asphalt dug up and removed until product no longer leached out of an adjacent soil bank.

Seattle METRO conducted dye tests to trace the points of discharge and confirmed there were no other connections to the Duwamish Waterway. Vacuum trucks were used to remove pockets of free-floating material in the wetland and at the drainage pipe discharge culvert near Terminal 112. This was most effective in the wetland during low tide when much of the material was collected in the drainage channel along the highway where crews had access with the vacuum hoses. The culverts draining water from the marsh to the Duwamish Waterway were blocked with booms and straw bales and the collected product actively removed by vacuum. Most of the free-floating oil in the marsh and at Terminal 112 was removed by the end of the second day. Passive absorption of sheens resulting from tidal flushing of the drainage pipe and product trapped in the wetland vegetation using absorbent sweeps continued until February 21.

On February 23, the Washington State Department of Transportation (owners of the contaminated marsh) and the Washington DOE assumed responsibility for coordinating with the responsible party on the long-term remediation and restoration of the marsh area.

Other Special Interest Issues:

The spill occurred in the U.S. EPA zone of responsibility; but due to the threat of contamination to the Duwamish Waterway, the USCG was the first Federal official on-scene and ultimately assumed responsibility as the FOSC. This incident has led to a re-evaluation of the Memorandum of Agreement between EPA and the USCG and may result in redefining the boundary between their response zones.

NOAA Activities:

NOAA was notified at 1100 on February 15, 1994, and was requested to provide assistance on-scene. NOAA provided daily weather reports for cleanup activities and information on wetland tidal dynamics; participated in overflights, shoreline surveys, and daily operational briefings; and provided routine response updates to the U.S. Department of the Interior, Muckleshoot Indian Tribe, Washington State trustees, and NOAA trustees.

The NOAA Health and Safety Officer provided recommendations on permitted exposure levels, personal protective equipment, and toxicity and monitoring for specific solvent components reported to be in the mixture. In response to these recommendations, air monitoring was conducted by an EPA Technical Assistance Team and cleanup workers involved in vacuum recovery of free-floating product from the marsh and culverts worked in Level C equipment (respirators with organic cartridges).

References:

P 152357Z, COGARD MSO PUGET SOUND WA, Polrep One, Mixed Waste Solvents N.O.S. (Toluene, Xylene, Heavy Metals and Water Mixture), Minor, 5,000 Gallons, Railroad Tank Car, Duwamish Waterway, MC94003149.

P 011959Z MAR 94, COGARD MSO PUGET SOUND WA, Polrep Six and Final, Mixed Waste Solvents N.O.S. (Toluene, Xylene, Heavy Metals and Water Mixture), Minor, 5,000 Gallons, Railroad Tank Car, Duwamish Waterway, MC94003149.

NOAA Hotline #150, 6 Reports

Research Planning Institute. 1985. *Sensitivity of coastal environments and wildlife to spilled oil: Central and Southern Puget Sound. An atlas of coastal resources.* Seattle: Ocean Assessments Division, NOAA. 44 maps.

Name of Spill:	Mystery Spill, Columbia River
NOAA SSC:	Sharon K. Christopherson
USCG District:	13
Date of Spill	08/10/94
Location of Spill:	Clifton Channel, Columbia River, Oregon
Latitude:	46°13'N
Longitude:	123°26'W
Spilled Material:	bilge oil (intermediate fuel oil)
Spilled Material Type:	3
Amount:	12 barrels
Source of Spill:	unknown
Resources at Risk:	freshwater marsh, birds
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	USFWS Wildlife Refuge
Shoreline Types Impacted:	freshwater marsh
Keywords:	none

Incident Summary:

A report of an oil slick was received from a vessel off Tongue Point by MSO Portland at 0100 on August 10, 1994. A USCG helicopter overflight at first light reported what appeared to be a substantial quantity of cleanable oil in and around Tenasillahe Island from Columbia River mile 38 downriver to approximately river mile 25. The Columbia River islands downriver of Tenasillahe are part of the Lewis and Clark National Wildlife Refuge. Based on observations and the area at risk, a significant response was launched. Cleanup contractors were directed to deploy the protection booming between Puget Island and the mouth of the Columbia River identified in the Northwest Area Plan's Columbia River Geographical Response Plan. Skimmers and contractor response vessels were mobilized.

Subsequent overflights and surface surveys (shore and water) over the next two days failed to detect significant concentrations of oil anywhere in the previously identified locations. Light staining of marsh vegetation and widely scattered tarballs (.25 inch diameter) were observed along small sections of shoreline within the Lewis and Clark National Wildlife Refuge. A small section of sand and riprap shoreline near Hunts Mill Point (upriver entrance to Clifton Channel) had moderate oiling that was manually removed. Cleanup was completed on August 12.

Behavior of Oil:

The USCG overflight at 0815 on August 10 reported two slicks. The slick in the main channel north of Tenasillahe Island at river mile 35 was described as 1 mile by 700 yards consisting of heavy sheen and patches of black oil. A second slick, 0.5 mile by 300 yards, was located south of Tenasillahe Island.

The USCG concluded that the product was bilge slops consisting of primarily intermediate fuel oil, probably discharged the evening of August 9 by a passing vessel. The calm winds, cool temperatures, and fog resulted in the spill remaining as a cohesive slick in the area until

the following morning when the turbulence and evaporation created by the wind, sun, and current caused it to rapidly dissipate. This is consistent with NOAA's hindcast trajectory that the spill probably occurred east of Tenasillahe Island and was subsequently split into two slicks moving through the main channel and Clifton Channel. As predicted, light sheen was observed in the vicinity of Horseshoe Island and Woody Island Channel in the early afternoon of August 10. No free-floating oil or sheen was observed after August 11.

Boat surveys on August 11 identified a lightly to moderately impacted section of shoreline near Hunts Mill Point. Manual cleanup was conducted August 12.

Countermeasures and Mitigation:

Primary cleanup consisted of manual removal of tarballs from a small section of sand and gravel beach near Hunts Mill Point. Approximately 1,000 feet of snare boom was deployed to control sheening from oiled riprap adjacent to this beach. Fifty gallons of emulsified black oil was collected by skimmer off Aldrich Point.

Joint shoreline surveys by NOAA, USCG, Oregon DEQ, Washington DOE, and USFWS were conducted August 11. Light staining of marsh vegetation and widely scattered tarballs (less than .25 inch diameter) were observed along the outer shoreline of several islands within the refuge. No cleanup of these areas was the joint recommendations of the survey members. Joint survey by NOAA, USCG and Oregon DEQ on August 12 recommended no further active cleanup required, but did recommend snare booms along the contaminated riprap at Hunts Mill Point be maintained and monitored for another week.

Other Special Interest Issues:

Potential threat to the Lewis and Clark National Wildlife Refuge required close coordination among unified command, refuge manager, and USFWS biologists to identify impacts and make cleanup recommendations.

NOAA Activities:

NOAA was notified at 0915 on August 10, 1994, and was requested to provide assistance on-scene. NOAA provided the initial trajectory analysis and probable location of discharge and participated in overflights, shoreline assessments, and evening operational briefings. The NOAA SSC also coordinated closely with the Lewis and Clark National Wildlife Refuge Managers and Oregon DEQ on cleanup recommendations and in determining "how clean is clean".

References:

P 110045Z AUG 94 Z, COGARD MSO PORTLAND OR, Polrep One, Possible Bunker 'C' Oil, Minor, Unknown Source, Columbia River Mile 35, Posit 46-14N, 123-26W, PCN-POR-256-94, FPN 13-4056, MC94016345.

Geographic Response Plan: Columbia River - Astoria, Oregon to Portland, Oregon, Northwest Area Committee, June 8, 1994 Draft.

NOAA Hotline #160, 5 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:	Tarball Impact Makah Indian Reservation
NOAA SSC:	Sharon K. Christopherson
USCG District:	13
Date of Spill:	03/15/94
Location of Spill:	Olympic Peninsula, Washington
Latitude:	48°20.0'N
Longitude:	124°40.0'W
Spilled Material:	tarballs composed of various weathered refined fuels and Alaska North Slope crude
Spilled Material Type:	3 and 4
Amount:	2,100 pounds
Source of Spill:	unknown
Resources at Risk:	harbor seals, seabirds, salmon
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	remote location, tribal lands, Olympic National Park
Shoreline Types Impacted:	sand and gravel pocket beaches, sand beaches, river mouth
Keywords:	none

Incident Summary:

Between March 15 and April 27, 1994, tarballs washed ashore on ocean beaches within the Makah Reservation and Olympic National Park located on the Olympic Peninsula at the northwest tip of Washington State. Over this six-week period, cleanup crews composed of Makah tribal members and cleanup contractors recovered 2,100 pounds of tarballs.

Behavior of Oil:

Tarballs were washed ashore on Olympic Peninsula beaches over the six-week period by a prolonged period of onshore winds. Shoreline impacts were sporadic, generally limited to localized accumulations on small, isolated pocket beaches, and found at all different levels of the intertidal area. These localized areas of accumulations were generally made up of quarter- to baseball-sized tarballs. However, on April 14 a tar paddy two feet in diameter weighing over 250 pounds was recovered from Duk Point, as well as an additional 150 pounds of softball- to volleyball-sized tarballs from a 50-yard stretch of beach.

Illegal or accidental discharges of petroleum product from vessel traffic transiting along the West Coast occur year round. Weather patterns in the late winter and early spring favor the development of periods of strong onshore winds capable of moving such oil from 10 to 50 miles offshore onto the beaches all along the coast from Canada to California. GC/MS analyses of samples collected from the beaches indicated that the tarballs were composed of various types of oil from multiple sources. Samples collected and analyzed during the first weeks of the spill by Washington DOE indicated a refined product similar to Bunker C from at least two sources. Samples collected in mid-April by the USCG and analyzed by NOAA indicated an unrefined product similar to Alaska North Slope crude with an enriched high molecular weight wax content indicative of residuals from cleaning tanker holds or tank sludge discharge.

Countermeasures and Mitigation:

Small work crews manually picked up the tarballs, placed them in plastic bags, and airlifted the bags off the beaches by helicopters.

Other Special Interest Issues:

The remote location of most of the impacted beaches, the sporadic beach impacts, and the necessity to time access and cleanup activity with the tides made shoreline assessment and cleanup very difficult, time consuming, and costly. Impacts to tribal land and National Park lands required close coordination among the USCG, Makah Tribal representatives, and Olympic National Park rangers.

NOAA Activities:

NOAA was requested by MSO Puget Sound to analyze five samples from three beaches on the Makah Reservation (Sooes Beach) and Olympic National Park (Norwegian Creek and Second Beach) to identify the types of oil and compare the results with data collected from a recent spill by the M/V *An Ping No. 6* on the Columbia River. The samples were analyzed and determined to be a lightly weathered crude oil, similar to Alaska North Slope Crude. The material appeared to be enhanced with a high molecular weight wax that suggested tanker cleaning or tanker sludge discharge. All five samples fingerprinted were definitive non-matches to the M/V *An Ping No. 6* reference oil.

References:

P 200032Z APR 94, Polrep Thirteen, Tarball Impact Makah Reservation and Olympic National Park, Minor, Unk source, MC94005131, FPN 13-4035.

P 282228Z APR 94, COGARD MSO PUGET SOUND WA, Polrep Fourteen and Final, Tarball Impact Makah Reservation and Olympic National Park, Minor, Unk source, MC94005131, FPN 13-4035.

Henry, Charles, Jr. April 22, 1994. Chemistry Report: IES/RCAT94-27, fingerprint results from Washington Coast mystery spill. Baton Rouge: Institute for Environmental Studies, Louisiana State University.

Name of Spill:	Mystery Spill, Strait of Juan de Fuca
NOAA SSC:	Sharon K. Christopherson
USCG District:	13
Date of Spill:	09/23/94
Location of Spill:	Entrance to Strait of Juan de Fuca, Puget Sound, WA (Buoy J)
Latitude:	48°28.9'N
Longitude:	124°44.0'W
Spilled Material:	black oil
Spilled Material Type:	3
Amount:	unknown
Source of Spill:	unknown
Resources at Risk:	birds
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	none
Shoreline Types Impacted:	none
Keywords:	none

Incident Summary:

Group Port Angeles passed a sport fisherman's report of a slick in the vicinity of Buoy J at the entrance to the Strait of Juan de Fuca to the MSO Puget Sound at 1515 on September 23, 1994. A USCG boat out of Station Neah Bay confirmed the sighting before dark, describing it as a silver sheen containing intermittent brown patches, 1.5 feet wide by 6 feet long, made up of small tarballs described as brown, gooey clumps. They estimated the slick covered a two- by six-mile area.

On September 24, response equipment was pre-staged at Port Angeles and pre-planned protection booming as specified in the Geographical Response Plan was deployed at the Waatch and Sooes rivers to protect local salmon runs. Searches for the oil at first light by Canadian and USCG vessels, spill response contractor vessels, and helicopters were significantly hampered by heavy fog that continued throughout the day. The Vessel Traffic Service coordinated with all commercial vessels transiting the area for reports of any oil sighting. After not being able to find the slick, searches were discontinued at nightfall, to be resumed at first light September 25. Response equipment was left in place at Port Angeles and Neah Bay. Heavy fog prevailed throughout the next 24 hours. When the fog finally lifted, two bands of emulsified oil were sighted by an overflight late in the afternoon of September 26 near Point of Arches, eight miles south of Neah Bay. However, the following morning, overflights and shoreline surveys were unable to locate any oil. Search for the oil was suspended at 1600 on September 27 and all equipment stood down.

Behavior of Oil:

The NOAA trajectory analysis predicted the oil would move out of the Strait of Juan de Fuca and south to an area about 6 miles southwest of the original sighting by the middle of the morning of September 24. Without any significant winds, the slick was expected to continue on down the coast at the rate of around six miles per day. The lack of any

additional sightings made further trajectory analysis extremely unreliable until the patches of emulsified oil were observed off Point of Arches late in the afternoon of September 26.

Countermeasures and Mitigation:

No recoverable oil was located.

Other Special Interest Issues:

Media interest triggered by the Makah tribe and local environmental groups remained high throughout the first two days and exaggerated the perceived threat. The NOAA SSC and the USCG conducted frequent briefings to prevent misunderstanding the situation among trustee agencies.

NOAA Activities:

The NOAA SSC was notified at 2040 on September 23, 1994, and requested to provide initial spill trajectory analysis and weather forecasts. The following day, SSC assistance was requested at MSO Puget Sound's Crisis Action Center to provide trajectory assistance in planning search patterns for oil in the fog.

References:

Strait of Juan de Fuca, Washington Geographic Response Plan (GRP), January 3, 1994 draft, Northwest Area Committee.

U.S. COAST GUARD DISTRICT 14

Name of Spill:	F/V *Jin Shiang Fa*
NOAA SSC:	Sharon K. Christopherson
USCG District:	14
Date of Spill	10/14/93
Location of Spill:	Rose Island, 150 miles east of American Samoa
Latitude:	14°32.4′ S
Longitude:	168°10.0′ W
Spilled Material:	marine diesel, lube oil
Spilled Material Type:	2
Amount:	2,390 barrels
Source of Spill:	non-tank vessel
Resources at Risk:	sea turtles, corals, giant clams, reef fish, humpback whales
Dispersants:	N
Bioremediation:	N
In-situ Burning:	N
Other Special Interest:	Rose Atoll is a USFWS Wildlife Refuge, logistical difficulties working in remote areas
Shoreline Types Impacted:	coral reef flat
Keywords:	coral reef, salvage

Incident Summary:

The USCG MSO Honolulu was notified by the MSD office in American Samoa that the fishing vessel *Jin Shiang Fa* ran aground on Rose Island, approximately 150 miles east of American Samoa sometime after midnight on October 14, 1993. The crew abandoned ship and was rescued by another fishing vessel in the area. The *Jin Shiang Fa*, a 137-foot, Taiwanese-flagged fishing vessel, was carrying 10,000 gallons of diesel in its internal fuel tanks, as well as an additional 100,000 gallons (2,390 barrels) of diesel in its forward cargo holds when it went aground. A USCG overflight reported the vessel hard aground on the west side of Rose Island, south of the narrow opening into the inner lagoon. A sheen, two miles long by 200 yards wide, trailed from the vessel in a northwesterly direction away from the island. An overflight the following day indicated that the vessel had a 30-degree list to port and an 11-mile by 200-yard wide sheen trailing to the northwest.

A charter vessel from the USCG PST, MSO Honolulu, and the USFWS arrived on-scene October 16. PST and MSO personnel were able to determine that there was no oil remaining in the forward two fish holds, but were unable to check the remaining tanks because heavy surf washing over the vessel caused it to move around on the reef. It was estimated that 40,000 gallons of diesel remained in #2 fish hold and 4,000 to 6,000 gallons in the internal fuel tanks. The charter vessel on-scene was unable to tow the *Jin Shiang Fa* off the reef due to engine horsepower and towing cable limitations. The fishing vessel continued to spill oil from various sources, producing a 1-mile by 200-yard wide sheen trailing to the northwest. The charter vessel returned to American Samoa on October 19.

The vessel's condition continued to be monitored through overflights until the owners completed an approved salvage plan and salvage equipment arrived from Singapore on November 28. During this time the vessel continued to be beat by the surf and the list to port increased from 30 degrees to 65 degrees. By October 28 it was assumed that all the oil

in the forward fish holds had been released with only the oil in the internal aft fuel tanks continuing to be released to produce a sheen. Resource trustees recommended the vessel still be salvaged to minimize further mechanical damage to the coral reef.

The USFWS coordinated a five-day, multi-agency diving and shoreline survey November 2 through 6 to assess impact of the spill and grounded vessel on the reef. Participants in the survey included USFWS, NOAA, American Samoan Marine Division, and a representative of the responsible party. The survey determined that the oil impact zone surrounding the vessel consisted of a 400- by 600-meter area of intertidal and subtidal reef flats. Within this zone, divers estimated 75 percent mortality of giant clams; extensive coralline algae bleaching; diesel entrapment in the rubble, sand, and under rocks; and oil-soaked debris on the bottom of the lagoon and seaward reef slope. Physical impact to the reef included two 40-meter scars on the outer reef front and debris, including longline fishing gear, on the reef from the intertidal zone down to 150 feet on the ocean reef front and down to 50 feet in the lagoon

The overflight on November 26 revealed the vessel had broken in two. The forward section with the superstructure was still on the reef flat, while the stern section had slipped off and was submerged in deeper water. The vessel was finally salvaged at the end of November. The forward section and superstructure were towed off the reef and sunk in deep water. Divers recovered the oily debris and longline gear from the lagoon and ocean-front sides of the reef slope.

Behavior of Oil:

It is estimated that 60 percent of the 110,000 gallons of diesel onboard was released within 48 hours of the vessel running aground, although a narrow band of sheen was observed trailing off to the northwest at varying distances from 2 to 11 miles during this period. Over the next two weeks, the remaining 40,000 gallons of diesel in the forward fish holds was released as the heavy sea continued to work on the vessel. Overflights during this period consistently showed the sheen being carried to the west away from the lagoon.

The diver survey conducted the first week in November suggested that one or more of the larger releases of diesel from the forward fish holds coincided with low tide, allowing diesel to pool under the coral rubble in the immediate vicinity of the vessel.

Countermeasures and Mitigation:

None of the fuel released from the vessel was recovered. Heavy surf and the lack of a large enough vessel prevented lightering or salvage of the *Jin Shiang Fa* before all the fuel was released. Salvage of the forward section and superstructure from the surf zone and recovery of oiled debris and fishing gear from the coral reef slope was successfully completed by a commercial salvage operator based in Singapore.

NOAA Activities:

The NOAA SSC was notified by MSO Honolulu on October 14, 1993. The SSC participated in RRT conference calls, coordinated with resource trustees in formulating response options, provided initial spill trajectory analysis, prepared climatological information on sea heights and wind speed and directions to help plan salvage operations and develop daily weather forecasts for the spill site.

References:

P 151099Z OCT 93, COGARD MSO HONOLULU HI, Polrep One, Medium Oil Spill, Diesel Oil, F/V JIN SHIANG FA (VIN CG039474), Rose Island, American Samoa, FPN 144002.

National Climatic Center. 1990. Climatic Summaries for NDBC Buoys and Stations Update 1. February1990. NSTL, MS: National Data Buoy Center, National Weather Service, NOAA.

U.S. Navy. 1992. *U.S. Navy Marine Climatic Atlas of the World. Version 1.* Asheville, NC: Naval Oceonography Command Detachment Asheville and NCBC, NOAA.

U.S. COAST GUARD DISTRICT 17

Name of Spill:	F/V *Belair*
NOAA SSC:	John W. Whitney
Date of Spill:	02/02/94
USCG District:	17
Location of Spill:	south side of St. George Island, Pribilof Islands in the Bering Sea
Latitude:	56°5'N
Longitude:	169°0'W
Spilled Material:	diesel
Spilled Material Type:	2
Amount:	3,500 gallons of diesel, 2 barrels of lube oil, and 2.5 barrels of hydraulic oil
Source of Release:	non-tank vessel
Resources at Risk:	birds and habitats
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest:	shoreline and onshore areas are part of the Alaska Maritime National Wildlife Refuge; shoreline is exposed rocky headlands
Key Words:	none

Incident Summary:

The fishing vessel (F/V) *Belair* was driven onto the rocks at the southern exposed rocky shoreline of St. George Island during the early morning of February 2, 1994. At the time of the grounding, winds were 25 to 30 knots with gale force gusts from the south. Winds continued pounding the vessel with 10- to 25-foot surf for the next week. It is believed that all the fuel was lost during the first day. The weather prohibited any on-site evaluation of the vessel and the case was closed by the USCG on February 10, 1994.

Behavior of Oil:

The extreme winds against the rocky shoreline caused the diesel to disperse and dissipate very rapidly. No impacted areas were reported

NOAA Activities:

NOAA was notified of the incident at noon on February 2, 1994, by the USCG. They requested information on the weather, existing and predicted, and possible resources at risk. The response, which was totally via phone and fax, included several weather briefings and an integration of resources at risk information from the resource agencies. This incident took place in a National Wildlife Refuge, but most of the birds would not be arrive until mid-March; although the presence of some stellars eiders and spectacled eiders was a possibility. The biggest concern was the possibility of rats going ashore.

Name of Spill:	F/V *Westerly*
NOAA SSC:	John W. Whitney
USCG District:	17
Date of Spill:	02/15/94
Location of Spill:	Glacier Bay National Park in southeast Alaska
Latitude:	58°31'N
Longitude:	135°59'W
Spilled Material:	diesel
Spilled Material Type:	2
Amount:	1,500 gallons
Source of Release:	non-tank vessel
Resources at Risk:	marine mammals and birds
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest:	none
Keywords:	none

Incident Summary:

The 80-foot F/V *Westerly*, preparing for crab fishing in Glacier Bay National Park with crab pots stacked high on its decks, was rendered unstable by high winds. The vessel sank just south of Strawberry Island in 37 fathoms of water with roughly 1,500 gallons of diesel onboard. Because the high winds made on-site assessment impossible, the National Park Service (NPS) conducted overflights. The overflights showed minor sheening for several days, decreasing to nothing. No response was possible or necessary. Salvage possibilities were discussed with NPS personnel, who would have liked to have the vessel removed, but recognized the risk and expense for such an operation might make removal impossible. The case was closed on February 18.

Behavior of Oil:

The diesel was not catastrophically released, but trickled to the surface from air vents in the fuel tanks. The extremely high winds and natural high tidal currents in Glacier Bay caused the diesel to disperse and dissipate within a very short time. No areas were impacted. The actual amount of diesel that surfaced is not known.

Countermeasures and Mitigation:

None. Spilled diesel was dispersed naturally by wind and wave actions.

NOAA Activities:

NOAA was notified of the incident on February 15, 1994, by USCG MSO Juneau. The SSC responded with weather and resources at risk information. NOAA notified the USCG that the most significant resources were nearby sea lion and harbor seal haulouts and a limited number of birds. It was believed that most resources had already sought off-water or protected water shelter from the intense winds. NOAA advised the USCG that no response

was necessary or possible. It was anticipated that the small amount of diesel expected to surface would be minimal and consequences to the wildlife or shorelines were not foreseen.

Name of Spill:	F/V *Chevak*
NOAA SSC:	John W. Whitney
Date of Spill:	02/22/94
USCG District:	17
Location of Spill:	St. Paul Island in the Pribilof Island group, Bering Sea, Alaska
Latitude:	57°05′ N
Longitude:	170·18′ W
Spilled Material:	diesel
Spilled Material Type:	2
Amount:	12,000 gallons of diesel and 200 gallons of lube oil
Source of Release:	non-tank vessel
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest:	continual high winds offshore rendered assessment and any response impossible.
Keywords:	none

Incident Summary:

Due to an apparent navigational error, the F/V *Chevak* ran aground on a rocky reef complex off the southern tip of St. Paul Island, one-half mile due west of Sea Lion Rock. Ten-foot breakers compromised the structural integrity of the vessel and it is believed that most of the fuel was lost to the sea; even if a catastrophic loss occurred, offshore winds from 35 to 40 knots dispersed it quickly. A small-boat rescue crew from the USCG Cutter *Hamilton* retrieved the six people onboard and reported no visible sheen in the vicinity. A USCG MSO representative was aboard the motor vessel (M/V) *Mary J* immediately downwind of the vessel three days after the grounding and reported no visible sheen on the water. The intense winds and heavy breakers near the vessel prevented any on-scene assessment for six weeks. However, the vessel's owner had a diving party standing by to respond if the weather improved. On April 25, the vessel's owner removed the remaining fuel and in early May an attempt was made to salvage the vessel; however, when it was pulled off the rocks into deeper water it sank.

Behavior of Oil:

Diesel is a non-persistent fuel and tends to disperse very rapidly. Under the given weather conditions, a catastrophic release of 12,000 gallons of diesel would have been gone in less than 10 hours. The pounding surf and gargantuan breakers would reduce this time even further. Any possible environmental impact of the diesel release would have been localized (less than 10 meters radius or 100 meters downwind), transient, and very difficult to visually observe and confirm. With strong offshore winds for the duration of the incident, wildlife and shorelines in the vicinity were not likely to get oiled and no shoreline impacts were noted.

Countermeasures and Mitigation:

No response was possible until April 25 when the sea and icing conditions improved enough to allow salvers to board the vessel. Approximately 6,550 gallons of fuel were removed at this time.

Other Special Interest Issues:

The DOI reported that Reef Point is part of the Seal Island Historic District and is considered a national historic landmark. Should any shoreside activities have been necessary, this resource would have had to be considered.

NOAA Activities:

NOAA was notified of the incident on February 22, 1994, by the USCG and responded by phone and fax. The SSC kept the USCG informed of the persistence of the high wind. Resource agencies were contacted and it was determined that, even though at the time no significant resources were at risk, this area served as a sea lion and fur seal rookery during the summer and, therefore, merited monitoring for actual or threatened impacts.

Name of Spill:	UNOCAL Cook Inlet Baker Platform
NOAA SSC:	John W. Whitney
USCG District:	17
Date of Spill:	04/06/94
Location of Spill:	Upper Cook Inlet, north of Forelands, Alaska
Latitude:	60°49.45' N
Longitude:	151°20.01' W
Spilled Material:	middle ground shoal crude oil
Spilled Material Type:	2
Amount:	96 barrels
Source of Release:	platform
Resources at Risk:	none
Dispersants:	Y
Bioremediation:	N
In-Situ Burning:	Y
Other Special Interest:	in-situ burn and dispersants were approved for use
Keywords:	dispersants, in-situ burning, skimmers

Incident Summary:

The USCG received a report from UNOCAL just before noon on April 6, 1994, that a valve had been accidentally left open on their Baker Platform and 50 to 100 barrels of crude had escaped into Cook Inlet. UNOCAL immediately called their incident command team to Nikiski and established a command post at the Cook Inlet Spill Prevention and Response Inc. (CISPRI) headquarters. CISPRI immediately launched a mechanical cleanup capability (boats and skimmers) while completing the dispersant and in-situ burn (ISB) request forms. Neither of these alternative response techniques were needed because the oil thinned, evaporated, and dispersed too rapidly. A total of 40 barrels were collected mechanically. The USCG and the FOSC were on-scene; however, their role was strictly one of consultation and monitoring. The response lasted about 8 hours. Weather was warm and sunny; although a small amount of floating ice (<10%) was in the area.

Behavior of Oil:

The spilled oil was middle ground shoal crude, a very light oil with an API of 42, predicted to evaporate 50 percent within the first 12 hours with no predicted dispersion. However, due to the dynamics of Cook Inlet, less time was needed for dispersion. Initially the oil formed a slick one mile by one-third mile and moved predictably with the tidal currents. UNOCAL calculated that 96 barrels were spilled and about 40 barrels were recovered; the balance is believed to have evaporated and dispersed naturally. No significant winds were present and no areas were impacted.

Countermeasures and Mitigation:

CISPRI maintains a 24-hour floating response vessel that immediately deployed boom and skimmers; other vessels were immediately launched from the nearby CISPRI warehouse. The rapidity of their response is the reason they were able to achieve a 40 percent open-water recovery. ISB and dispersants were both approved and staged but not used.

Other Special Interest Issues:

Approval was obtained to conduct an ISB; however, the oil thinned too rapidly to be reconcentrated sufficiently to conduct the burn. Similarly, dispersants were approved for use by the FOSC, but the oil evaporated and dispersed so rapidly that 5 or 6 hours after the release there were no slicks remaining that could be dispersed.

Interestingly enough, after this response the Cook Inlet Regional Citizens Advisory Council endorsed ISB as a primary response tool whenever there is ice present.

NOAA Activities:

NOAA was notified of this incident on April 6, 1994, by the USCG who requested on-scene assistance. The SSC notified and consulted with the resource agencies and the weather service. Since dispersants and ISB were being considered, oil movement trajectories and oil behavior characteristics were provided to the FOSC, UNOCAL, CISPRI, and resource and regulatory agencies. On-scene, NOAA represented the FOSC on the dispersant's effectiveness spotter plane; however, after flying for about an hour, no oil was located. NOAA supported this incident for 10 hours.

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:	Skagway Harbor Diesel
NOAA SSC:	John W. Whitney
USCG District:	17
Date of Spill:	05/19/94
Location of Spill:	Skagway Harbor, Skagway, Alaska
Latitude:	59°17'N
Longitude:	135°27'W
Spilled Material:	diesel
Spilled Material Type:	2
Amount:	498 gallons
Source of Release:	tank vessel to facility pipeline
Resources at Risk:	salmon hatcheries
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest:	none
Keywords:	evaporation

Incident Summary:

On May 19, 1994, #2 diesel fuel spilled in Skagway Harbor when a gasket failed on a 12-inch pipeline during a fuel transfer from the tank barge *Alaskan Spirit* to the Whitepass Fuel facility in Skagway, Alaska. Whitepass Fuel informed the MSO that the diesel was contained and cleanup was underway using sorbent materials. Mop up continued throughout the day; only a sheen was visible by the next day. Whitepass Fuel hired a local diver to assess any damage to the Skagway School Hatchery; no damage was reported. The case was closed on May 24, 1994. Weather throughout the incident was sunny with light winds from the south.

Behavior of Oil:

Shortly after the incident the diesel was contained around and under the pier. As much as 50 percent of the diesel evaporated. Final gauging indicated that 498 gallons were lost in the water and Whitepass recovered approximately 168 gallons; the rest naturally dispersed. No areas appeared to be impacted.

Countermeasures and Mitigation:

Booms were used to contain much of the diesel and sorbents were used to mop it up. Two salmon hatcheries were on streams that fed into Skagway Harbor; neither released any fry until the diesel was completely cleaned up. No shoreline impact occurred.

NOAA Activities:

NOAA was notified of the incident on May 19, 1994, by the MSO. NOAA's response was by phone and fax. The SSC apprised MSO of weather information and resources at risk data. NOAA supported this incident for one day.

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:	Lynn Canal Mystery Spill
NOAA SSC:	John W. Whitney
USCG District:	17
Date of Spill:	05/19/94
Location of Spill:	Lynn Canal west of False Point Retreat, southeast Alaska
Latitude:	58°20'N
Longitude:	135°00'W
Spilled Material:	Thick, dark oil, specific identity uncertain
Spilled Material Type:	4
Amount:	100-300 gallons
Source of Release:	unknown
Resources at Risk:	salmon streams, eagles
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest:	none
Keywords:	sorbent boom sorbent pads

Incident Summary:

On the morning of May 19, 1994, a report came into MSO Juneau from commercial pilots of an oil slick in Lynn Canal near False Point Retreat. The estimated quantity was 100 to 300 gallons extending two miles and contacting the beach; no source was evident. The USCG cutter *Liberty* was diverted to the scene to utilize as a platform for beach assessment and possible cleanup. Small boats from the cutter were deployed using sorbents to mop up some of the oil. A C-130 flight in the afternoon reported mostly small patches of weathered oil and sheen that was breaking up. Samples were taken of the oil slick and of several cruise ships that had transited the area during the past 24 hours. Beach contact was reported at Cordwood; however, a Shoreline Cleanup Advisory Team (SCAT) party organized the next day, with personnel from the USCG, Alaska Department of Environmental Conservation (ADEC), USFWS, U.S. Forestry Service (the land manager), Alaska Department of Natural Resources, and a private consultant walked the beach and reported no impacted shorelines. Throughout the incident winds were from the south at 5 to 10 knots. Samples of the oil were sent to the USCG COIL for analysis.

Behavior of Oil:

The oil moved north and south with the tidal currents, peaking at 0.5 knots ebb. Even though the wind was negligible, the slick reportedly broke up and dispersed naturally in one day. No shoreline was impacted.

Countermeasures and Mitigation:

Sorbent boom and pads were deployed by the USCG cutter *Liberty* and MSO personnel. Additional sorbent boom and pads were delivered to the cutter by air charger. A SCAT team was organized to assess possible shoreline oiling, but none was confirmed. ADEC oversaw the disposal of used sorbent material by burning them on the beach.

NOAA Activities:

NOAA was notified of the incident on May 19, 1994, by MSO Juneau. The SSC gave weather, tidal current, trajectory information, and resources at risk data to the responders. Dialogue with the USFWS and Alaska Department of Fish and Game indicated that salmon streams and eagles were near the spill area. NOAA passed this information on to the MSO. NOAA's support ended after one day.

Name of Spill:	T/V *Eastern Lion*
NOAA SSC:	John W. Whitney
USCG District:	17
Date of Spill:	05/21/94
Location of Spill:	Valdez, Alaska
Latitude:	61°05.4'N
Longitude:	146°24.2'W
Spilled Material:	North Slope crude
Spilled Material Type:	3
Amount:	less than 200 barrels
Source of Release:	tank vessel
Resources at Risk:	birds, salmon hatchery, seals
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest:	none
Keywords:	none

Incident Summary:

On May 21, 1994, MSO Valdez received a report from the master of tank vessel (T/V) *Eastern Lion* (on lease to British Petroleum [BP]) of oil in the water around the vessel loading at berth 5 of the Alyeska Marine Terminal. Apparently, a crack in one of the wing tanks leaked out an estimated 200 barrels of North Slope crude and, because the normal containment boom that surrounds loading tankers was sucked up against the hull, from 10 to 20 barrels of oil escaped into the Port of Valdez. The *Eastern Lion* began transferring fuel from its wing tanks to its center tanks and arranging to lighter the entire 800,000 barrels onto the waiting T/V *Arco Fairbanks*. Alyeska (SERVS) response crews immediately began conducting cleanup operations; however, the shorelines on Saw Island and near berths 4 and 5 were lightly impacted. The small slick created by the escaping oil was largely contained in the terminal area, with significant sheens to the east and west. Weather throughout the incident was mild with relatively calm winds.

Behavior of Oil:

The estimate of spilled oil was less than 200 barrels. Sheens from the spill moved east and west with the tidal current, extending from the Soloman Gulch Salmon Hatchery on the east to Anderson Bay on the west, about 9 miles. Sheens were also reported on the north side of the Port of Valdez near Duck Flats and the mouth of Mineral Creek. Cleanup personnel recovered 1,366 barrels of oily liquids, containing 78 barrels of oil. Approximately 5,700 bags and drums of solid waste were recovered. Approximately 30 percent of the oil evaporated just as NOAA had predicted. The small amount of shoreline impacted near berth 5 was a rocky shoreline for which no cleanup was recommended.

Countermeasures and Mitigation:

After taking care of all the surface oil, BP instituted a formal shoreline assessment (SCAT process) for the entire Port of Valdez. Only light oiling near berth 5 was noted and no shoreline cleanup was recommended. BP established a wildlife center in Valdez and activated the Anchorage wildlife facility. Although some birds, seals, and otters were

sighted in light sheens, none were in distress or captured. Precautionary booming was implemented around the hatchery and in front of Duck Flats. The USCG and the State of Alaska were heavily involved in the response, which lasted three days. USCG, State, and BP personnel remained on-scene to monitor hull cleaning operations.

NOAA Activities:

NOAA was notified of the incident on May 22, 1994, and the SSC reported on-scene. Most of the free oil had been brought under control by the time the SSC arrived so he began assessing the oiled shoreline and answering questions. The SSC participated in the SCAT process that involved checking the entire shoreline of the Port of Valdez, attending meetings, and ensuring that the resource agencies and other special interest groups were adequately represented in the process. As most of the manifestations of the oil were large areas of sheen, considerable interest was focused on sheen toxicity. The SSC obtained and distributed a report prepared by Jacqui Michel, Research Planning Inc., Columbia, South Carolina entitled "Toxicity Concerns Associated with Oil Sheens." The NOAA support lasted through May 25, 1994.

References:

NOAA Hotline 154, 3 reports

Name of Spill:	F/P *All Alaskan*
NOAA SSC:	John W. Whitney
USCG District:	17
Date of Spill:	07/24/94
Location of Spill:	Unimak Pass, Aleutian Islands, Alaska
Latitude:	54°40'N
Longitude:	165°18'W
Spilled Material:	diesel and ammonia
Spilled Material Type:	2 and 5
Amount:	approximately 10,000 gallons diesel and 38,000 pounds of ammonia
Source of Release:	fish processing vessel
Resources at Risk:	Birds: murres, kittiwakes, tufted puffins Marine Mammals: sea otters, sea lions stellar sea lion critical habitat
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Key Words:	none

Incident Summary:

On Sunday morning, July 24, 1994, a fire broke out in the fore section hold of the *All Alaskan*, a 350-foot vessel processing salmon. The vessel was approximately 10 miles west of Cape Sarichef on the western side of Unimak Island and riding in relatively calm seas. At the time of the fire, the vessel was carrying 126,000 gallons of diesel fuel, 7 bottles of acetylene, 12 bottles of oxygen, 10,000 gallons of lube oil, 8 drums of hydraulic oil, 2 drums of gasoline, and 38,000 pounds of ammonia. After the initial diesel release on July 24, additional oil pollution was considered a low probability as the integrity of the fuel tanks and hull were not threatened by the fire.

The USCG responded to what was initially a search and rescue mission. They safely rescued all but one crewmember who, unfortunately, was killed while fighting the fire. The fire caused the failure of a 10,000-gallon diesel day tank on the fore deck and the explosion, release, and fire of most of the 38,000 pounds of ammonia. The diesel release resulted in a reported eight-mile long sheen that dissipated within 12 hours.

To move the vessel from the sensitive resources in Unimak Pass, a bridle was fitted to the stern of the *All Alaskan* and she was slowly towed westward to deeper water in case scuttling became necessary. The fire subsided by July 25 but continued smoldering in the forepeak holds of the vessel. Three USCG cutters and several members of the PST went to the scene to assist.

On July 26 the vessel was brought into Captain's Bay at Dutch Harbor where the fire was completely extinguished and the vessel was thoroughly evaluated. One bottle of ammonia was found slowly leaking after the vessel reached port; the rest were believed lost while the vessel was burning at sea. As the vessel cooled down and aired out, the response phase was replaced with a vessel integrity evaluation phase done primarily by the U.S. Navy Supervisor of Salvage and representatives of the vessel.

Behavior of Oil:

An eight-mile long sheen of diesel resulted from the loss of the 10,000-gallon day tank on the fore deck. No areas were impacted, no response was attempted, and the sheen dissipated and dispersed within 12 hours.

Ammonia is flammable and was largely released and consumed in the initial conflagration. When the initial evaluation of the *All Alaskan* was carried out in Captain's Bay, only 3,000 pounds of ammonia remained.

Countermeasures and Mitigation:

No response countermeasures were attempted. As ammonia was being released in the fire and the potential existed for additional oil releases, the vessel was towed westward as far away from land and sensitive resources as possible. Once the vessel was towed into Captain's Bay the chemical hazards from ammonia were constantly evaluated and bottles of ammonia, chlorine, acetylene, and other chemicals were secured.

NOAA Activities:

NOAA was notified of the incident the afternoon of July 24, 1994, by the USCG and asked to provide weather and resources at risk information. NOAA reported that the weather would remain generally fair with light winds. The SSC also reported that the incident had occurred in part of a Stellar sea lion critical habitat and the islands, islets, and rookeries were all part of the Alaska Maritime National Wildlife Refuge, Aleutian Unit and included large numbers of sea birds, sea lions, and sea otters. Two reports were prepared for the FOSC detailing the specific locations, species, and numbers of resources at risk nearby.

Initially, there was concern that larger quantities of diesel fuel and lube oil might be released. NOAA, at the request of the FOSC, provided information on the possibility of using dispersants on a diesel fuel-lube oil combination.

After the initial diesel release, NOAA helped answer two questions:

- ❒ What are safe distances from the ammonia releases?
- ❒ Where is a safe place to anchor the vessel for detailed assessment after the fire is extinguished?

The SSC advised the FOSC of ammonia concentrations that would pose a health risk to responders. The USCG used other SSC-developed IDLH distances for USCG presentations to the people of Dutch Harbor to familiarize them with the possible effects of an ammonia release should it occur while the vessel was moored there.

The first few days after the initial fire, NOAA provided daily status reports to the resource agencies and regularly interacted with them when scuttling the vessel was being considered by the USCG. The NOAA response was entirely by phone and fax and lasted approximately five days.

References:

Department of Health and Human Services. 1990. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 90-117. Washington, D.C.: U.S. Government Printing Office. 245 pp.

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

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

Name of Spill:	F/V *Knight Island*
NOAA SSC:	John W. Whitney
USCG District:	17
Date of Spill:	08/02/94
Location of Spill:	Cape Ugat, the northwest side of Kodiak Island, Alaska
Latitude:	57°51.2'N
Longitude:	153°53.2'W
Spilled Material:	diesel
Spilled Material Type:	2
Amount:	6,000 gallons
Source of Release:	fishing vessel
Resources at Risk:	Fish: anadromous salmon stream Birds: seabird colony with gulls, puffins, guillemots Marine Mammals: rookery for sea lions, and harbor seals
Other Special Interest:	none
Keywords:	none

Incident Summary:

The F/V *Knight Island* capsized and sank in 15 to 20 fathoms of water approximately one mile off Cape Ugat on Kodiak Island August 2, 1994. The vessel had 6,000 gallons of diesel fuel and 200 gallons of gasoline in drums on board. The USCG cutter *Sedge* was on-scene and recovered the five 55-gallon drums of gasoline and observed diesel bubbling to the surface at an estimated rate of 3 to 5 gallons per minute creating a sheen 1,300 yards by 1,600 yards, moving northwesterly away from the beach; it was dissipating rapidly. The winds were light and variable throughout the incident. Weather (low ceilings and fog) hampered overflights after the initial view until the third day when overflight observers saw the sheen largely dissipated with no impact of oil on surrounding beach areas. No impacts were reported.

Behavior of Oil:

The diesel rapidly sheened out, evaporated, dissipated, and dispersed naturally. No attempts were made to recover any of the diesel and no areas were impacted.

Countermeasures and Mitigation:

No countermeasures were deployed, although consideration was given to booming the Little River salmon stream. This was not necessary as the oil moved naturally away from the beach.

NOAA Activities:

NOAA was notified of the incident on August 2, 1994, by the USCG and asked to provide oil behavior and resources at risk analyses. The weather forecast called for continued calm conditions. The state of the tide indicated that the diesel would be carried in a northerly direction no more than one mile before dispersing and dissipating. Resources in the area included a salmon stream roughly one mile to the south and seabird, sea lion, and harbor seal rookeries one to two miles to the northeast.

References:

Research Planning Institute. 1983. *Sensitivity of coastal environments and wildlife to spilled oil: Shelikof Strait, Alaska, southern section: An atlas of coastal resources.* Seattle: Office of Oceanography and Marine Assessment, NOAA. 40 maps.

Name of Spill:	Barge *Umpqua Fisher*
NOAA SSC:	John W. Whitney
USCG District:	17
Date of Spill:	08/10/94
Location of Spill:	Cape Nome on the northern side of Norton Sound
Latitude:	64°27'N
Longitude:	165°0'W
Spilled Material:	diesel
Spilled Material Type:	2
Amount:	20,000 gallons
Source of Release:	barge
Resources at Risk:	Birds: potentially large numbers of waterfowl
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest:	none
Keywords:	none

Incident Summary:

The open-deck barge, *Umpqua Fisher* owned by Peter Kiewit Sons Co., was being used to move small quantities of rock at the Cape Nome rock quarry when brisk south-southeast winds caused it to run aground on the west side of the causeway extending from Cape Nome. The grounding occurred very early August 10 and fuel tanks were immediately breached. The barge had 20,000 gallons of diesel onboard. The weather continued to deteriorate as winds increased to 30 to 40 knots, with high seas and heavy breakers pounding the barge and Cape Nome. The owner believes that most of the 20,000 gallons was lost during the first 12 hours. The responsible party was very cooperative with the USCG and was very proactive in attempts to salvage the barge. The continuation of high winds, however, caused further deterioration and damage to the barge, so it was towed offshore and scuttled. The owner saved a large crane onboard and used temporary patches to ensure the barge's flotation en route to the scuttle area. Heavy weather persisted as the barge was towed offshore. Finally, in 135 feet of water, explosive charges were detonated and the barge was sunk at 64°28.37', 169°25.14'. This response lasted 16 days.

Behavior of Oil:

Cape Nome is a very exposed wave-cut platform, rocky headland and the high winds that drove the diesel onto the rocks quickly caused the oil to disperse and dissipate. No diesel was recovered and no areas were apparently impacted.

Countermeasures and Mitigation:

High winds made countermeasures impossible.

NOAA Activities:

The USCG and NOAA were notified of the incident the morning of August 10, 1994. NOAA's response was entirely by phone and fax. NOAA provided weather updates, contacted all the resource agencies, and passed the information on to the USCG. The MNFS

indicated that there were no marine mammal concerns; the USFWS mentioned waterfowl concerns, generally in the Norton Sound area. USFWS specifically mentioned Safety Sound Barrier Island roughly five miles east of Cape Nome. part of the Alaska Maritime Northwest Region because it has significant populations of shorebirds and waterfowl, An Alaska Department of Fish and Game representative on-scene observed no birds in the water near Cape Nome. ADIOS runs were performed and regular updates were maintained with the resource agencies.

NOAA supported this response for two days.

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:	T/B *Annahootz*
NOAA SSC:	John W. Whitney
Date of Spill:	09/01/94
USCG District:	17
Location of Spill:	Port of Anchorage
Latitude:	61°05'N
Longitude:	150°00'W
Spilled Material:	diesel
Spilled Material Type:	2
Amount:	400-500 gallons
Source of Release:	barge
Resources at Risk:	none
Dispersants:	N
Bioremediation:	N
In-Situ Burning:	N
Other Special Interest:	none
Keywords:	evaporation

Incident Summary:

On the morning of September 1, 1994, the barge *Annahootz* spilled approximately 500 gallons of diesel into Cook Inlet while onloading at the Port of Anchorage. The spill occurred when oil flowed up through the No. 1 port expansion trunk and sounding tube saturating the barge's wooden deck. The response was initiated by Forty-Niner Transportation, the responsible party; but Verca, a local spill contractor, was hired to complete the response. The oil moved under the dock and out the north end in response to a back eddy from the ebbing tide. Containment boom and sorbents were deployed around the barge and at the north end of the dock. Sheen extended north along the shore 50 to 100 yards offshore from near the dock to the vicinity of Cairn Point. Overflight observers reported isolated ribbons and stringers of sheen with no more than 50 gallons of diesel estimated to be on the water near Cairn Point and no wildlife activity on shore within four miles. Much of the diesel dispersed naturally in the energetic currents of Cook Inlet; however, the next morning MSO representatives noted approximately five small sheens in the dock area and judged that further cleanup was possible. Approximately 100 to 110 gallons of oil-water mix were recovered. The weather throughout the incident was light winds from the southwest and good visibility.

Behavior of Oil:

The sheen moved north along the coast during an ebb tide, apparently in response to a back eddy. Of the 400 to 500 gallons of diesel spilled, only 110 gallons of oil-water mix were recovered. No areas were impacted.

Countermeasures and Mitigation:

Containment and sorbent booms were deployed around the barge. Some oil was recovered as the current carried the slick into a shoreline entrapment boom configuration. Open-water recovery or shoreline cleanup were not necessary. The oiled wood planking on the deck of the barge was removed and the deck was cleaned by order of the COTP. The barge sailed on September 3.

NOAA Activities:

NOAA was notified of the *Annahootz* incident on September 1, 1994, by MSO Anchorage. NOAA provided weather and tidal current information and notified the appropriate resource agencies of the incident. The SSC accompanied the responsible party on an overflight of the Port of Anchorage during which the dock area and five miles of coastline north of the dock were inspected. NOAA supported this incident for one day.

Acronyms

ADEC	Alaska Department of Environmental Conservation
ADIOS™	Automated Data Inquiry for Oil Spills
ALOHA™	Areal Locations of Hazardous Atmospheres
API	American Petroleum Institute
AST	Atlantic Strike Team
ATSDR	Agency for Toxic Substances and Disease Registry
BOA	Basic Ordering Agreement (USCG)
CAMEO™	Computer-Aided Management of Emergency Operations
CCG	Canadian Coast Guard
CCRT	Caribbean Regional Response Team
CDC	Centers for Disease Control
CEDRE	Research and Documentation Center For Accidental Water Pollution (France)
CF&G	California Fish and Game
CHRIS	Chemical Response Information System (U.S.Coast Guard)
CISPRI	Cook Inlet Spill Prevention and Response Inc.
cm	centimeter
COIL	Central Oil Identification Laboratory (USCG)
COTP	Captain of the Port (USCG)
CRRT	Caribbean Regional Response Team
C/V	container vessel
DBRC	Delaware Bay and River Cooperative
DCM	Dangerous Cargo Manifest
DEEP	Dispersant Employment and Evaluation Plan
DEP	Department of Environmental Protection (MA)
DEQ	Department of Environmental Quality (VA)
DOE	Washington Department of Ecology
DOI	Department of the Interior
DRAT	District Response and Advisement Team (USCG)
EDC	ethylene dichloride
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FLIR	forward-looking infrared radar
FOSC	Federal On-Scene Coordinator
F/P	fish processing vessel
F/V	fishing vessel
GC-MS	gas chromatography-mass spectrometry
GST	Gulf Strike Team

HAZMAT	hazardous material/Hazardous Material Response and Assessment Division (NOAA)
HDPE	high density polyethylene
ICWW	Intracoastal Waterway
IDLH	Immediately Dangerous to Life or Health
IFO	intermediate fuel oil
IMO	International Maritime Organisation
IMS	International Marine Service
IRT	Incident Response Team
ISB	in-situ burn
ITOPF	International Tanker Owners Pollution Federation
km	kilometer
LC	lethal concentration
LSU	Louisiana State University
m	meter
MDNR	Michigan Department of Natural Resources
MSD	Marine Safety Detachment (USCG)
MSO	Marine Safety Office (USCG)
MSRC	Marine Spill Response Corporation
M/V	motor vessel
NCP	National Contingency Plan
NAVSUPSAL	Navy Supervisor of Salvage
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmosphere Administration
NPS	National Park Service
OHEPA	Ohio Environmental Protection Agency
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
PST	Pacific Strike Team
RIEMA	Rhode Island Emergency Management Agency
RRT	Regional Response Team
RWQCB	Regional Water Quality Control Board (CA)
SCAT	Shoreline Cleanup Advisory Teams
SLAR	side-looking airborne radar
SSC	Scientific Support Coordinator (NOAA)
SSST	Sand Source Site Team
T/B	tank barge
T/V	tank vessel

UAE	United Arab Emirates
USAT	United States. Advisory Team
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
USN	United States Navy
VOSS	Vessel of Opportunity Skimming System