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ERT'S 40 HOUR
INLAND OIL SPILLS

(165.18)

5 DAYS

The objectives are:

- An overview of the Oil Pollution Act of 1990.
- Anticipated Revisions to the National Contingency Plan.
- Basic Technical Issues associated with Inland Oil Spills.
- Oil Spill Prevention.
- Clean-up and Treatment Technologies.
- Role of Public Agencies Responding to Inland Spills.
- Monitoring Requirements.

After completing the course, students will be more knowledgeable about the fundamentals of oil spill response; collection of information concerning spill conditions; interpretation and use of data; and response actions for inland oil spills.

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Emergency and Remedial Response
Environmental Response Team

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FOREWORD

This manual is for reference use of students enrolled in scheduled training courses of the U.S. Environmental Protection Agency. While it will be useful to anyone who needs information on the subjects covered, it will have its greatest value as an adjunct to classroom presentations involving give and take discussions among the students and the instructional staff.

This manual has been developed with a goal of providing the best available current information, individual instructors may provide additional material to cover special aspects of their presentations.

Due to the limited availability of the manual, it should not be cited in bibliographies or other publications.

References to products and manufacturers are for illustration only; they do not imply endorsement by the U.S. Environmental Protection Agency.

Constructive suggestions for the improvement in the coverage, content and format of the manual are welcome.

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INLAND OIL SPILLS (165.18)

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SECTION 1

PART I

INTRODUCTION

The Inland Oil Spill Training course was developed to provide the OSCs with a basic knowledge of the effects of spilled oil on the environment; strategies used for cleanup of spilled oil/ and an overview of the Oil Pollution Act of 1990. In order to understand the magnitude of the oil spill problem, some past spill statistics can be reviewed (see **TABLE 1 and 2**). Spills can be categorized by their frequency, location, cause or by types of oil spilled.

In 1985 and 1986, 12,802 spills occurred, mostly occurring inland. The highest volume of oil spilled at one time also occurred inland.

The most commonly listed causes of these spills were equipment failure (i.e., pipeline/tank rupture and leak) and human error (see **TABLE 3**).

Products spilled most often were crude oil and diesel oil. Products that were spilled in large volume at one time were crude oil, diesel oil, gasoline and kerosene (see **TABLE 4**).

These statistics indicate the need for oil spill control training, both inland and offshore.

Annual summaries of spill statistics can be obtained from the Office of the Commandant (G-MTH), U.S. Coast Guard, 2100 Second St. SW, Washington, DC. 20593 (202/426-0266). As of July 1990, statistics from 1986 are the most current being published by the Federal Government.

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TABLE 1
U.S. SPILL INCIDENTS AND VOLUMES FOR 1985 AND 1986

General Areas	# Incidents		% of Total Volume		% of Total	
	1985	1986	1985	1986	1985	1986
Inland	1343	620	19.2	10.8	63.2	18.5
Atlantic	1270	1022	18.2	17.7	10.8	29.1
Pacific	1189	920	17.0	16.0	3.2	5.0
Gulf	1555	1206	22.2	20.9	8.2	22.7
Great Lakes	27	158	0.4	2.7	0.0	0.2
Other	1609	1836	23.0	31.9	14.6	24.5
TOTAL	6993	5762	100.0	100.0	100.0	100.0
HAZARDOUS/OTHER SUBSTANCES (pounds)						
Inland	58	20	21.2	12.7	2.2	64.7
Atlantic	25	8	9.2	5.1	0.4	6.5
Pacific	16	17	5.9	10.8	39.4	2.8
Gulf	10	29	3.7	18.4	0.6	8.6
Great Lakes	0	7	0.0	4.4	0.0	0.8
Other	164	77	60.1	48.7	57.4	16.6
TOTAL	273	158	100.0	100.0	100.0	100.0

TABLE 2
COMPARISONS OF OIL LOSS INCIDENTS IN 1984, 1985 AND 1986 BY SOURCE

Source	Total Number of Incidents			Total Oil Lost (gallons)			Percent of Year's Total		
	1984	1985	1986	1984	1985	1986	1984	1985	1986
Vessels	2425	2069	2819	6268348	15127802	3397985	38.6	81.0	76.5
Land vehicles	635	484	259	376627	228456	37354	2.3	1.2	0.8
Non-transportation	2398	1830	597	1921687	2094608	654747	11.8	11.2	14.7
Trans/related	54	65	41	2613	43047	173599	0.0	0.2	3.9
Marine facilities	180	194	318	88973	56549	82288	0.5	0.3	1.9
Land facilities	73	130	256	31062	88946	23779	0.2	0.5	0.5
Misc./unknown	3480	2250	1538	7565613	1035732	297449	46.5	5.5	6.7
GRAND TOTAL	9245	7022	5828	16254923	18675140	4667201	100.0	100.0	100.0

TABLE 3
PRODUCTS SPILLED
U.S. OIL SPILL CAUSES
1985 AND 1986

Causes	Total Incidents		% of Total	
	1985	1986	1985	1986
Human error	1377	2081	10.8	93.9
Equipment failure/rupture	2792	1452	19.3	6.6
Intentional discharge	210	248	0.4	1.6
Natural chronic phenomena	92	77	0.2	0.0
Miscellaneous Unknown	2024	1620	68.0	2.0
RR/highway/air	527	302	1.3	0.9
TOTAL	7022	5780	100.0	100.0

TABLE 4
PRODUCTS SPILLED

Type	# of Incidents		% Total		Quantity		% of Total	
	1985	1986	1985	1986	1985	1986	1985	1986
Crude Oil	2310	933	33.0	16.2	12004014	1698805	64.3	38.3
Gasoline	583	537	8.3	9.3	510359	439652	2.7	9.9
Kerosene/Fuel Oil	120	107	1.7	1.9	216132	107379	1.2	2.4
Diesel Oil	1815	1990	26.7	34.5	2212884	922579	11.9	20.8
Fuel Oil	340	446	4.9	7.7	965451	854589	5.2	19.2
Asphalt/Tar/Pitch	41	42	0.6	0.7	42908	11595	0.2	0.3
Other Distillate	61	48	0.9	0.8	9490	1866	0.1	0.0
Solvents	11	10	0.2	0.2	110109	28714	0.6	0.6
Waste Oil	7	674	0.1	11.7	96	43641	0.0	1.0
Animal/Vegetable Oil	138	35	2.0	0.6	51618	84057	0.3	1.9
Other Oil	1552	938	22.2	16.3	2543624	121575	13.6	2.7
Chemical	0	0	0.0	0.0	0	0	0.0	0.0
Other Substances	15	2	0.2	0.0	109	126000	0.0	0.0
TOTAL	6993	5762	100.0	100.0	1866794	4440452	100.0	100.0

PAST EXPERIENCES IN SPILL RECOVERY

One good way to learn is by doing something, making mistakes and correcting those mistakes. Unfortunately, this type of learning can be expensive. A second method is to study the mistakes and successes of others and learn from their experiences. The purpose of this section is to take the second course of action by studying different types of spills and learning how the cleanup activities were conducted.

Tampico Maru Spill

The tanker Tampico Maru, carrying 60,000 barrels of marine diesel oil, grounded on March 29, 1957 at the entrance to a small cove on the Pacific Coast of Baja, California. The wreck blocked three-fourths of the entrance to the cove, trapping most of the oil inside. About one-third of the cargo was lost when the ship grounded, and the rest was lost over a period of nine months as the ship broke apart.

An initial survey conducted one month after the wreck revealed almost a 100% mortality rate in the intertidal zone of the cove and the adjacent shorelines for one-half mile in either direction. The area was taken over by seaweed three months after the spill and recovered steadily for a three to four year period, after which it was almost completely recovered. However, populations of some animals were reported to be considerably reduced seven to 12 years after the spill (North et al., 1965; Mitchell et al., 1970).

Torrey Canyon Spill

The tanker Torrey Canyon grounded about 15 miles off Cornwall, England on March 18, 1967. Some 800,000 barrels of Kuwait crude were spilled, with about one-third lost through weathering before reaching land (Nelson-Smith, 1970). About 200 miles of British and French coastline were contaminated.

Mortalities from the oil were not only due to mechanical causes but also to highly toxic detergents used to remove oil from intertidal surfaces. Where detergents were not used, some plants and animals survived the spill. Seaweeds were less affected by the spill and cleaning operations and covered the rocky shores within two to three months. Animal recovery began almost immediately and was almost complete after two years. Birds, however, were seriously affected. Estimates of mortality ranged between 10,000 and 100,000 birds, mostly auks (Ranwell, 1968).

Santa Barbara Spill

On January 29, 1969, an oil well in the Santa Barbara Channel, California, blew out and released an estimated 30,000 - 50,000 barrels of oil. Most of the oil was released during the first ten days. The oil weathered before reaching shore and the biological effects were

mostly mechanical, except for mortalities in the immediate vicinity of the well platform (Straughan, 1971). Studies following the spill indicate that some intertidal animals and plants were killed. Birds were seriously affected. Sea lion and elephant seal colonies apparently suffered no ill effects (Straughan, 1971).

Tank Barge Florida

On September 19, 1969, the tank barge Florida grounded in Buzzards Bay near West Falmouth, Massachusetts and released about 2,400 barrels of No. 2 fuel oil. Heavy seas and on-shore winds kept the oil near shore and worked it into the sediments. The initial survey, three days after the spill, found large piles of dead fish and invertebrates on the shore. Trawl samples taken near shore indicated that 95 percent of the animal life was killed. Nearby marshes were contaminated, killing marsh plants. Some oysters and mussels inhabiting the fringe areas were temporarily tainted. It was reported that after a year and a half only the most pollution-resistant organisms had resettled in the more heavily contaminated areas. Less contaminated areas began to recover within a year (Blumer et at., 1971: Hampson and Sanders, 1969).

Tanker Collision - Golden Gate Bridge

On January 18, 1971 two tankers collided under the Golden Gate Bridge near San Francisco. About 20,000 barrels of Bunker C oil was spilled, fouling some 50 miles of coastline. Immediately after the spill, dead shore crabs were seen and barnacles were completely covered with oil. Up to eight million organisms, mostly barnacles, were smothered by the oil. By July 1971, the mean number of organisms per square meter had decreased to 21 from an August 1969 mean of 56. Because there was extensive per-spill baseline data over several years, the decrease could be attributed to the oil. However, the majority of organisms showed new growth and recruitment which continued through December. The area began to recover as the oil was eroded from the rock (Chan, 1972). By April 1974, less than five percent of the oil remained on rocky surfaces as wave action continued its erosive process. The population of mussels and snails increased 50 percent above the immediate post-spill population. These large increases may be partly due to the removal of older animals from the rocks, making more space available for the settlement of young animals.

Populations of the striped shore crab did not recover to pre-spill levels. Many of the crabs were smothered by the oil, but some of the decrease may have been due to handling by seashore visitors. Overall, no lingering effects of the oil could be detected by early 1974 (Chan, 1974).

Bay Marchand Spill

The Shell Oil platform blowout at Bay Marchand, Louisiana was a major incident because of fire, platform damage and the number of personnel and equipment involved. Since the wind in January was from the north, little oil reached the shoreline. Also, the fire was allowed to burn until secondary wells could be drilled to plug the burning wells.

Lake Champlain Spill

The Lake Champlain spill occurred on March 23, 1971 at a terminal on the frozen shore of Lake Champlain at Plattsburgh, New York. A pumper began transferring No. 6 fuel oil from a holding tank to a working tank at 10:30 a.m. Because of the low temperatures and slow pumping, the transfer was allowed to proceed for the rest of the shift. At 10:30 p.m. the pumper remembered that the transfer pump was still on. He returned to the terminal and discovered that approximately 1000 barrels of No. 6 fuel oil had been pumped over the top of the tank. Oil had spilled down the side of the tank, over the ground, into a drainage ditch, then into a stream and into Lake Champlain.

The pumper and others from the terminal constructed temporary dikes around the tank and in the ditch and spread straw over the spilled oil. Unfortunately, most of the oil reached the ice-covered lake where it melted down through five feet of ice. The oil cooled and remained trapped under the ice but on top of the water.

The next day the company constructed a temporary steam line down to the lake and added a number of secondary lines at the end header. Secondary lines were submerged under the ice and in the oil to make the oil easier to pump. Vacuum trucks were used to remove the oil from the lake. This proved to be a slow process because of the viscosity of the oil and the high suction lift.

To prevent oil from spreading under the ice, an open water ditch was constructed around the spill by sawing and removing blocks of ice. A wooden boom of 4' x 8' sheets of marine plywood was nailed to railroad ties. The boom was lowered into the ditch. During the night, the water froze and held the boom in place. Test borings showed that oil did not migrate past the boom.

Oil was removed from beneath the ice on a 24-hour basis. Straw was used in the drainage ditch and stream bed to sorb the oil. Oiled straw was handled by pitchfork and placed in large boxes to be carried up the steep hills to dump trucks (one of the few instances where the use of straw would be recommended).

Six days after the oil was spilled, the cleanup operation was completed. Although about 1000 barrels of oil were spilled from the tank, about 5000 barrels of oil and water were removed from the lake for separation. After the spill, the company constructed a system of dikes to prevent other spills. Drainage from the diked areas was directed to a new oil-water separator.

Schuylkill River Spill

On June 21, 1972 the largest inland oil spill in history occurred due to flooding conditions from Hurricane Agnes. Six to eight million gallons of oily sludge was released into the Schuylkill River from Douglassville, PA to Philadelphia, PA and eventually the Delaware River. Forty miles of river was directly impacted.

Hundreds of Federal/State/Local workers directly and indirectly aided in the cleanup operations. The peak of the operations involved 500 contract personnel working with over 60 pieces of major heavy equipment. The result of the cleanup was an estimated 350,000 gallons of oil recovered and 13,627 tons of oily material and debris disposed of. By the conclusion of the operations on September 30, 1972, the cleanup costs were approximately 4.5 million dollars.

Oakland Estuary Spill

The Oakland Estuary Spill cleanup operation was well organized and coordinated through the Clean Bay Inc. cooperative headquarters near San Francisco. The spill began just before midnight on January 18, 1973 from three storage tanks which held waste oil. About 4000 barrels of waste oil were released from the tanks into nearby storm drains and into the estuary. The police suspected vandalism.

The Coast Guard Captain of the Port acted as the on-scene coordinator for the spill. The Coast Guard first called an oil cleanup contractor to begin work by sandbagging the storm drain and deploying booms around the pier near the storm drain. During the first day 195 birds were rescued by Coast Guard recruits and the State Department of Fish and Game.

At some time during the first day, it was determined that considerably more oil was spilled than first estimated. Thirty hours into the spill, the Coast Guard asked Clean Bay, Inc. to act as principal contractor. Within minutes of the call, the contingency plan was activated and personnel were called to take assignments.

Within two hours the communications headquarters was moved to the spill site and cleanup supervisors began arriving at the scene. Clean Bay began by working two 12-hour shifts and called for additional staff and equipment as needed.

The cleanup required 30,500 staff hours, 31 major vessels, 95 tanks, 58 small boats, 3 helicopters and about 20,000 feet of boom. Cleanup costs totaled $1.2 million for the 7½-day operation. Although 320 oiled birds died from the spill, about 140 oiled birds were saved.

Details of this spill and the Lake Champlain spill are included in the copies of the reports at the end of this section. Because the Oakland Estuary spill was well documented, it will be referred to throughout the course.

Nepco 140 Spill

The tank barge Nepco 140 grounded near the eastern end of Wellesley Island on June 23, 1976, releasing approximately 300,000 gallons of No. 6 oil into the St. Lawrence River. During the three days that followed, the oil slick extended over 80 miles downstream. In all, over 300 miles of island and mainland shoreline were contaminated by oil. Included in the contaminated shorelines were areas of recreational and ecologically unique value. The total cost of the 16-week cleanup effort exceeded $8 million.

During the spill cleanup a number of techniques were tried to remove the heavy bunker oil from the water, shorelines and marshes. Although special skimmers were used in the initial spill stages, manual labor provided for most of the spill cleanup. Cleaning of rocks and other solid objects was done by manually scraping or spraying from high pressure water or steam systems. One major problem of this spill was finding a location for all of the collected debris.

Amoco Cadiz Spill

On march 16, 1978 the tanker Amoco Cadiz went aground as a result of mechanical failures in the rudder hydraulics system. The spill that ensued dumped 220,000 metric tons of Iranian and Arabian light crude into the area near Portsall, France. Due to rough sea conditions (6 to 8m waves) that coincided with this incident, lightering operations were made impossible. The occurrence of the spill within the equinoctial spring tides allowed waves to reach five meters higher than normal tides. The oil-water mixture, termed chocolate mousse, that heavily contaminated shores east of the grounding provided a cleanup problem that lasted for months. Cleanup techniques used covered a wide range of efforts.

Nearly 10,000 persons worked on the cleanup project at its height. Over 200,000 tons of oil and debris were recovered, although this yielded only 20,000 tons of oil after separation from water and debris. The remaining oil was either dispersed, evaporated or mixed into the sea bottom.

Shoreline cleanup was intense. Loaders, bulldozers, graders, mechanical shovels, agriculture manure tanks, vacuum trucks and skimmers were used on sandy beaches. However, on pebble beaches and rocky coves, this mechanization could not be used effectively. In these latter areas manual methods were used (shovels, rakes, baskets, plastic bags). Using high pressure jets of water proved ineffective in some areas as oil was just pushed from rock to rock. In some areas, dispersant was mixed with sprayed water (0.2 to 0.5% dispersant) and oil was removed from the rocks.

Ixtoc I Blow-out

On June 3, 1980 the Ixtoc I, a Petroleos Mexicanos (PEMEX) exploratory well, blew out at a site about 80 kilometers northwest of Ciudad del Carmen, Mexico and began spilling oil into the Bahia de Campeche. By late July, the Ixtoc I had become the largest oil spill in world history, surpassing the 68 million gallons of oil lost by the tanker Amoco Cadiz. The Ixtoc I spill may prove to be the most expensive oil spill in history as well as the largest. By December 15, 1980 the Ixtoc I had lost more than 158 million gallons of crude oil. Total costs including cleanup costs, damage claims, lost oil revenues and equipment may exceed $590 million.

Although much of the oil was kept offshore by the prevailing ocean currents, dispersion was aided by the spraying of over 1.5 million U.S. gallons of dispersant. Oil that reached the shoreline was removed either naturally or by manual labor.

Alvenus Spill

On July 30, 1984, the British tanker Alvenus ran aground in the Calcasiou Ship Channel while en route to the Conoco Refinery at Lake Charles, Louisiana. The vessel's hull cracked in the vicinity of the number 2 forward cargo tanks on port, centerline and starboard. Over 10,500 metric tons of heavy Venezuelan crude were spilled.

The oil impacted 55 miles of coastline and finally moved onshore at Galveston Island, Texas. It accumulated the heaviest in the middle and western portions of the island. About 80% of the Galveston seawall was oiled, as were about 90% of the beaches on the west end.

Cleanup of the beaches was accomplished by removal of oiled sand with heavy equipment. The seawall cleanup used sorbents and hydroblasting to remove oil from the rocks and seawall.

Shipping channels were not impacted, and almost no oil reached areas inside the barrier beach, limiting the biological impact of the spill. The estimated cost of cleanup came to $20 million.

Puerto Rican Spill[1,2]

On October 31, 1984 the tanker Puerto Rican fully laden with lube oil and lube oil additives, suffered an explosion 12 miles southwest of the Golden Gate Bridge, San Francisco, California. After an additional series of explosions, the vessel was abandoned and towed further offshore. On November 3, 1984 during the towing operation, the vessel broke into two sections, with the stern section sinking and releasing approximately 30,000 bbls of lube oil. Rough weather prevented response equipment from being dispatched and the decision to utilize dispersants was made by government officials. Approximately 2,000 gallons of Corexit 9527 were applied by plane, making this the first spill response application on the west coast of the U.S.

Although minimal shoreline impact resulted from this spill, approximately 620 birds were oiled and contractor cleanup costs were estimated at 1.5 million dollars.

Exxon Valdez Spill[3]

On March 24, 1989 just after midnight, the U.S. registered tankship, Exxon Valdez, ran hard aground on Bligh Reef in Prince William Sound. A catastrophic release of approximately 240,000 barrels of Prudhoe Bay crude oil occurred, polluting one of North America's most pristine environments. Dispersant use was presented to government agencies for approval and despite pre-planned application zone designation, dispersant use was allowed on a trial basis only. Days one to three of the spill were blessed with very calm weather, however, very little recovery was accomplished. During the early morning hours of March 27, a strong winter storm buffeted the area and the 240,000 barrel spill was transformed into a water/oil emulsion, resistant to in-situ burning and dispersal. This transformation dramatically changed the nature of the spill response.

The cleanup that followed the spill is still ongoing and is expected to continue into 1991. Exxon Corporation accepted full responsibility for the cleanup and during the summer of 1989 employed over 11,000 personnel in the cleanup efforts. Extraordinary volumes of equipment and material were utilized from around the world, yet Exxon never shed the "bad guy" image.

Cleanup management topics such as waste disposal, state government relations, public affairs, in-situ burning, dispersant usage and damage assessment were covered in detail rarely seen in a spill response, yet solutions were infrequently found. At the time of this manual update, approximately $2 billion (over $8000 per bbl spilt) had been expended by Exxon making this the most expensive cleanup effort in history.

Brooklyn Underground Oil Spill[4]

On September 2, 1978 oil was observed in a creek by USCG personnel. Although it appeared to come from a storm sewer outfall, oil was found to be seeping out from a bulkhead. Booms and vacuum trucks were deployed to recover the oil.

Test boring in the area revealed oil underground. Sumps and a recovery well were installed near the sewer outfall. Local investigations for the spill source at bulk oil and gasoline facilities were inconclusive. As the amount of oil recovered increased, large scale testing was initiated.

At least 191 test wells were drilled by the government and various oil companies, most by hollow-stem auger. Most wells were four inches in diameter, using PVC slotted pipe, capped at ground level to prevent vehicular damage. On the average, three wells were damaged or destroyed each week.

Data was collected to determine oil layer thickness and shape. The spill was estimated to cover 52 acres with about 17 million gallons of oily product. Oil and groundwater varied from seven to over 40 feet below the land surface. Since there were no active public water wells in the area, pumping out water and oil was not a major problem. Also, the product did not appear to threaten any populated areas, as most of the entire area was industrial or commercial property.

Oil recovery at the initial recovery site averaged about 18,000 gallons for several months and slowly decreased to about 2,000 gallons in May 1979. Subsequent recovery wells were installed, particularly on oil company property to collect oil. Many systems installed included groundwater depression pumps to increase the oil recovery rate.

The product appears to have originated from a former refinery. The products may have been in the ground as much as 30 years and may have included leaded gasoline, kerosene, No. 2 fuel oil, solvents and refinery fuel. Cleanup costs were estimated at $4,000,000.

Long Island Tank Truck Spill[5]

On June 12, 1981 a car went out of control on the Long Island Expressway, hit a wall, crossed three lanes and collided with a tank truck. About 2,500 gallons of No. 6 fuel oil flowed onto the highway. A local contractor and the New York Sanitation Department cooperated so that the 3000 gallons left in the tank were off-loaded. Oil on the road was removed from the highway by using 24-inch neoprene squeegees and vacuum trucks. Oil in catch basins was recovered using vacuum trucks. Residual oil on the highway was treated with sawdust which was later removed. Two lanes were reopened in about four hours, and the third land was reopened within eight hours.

St. Louis Bay Spill[6, 7]

A pipeline metering device ruptured on October 31, 1981 at Superior, Wisconsin. About 94,500 gallons of gasoline leaked into a creek, through a culvert and into a boat skip on St. Louis Bay. Upon receiving a report of strong gasoline fumes from local citizens, the U.S. Coast Guard located a large slick and traced its origin back to the boat slip, the culvert and to the pipeline. Upon checking the metering devices, the pipeline company reported that the oil had been flowing for about eight hours.

Meanwhile, the USCG deployed 75 meters of boom at the boat slip. The local fire department requested nearby industries and the railroad to cease operations. The police closed off a two-block area near the culvert. The electric utility turned off electricity to the slip area. The oil company hired a local contractor to recover the product within the boom. Weir types skimmers were used to remove the product into tank trucks; the USCG used fire boat water jets to disperse the sheen on the bay.

In the creek, an underflow dam was constructed near the pipeline to contain any leaching oil. A polyethylene-lined liquid containment pit was constructed next to the transfer station to collect water during a recent flushing operation. Collected water was filtered through activated charcoal. A sub-contractor was hired to test groundwater by drilling two to three meter-deep monitoring wells. Wells were checked by hydrocarbon sniffers and by visual inspection. No gasoline was found. About 25,000 gallons of gasoline were recovered.

Tank Farm Spill[8, 9, 10]

A ruptured fuel tank at Wilmington, North Carolina spilled about 2,000,000 gallons of diesel fuel on January 10 and 11, 1982. Although the oil flowed into the diked containment area, a network of storm drains and sewer pipes running within the hilly terrain complicated spill cleanup.

A contractor was hired to clean up the spill. Heavy equipment was used to construct dams in two nearby drainage ditches. Collected oil was pumped back to the diked enclosure and into tank trucks. Booms were placed in the river as a precautionary measure.

Heavy rains caused dams to fail. Oil and water were pumped into railroad tank cars and taken to an oil/water containment tank. A few days later the containment tank cracked, respilling oil into a drainage ditch. A dam was constructed in the ditch to contain the oil, and the oil and water were pumped back into tank cars. By January 26, 4 barges, 50 rail cars and 90 tank trucks of liquid had been recovered, or about 1,950,000 gallons.

The remaining oil apparently seeped into the ground. On January 19, oil was found at two sewer pump stations. Sorbent booms and skimmers were deployed to collect oil in pools. Subsequent investigation of underground pipes and drains found contaminated lines. Sewer lines were blocked to contain the oil. Monitoring wells were drilled to determine the direction of oil movement. Wells near the storage tanks failed to collect oil. There was no estimate of cleanup completion by February 7.

Ruffy Brook and Swamp Spill[11]

On July 21, 1982 over 540,000 gallons of light crude oil flowed from a ruptured pipeline, down a hill and into a creek and adjacent swamp in Minnesota. After a local farmer reported the spill, pipeline workers constructed a series of siphon dams and a sorbent filter fence in the creek. About 160,000 gallons of oil were recovered from the creek; a small amount escaped after a rainfall on July 23.

An estimated 300,000 gallons of oil remained in the grassy swamp. Due to the thick vegetation, manual and mechanical cleanup were not attempted. Instead, the oil was burned. The burn thinned out the grass, leaving heavy unburned oil residue. The oil, ash and burned grass were removed by a local contractor. Water samples were taken for hydrocarbons, heavy metals and pH changes. No changes were noticed. No fish kills of wildlife deaths were reported.

Sautali Marsh Spill[12, 13, 14]

The Sautali Marsh spill occurred on September 2 and 3, 1982 at a refinery on the island of Guam. Apparently a metal pipeline elbow broke under stress, and about 30,000 gallons of oil flowed down a ridge and into a marsh. Oil in the marsh drained through a culvert into the river and harbor. Initially the spill was believed to have come from a navy vessel in the harbor. The Navy deployed booms, a skimmer, vacuum trucks, sorbent booms and sorbent pads. They estimated recovering 10,000 gallons. However, the boom skirt was not of sufficient depth to hold oil during tidal changes. Furthermore, heavy rains helped flush oil out of the marsh.

When later estimates claimed 500,000 gallons of oil were spilled into the marsh, the USCG Pacific Strike Team was called in November. The culvert from the marsh was cleared and modified for draining oil into a collection point. Nine smaller channels were constructed to aid oil drainage out of the marsh. Due to all the liquid being pumped out of the marsh, water from adjacent marshes was pumped into the oiled marsh. As of January, about 185,000 gallons of liquid had been recovered, with about 200,000 gallons of oil remaining

in the marsh. The cleanup required several more months, with oil leaching out of the marsh throughout the next year.

Ashland Oil Spill [15, 16]

The Ashland oil spill on January, 1988 near Pittsburgh, Pennsylvania, was one of the largest inland releases of oil in U.S. history. On that Saturday, January 2nd, at approximately 5:10 p.m., 38,881,841 gallons of No. 2 diesel fuel were released from a collapsing oil storage tank at the Ashland Oil Company terminal in Floreffe, Pennsylvania. Approximately 750,000 gallons was estimated to have reached the Monongahela River.

Most of the 750,000 gallons of oil that entered the river did so within the first two hours following the rupture of the tank. Approximately 250 near-by residents were evacuated that evening. Eight hundred, thirty four thousand people were affected by water-intake closures on the Monongahela and Ohio Rivers. An estimated water fowl mortality range was from 2,000 to 4,000 ducks, loons, cormorants, and Canada geese.

Efforts to contain and recover oil at this enormous spill included more than 150 people, 11 vacuum trucks, 3 cranes, 10 barges and towboats, dozens of small work boats, and 20,000 feet of river boom. Three USCG and three private helicopters were used for air surveys and to transport personnel and equipment quickly over long distances. Two of the barges were self-propelled suction barges. While underway the barge deploys boom to collect oil product, and simultaneously vacuums the product and stores it in the vessel's 5,000 gallon tank. This recovery method has been considered the best and most flexible alternative to boom systems for river spills of this nature. The cleanup operations continued and were monitored by EPA OSC until EPA's demobilization on February 26, 1988. Clean up efforts resulted in an estimated 204,600 gallons of recovered oil.

SUMMARY

The spills described represent many different situations, but some conclusions can be reached which are common to all. In each case, it was necessary to clean up the spill in a manner that was compatible with the equipment and manpower available at the site. Proven cleanup techniques worked at each spill. Innovation was necessary to match the unique circumstances of each spill to the cleanup effort. Weather played a significant part in some cases. Each cleanup effort showed the necessity of preplanning cleanup activities.

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SECTION 1

PART II

GLOSSARY

ABSORPTION — Any process by which one substance penetrates the interior of another substance. In the case of oil spill cleanup, this process applies to the uptake of oil by capillaries within certain sorbent materials. (See also: Capillary action.)

ADSORPTION — The process by which one substance is attracted to and adheres to the surface of another substance without actually penetrating its internal structure.

AEROBIC — Able to live or grow only where free oxygen is present.

AEROSOL — A system in which liquid or solid particles are distributed in a finely divided state through a gas, usually air. particles within aerosols are usually less than 1 micron (0.001 mm) in diameter, and are more uniformly distributed than in a spray.

AIR OR WATER STREAMS — A method of oil containment where the force of air or water directed as a stream can be used to divert or contain an oil slick. The method can be used to flush oil from beneath docks or to adjust floating booms once they are in place.

ALCOHOLS — A class of organic chemical compounds characterized by the presence of the hydroxyl (OH: oxygen-hydrogen) group attached to a carbon atom. Alcohols are important solvents, and are used to a certain extent in the preparation of chemical dispersants. (See also: Glycols.)

ALGA — Any of a large group of aquatic plants ranging from tiny one-celled to large multi-celled organisms.

ALIPHATIC COMPOUND — Any organic compound of hydrogen and carbon characterized by a linear or branched chain of carbon atoms. Three subgroups of such compounds are alkanes, alkenes, and alkynes.

ALKANES — A class of hydrocarbons (compounds of hydrogen and carbon) characterized by branched or unbranched chains of carbon atoms with attached hydrogen atoms. Alkanes all have the general formula C_nH_{2n+2}, and contain no carbon-carbon double bonds (i.e., they are saturated). Alkanes are also called paraffins and are major constituents of natural gas and petroleum. Alkanes containing less than 5 carbon atoms per molecule ("n" in above formula is less than 5) are usually

gases at room temperature (e.g., methane), those having between 5 to 15 carbon atoms are usually liquids, and straight chain alkanes having more than 15 carbons are solids. Low carbon number alkanes produce anaesthesia and narcosis stupor; slowed activity at low concentrations and at high concentrations can cause cell damage and death in a variety of organisms. Higher carbon number alkanes are not generally toxic but have been shown to interfere with normal metabolic processes and communication in some species. (For other common hydrocarbons, see also: Alkenes, Aromatics and Naphthalenes.)

ALKENES

A class of straight or branched chain hydrocarbons similar to alkenes but characterized by the presence of carbon atoms united by double bonds. Alkenes are also called olefins and all have the general formula C_nH_{2n}. alkenes containing 2 to 4 carbon atoms are gases at room temperature, while those containing 5 or more carbon atoms are usually liquids. Alkenes are not found in crude oils but are often formed in large quantities during the cracking (breaking down of large molecules) of crude oils, and are common in many refined petroleum products such as gasolines. These hydrocarbons are generally more toxic than alkanes but less toxic than aromatics. (For other classes of hydrocarbons, see also: Alkanes, Aromatics and Naphthenes.)

AMBIENT

Local or surrounding conditions; primarily used in reference to climatic conditions at some point in time, e.g., ambient temperature.

ANAEROBIC

A term used to describe a situation or an area characterized by the lack of oxygen. The term can also be used in reference to organisms such as some bacteria which can survive and grow in the absence of gaseous or dissolved oxygen. For example, many marine sediments are anaerobic below depth of a few centimeters from the surface, and therefore degradation of oil deposited in such areas in slow and primarily associated with anaerobic types of micro-organisms.

API GRAVITY

A scale developed by the American Petroleum Institute to designate an oil's specific gravity, or the ratio of the weights of equal volumes of oil and pure water. API gravity is dependent on temperature and barometric pressure, and is therefore generally measured at 16°C and one atmosphere pressure. Water with a specific gravity of 1.0 has an API gravity of 10°. A light crude oil may have an API gravity of 40°. Oils with low specific gravities have high API gravities and vice versa. API gravity can be calculated from specific gravity using the following formula. (See also: Specific gravity.)

$API^\circ = (141.5/\text{Specific Grav. @ } 16^\circ C) - 131.5$

AROMATICS

A class of hydrocarbons characterized by rings containing 6 carbon atoms. Benzene is the simplest aromatic and most aromatics are derived from this compound. Aromatics are considered to be the most immediately toxic hydrocarbons found in oil, and are present in virtually all crude oils and petroleum products. Many aromatics are

soluble in water to some extent, thereby increasing their danger to aquatic organisms. Certain aromatics are considered long-term poisons and often produce carcinogenic effects. (For other classes of hydrocarbons, see also: Alkanes, Alkenes and Naphthenes.)

ASPHALT A black or brown hydrocarbon material that ranges in consistency from a heavy liquid to a solid. The most common source of asphalt is the residue left after the fractional distillation of crude oils. Asphalt is primarily used for surfacing roads.

BACKSHORE The area of the shoreline above the high tide mark. The backshore is only inundated with water during exceptionally strong storms or abnormally high tides accompanied by high winds, and therefore does not support characteristic intertidal flora and fauna. Granular materials for the replacement of oil contaminated beach material excavated during shoreline cleanup programs are frequently taken from backshore areas.

BARREL A unit of liquid (volumetric) measure of petroleum and petroleum products, equal to 35 Imperial gallons or approximately 160 liters. This measure is used extensively by the petroleum industry. The U.S. standard barrel is 42 gallons.

BARRIER or CONTAINMENT BARRIER With respect to oil spill cleanup, any non-floating structure which is constructed to contain or divert spilled oil. Barriers are generally improvised and, unlike booms, are usually left in place until the cleanup program is complete. Sorbent materials may be used in the barrier construction to simultaneously recover the spilled oil. Barriers are most frequently used in streams or ditches too shallow for conventional floating booms, and are almost always staked downstream of the spill site.

BENTHOS The plants and animals that live in and on the bottom of a water body.

BERM A low, impermanent, nearly horizontal or landward-sloping beach, shelf, ledge, or narrow terrace on the back-shore of a beach, formed of material thrown up and deposited by storm waves; it is generally bounded on one side or the other by a beach ridge or beach scarp. Some beaches have no berm, others may have one or several.

BIODEGRADATION The degradation of substances resulting from their use as food energy sources by certain micro-organisms including bacteria, fungi and yeasts. The process with respect to oil degradation is extremely slow and limited to great extent by temperature, nutrients and oxygen availability. Although more than 100 species of micro-organisms have the ability to utilize hydrocarbons as an energy source, no single species can degrade more than 2 or 3 of the many compounds normally found in oil.

BIOLOGICAL AGENT Micro-organisms (primarily bacteria) added to the water column or soil to increase the rate of biodegradation of spilled oil. Alternatively, nutrients added to the water (in the form of fertilization) to increase the growth and biodegradation capacity of micro-organisms already present.

BIOLOGICAL PRODUCTIVITY The rate at which the energy of the sun is transferred to and reflected in growth and/or abundance of plants and animals. It is a measure of the biological richness of a population, community or ecosystem, and is usually expressed as the quantity of carbon stored in tissue per unit time. Certain environments are characterized by higher biological productivity than others; for example, marshes and estuaries are generally more productive than offshore marine waters. The biological productivity of an area is an important consideration in contingency plan design and priorities assigned for oil spill cleanup.

BIOREMEDIATION A treatment technology that uses biological activity to reduce the concentration or toxicity of contaminants: materials are added to contaminated environments to accelerate natural biodegradation.

BIOTA Animal and plant life characterizing a given region. Flora and fauna, collectively.

BOG A wet soggy area with little or no drainage.

BOILING POINT The temperature at which a liquid begins to boil; specifically, the temperature at which the vapor pressure of a liquid is equal to the atmospheric or external pressure. The boiling point of crude oils and petroleum products may vary from 30 to 550°C but is of little practical significance in terms of oil spill cleanup. (See also: Flash point.)

BOOM or CONTAINMENT BOOM A floating mechanical structure which extends above and below the water surface, and is designed to stop or divert the spread or movement of an oil slick. Booms are an integral part of virtually all cleanup programs following oil spills on water.

BOOM FAILURE Failure of a commercial or improvised boom to contain oil due to excessive winds, waves or currents, or improper deployment. Boom failure may be manifested in oil underflow, oil splashover, or structural breakage. (See also: Sheet breakaway; Droplet breakaway.)

BOTTOMLAND Low-lying ground that may be flooded from time to time.

BRACKISH Intermediate in salinity between sea water and fresh water.

BRINE CHANNELS Small passages formed in the lower surface of first-year sea ice formed by the exclusion of saline water or salts during rapid freezing. Researchers have found that oil under first year ice will migrate through the brine channels once the spring melting process beings. (See also: First-year ice.)

BUBBLE BARRIER A containment barrier which takes advantage of the 2-way currents produced when a rising curtain of bubbles reaches the water surface. The system has been used with some success in relatively calm harbors but requires considerable maintenance when the submerged perforated pipes which are used to produce the bubble curtain become covered with redistributed bottom silt.

BULK CARRIER An ocean-going vessel specifically designed to transport large quantities of a single product such as grain or coal.

BUNKER "B" A relatively viscous fuel oil (No. 5 fuel) used primarily as a fuel for marine and industrial boilers.

BUNKER "C" A very viscous fuel oil (No. 6 fuel) used as a fuel for the marine and industrial oilers.

BURNING AGENT Compounds or materials such as gasoline which are used to ignite and sustain combustion of spilled oil which otherwise will not burn. Burning agents are generally required to burn weathered oils since volatile, low flash point hydrocarbons are rapidly lost through evaporation.

CARBON NUMBER The number of carbon atoms present in a single molecule of a given hydrocarbon. The physical and chemical properties of hydrocarbons tend to vary with the number of carbon atoms, and these properties are frequently described in terms of carbon number ranges for specific classes of hydrocarbons. For example, alkanes with carbon numbers from 1 to 4 are gaseous at ordinary temperatures and pressures.

CATALYST A substance added to a reacting system (e.g., chemical reaction) which alters the rate of the reaction without itself being consumed. Most catalysts are used to increase the rate of a reaction. For example, the metal vanadium is often present in trace amounts in crude oils and acts as a catalyst to accelerate the rate of chemical oxidation of certain hydrocarbons as the oil weathers. Catalysts (Silica, alumina, for example) are also used during the refining of petroleum to increase the rate at which large hydrocarbon molecules are split into smaller ones (catalytic cracking).

CHEMICAL DISPERSION With respect to oil spills, this term refers to the creation of oil-in-water emulsions by the use of chemicals made for this purpose. In regard to shoreline cleanup, chemical dispersion is the process of spraying chemical dispersant to remove stranded oil from rocky shoreline areas which are not considered biologically sensitive. Dispersants are usually sprayed on the contaminated surfaces at low tide and allowed to mix with the oil through natural wave action on the incoming tide. This forms an oil-in-water emulsion which is subsequently flushed from the shoreline with water hoses or through natural wave action.

"CHOCOLATE MOUSSE"	The name given to a water-in-oil emulsion containing 50-80% water. These emulsions are very stable, have a butter-like consistency, and are only formed with a relatively viscous oil in the presence of considerable wave action. (See also: Emulsification; Water-in-oil emulsion.)
CLAM SHELL	A mechanical device mounted at the end of a crane which picks up soil or mud with a pincer-like movement.
CLAY	Soil or sediment particles which are less than 0.004 mm (4 microns) in maximum dimensions. Most clays are produced as a result of the weathering of coarser rock materials. Clay particles are smaller than either sand or silt.
COAGULATING AGENT	Chemical additives applied to oil to form a more cohesive mass.
COBBLE BEACH	A beach composed primarily of gravel having a size range from 64 to 256 mm. This type of beach is also referred to as a shingle beach. By comparison, boulder substrates are greater than 256 mm, while pebble substrates range in size from 4 to 64 mm.
COMETRABOLISM	The process by which compounds in petroleum may be enzymatically attached by micro-organisms without furnishing carbon for cell growth and division.
CONTACT PERIOD	The time required to maximize the efficiency of the sorbent or chemical agent or the time before plant or animal damage occurs.
CONTAINMENT	The process of preventing the spread of oil beyond the area where it has been spilled in order to minimize pollution and facilitate recovery.
CONTINGENCY PLAN	A plan for action prepared in anticipation of an oil spill. A contingency plan usually consists of guidelines developed for a specific industrial facility or an entire region to increase the effectiveness, efficiency and speed of cleanup operations in the event of an oil spill, and simultaneously protect areas of biological, social and economic importance.
COUNTERMEASURE	An action taken to prevent or control pollution by oil spills.
CRITICAL VELOCITY	The lowest water current velocity which will cause loss of oil under the skirt of a containment boom. Critical velocity varies with specific gravity, viscosity and thickness of the oil slick contained by the boom, as well as the depth of the skirt and position of the boom with respect to the current direction. Critical velocity for most oils in situations where the boom is at right angles to the current is about 0.5 m/sec (1 knot). (See also: Boom failure.)

DETRITUS Loose material that results from rock disintegration or abrasion. Also, suspended material in the water column including fragments of decomposing flora and fauna, and fecal pellets produced by zooplankton and associated bacterial communities. (See also: Fecal pellets.)

DISPERSANT Solvents and agents for reducing surface tension used to remove oil slicks from the water surface.

DISPERSANT or CHEMICAL DISPERSANT Chemicals which reduce the surface tension between oil and water, and thereby facilitate the breakup and dispersal of the slick throughout the water column in the form of an oil-in-water emulsion. Chemical dispersant can only be used in areas where adverse biological damage will not occur, and then only when approved for use by government regulatory agencies.

DISPERSION The distribution of spilled oil into the upper layers of the water column by natural wave action or application of chemical dispersant. In shoreline cleanup and restoration, the removal of stranded oil through wave action (natural dispersion), or application of chemical dispersants, or use of one of various hydraulic dispersion techniques.

DISTILLATE A refined hydrocarbon which is obtained by collection and condensation of a known vapor fraction of the crude oil.

DISSOLUTION The act or process of dissolving one substance in another. Specifically, a process contributing to the weathering of spilled oil whereby certain "slightly" soluble hydrocarbons and various mineral salts present in oil are dissolved in the surrounding water.

DRAG LINE A mechanical device that excavates or transports soil, using a container pulled over earth by cables or chains.

DROPLET BREAKAWAY A type of boom failure resulting from excessive current velocity. In this type of boom failure, the head wave formed upstream of the oil mass contained within a boom becomes unstable and oil droplets are torn off and become entrained in the water flow beneath the boom. (See also: Critical velocity; Head wave; Sheet breakaway.)

ECOSYSTEM The interaction of plants, animals, and their environment.

EMULSIFICATION The process whereby one liquid is dispersed into another liquid in the form of small droplets. In the case of oil, the emulsion can be either oil-in-water or water-in-oil. Both types of emulsions are formed as a result of wave action, although water-in-oil emulsions are more stable and create special cleanup problems. (See also: Oil-in-water emulsion; Water-in-oil emulsion.)

ENVIRONMENTAL SENSITIVITY	The susceptibility of a local environment or area to any disturbance which might decrease its stability or result in either short or long-term adverse impacts. Environmental sensitivity generally includes physical, biological and socio-economic parameters.
EROSION	The process by which the earth's surface is worn away by water, wind, or waves.
ESTUARY	A partly enclosed coastal body of water in which freshwater (usually originating from a river) is mixed and diluted by seawater. Estuaries are generally considered more biologically productive than either adjacent marine or freshwater environments, and are important areas in the life cycles of many fish and wildlife resources.
EUTROPHICATION	The filling in of a lake basin by the ceposition of organic and inorganic sediment that eventually results in the lake becoming a swamp or bog, and ultimately a meadow.
EVAPORATION	The process whereby any substance is converted from a liquid state to become part of the surrounding atmosphere in the form of a vapor. In the case of oil, the rate of evaporation depends on the volatility of various hydrocarbon constituents, temperature, wind and water turbulence, and the spreading rate of the slick. Evaporation is the most important process in the weathering of most oils. Evaporation reduces the volume of oil, its flammability and its toxicity, but increases the viscosity and density of the residue.
FAUNA	Animals in general, or animal life as distinguished from plant life (flora). Usually used in reference to all the animal life characteristic of or inhabiting a particular region or locality.
FERTILIZER	A substance or agent that helps promote plant or seed growth.
FLASH POINT	The temperature at which vapors produced by a crude oil or petroleum product will ignite when exposed to an ignition source such as an open flame. (See also: Boiling point.)
FLORA	Plants in general, or plant life as distinguished from fauna (animal life). Usually used in reference to all the plant life inhabiting or characteristic of a particular region or locality.
FLUSHING	Use of a water stream to make oil flow to a desired location or recovery device.
FOULING	Accumulation of oil or other materials, such as debris, that makes a device inoperative.
FRACTION	One of the portions of chemical mixture separated by chemical or physical means from the remainder.

FRACTIONAL DISTILLATION — Separation of a mixture of liquids such as crude oil into components having different boiling points. Fractional distillation is the primary process in the refining of crude oils.

FREEBOARD — The part of a floating boom designed to prevent waves from washing oil over the top. Freeboard is also used to describe the distance from the water surface to the top of the boom. Freeboard is generally also applied to the distance from the deck of a vessel (ship, barge, etc.) to the water line.

FREE OIL — See mobile oil.

FUEL OILS — Refined petroleum products having specific gravities in the range from 0.85 to 0.98 and flash points greater than 55°C. This group of products includes furnace, auto diesel, and stove fuels (No. 2 fuel oils); plant or industrial heating fuels (No. 4 fuel oils); and various bunker fuels (No. 5 and No. 6 fuel oils).

GASOLINES — A mixture of volatile, flammable liquid hydrocarbons used primarily for internal combustion engines, and characterized by a flash point of approximately -40°C and a specific gravity from 0.65 to 0.75.

GELLING AGENTS — Chemicals which increase the viscosity of oil, and, in theory, can be applied to an oil slick to reduce its rate of spread over the water surface. However, gelling agents are rarely used due to their expense, the large volume requirements and slow action.

GLYCOLS — Any of a class of organic compounds belonging to the alcohol family but having two hydroxyl groups (OH: oxygen-hydrogen) attached to different carbon atoms. The simplest glycol is ethylene glycol, a compound used extensively for automobile antifreeze and contained in many modern chemical dispersant.

GROUNDFISH — Fish species normally found close to the sea bottom throughout the adult phase of their life cycle. Groundfish feed extensively on bottom fauna.

GROUNDWATER — Water present below the soil surface and occupying voids in the porous subsoil; specifically, the porous layer which is completely saturated with water. The upper surface of the groundwater is referred to as the water table. Contamination of groundwater supplies is a major concern when oil is spilled on land since groundwater supplies springs and wells, and passes into surface water supplies in many areas.

HABITAT — The chemical, physical, and biological setting in which a plant or animal lives.

HEAD WAVE — An area of oil concentration which occurs behind and at some distance from containment booms. This area of oil thickening is important to the positioning of mechanical recovery devices (i.e., skimmers), and is the region where the droplet breakaway boom failure phenomenon is initiated when current flow exceeds critical velocity. (See also: Droplet breakaway.)

HERDING AGENT — Chemical agent which confines or controls the spread of a floating oil film.

HYDRAULIC DISPERSION — One of various shorelines cleanup techniques which utilizes a water stream at either low or high pressure to remove stranded oil. These techniques are most suited to removal of oil from coarse sediments, rocks and man-made structures, although care must be taken to avoid damage to intertidal flora and fauna.

HYDROCARBON — One of a very large and diverse group of chemical compounds composed only of carbon and hydrogen; the largest source of hydrocarbons is petroleum crude oil.

HYDROCARBONS — Organic chemical compounds composed only of the elements carbon and hydrogen. Hydrocarbons are the principal constituents of crude oil, natural gas and refined petroleum products, and include four major classes of compounds (alkanes, alkenes, naphthenes, and aromatics) each having characteristic structural arrangements of hydrogen and carbon atoms, as well as different physical and chemical properties.

HYDROPHOBIC AGENT — A chemical or material which has the ability to resist wetting by water. Hydrophobic agents are occasionally used in the treatment of synthetic sorbents to decrease the amount of water absorbed and hence increase the volume of oil they can absorb before becoming saturated. (See also: Synthetic organic sorbents.)

INORGANIC — Pertaining to, or composed of, chemical compounds that are not organic, that is, contain no carbon-hydrogen bonds. Examples include chemicals with no carbon and those with carbon in non-hydrogen-linked forms.

INTERTIDAL ZONE — The portion of the shoreline between the low tide mark and high tide mark which is covered by water at some time during daily tidal cycles. The size of the intertidal zone varies with the tidal characteristics of a given region, as well as the steepness of the shoreline. In general, steep, rocky shorelines have smaller intertidal zones than gradually sloping sand or gravel beaches. Since all portions of the intertidal zone are without water cover at some time during each day, flora and fauna capable of withstanding desiccation are found throughout this zone. Depending on the tidal level when oil reaches the shoreline, all or a portion of the intertidal zone can be affected by the incoming slick. The most suitable cleanup methods are dictated by the physical

characteristics of the intertidal zone, as well as the sensitivity of the affected shoreline. In some instances, the intertidal zone is left to cleanse itself naturally.

JET FUEL A kerosene or kerosene-based fuel used to power jet aircraft combustion engine. (See also: Kerosene.)

KEROSENE A flammable oil characterized by a relatively low viscosity, specific gravity of approximately 0.8 and flash point near 55°C. Kerosene lies between the gasolines and fuel oil in terms of major physical properties, and is separated from these products during the fractional distillation of crude oils. Uses for kerosene include fuels for wick lamps, domestic heaters and furnaces; fuel or fuel components for jet aircraft engines; and thinner in paints and insecticide emulsions.

LAGOON A shallow sound, pond, or lake generally near but separated from or communicating with the open sea. A shallow freshwater pond, or lake generally near or communicating with a larger body of freshwater.

LANDFILL A dump that has progressive layers of waste matter and earth.

LIGHT ENDS A term used to describe the low molecular weight, volatile hydrocarbons in crude oil and petroleum products. The light ends are the first compounds recovered from crude oil during the fractional distillation process, and are also the first fractions of spilled oil to be lost through evaporation.

LUBRICATING OILS Oils used to reduce friction and wear between solid surfaces such as moving machine parts and internal combustion engine components. Petroleum-based lubricating oils (and greases) are refined from crude oil through a variety of processes including vacuum distillation, extraction, of specific products with solvents (solvent extraction), removal of waxes with solvents, and treatment with hydrogen in the presence of a catalyst. Most lubricating oils and greases derived from crude oil contain a large proportion of high carbon number alkanes and naphthalenes which provide the most favorable lubricating characteristics. The viscosity of a lubricating oil is its most important characteristic since it determines the amount of friction that will be encountered between sliding surfaces and whether a thick enough film can be built up to avoid wear from solid-to-solid contact.

MARSH Low, wet land covered by grassy vegetation.

MARSH FRINGE The outermost edge of shoreline vegetation.

MEANDER The curve of a river.

METABOLISM	The physical and chemical processes by which foodstuffs are synthesized into complex elements, complex substances are transformed into simple ones, and energy is made available for use by an organism; thus all biochemical reactions of a cell or tissue, both synthetic and degradative, are include.
METABOLITE	A product of metabolism.
METRIC TON (TONNE)	A unit of mass and weight equal to 1,000 kilograms or 2,205 pounds avoirdupois. In Canada, the metric ton is the most widely used measure of oil quantity by weight. There are roughly 7 to 9 barrels (245 to 315 Imperial gallons) of oil per metric ton, depending on the specific gravity of the crude oil or petroleum product.
MICRO-ORGANISM	Microscopic organisms including bacteria, yeasts, filamentous fungi, algae, and protozoa.
MICRO-ORGANISMS	Plant or animal life of microscopic or ultramicroscopic size (i.e., not visible to the human eye without the aid of a microscope). Micro-organisms are found in the air, water and soil, and generally include the bacteria, yeasts and fungi. Some micro-organisms are capable of metabolizing hydrocarbons and play a role in the natural degradation of spilled oil.
MIGRATION	The rhythmic seasonal movement of certain birds and other animals.
MINERAL SPIRITS	Flammable petroleum distillates that boil at temperatures lower than kerosene, and are used as solvents and thinners, especially in paints and varnishes. Mineral spirits are the common term for some naphthas. Mineral spirits were used extensively in chemical dispersants made before 1970 but are not used in modern dispersants due to their toxicity. (See also: Naphtha.)
MINERALIZATION	The biological process of complete breakdown of organic compounds, whereby organic materials are converted to inorganic products (e.g., the conversion of hydrocarbons to carbon dioxide and water.)
MOBILE OIL	Oil which can refloat when water is applied (as in high tide).
MOBILIZATION	Movement of oil caused by physical forces such as gravity, tides, or wind. Mobility of oil is limited by its viscosity.
MOLECULAR WEIGHT	The total mass of any group of atoms which are bound together to act as a single unit or molecule.
MOUSSE	A type of oil/water emulsion.

NAPHTHA — Any of various volatile and often flammable liquid hydrocarbon mixtures used chiefly as solvents and diluents. Naphtha consists mainly of hydrocarbons which have a higher boiling point than gasolines and lower boiling point than kerosene. Naphtha was a principal component of chemical dispersants used prior to 1970.

NAPHTHENES — A class of hydrocarbons with similar physical and chemical properties to alkanes but characterized by the presence of simple closed rings. Like alkanes, naphthenes are also saturated (i.e., they contain no carbon-carbon double bonds), and have the general formula, C_nH_{2n}. Naphthenes are found in both crude oils and refined petroleum products. This class of hydrocarbons are insoluble in water, and generally boil at 10-20°C higher than the corresponding carbon number alkanes. (For other classes of hydrocarbons, see also: Alkanes, Alkenes, Aromatics.)

NON-PERSISTENT — Decomposed rapidly by environmental action.

OIL-IN-WATER EMULSION — An emulsion of oil droplets dispersed in surrounding water, formed as a result of wave action or by a chemical dispersant. Oil-in-water emulsions show a tendency to coalesce and reform an oil slick when the water becomes calm, although the presence of surface active agents in the oil or artificially added in the form of chemical dispersants increases the persistence of this type of emulsion. Natural dispersion of large quantities of oil can follow the formation of oil-in-water emulsions, and weathering processes such as dissolution, oxidation and biodegradation may be accelerated due to the large increase in the surface area of the oil relative to its volume. (See also: Emulsification; Water-in-oil emulsion.)

OIL/WATER SEPARATOR — A device for separating oil from water.

OLEOPHILIC — A material that has affinity for oil.

OLEOPHILIC AGENT — A material or chemical which was the tendency to attract oil. Chemicals of this type may be used to treat sorbent materials in order to increase their oil recovery capacity.

ORGANIC — Chemical compounds based on carbon that also contain hydrogen, with or without oxygen, nitrogen, and other elements.

OXIDATION or ATMOSPHERIC OXIDATION — The chemical combination of compounds such as hydrocarbons with oxygen. Oxidation is a process which contributes to the weathering of oil. However, in comparison to other weathering processes, oxidation is slow since the reaction occurs primarily at the surface, and only a limited amount of oxygen is capable of penetrating the slick or surface oil.

PARAFFIN A waxy substance obtained from the distillation of crude oils. Paraffin is a complex mixture of higher carbon number alkanes that is resistant to water and water vapor and is chemically inert. The term is sometimes used to refer to alkanes as a class of compounds.

PEAT Partially decomposed plant material common to wet areas.

PEBBLE BEACH A beach substrate composed primarily of gravel having a size range from 4 to 64 mm. Pebble substrates are finer than cobble and coarser than sand, and can allow stranded oil to penetrate to a considerable depth.

PENETRATION Downward extent of oil (into the sediments) for each distribution.

PHOTOSYNTHESIS The process by which plants convert water and carbon dioxide into carbohydrates.

POLYETHYLENE A polymer (substance composed of very large molecules that are multiples of simpler chemical units) of the alkene, ethylene, which takes the form of a lightweight thermoplastic. Polyethylene has high resistance to chemicals, low water absorption and good insulating properties, and can be manufactured in a number of forms. Polyethylene also as high oleophilic properties and has been used with considerable success as a sorbent for oil spill cleanup.

POLYURETHANE Any of a class of synthetic resinous, fibrous or elastomeric compounds belonging to the family of organic polymers, consisting of large molecules formed by the chemical combination of successive smaller molecules into chains or networks. The best known polyurethanes are the flexible foams used as upholstery material and mattresses, and the rigid foams used as lightweight structural elements including cores for airplane wings. Polyurethane is also the most effective sorbent that can be used for oil spill cleanup and, unlike most synthetic sorbents, efficiently recovers a wide range of different viscosity oils.

POOLED OIL Oil thickness exceeds 1 cm. This need not be uniform.

POROSITY A measure of the space in a rock or soil that is not occupied by mineral matter. Porosity is defined as the percentage of total pore space, including all voids, whether or not they are interconnected, in the total volume of rock. The porosity of a rock or soil is determined by the mode of deposition, packing of grains, compaction, grain shape, and grain size. Porosity can also be used to refer to the voids in other materials such as in sorbents.

POUR POINT The lowest temperature at which a substance, such as oil, will flow under specified conditions. The pour point of crude oils generally varies from -57°C to 32°C; lighter oils with low viscosities have lower pour points. The pour point of an oil is important in terms of impact

to the shoreline and subsequent cleanup since free-flowing oils rapidly penetrate most beach substrates, whereas semi-solid oils tend to be deposited on the surface and will only penetrate if the beach material is coarse or the ambient temperature is high.

RECONTAMINATION Contamination by oil of an area that was previously cleaned.

RECOVERY In oil spill cleanup, the entire process or any operation contributing to the physical removal of spilled oil from land, water or shoreline environments. General methods of recovery of oil from water are the use of mechanical skimmers, sorbents and manual recovery by the cleanup work force. The main method of recovery of oil spilled on land or shorelines is excavation of contaminated materials.

REMOTE SENSING The aerial sensing of oil on the water surface. The primary applications of remote sensing are the location of an oil spill prior to its detection by any other means and the monitoring of the movement of an oil slick under adverse climatic conditions and during the night.

RESIDUAL OILS The oil remaining after fractional distillation during petroleum refining; generally includes the bunker fuel oils.

RHIZOME A rootlike stem under or along the ground, ordinarily in a horizontal position, which usually sends out roots from its lower surface and leafy shoots from its upper surface.

RIPRAP A layer of large, durable fragments of broken rock, specially selected and graded, thrown together irregularly or fitted together. Its purpose is to prevent erosion by waves or currents and thereby preserve the shape of a surface, slope, or underlying structure. It is used for irrigation channels, river-improvement works, spillways at the dams, and sea walls for shore protection. (b) The stone used for riprap.

RUNOFF Rainwater or melting snow that drains away across the surface of the ground.

SEDIMENTS A general term used to describe or refer to: material in suspension in air or water; the total dissolved and suspended material transported by a stream or river; the unconsolidated sand and gravel deposits of river valleys and coastlines; and materials deposited on the floor of lakes and oceans.

SEDIMENTATION Due to the weathering, the density of some heavy spilled oils may increase and become higher than that of the sea water, so that they sink. Oil may also be absorbed by heavy mineral particles (sand, silt, etc.) and thus sink.

SEINE A fish net which can be used to collect sorbent or debris.

SENSITIVITY MAPS Maps used by oil spill response teams which designate areas of biological, social and economic importance in a given region. These maps often prioritize sensitive areas so that in the event of an extensive spill these areas can be protected or cleaned up first. Sensitivity maps usually contain other information useful to the response team such as the location of shoreline access areas, landing strips, roads, communities, and the composition and steepness of shoreline areas. Maps of this type often form an integral part of local or regional contingency plans.

SHEET BREAKAWAY A type of current-induced boom failure resulting from the fact that a boom placed in moving water tends to act like a dam. The surface water being held back by the boom is diverted downwards and accelerates in an attempt to keep up with the water flowing directly under the boom skirt, and in so doing simultaneously draws oil from the surface under the boom. As a general rule, sheet breakaway will occur when current velocity exceeds 36 cm/sec, although skirt depth, oil viscosity, specific gravity, slick thickness, and angle or placement of the boom relative to the current direction have a bearing on this form of boom failure.

SHORELINE SENSITIVITY The susceptibility of a shoreline environment to any disturbance which might decrease its stability or result in short- or long-term adverse impacts. Shorelines that are most susceptible to damage from stranded oil are usually equally sensitive to cleanup activities, which may alter the physical habitat or disturb associated flora and fauna. The most sensitive shoreline environments are marshes and lagoons, while exposed coastline, subject to heavy wave action, is generally least affected by oil and/or cleanup activities.

SHORELINE TYPE The average slope or steepness and predominant substrate composition of the intertidal zone of a shoreline area. In any given region, shoreline type may be used to assess the type and abundance of intertidal flora and fauna, protection priorities, and most suitable oil spill cleanup strategies.

SILT Soil or sediment particles which range in size from 4 to 64 microns. Silt particles are larger than clays (4 microns) but smaller than sand (64 microns to 2 mm).

SKIRT The portion of a floating boom which lies below the water surface and provides the basic barrier to the spread of an oil slick or the loss of oil beneath the boom.

SKIMMER A mechanical device that removes an oil film from the water surface. Oil skimmers collect oil spilled on, or released to, the water's surface. They come in a wide range of shapes and sizes. Skimmers generally have a higher recovery rate than sorbents, providing enough oil is present for operation. Skimmers are usually equipped with storage

space for collected oil. Oil is herded to a collection point along a containment boom located close to shore yet in water of sufficient depth for the skimmer to function.

SLICK — The common term used to describe a film of oil (usually less than 2 microns thick) on the water surface.

SLURRY — A suspension of particles in water.

SOLUBILITY — The amount of substance (solute) that will dissolve in a given amount of another substance (solvent). The solubility of oil in water is extremely low. (See also: Dissolution.)

SOLVENT — A chemical agent which will dissolve oil.

SORBENT BARRIER — A barrier which is constructed of or includes sorbent materials to simultaneously recover spilled oil during the containment process. Sorbent booms and barriers are only used when the oil slick is relatively thin since their recovery efficiency rapidly decreases once the sorbent is saturated with oil.

SPECIES — A group of related plants or animals that interbreed to produce fertile offspring.

SPECIFIC GRAVITY — The ratio of the weight of a substance such as an oil to the weight of an equal volume of water. Buoyancy is intimately related to specific gravity; if a substance has a specific gravity less than that of a fluid, it will float on that fluid. The specific gravity of most crude oils and refined petroleum products is less than 1.0, and therefore these substances generally float on water. (See also: Surface tension.)

SPREADING — When crude oil or refined petroleum product is poured onto clear water surfaces, it tends to spread out to a thin film. Most crude oils spread to a thickness of some tenths of millimeter after one hour and to only a few microns after two or three hours. In reality oil when spilled onto the sea will form windrows which are elongated thick patches of oil separated by areas of clear water or water covered by a thin film of oil. The spreading rate will be affected by many parameters such as oil thickness near the source of spill, type of oil (boiling range, wax content, viscosity, presence of natural surface active compounds), state of sea, weather conditions, unimpeded surface area water available.

Contamination, in the vicinity of the spill, by floating debris, the limitation of free water surface due to underwater plants or the presence of natural or man made structures (rock, jetties, etc.) and the modification of the pollutant composition (emulsion built up) may also interfere with the phenomenon.

STAIN — Oil thickness is greater than 1 mm.

SUBSTRATE The substance, base, or nutrient on which, or the medium in which, an organism lives and grows, or the surface of which a fixed organism is attached; e.g., soil, rocks, and water.

SUCCESSION The process by which the vegetation of an ecosystem changes over time.

SUMP A pit or reservoir that serves as a drain from which oil can be collected.

SUPRATIDAL Above the normal high tide line.

SURFACE-ACTIVE AGENT A compound that reduces the surface tension of liquids, or reduces interfacial tension between two liquids or a liquid and a solid; also known as surfactant, wetting agent, or detergent.

SURFACE TENSION The force of attraction between the surface molecules of liquid. Surface tension affects the rate at which spilled oil will spread over a land or water surface, or into the ground. Oils with low specific gravities are often characterized by low surface tensions and therefore faster spreading rates. (See also: Specific gravity.)

SWAMP Low, wet forest that is regularly flooded.

TAR A black or brown hydrocarbon material that ranges in consistency from a heavy liquid to a solid. The most common source of tar is the residue left after fractional distillation of crude oil.

TAR BALLS Compact semi-solid or solid masses of highly weathered oil formed through the aggregation of viscous, high carbon number hydrocarbons with debris present in the water column. Tar balls generally sink to the sea bottom but may be deposited on shorelines where they tend to resist further weathering.

TENSION MEMBER The part of a floating containment boom which carries the load placed on the barrier by wind, wave and current forces. Tension members are commonly constructed from wire cable due to its strength and stretch resistance.

TOXICITY The capability of a poisonous compound (toxin) to produce deleterious effects in organisms such as alteration of behavioral patterns or biological productivity (sublethal toxicity), or, in some cases, death (lethal or acute toxicity). The toxic capability of a compound is frequently measured by its "acute LC_{50}" with a standard test organism such as rainbow trout. The acute LC_{50} of a toxic chemical is the concentration which will result in death in 50% of the test organisms over a given time period, usually 96 hours. The most immediately toxic compounds in crude oils or refined petroleum products are the aromatics such as benzene. (See also: Aromatics.)

ULTRAVIOLET RADIATION The portion of the electromagnetic spectrum emitted by the sun which is adjacent to the violet end of the visible light range. Often called "black light", ultraviolet light is invisible to the human eye, but when it falls on certain surfaces, it causes them to fluoresce, or emit visible light. Ultraviolet light is responsible for the photo-oxidation of certain compounds including hydrocarbons, although this process is limited to a large extent by the low penetration ability (in water, air or soil) of this short wavelength form of energy. (See also: Photo-oxidation.)

VISCOSITY The property of a fluid (gas or liquid) by which it resists a change in shape, or movement. Viscosity denotes opposition to flow, and may be thought of as internal friction between the molecules in a fluid. Tar, for example, is very viscous as compared to gasoline. The viscosity of liquids decreases rapidly with an increase in temperature. In oil spill cleanup, the viscosity of an oil is important in terms of its ability to penetrate shoreline substrates, as well as its ability to be handled by most conventional pumps. Viscosity increases as oil weathers since low molecular weight, volatile fractions (light ends) are lost most rapidly. (See also: Light ends; Volatility.)

VOLATILE Readily dissipating by evaporation.

VOLATILITY The tendency of a solid or liquid substance to pass into the vapor state. Many low carbon number hydrocarbons are extremely volatile and readily pass into a vapor state when spilled. For example, gasolines contain a high proportion of volatile constituents which pose considerable short-term risk of fire or explosion when spilled. On the other hand, bunker fuels contain few volatile hydrocarbons since these have been removed during the (fraction distillation) refining process.

WATERFOWL Aquatic birds, including geese, ducks, and swans.

WATER-IN-OIL EMULSION A type of emulsion where droplets of water are dispersed throughout oil, formed when water is mixed with a relatively viscous oil by wave action. In contrast to oil-in-water emulsions, this type of emulsion is extremely stable, and may persist for months or years after a spill, particularly when deposited in shoreline areas. Water-in-oil emulsions containing 50-80% water are most common, have a grease-like consistency, and are generally referred to as "chocolate mousse". (See also: Chocolate mousse; Emulsification; Oil-in-water emulsion.)

WATER TABLE The fluctuating upper level of the water saturated zone (groundwater) located below the soil surface. (See also: Groundwater.)

WAX Any of a class of pliable substances of plant, animal, mineral, or synthetic origin. Waxes generally consist of long-chain organic compounds. Waxes are included in the residue formed following the refining of crude oil.

WEATHERING The alteration of the physical and chemical properties of spilled oil through a series of natural processes which begin when the spill occurs and continues indefinitely while the oil remains in the environment. Major processes which contribute to weathering include: evaporation, dissolution, oxidation, emulsification, and microbial degradation.

WEIR A vertical barrier placed just below the surface of the water so that a floating oil slick can flow over the top.

WICKING AGENT Substances such as straw, wood chips, glass beads and treated silica which are used to increase oxygen availability and provide insulation between oil and water during the disposal of spilled oil by burning. (See also: Burning agent.)

WRACK Debris found on shoreline. May be used by birds for nesting sites.

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TITLE I—OIL POLLUTION LIABILITY AND COMPENSATION

33 USC 2701.

Sec. 1001. DEFINITIONS.

For the purposes of this Act, the term—

(1) "act of God" means an unanticipated grave natural disaster or other natural phenomenon of an exceptional, inevitable, and irresistible character the effects of which could not have been prevented or avoided by the exercise of due care or foresight;

(2) "barrel" means 42 United States gallons at 60 degrees fahrenheit;

(3) "claim" means a request, made in writing for a sum certain, for compensation for damages or removal costs resulting from an incident;

(4) "claimant" means any person or government who presents a claim for compensation under this title;

(5) "damages" means damages specified in section 1002(b) of this Act, and includes the cost of assessing these damages;

(6) "deepwater port" is a facility licensed under the Deepwater Port Act of 1974 (33 U.S.C. 1501-1524);

(7) "discharge" means any emission (other than natural seepage), intentional or unintentional, and includes, but is not limited to, spilling, leaking, pumping, pouring, emitting, emptying, or dumping;

(8) "exclusive economic zone" means the zone established by Presidential Proclamation Numbered 5030, dated March 10, 1983, including the ocean waters of the areas referred to as "eastern special areas" in Article 3(1) of the Agreement between the United States of America and the Union of Soviet Socialist Republics on the Maritime Boundary, signed June 1, 1990;

(9) "facility" means any structure, group of structures, equipment, or device (other than a vessel) which is used for one or more of the following purposes: exploring for, drilling for, producing, storing, handling, transferring, processing, or transporting oil. This term includes any motor vehicle, rolling stock, or pipeline used for one or more of these purposes;

(10) "foreign offshore unit" means a facility which is located, in whole or in part, in the territorial sea or on the continental shelf of a foreign country and which is or was used for one or more of the following purposes: exploring for, drilling for, producing, storing, handling, transferring, processing, or transporting oil produced from the seabed beneath the foreign country's territorial sea or from the foreign country's continental shelf;

(11) "Fund" means the Oil Spill Liability Trust Fund, established by section 9509 of the Internal Revenue Code of 1986 (26 U.S.C. 9509);

(12) "gross ton" has the meaning given that term by the Secretary under part J of title 46, United States Code;

(13) "guarantor" means any person, other than the responsible party, who provides evidence of financial responsibility for a responsible party under this Act;

(14) "incident" means any occurrence or series of occurrences having the same origin, involving one or more vessels, facilities, or any combination thereof, resulting in the discharge or substantial threat of discharge of oil;

(15) "Indian tribe" means any Indian tribe, band, nation, or other organized group or community, but not including any Alaska Native regional or village corporation, which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians and has governmental authority over lands belonging to or controlled by the tribe;

(16) "lessee" means a person holding a leasehold interest in an oil or gas lease on lands beneath navigable waters (as that term is defined in section 2(a) of the Submerged Lands Act (43 U.S.C. 1301(a))) or on submerged lands of the Outer Continental Shelf, granted or maintained under applicable State law or the Outer Continental Shelf Lands Act (43 U.S.C. 1331 et seq.);

(17) "liable" or "liability" shall be construed to be the standard of liability which obtains under section 311 of the Federal Water Pollution Control Act (33 U.S.C. 1321);

(18) "mobile offshore drilling unit" means a vessel (other than a self-elevating lift vessel) capable of use as an offshore facility;

(19) "National Contingency Plan" means the National Contingency Plan prepared and published under section 311(d) of the Federal Water Pollution Control Act, as amended by this Act, or revised under section 105 of the Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. 9605);

(20) "natural resources" includes land, fish, wildlife, biota, air, water, ground water, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the United States (including the resources of the exclusive economic zone), any State or local government or Indian tribe, or any foreign government;

(21) "navigable waters" means the waters of the United States, including the territorial sea;

(22) "offshore facility" means any facility of any kind located in, on, or under any of the navigable waters of the United States, and any facility of any kind which is subject to the jurisdiction of the United States and is located in, on, or under any other waters, other than a vessel or a public vessel;

(23) "oil" means oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil, but does not include petroleum, including crude oil or any fraction thereof, which is specifically listed or designated as a hazardous substance under subparagraphs (A) through (F) of section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. 9601) and which is subject to the provisions of that Act;

(24) "onshore facility" means any facility (including, but not limited to, motor vehicles and rolling stock) of any kind located in, on, or under, any land within the United States other than submerged land;

(25) the term "Outer Continental Shelf facility" means an offshore facility which is located, in whole or in part, on the Outer Continental Shelf and is or was used for one or more of the following purposes: exploring for, drilling for, producing, storing, handling, transferring, processing, or transporting oil produced from the Outer Continental Shelf;

(26) "owner or operator" means (A) in the case of a vessel, any person owning, operating, or chartering by demise, the vessel, and (B) in the case of an onshore facility, and an offshore facility, any person owning or operating such onshore facility or offshore facility, and (C) in the case of any abandoned offshore facility, the person who owned or operated such facility immediately prior to such abandonment;

(27) "person" means an individual, corporation, partnership, association, State, municipality, commission, or political subdivision of a State, or any interstate body;

(28) "permittee" means a person holding an authorization, license, or permit for geological exploration issued under section 11 of the Outer Continental Shelf Lands Act (43 U.S.C. 1340) or applicable State law;

(29) "public vessel" means a vessel owned or bareboat chartered and operated by the United States, or by a State or political subdivision thereof, or by a foreign nation, except when the vessel is engaged in commerce;

(30) "remove" or "removal" means containment and removal of oil or a hazardous substance from water and shorelines or the taking of other actions as may be necessary to minimize or mitigate damage to the public health or welfare, including, but not limited to, fish, shellfish, wildlife, and public and private property, shorelines, and beaches;

(31) "removal costs" means the costs of removal that are incurred after a discharge of oil has occurred or, in any case in which there is a substantial threat of a discharge of oil, the costs to prevent, minimize, or mitigate oil pollution from such an incident;

(32) "responsible party" means the following:

(A) VESSELS.—In the case of a vessel, any person owning, operating, or demise chartering the vessel.

(B) ONSHORE FACILITIES.—In the case of an onshore facility (other than a pipeline), any person owning or operating the facility, except a Federal agency, State, municipality, commission, or political subdivision of a State, or any interstate body, that as the owner transfers possession and right to use the property to another person by lease, assignment, or permit.

(C) OFFSHORE FACILITIES.—In the case of an offshore facility (other than a pipeline or a deepwater port licensed under the Deepwater Port Act of 1974 (33 U.S.C. 1501 et seq.)), the lessee or permittee of the area in which the facility is located or the holder of a right of use and easement granted under applicable State law or the Outer Continental Shelf Lands Act (43 U.S.C. 1301-1356) for the area in which the facility is located (if the holder is a different person than the lessee or permittee), except a Federal agency, State, municipality, commission, or political subdivision of a State, or any interstate body, that as

owner transfers possession and right to use the property to another person by lease, assignment, or permit.

(D) DEEPWATER PORTS.—In the case of a deepwater port licensed under the Deepwater Port Act of 1974 (33 U.S.C. 1501-1524), the licensee.

(E) PIPELINES.—In the case of a pipeline, any person owning or operating the pipeline.

(F) ABANDONMENT.—In the case of an abandoned vessel, onshore facility, deepwater port, pipeline, or offshore facility, the persons who would have been responsible parties immediately prior to the abandonment of the vessel or facility.

(33) "Secretary" means the Secretary of the department in which the Coast Guard is operating;

(34) "tank vessel" means a vessel that is constructed or adapted to carry, or that carries, oil or hazardous material in bulk as cargo or cargo residue, and that—

(A) is a vessel of the United States;

(B) operates on the navigable waters; or

(C) transfers oil or hazardous material in a place subject to the jurisdiction of the United States;

(35) "territorial seas" means the belt of the seas measured from the line of ordinary low water along that portion of the coast which is in direct contact with the open sea and the line marking the seaward limit of inland waters, and extending seaward a distance of 3 miles;

(36) "United States" and "State" mean the several States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Commonwealth of the Northern Marianas, and any other territory or possession of the United States; and

(37) "vessel" means every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water, other than a public vessel.

SEC. 1002. ELEMENTS OF LIABILITY. 33 USC 2702.

(a) IN GENERAL.—Notwithstanding any other provision or rule of law, and subject to the provisions of this Act, each responsible party for a vessel or a facility from which oil is discharged, or which poses the substantial threat of a discharge of oil, into or upon the navigable waters or adjoining shorelines or the exclusive economic zone is liable for the removal costs and damages specified in subsection (b) that result from such incident.

(b) COVERED REMOVAL COSTS AND DAMAGES.—

(1) REMOVAL COSTS.—The removal costs referred to in subsection (a) are—

(A) all removal costs incurred by the United States, a State, or an Indian tribe under subsection (c), (d), (e), or (l) of section 311 of the Federal Water Pollution Control Act (33 U.S.C. 1321), as amended by this Act, under the Intervention on the High Seas Act (33 U.S.C. 1471 et seq.), or under State law; and State and local governments Indians.

(B) any removal costs incurred by any person for acts taken by the person which are consistent with the National Contingency Plan.

(2) DAMAGES.—The damages referred to in subsection (a) are the following:

(A) NATURAL RESOURCES.—Damages for injury to, destruction of, loss of, or loss of use of, natural resources, including the reasonable costs of assessing the damage, which shall be recoverable by a United States trustee, a State trustee, an Indian tribe trustee, or a foreign trustee.

(B) REAL OR PERSONAL PROPERTY.—Damages for injury to, or economic losses resulting from destruction of, real or personal property, which shall be recoverable by a claimant who owns or leases that property.

(C) SUBSISTENCE USE.—Damages for loss of subsistence use of natural resources, which shall be recoverable by any claimant who so uses natural resources which have been injured, destroyed, or lost, without regard to the ownership or management of the resources.

(D) REVENUES.—Damages equal to the net loss of taxes, royalties, rents, fees, or net profit shares due to the injury, destruction, or loss of real property, personal property, or natural resources, which shall be recoverable by the Government of the United States, a State, or a political subdivision thereof.

(E) PROFITS AND EARNING CAPACITY.—Damages equal to the loss of profits or impairment of earning capacity due to the injury, destruction, or loss of real property, personal property, or natural resources, which shall be recoverable by any claimant.

(F) PUBLIC SERVICES.—Damages for net costs of providing increased or additional public services during or after removal activities, including protection from fire, safety, or health hazards, caused by a discharge of oil, which shall be recoverable by a State, or a political subdivision of a State.

(c) EXCLUDED DISCHARGES.—This title does not apply to any discharge—

(1) permitted by a permit issued under Federal, State, or local law;

(2) from a public vessel; or

(3) from an onshore facility which is subject to the Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1651 et seq.).

(d) LIABILITY OF THIRD PARTIES.—

(1) IN GENERAL.—

(A) THIRD PARTY TREATED AS RESPONSIBLE PARTY.—Except as provided in subparagraph (B), in any case in which a responsible party establishes that a discharge or threat of a discharge and the resulting removal costs and damages were caused solely by an act or omission of one or more third parties described in section 1003(a)(3) (or solely by such an act or omission in combination with an act of God or an act of war), the third party or parties shall be treated as the responsible party or parties for purposes of determining liability under this title.

(B) SUBROGATION OF RESPONSIBLE PARTY.—If the responsible party alleges that the discharge or threat of a discharge was caused solely by an act or omission of a third party, the responsible party—

(i) in accordance with section 1013, shall pay removal costs and damages to any claimant; and

(ii) shall be entitled by subrogation to all rights of the United States Government and the claimant to recover

removal costs or damages from the third party or the Fund paid under this subsection.

(2) LIMITATION APPLIED.—

(A) OWNER OR OPERATOR OF VESSEL OR FACILITY.—If the act or omission of a third party that causes an incident occurs in connection with a vessel or facility owned or operated by the third party, the liability of the third party shall be subject to the limits provided in section 1004 as applied with respect to the vessel or facility.

(B) OTHER CASES.—In any other case, the liability of a third party or parties shall not exceed the limitation which would have been applicable to the responsible party of the vessel or facility from which the discharge actually occurred if the responsible party were liable.

SEC. 1003. DEFENSES TO LIABILITY. 33 USC 2703.

(a) COMPLETE DEFENSES.—A responsible party is not liable for removal costs or damages under section 1002 if the responsible party establishes, by a preponderance of the evidence, that the discharge or substantial threat of a discharge of oil and the resulting damages or removal costs were caused solely by—

(1) an act of God;

(2) an act of war;

(3) an act or omission of a third party, other than an employee or agent of the responsible party or a third party whose act or omission occurs in connection with any contractual relationship with the responsible party (except where the sole contractual arrangement arises in connection with carriage by a common carrier by rail), if the responsible party establishes, by a preponderance of the evidence, that the responsible party—

(A) exercised due care with respect to the oil concerned, taking into consideration the characteristics of the oil and in light of all relevant facts and circumstances; and

(B) took precautions against foreseeable acts or omissions of any such third party and the foreseeable consequences of those acts or omissions; or

(4) any combination of paragraphs (1), (2), and (3).

(b) DEFENSES AS TO PARTICULAR CLAIMANTS.—A responsible party is not liable under section 1002 to a claimant, to the extent that the incident is caused by the gross negligence or willful misconduct of the claimant.

(c) LIMITATION ON COMPLETE DEFENSE.—Subsection (a) does not apply with respect to a responsible party who fails or refuses—

(1) to report the incident as required by law if the responsible party knows or has reason to know of the incident;

(2) to provide all reasonable cooperation and assistance requested by a responsible official in connection with removal activities; or

(3) without sufficient cause, to comply with an order issued under subsection (c) or (e) of section 311 of the Federal Water Pollution Control Act (33 U.S.C. 1321), as amended by this Act, or the Intervention on the High Seas Act (33 U.S.C. 1471 et seq.).

SEC. 1004. LIMITS ON LIABILITY. 33 USC 2704.

(a) GENERAL RULE.—Except as otherwise provided in this section, the total of the liability of a responsible party under section 1002

and any removal costs incurred by, or on behalf of, the responsible party, with respect to each incident shall not exceed—

(1) for a tank vessel, the greater of—

(A) $1,200 per gross ton; or

(B)(i) in the case of a vessel greater than 3,000 gross tons, $10,000,000; or

(ii) in the case of a vessel of 3,000 gross tons or less, $2,000,000;

(2) for any other vessel, $600 per gross ton or $500,000, whichever is greater;

(3) for an offshore facility except a deepwater port, the total of all removal costs plus $75,000,000; and

(4) for any onshore facility and a deepwater port, $350,000,000.

(b) DIVISION OF LIABILITY FOR MOBILE OFFSHORE DRILLING UNITS.—

(1) TREATED FIRST AS TANK VESSEL.—For purposes of determining the responsible party and applying this Act and except as provided in paragraph (2), a mobile offshore drilling unit which is being used as an offshore facility is deemed to be a tank vessel with respect to the discharge, or the substantial threat of a discharge, of oil on or above the surface of the water.

(2) TREATED AS FACILITY FOR EXCESS LIABILITY.—To the extent that removal costs and damages from any incident described in paragraph (1) exceed the amount for which a responsible party is liable (as that amount may be limited under subsection (a)(1)), the mobile offshore drilling unit is deemed to be an offshore facility. For purposes of applying subsection (a)(3), the amount specified in that subsection shall be reduced by the amount for which the responsible party is liable under paragraph (1).

(c) EXCEPTIONS.—

(1) ACTS OF RESPONSIBLE PARTY.—Subsection (a) does not apply if the incident was proximately caused by—

(A) gross negligence or willful misconduct of, or

(B) the violation of an applicable Federal safety, construction, or operating regulation by,

the responsible party, an agent or employee of the responsible party, or a person acting pursuant to a contractual relationship with the responsible party (except where the sole contractual arrangement arises in connection with carriage by a common carrier by rail).

(2) FAILURE OR REFUSAL OF RESPONSIBLE PARTY.—Subsection (a) does not apply if the responsible party fails or refuses—

(A) to report the incident as required by law and the responsible party knows or has reason to know of the incident;

(B) to provide all reasonable cooperation and assistance requested by a responsible official in connection with removal activities; or

(C) without sufficient cause, to comply with an order issued under subsection (c) or (e) of section 311 of the Federal Water Pollution Control Act (33 U.S.C. 1321), as amended by this Act, or the Intervention on the High Seas Act (33 U.S.C. 1471 et seq.).

(3) OCS FACILITY OR VESSEL.—Notwithstanding the limitations established under subsection (a) and the defenses of section 1003, all removal costs incurred by the United States Government or any State or local official or agency in connection with a discharge or substantial threat of a discharge of oil from any

Outer Continental Shelf facility or a vessel carrying oil as cargo from such a facility shall be borne by the owner or operator of such facility or vessel.

(d) ADJUSTING LIMITS OF LIABILITY.—

(1) ONSHORE FACILITIES.—Subject to paragraph (2), the President may establish by regulation, with respect to any class or category of onshore facility, a limit of liability under this section of less than $350,000,000, but not less than $8,000,000, taking into account size, storage capacity, oil throughput, proximity to sensitive areas, type of oil handled, history of discharges, and other factors relevant to risks posed by the class or category of facility.

(2) DEEPWATER PORTS AND ASSOCIATED VESSELS.—

(A) STUDY.—The Secretary shall conduct a study of the relative operational and environmental risks posed by the transportation of oil by vessel to deepwater ports (as defined in section 3 of the Deepwater Port Act of 1974 (33 U.S.C. 1502)) versus the transportation of oil by vessel to other ports. The study shall include a review and analysis of offshore lightering practices used in connection with that transportation, an analysis of the volume of oil transported by vessel using those practices, and an analysis of the frequency and volume of oil discharges which occur in connection with the use of those practices.

(B) REPORT.—Not later than 1 year after the date of the enactment of this Act, the Secretary shall submit to the Congress a report on the results of the study conducted under subparagraph (A).

(C) RULEMAKING PROCEEDING.—If the Secretary determines, based on the results of the study conducted under this subparagraph (A), that the use of deepwater ports in connection with the transportation of oil by vessel results in a lower operational or environmental risk than the use of other ports, the Secretary shall initiate, not later than the 180th day following the date of submission of the report to the Congress under subparagraph (B), a rulemaking proceeding to lower the limits of liability under this section for deepwater ports as the Secretary determines appropriate. The Secretary may establish a limit of liability of less than $350,000,000, but not less than $50,000,000, in accordance with paragraph (1).

(3) PERIODIC REPORTS.—The President shall, within 6 months after the date of the enactment of this Act, and from time to time thereafter, report to the Congress on the desirability of adjusting the limits of liability specified in subsection (a). President of U.S.

(4) ADJUSTMENT TO REFLECT CONSUMER PRICE INDEX.—The President shall, by regulations issued not less often than every 3 years, adjust the limits of liability specified in subsection (a) to reflect significant increases in the Consumer Price Index. Regulations.

SEC. 1005. INTEREST. 33 USC 2705.

(a) GENERAL RULE.—The responsible party or the responsible party's guarantor is liable to a claimant for interest on the amount paid in satisfaction of a claim under this Act for the period described in subsection (b).

(b) PERIOD.—

(1) IN GENERAL.—Except as provided in paragraph (2), the period for which interest shall be paid is the period beginning on the 30th day following the date on which the claim is presented to the responsible party or guarantor and ending on the date on which the claim is paid.

(2) EXCLUSION OF PERIOD DUE TO OFFER BY GUARANTOR.—If the guarantor offers to the claimant an amount equal to or greater than that finally paid in satisfaction of the claim, the period described in paragraph (1) does not include the period beginning on the date the offer is made and ending on the date the offer is accepted. If the offer is made within 60 days after the date on which the claim is presented under section 1013(a), the period described in paragraph (1) does not include any period before the offer is accepted.

(3) EXCLUSION OF PERIODS IN INTERESTS OF JUSTICE.—If in any period a claimant is not paid due to reasons beyond the control of the responsible party or because it would not serve the interests of justice, no interest shall accrue under this section during that period.

(4) CALCULATION OF INTEREST.—The interest paid under this section shall be calculated at the average of the highest rate for commercial and finance company paper of maturities of 180 days or less obtaining on each of the days included within the period for which interest must be paid to the claimant, as published in the Federal Reserve Bulletin.

(5) INTEREST NOT SUBJECT TO LIABILITY LIMITS.—

(A) IN GENERAL.—Interest (including prejudgment interest) under this paragraph is in addition to damages and removal costs for which claims may be asserted under section 1002 and shall be paid without regard to any limitation of liability under section 1004.

(B) PAYMENT BY GUARANTOR.—The payment of interest under this subsection by a guarantor is subject to section 1016(g).

33 USC 2706.

SEC. 1006. NATURAL RESOURCES.

(a) LIABILITY.—In the case of natural resource damages under section 1002(b)(2)(A), liability shall be—

(1) to the United States Government for natural resources belonging to, managed by, controlled by, or appertaining to the United States;

State and local governments.

(2) to any State for natural resources belonging to, managed by, controlled by, or appertaining to such State or political subdivision thereof;

Indians.

(3) to any Indian tribe for natural resources belonging to, managed by, controlled by, or appertaining to such Indian tribe; and

(4) in any case in which section 1007 applies, to the government of a foreign country for natural resources belonging to, managed by, controlled by, or appertaining to such country.

(b) DESIGNATION OF TRUSTEES.—

President of U.S. Claims.

(1) IN GENERAL.—The President, or the authorized representative of any State, Indian tribe, or foreign government, shall act on behalf of the public, Indian tribe, or foreign country as trustee of natural resources to present a claim for and to recover damages to the natural resources.

(2) FEDERAL TRUSTEES.—The President shall designate the Federal officials who shall act on behalf of the public as trustees for natural resources under this Act.

(3) STATE TRUSTEES.—The Governor of each State shall designate State and local officials who may act on behalf of the public as trustee for natural resources under this Act and shall notify the President of the designation.

(4) INDIAN TRIBE TRUSTEES.—The governing body of any Indian tribe shall designate tribal officials who may act on behalf of the tribe or its members as trustee for natural resources under this Act and shall notify the President of the designation.

(5) FOREIGN TRUSTEES.—The head of any foreign government may designate the trustee who shall act on behalf of that government as trustee for natural resources under this Act.

(c) FUNCTIONS OF TRUSTEES.—

(1) FEDERAL TRUSTEES.—The Federal officials designated under subsection (b)(2)—

(A) shall assess natural resource damages under section 1002(b)(2)(A) for the natural resources under their trusteeship;

(B) may, upon request of and reimbursement from a State or Indian tribe and at the Federal officials' discretion, assess damages for the natural resources under the State's or tribe's trusteeship; and

(C) shall develop and implement a plan for the restoration, rehabilitation, replacement, or acquisition of the equivalent, of the natural resources under their trusteeship.

(2) STATE TRUSTEES.—The State and local officials designated under subsection (b)(3)—

(A) shall assess natural resource damages under section 1002(b)(2)(A) for the purposes of this Act for the natural resources under their trusteeship; and

(B) shall develop and implement a plan for the restoration, rehabilitation, replacement, or acquisition of the equivalent, of the natural resources under their trusteeship.

(3) INDIAN TRIBE TRUSTEES.—The tribal officials designated under subsection (b)(4)—

(A) shall assess natural resource damages under section 1002(b)(2)(A) for the purposes of this Act for the natural resources under their trusteeship; and

(B) shall develop and implement a plan for the restoration, rehabilitation, replacement, or acquisition of the equivalent, of the natural resources under their trusteeship.

(4) FOREIGN TRUSTEES.—The trustees designated under subsection (b)(5)—

(A) shall assess natural resource damages under section 1002(b)(2)(A) for the purposes of this Act for the natural resources under their trusteeship; and

(B) shall develop and implement a plan for the restoration, rehabilitation, replacement, or acquisition of the equivalent, of the natural resources under their trusteeship.

(5) NOTICE AND OPPORTUNITY TO BE HEARD.—Plans shall be developed and implemented under this section only after ade-

quate public notice, opportunity for a hearing, and consideration of all public comment.

(d) MEASURE OF DAMAGES.—

(1) IN GENERAL.—The measure of natural resource damages under section 1002(b)(2)(A) is—

(A) the cost of restoring, rehabilitating, replacing, or acquiring the equivalent of, the damaged natural resources;

(B) the diminution in value of those natural resources pending restoration; plus

(C) the reasonable cost of assessing those damages.

(2) DETERMINE COSTS WITH RESPECT TO PLANS.—Costs shall be determined under paragraph (1) with respect to plans adopted under subsection (c).

(3) NO DOUBLE RECOVERY.—There shall be no double recovery under this Act for natural resource damages, including with respect to the costs of damage assessment or restoration, rehabilitation, replacement, or acquisition for the same incident and natural resource.

President of U.S.

(e) DAMAGE ASSESSMENT REGULATIONS.—

(1) REGULATIONS.—The President, acting through the Under Secretary of Commerce for Oceans and Atmosphere and in consultation with the Administrator of the Environmental Protection Agency, the Director of the United States Fish and Wildlife Service, and the heads of other affected agencies, not later than 2 years after the date of the enactment of this Act, shall promulgate regulations for the assessment of natural resource damages under section 1002(b)(2)(A) resulting from a discharge of oil for the purpose of this Act.

(2) REBUTTABLE PRESUMPTION.—Any determination or assessment of damages to natural resources for the purposes of this Act made under subsection (d) by a Federal, State, or Indian trustee in accordance with the regulations promulgated under paragraph (1) shall have the force and effect of a rebuttable presumption on behalf of the trustee in any administrative or judicial proceeding under this Act.

(f) USE OF RECOVERED SUMS.—Sums recovered under this Act by a Federal, State, Indian, or foreign trustee for natural resource damages under section 1002(b)(2)(A) shall be retained by the trustee in a revolving trust account, without further appropriation, for use only to reimburse or pay costs incurred by the trustee under subsection (c) with respect to the damaged natural resources. Any amounts in excess of those required for these reimbursements and costs shall be deposited in the Fund.

(g) COMPLIANCE.—Review of actions by any Federal official where there is alleged to be a failure of that official to perform a duty under this section that is not discretionary with that official may be had by any person in the district court in which the person resides or in which the alleged damage to natural resources occurred. The court may award costs of litigation (including reasonable attorney and expert witness fees) to any prevailing or substantially prevailing party. Nothing in this subsection shall restrict any right which any person may have to seek relief under any other provision of law.

33 USC 2707.

SEC. 1007. RECOVERY BY FOREIGN CLAIMANTS.

(a) REQUIRED SHOWING BY FOREIGN CLAIMANTS.—

(1) IN GENERAL.—In addition to satisfying the other requirements of this Act, to recover removal costs or damages resulting from an incident a foreign claimant shall demonstrate that—

(A) the claimant has not been otherwise compensated for the removal costs or damages; and

(B) recovery is authorized by a treaty or executive agreement between the United States and the claimant's country, or the Secretary of State, in consultation with the Attorney General and other appropriate officials, has certified that the claimant's country provides a comparable remedy for United States claimants.

(2) EXCEPTIONS.—Paragraph (1)(B) shall not apply with respect to recovery by a resident of Canada in the case of an incident described in subsection (b)(4). Canada.

(b) DISCHARGES IN FOREIGN COUNTRIES.—A foreign claimant may make a claim for removal costs and damages resulting from a discharge, or substantial threat of a discharge, of oil in or on the territorial sea, internal waters, or adjacent shoreline of a foreign country, only if the discharge is from—

(1) an Outer Continental Shelf facility or a deepwater port;

(2) a vessel in the navigable waters;

(3) a vessel carrying oil as cargo between 2 places in the United States; or

(4) a tanker that received the oil at the terminal of the pipeline constructed under the Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1651 et seq.), for transportation to a place in the United States, and the discharge or threat occurs prior to delivery of the oil to that place.

(c) FOREIGN CLAIMANT DEFINED.—In this section, the term "foreign claimant" means—

(1) a person residing in a foreign country;

(2) the government of a foreign country; and

(3) an agency or political subdivision of a foreign country.

SEC. 1008. RECOVERY BY RESPONSIBLE PARTY. 33 USC 2708.

(a) IN GENERAL.—The responsible party for a vessel or facility from which oil is discharged, or which poses the substantial threat of a discharge of oil, may assert a claim for removal costs and damages under section 1013 only if the responsible party demonstrates that—

(1) the responsible party is entitled to a defense to liability under section 1003; or

(2) the responsible party is entitled to a limitation of liability under section 1004.

(b) EXTENT OF RECOVERY.—A responsible party who is entitled to a limitation of liability may assert a claim under section 1013 only to the extent that the sum of the removal costs and damages incurred by the responsible party plus the amounts paid by the responsible party, or by the guarantor on behalf of the responsible party, for claims asserted under section 1013 exceeds the amount to which the total of the liability under section 1002 and removal costs and damages incurred by, or on behalf of, the responsible party is limited under section 1004.

SEC. 1009. CONTRIBUTION. 33 USC 2709.

A person may bring a civil action for contribution against any other person who is liable or potentially liable under this Act or

another law. The action shall be brought in accordance with section 1017.

33 USC 2710.

SEC. 1010. INDEMNIFICATION AGREEMENTS.

(a) AGREEMENTS NOT PROHIBITED.—Nothing in this Act prohibits any agreement to insure, hold harmless, or indemnify a party to such agreement for any liability under this Act.

(b) LIABILITY NOT TRANSFERRED.—No indemnification, hold harmless, or similar agreement or conveyance shall be effective to transfer liability imposed under this Act from a responsible party or from any person who may be liable for an incident under this Act to any other person.

(c) RELATIONSHIP TO OTHER CAUSES OF ACTION.—Nothing in this Act, including the provisions of subsection (b), bars a cause of action that a responsible party subject to liability under this Act, or a guarantor, has or would have, by reason of subrogation or otherwise, against any person.

President of U.S. State and local governments. 33 USC 2711.

SEC. 1011. CONSULTATION ON REMOVAL ACTIONS.

The President shall consult with the affected trustees designated under section 1006 on the appropriate removal action to be taken in connection with any discharge of oil. For the purposes of the National Contingency Plan, removal with respect to any discharge shall be considered completed when so determined by the President in consultation with the Governor or Governors of the affected States. However, this determination shall not preclude additional removal actions under applicable State law.

President of U.S. 33 USC 2712.

SEC. 1012. USES OF THE FUND.

(a) USES GENERALLY.—The Fund shall be available to the President for—

(1) the payment of removal costs, including the costs of monitoring removal actions, determined by the President to be consistent with the National Contingency Plan—

(A) by Federal authorities; or

(B) by a Governor or designated State official under subsection (d);

(2) the payment of costs incurred by Federal, State, or Indian tribe trustees in carrying out their functions under section 1006 for assessing natural resource damages and for developing and implementing plans for the restoration, rehabilitation, replacement, or acquisition of the equivalent of damaged resources determined by the President to be consistent with the National Contingency Plan;

(3) the payment of removal costs determined by the President to be consistent with the National Contingency Plan as a result of, and damages resulting from, a discharge, or a substantial threat of a discharge, of oil from a foreign offshore unit;

(4) the payment of claims in accordance with section 1013 for uncompensated removal costs determined by the President to be consistent with the National Contingency Plan or uncompensated damages;

(5) the payment of Federal administrative, operational, and personnel costs and expenses reasonably necessary for and incidental to the implementation, administration, and enforcement of this Act (including, but not limited to, sections 1004(d)(2), 1006(e), 4107, 4110, 4111, 4112, 4117, 5006, 8103, and

title VII) and subsections (b), (c), (d), (j), and (l) of section 311 of the Federal Water Pollution Control Act (33 U.S.C. 1321), as amended by this Act, with respect to prevention, removal, and enforcement related to oil discharges, provided that—

(A) not more than $25,000,000 in each fiscal year shall be available to the Secretary for operating expenses incurred by the Coast Guard; Uniformed services.

(B) not more than $30,000,000 each year through the end of fiscal year 1992 shall be available to establish the National Response System under section 311(j) of the Federal Water Pollution Control Act, as amended by this Act, including the purchase and prepositioning of oil spill removal equipment; and

(C) not more than $27,250,000 in each fiscal year shall be available to carry out title VII of this Act.

(b) DEFENSE TO LIABILITY FOR FUND.—The Fund shall not be available to pay any claim for removal costs or damages to a particular claimant, to the extent that the incident, removal costs, or damages are caused by the gross negligence or willful misconduct of that claimant.

(c) OBLIGATION OF FUND BY FEDERAL OFFICIALS.—The President may promulgate regulations designating one or more Federal officials who may obligate money in accordance with subsection (a).

(d) ACCESS TO FUND BY STATE OFFICIALS.—

(1) IMMEDIATE REMOVAL.—In accordance with regulations promulgated under this section, the President, upon the request of the Governor of a State or pursuant to an agreement with a State under paragraph (2), may obligate the Fund for payment in an amount not to exceed $250,000 for removal costs consistent with the National Contingency Plan required for the immediate removal of a discharge, or the mitigation or prevention of a substantial threat of a discharge, of oil.

(2) AGREEMENTS.—

(A) IN GENERAL.—The President shall enter into an agreement with the Governor of any interested State to establish procedures under which the Governor or a designated State official may receive payments from the Fund for removal costs pursuant to paragraph (1).

(B) TERMS.—Agreements under this paragraph—

(i) may include such terms and conditions as may be agreed upon by the President and the Governor of a State;

(ii) shall provide for political subdivisions of the State to receive payments for reasonable removal costs; and

(iii) may authorize advance payments from the Fund to facilitate removal efforts.

(e) REGULATIONS.—The President shall—

(1) not later than 6 months after the date of the enactment of this Act, publish proposed regulations detailing the manner in which the authority to obligate the Fund and to enter into agreements under this subsection shall be exercised; and

(2) not later than 3 months after the close of the comment period for such proposed regulations, promulgate final regulations for that purpose.

(f) RIGHTS OF SUBROGATION.—Payment of any claim or obligation by the Fund under this Act shall be subject to the United States

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Government acquiring by subrogation all rights of the claimant or State to recover from the responsible party.

(g) AUDITS.—The Comptroller General shall audit all payments, obligations, reimbursements, and other uses of the Fund, to assure that the Fund is being properly administered and that claims are being appropriately and expeditiously considered. The Comptroller General shall submit to the Congress an interim report one year after the date of the enactment of this Act. The Comptroller General shall thereafter audit the Fund as is appropriate. Each Federal agency shall cooperate with the Comptroller General in carrying out this subsection.

Reports.

(h) PERIOD OF LIMITATIONS FOR CLAIMS.—

(1) REMOVAL COSTS.—No claim may be presented under this title for recovery of removal costs for an incident unless the claim is presented within 6 years after the date of completion of all removal actions for that incident.

(2) DAMAGES.—No claim may be presented under this section for recovery of damages unless the claim is presented within 3 years after the date on which the injury and its connection with the discharge in question were reasonably discoverable with the exercise of due care, or in the case of natural resource damages under section 1002(b)(2)(A), if later, the date of completion of the natural resources damage assessment under section 1006(e).

(3) MINORS AND INCOMPETENTS.—The time limitations contained in this subsection shall not begin to run—

(A) against a minor until the earlier of the date when such minor reaches 18 years of age or the date on which a legal representative is duly appointed for the minor, or

(B) against an incompetent person until the earlier of the date on which such incompetent's incompetency ends or the date on which a legal representative is duly appointed for the incompetent.

(i) LIMITATION ON PAYMENT FOR SAME COSTS.—In any case in which the President has paid an amount from the Fund for any removal costs or damages specified under subsection (a), no other claim may be paid from the Fund for the same removal costs or damages.

(j) OBLIGATION IN ACCORDANCE WITH PLAN.—

(1) IN GENERAL.—Except as provided in paragraph (2), amounts may be obligated from the Fund for the restoration, rehabilitation, replacement, or acquisition of natural resources only in accordance with a plan adopted under section 1006(c).

(2) EXCEPTION.—Paragraph (1) shall not apply in a situation requiring action to avoid irreversible loss of natural resources or to prevent or reduce any continuing danger to natural resources or similar need for emergency action.

(k) PREFERENCE FOR PRIVATE PERSONS IN AREA AFFECTED BY DISCHARGE.—

(1) IN GENERAL.—In the expenditure of Federal funds for removal of oil, including for distribution of supplies, construction, and other reasonable and appropriate activities, under a contract or agreement with a private person, preference shall be given, to the extent feasible and practicable, to private persons residing or doing business primarily in the area affected by the discharge of oil.

(2) LIMITATION.—This subsection shall not be considered to restrict the use of Department of Defense resources.

SEC. 1013. CLAIMS PROCEDURE. 33 USC 2713.

(a) PRESENTATION.—Except as provided in subsection (b), all claims for removal costs or damages shall be presented first to the responsible party or guarantor of the source designated under section 1014(a).

(b) PRESENTATION TO FUND.—

(1) IN GENERAL.—Claims for removal costs or damages may be presented first to the Fund—

(A) if the President has advertised or otherwise notified claimants in accordance with section 1014(c);

(B) by a responsible party who may assert a claim under section 1008;

(C) by the Governor of a State for removal costs incurred by that State; or

(D) by a United States claimant in a case where a foreign offshore unit has discharged oil causing damage for which the Fund is liable under section 1012(a).

(2) LIMITATION ON PRESENTING CLAIM.—No claim of a person against the Fund may be approved or certified during the pendency of an action by the person in court to recover costs which are the subject of the claim.

(c) ELECTION.—If a claim is presented in accordance with subsection (a) and—

(1) each person to whom the claim is presented denies all liability for the claim, or

(2) the claim is not settled by any person by payment within 90 days after the date upon which (A) the claim was presented, or (B) advertising was begun pursuant to section 1014(b), whichever is later,

the claimant may elect to commence an action in court against the responsible party or guarantor or to present the claim to the Fund.

(d) UNCOMPENSATED DAMAGES.—If a claim is presented in accordance with this section and full and adequate compensation is unavailable, a claim for the uncompensated damages and removal costs may be presented to the Fund.

(e) PROCEDURE FOR CLAIMS AGAINST FUND.—The President shall promulgate, and may from time to time amend, regulations for the presentation, filing, processing, settlement, and adjudication of claims under this Act against the Fund. President of U.S. Regulations.

SEC. 1014. DESIGNATION OF SOURCE AND ADVERTISEMENT. President of U.S. 33 USC 2714

(a) DESIGNATION OF SOURCE AND NOTIFICATION.—When the President receives information of an incident, the President shall, where possible and appropriate, designate the source or sources of the discharge or threat. If a designated source is a vessel or a facility, the President shall immediately notify the responsible party and the guarantor, if known, of that designation.

(b) ADVERTISEMENT BY RESPONSIBLE PARTY OR GUARANTOR.—If a responsible party or guarantor fails to inform the President, within 5 days after receiving notification of a designation under subsection (a), of the party's or the guarantor's denial of the designation, such party or guarantor shall advertise the designation and the procedures by which claims may be presented, in accordance with regulations promulgated by the President. Advertisement under the preceding sentence shall begin no later than 15 days after the date of the designation made under subsection (a). If advertisement is not otherwise made in accordance with this subsection, the President

shall promptly and at the expense of the responsible party or the guarantor involved, advertise the designation and the procedures by which claims may be presented to the responsible party or guarantor. Advertisement under this subsection shall continue for a period of no less than 30 days.

(c) ADVERTISEMENT BY PRESIDENT.—If—

(1) the responsible party and the guarantor both deny a designation within 5 days after receiving notification of a designation under subsection (a),

(2) the source of the discharge or threat was a public vessel, or

(3) the President is unable to designate the source or sources of the discharge or threat under subsection (a),

the President shall advertise or otherwise notify potential claimants of the procedures by which claims may be presented to the Fund.

33 USC 2715.

SEC. 1015. SUBROGATION.

(a) IN GENERAL.—Any person, including the Fund, who pays compensation pursuant to this Act to any claimant for removal costs or damages shall be subrogated to all rights, claims, and causes of action that the claimant has under any other law.

(b) ACTIONS ON BEHALF OF FUND.—At the request of the Secretary, the Attorney General shall commence an action on behalf of the Fund to recover any compensation paid by the Fund to any claimant pursuant to this Act, and all costs incurred by the Fund by reason of the claim, including interest (including prejudgment interest), administrative and adjudicative costs, and attorney's fees. Such an action may be commenced against any responsible party or (subject to section 1016) guarantor, or against any other person who is liable, pursuant to any law, to the compensated claimant or to the Fund, for the cost or damages for which the compensation was paid. Such an action shall be commenced against the responsible foreign government or other responsible party to recover any removal costs or damages paid from the Fund as the result of the discharge, or substantial threat of discharge, of oil from a foreign offshore unit.

33 USC 2716.

SEC. 1016. FINANCIAL RESPONSIBILITY.

(a) REQUIREMENT.—The responsible party for—

(1) any vessel over 300 gross tons (except a non-self-propelled vessel that does not carry oil as cargo or fuel) using any place subject to the jurisdiction of the United States; or

(2) any vessel using the waters of the exclusive economic zone to transship or lighter oil destined for a place subject to the jurisdiction of the United States;

shall establish and maintain, in accordance with regulations promulgated by the Secretary, evidence of financial responsibility sufficient to meet the maximum amount of liability to which, in the case of a tank vessel, the responsible party could be subject under section 1004 (a)(1) or (d) of this Act, or to which, in the case of any other vessel, the responsible party could be subjected under section 1004 (a)(2) or (d), in a case where the responsible party would be entitled to limit liability under that section. If the responsible party owns or operates more than one vessel, evidence of financial responsibility need be established only to meet the amount of the maximum liability applicable to the vessel having the greatest maximum liability.

(b) SANCTIONS.—

(1) WITHHOLDING CLEARANCE.—The Secretary of the Treasury shall withhold or revoke the clearance required by section 4197 of the Revised Statutes of the United States of any vessel subject to this section that does not have the evidence of financial responsibility required for the vessel under this section.

(2) DENYING ENTRY TO OR DETAINING VESSELS.—The Secretary may—

(A) deny entry to any vessel to any place in the United States, or to the navigable waters, or

(B) detain at the place,

any vessel that, upon request, does not produce the evidence of financial responsibility required for the vessel under this section.

(3) SEIZURE OF VESSEL.—Any vessel subject to the requirements of this section which is found in the navigable waters without the necessary evidence of financial responsibility for the vessel shall be subject to seizure by and forfeiture to the United States.

(c) OFFSHORE FACILITIES.—

(1) IN GENERAL.—Except as provided in paragraph (2), each responsible party with respect to an offshore facility shall establish and maintain evidence of financial responsibility of $150,000,000 to meet the amount of liability to which the responsible party could be subjected under section 1004(a) in a case in which the responsible party would be entitled to limit liability under that section. In a case in which a person is the responsible party for more than one facility subject to this subsection, evidence of financial responsibility need be established only to meet the maximum liability applicable to the facility having the greatest maximum liability.

(2) DEEPWATER PORTS.—Each responsible party with respect to a deepwater port shall establish and maintain evidence of financial responsibility sufficient to meet the maximum amount of liability to which the responsible party could be subjected under section 1004(a) of this Act in a case where the responsible party would be entitled to limit liability under that section. If the Secretary exercises the authority under section 1004(d)(2) to lower the limit of liability for deepwater ports, the responsible party shall establish and maintain evidence of financial responsibility sufficient to meet the maximum amount of liability so established. In a case in which a person is the responsible party for more than one deepwater port, evidence of financial responsibility need be established only to meet the maximum liability applicable to the deepwater port having the greatest maximum liability.

(e) METHODS OF FINANCIAL RESPONSIBILITY.—Financial responsibility under this section may be established by any one, or by any combination, of the following methods which the Secretary (in the case of a vessel) or the President (in the case of a facility) determines to be acceptable: evidence of insurance, surety bond, guarantee, letter of credit, qualification as a self-insurer, or other evidence of financial responsibility. Any bond filed shall be issued by a bonding company authorized to do business in the United States. In promulgating requirements under this section, the Secretary or the President, as appropriate, may specify policy or other contractual terms, conditions, or defenses which are necessary, or which are unaccept-

able, in establishing evidence of financial responsibility to effectuate the purposes of this Act.

(f) CLAIMS AGAINST GUARANTOR.—Any claim for which liability may be established under section 1002 may be asserted directly against any guarantor providing evidence of financial responsibility for a responsible party liable under that section for removal costs and damages to which the claim pertains. In defending against such a claim, the guarantor may invoke (1) all rights and defenses which would be available to the responsible party under this Act, (2) any defense authorized under subsection (e), and (3) the defense that the incident was caused by the willful misconduct of the responsible party. The guarantor may not invoke any other defense that might be available in proceedings brought by the responsible party against the guarantor.

(g) LIMITATION ON GUARANTOR'S LIABILITY.—Nothing in this Act shall impose liability with respect to an incident on any guarantor for damages or removal costs which exceed, in the aggregate, the amount of financial responsibility required under this Act which that guarantor has provided for a responsible party.

(h) CONTINUATION OF REGULATIONS.—Any regulation relating to financial responsibility, which has been issued pursuant to any provision of law repealed or superseded by this Act, and which is in effect on the date immediately preceding the effective date of this Act, is deemed and shall be construed to be a regulation issued pursuant to this section. Such a regulation shall remain in full force and effect unless and until superseded by a new regulation issued under this section.

(i) UNIFIED CERTIFICATE.—The Secretary may issue a single unified certificate of financial responsibility for purposes of this Act and any other law.

33 USC 2717.

SEC. 1017. LITIGATION, JURISDICTION, AND VENUE.

(a) REVIEW OF REGULATIONS.—Review of any regulation promulgated under this Act may be had upon application by any interested person only in the Circuit Court of Appeals of the United States for the District of Columbia. Any such application shall be made within 90 days from the date of promulgation of such regulations. Any matter with respect to which review could have been obtained under this subsection shall not be subject to judicial review in any civil or criminal proceeding for enforcement or to obtain damages or recovery of response costs.

(b) JURISDICTION.—Except as provided in subsections (a) and (c), the United States district courts shall have exclusive original jurisdiction over all controversies arising under this Act, without regard to the citizenship of the parties or the amount in controversy. Venue shall lie in any district in which the discharge or injury or damages occurred, or in which the defendant resides, may be found, has its principal office, or has appointed an agent for service of process. For the purposes of this section, the Fund shall reside in the District of Columbia.

(c) STATE COURT JURISDICTION.—A State trial court of competent jurisdiction over claims for removal costs or damages, as defined under this Act, may consider claims under this Act or State law and any final judgment of such court (when no longer subject to ordinary forms of review) shall be recognized, valid, and enforceable for all purposes of this Act.

(d) ASSESSMENT AND COLLECTION OF TAX.—The provisions of subsections (a), (b), and (c) shall not apply to any controversy or other matter resulting from the assessment or collection of any tax, or to the review of any regulation promulgated under the Internal Revenue Code of 1986.

(e) SAVINGS PROVISION.—Nothing in this title shall apply to any cause of action or right of recovery arising from any incident which occurred prior to the date of enactment of this title. Such claims shall be adjudicated pursuant to the law applicable on the date of the incident.

(f) PERIOD OF LIMITATIONS.—

(1) DAMAGES.—Except as provided in paragraphs (3) and (4), an action for damages under this Act shall be barred unless the action is brought within 3 years after—

(A) the date on which the loss and the connection of the loss with the discharge in question are reasonably discoverable with the exercise of due care, or

(B) in the case of natural resource damages under section 1002(b)(2)(A), the date of completion of the natural resources damage assessment under section 1006(c).

(2) REMOVAL COSTS.—An action for recovery of removal costs referred to in section 1002(b)(1) must be commenced within 3 years after completion of the removal action. In any such action described in this subsection, the court shall enter a declaratory judgment on liability for removal costs or damages that will be binding on any subsequent action or actions to recover further removal costs or damages. Except as otherwise provided in this paragraph, an action may be commenced under this title for recovery of removal costs at any time after such costs have been incurred.

(3) CONTRIBUTION.—No action for contribution for any removal costs or damages may be commenced more than 3 years after—

(A) the date of judgment in any action under this Act for recovery of such costs or damages, or

(B) the date of entry of a judicially approved settlement with respect to such costs or damages.

(4) SUBROGATION.—No action based on rights subrogated pursuant to this Act by reason of payment of a claim may be commenced under this Act more than 3 years after the date of payment of such claim.

(5) COMMENCEMENT.—The time limitations contained herein shall not begin to run—

(A) against a minor until the earlier of the date when such minor reaches 18 years of age or the date on which a legal representative is duly appointed for such minor, or

(B) against an incompetent person until the earlier of the date on which such incompetent's incompetency ends or the date on which a legal representative is duly appointed for such incompetent.

SEC. 1018. RELATIONSHIP TO OTHER LAW. 33 USC 2718.

(a) PRESERVATION OF STATE AUTHORITIES; SOLID WASTE DISPOSAL ACT.—Nothing in this Act or the Act of March 3, 1851 shall—

(1) affect, or be construed or interpreted as preempting, the authority of any State or political subdivision thereof from

imposing any additional liability or requirements with respect to—

(A) the discharge of oil or other pollution by oil within such State; or

(B) any removal activities in connection with such a discharge; or

(2) affect, or be construed or interpreted to affect or modify in any way the obligations or liabilities of any person under the Solid Waste Disposal Act (42 U.S.C. 6901 et seq.) or State law, including common law.

(b) PRESERVATION OF STATE FUNDS.—Nothing in this Act or in section 9509 of the Internal Revenue Code of 1986 (26 U.S.C. 9509) shall in any way affect, or be construed to affect, the authority of any State—

(1) to establish, or to continue in effect, a fund any purpose of which is to pay for costs or damages arising out of, or directly resulting from, oil pollution or the substantial threat of oil pollution; or

(2) to require any person to contribute to such a fund.

(c) ADDITIONAL REQUIREMENTS AND LIABILITIES; PENALTIES.—Nothing in this Act, the Act of March 3, 1851 (46 U.S.C. 183 et seq.), or section 9509 of the Internal Revenue Code of 1986 (26 U.S.C. 9509), shall in any way affect, or be construed to affect, the authority of the United States or any State or political subdivision thereof—

(1) to impose additional liability or additional requirements; or

(2) to impose, or to determine the amount of, any fine or penalty (whether criminal or civil in nature) for any violation of law;

relating to the discharge, or substantial threat of a discharge, of oil.

(d) FEDERAL EMPLOYEE LIABILITY.—For purposes of section 2679(b)(2)(B) of title 28, United States Code, nothing in this Act shall be construed to authorize or create a cause of action against a Federal officer or employee in the officer's or employee's personal or individual capacity for any act or omission while acting within the scope of the officer's or employee's office or employment.

33 USC 2719.

SEC. 1019. STATE FINANCIAL RESPONSIBILITY.

A State may enforce, on the navigable waters of the State, the requirements for evidence of financial responsibility under section 1016.

33 USC 2701 note.

SEC. 1020. APPLICATION.

This Act shall apply to an incident occurring after the date of the enactment of this Act.

TITLE II—CONFORMING AMENDMENTS

SEC. 2001. INTERVENTION ON THE HIGH SEAS ACT.

Section 17 of the *Intervention on the High Seas Act* (33 U.S.C. 1486) is amended to read as follows:

"SEC. 17. The Oil Spill Liability Trust Fund shall be available to the Secretary for actions taken under sections 5 and 7 of this Act."

SEC. 2002. FEDERAL WATER POLLUTION CONTROL ACT. 33 USC 1321 note.

(a) APPLICATION.—Subsections (f), (g), (h), and (i) of section 311 of the Federal Water Pollution Control Act (33 U.S.C. 1321) shall not apply with respect to any incident for which liability is established under section 1002 of this Act.

(b) CONFORMING AMENDMENTS.—Section 311 of the Federal Water Pollution Control Act (33 U.S.C. 1321) is amended as follows:

(1) Subsection (i) is amended by striking "(1)" after "(i)" and by striking paragraphs (2) and (3).

(2) Subsection (k) is repealed. Any amounts remaining in the revolving fund established under that subsection shall be deposited in the Fund. The Fund shall assume all liability incurred by the revolving fund established under that subsection. 33 USC 1321 note.

(3) Subsection (l) is amended by striking the second sentence.

(4) Subsection (p) is repealed.

(5) The following is added at the end thereof:

"(s) The Oil Spill Liability Trust Fund established under section 9509 of the Internal Revenue Code of 1986 (26 U.S.C. 9509) shall be available to carry out subsections (b), (c), (d), (j), and (l) as those subsections apply to discharges, and substantial threats of discharges, of oil. Any amounts received by the United States under this section shall be deposited in the Oil Spill Liability Trust Fund.".

SEC. 2003. DEEPWATER PORT ACT.

(a) CONFORMING AMENDMENTS.—The Deepwater Port Act of 1974 (33 U.S.C. 1502 et seq.) is amended—

(1) in section 4(c)(1) by striking "section 18(l) of this Act;" and inserting "section 1016 of the Oil Pollution Act of 1990"; and 33 USC 1503.

(2) by striking section 18. 33 USC 1517.

(b) AMOUNTS REMAINING IN DEEPWATER PORT FUND.—Any amounts remaining in the Deepwater Port Liability Fund established under section 18(f) of the Deepwater Port Act of 1974 (33 U.S.C. 1517(f)) shall be deposited in the Oil Spill Liability Trust Fund established under section 9509 of the Internal Revenue Code of 1986 (26 U.S.C. 9509). The Oil Spill Liability Trust Fund shall assume all liability incurred by the Deepwater Port Liability Fund. 26 USC 9509 note.

SEC. 2004. OUTER CONTINENTAL SHELF LANDS ACT AMENDMENTS OF 1978. Repeal.

Title III of the Outer Continental Shelf Lands Act Amendments of 1978 (43 U.S.C. 1811-1824) is repealed. Any amounts remaining in the Offshore Oil Pollution Compensation Fund established under section 302 of that title (43 U.S.C. 1812) shall be deposited in the Oil Spill Liability Trust Fund established under section 9509 of the Internal Revenue Code of 1986 (26 U.S.C. 9509). The Oil Spill Liability Trust Fund shall assume all liability incurred by the Offshore Oil Pollution Compensation Fund. 26 USC 9509 note.

TITLE III—INTERNATIONAL OIL POLLUTION PREVENTION AND REMOVAL

SEC. 3001. SENSE OF CONGRESS REGARDING PARTICIPATION IN INTERNATIONAL REGIME.

It is the sense of the Congress that it is in the best interests of the United States to participate in an international oil pollution liabil-

ity and compensation regime that is at least as effective as Federal and State laws in preventing incidents and in guaranteeing full and prompt compensation for damages resulting from incidents.

SEC. 3002. UNITED STATES-CANADA GREAT LAKES OIL SPILL COOPERATION.

(a) REVIEW.—The Secretary of State shall review relevant international agreements and treaties with the Government of Canada, including the Great Lakes Water Quality Agreement, to determine whether amendments or additional international agreements are necessary to—

(1) prevent discharges of oil on the Great Lakes;

(2) ensure an immediate and effective removal of oil on the Great Lakes; and

(3) fully compensate those who are injured by a discharge of oil on the Great Lakes.

(b) CONSULTATION.—In carrying out this section, the Secretary of State shall consult with the Department of Transportation, the Environmental Protection Agency, the National Oceanic and Atmospheric Administration, the Great Lakes States, the International Joint Commission, and other appropriate agencies.

(c) REPORT.—The Secretary of State shall submit a report to the Congress on the results of the review under this section within 6 months after the date of the enactment of this Act.

SEC. 3003. UNITED STATES-CANADA LAKE CHAMPLAIN OIL SPILL COOPERATION.

(a) REVIEW.—The Secretary of State shall review relevant international agreements and treaties with the Government of Canada, to determine whether amendments or additional international agreements are necessary to—

(1) prevent discharges of oil on Lake Champlain;

(2) ensure an immediate and effective removal of oil on Lake Champlain; and

(3) fully compensate those who are injured by a discharge of oil on Lake Champlain.

Vermont.
New York.

(b) CONSULTATION.—In carrying out this section, the Secretary of State shall consult with the Department of Transportation, the Environmental Protection Agency, the National Oceanic and Atmospheric Administration, the States of Vermont and New York, the International Joint Commission, and other appropriate agencies.

(c) REPORT.—The Secretary of State shall submit a report to the Congress on the results of the review under this section within 6 months after the date of the enactment of this Act.

SEC. 3004. INTERNATIONAL INVENTORY OF REMOVAL EQUIPMENT AND PERSONNEL.

The President shall encourage appropriate international organizations to establish an international inventory of spill removal equipment and personnel.

SEC. 3005. NEGOTIATIONS WITH CANADA CONCERNING TUG ESCORTS IN PUGET SOUND.

Congress urges the Secretary of State to enter into negotiations with the Government of Canada to ensure that tugboat escorts are required for all tank vessels with a capacity over 40,000 deadweight tons in the Strait of Juan de Fuca and in Haro Strait.

TITLE IV—PREVENTION AND REMOVAL

Subtitle A—Prevention

SEC. 4101. REVIEW OF ALCOHOL AND DRUG ABUSE AND OTHER MATTERS IN ISSUING LICENSES, CERTIFICATES OF REGISTRY, AND MERCHANT MARINERS' DOCUMENTS.

(a) LICENSES AND CERTIFICATES OF REGISTRY.—Section 7101 of title 46, United States Code, is amended by adding at the end the following:

"(g) The Secretary may not issue a license or certificate of registry under this section unless an individual applying for the license or certificate makes available to the Secretary, under section 206(b)(7) of the National Driver Register Act of 1982 (23 U.S.C. 401 note), any information contained in the National Driver Register related to an offense described in section 205(a)(3) (A) or (B) of that Act committed by the individual.

"(h) The Secretary may review the criminal record of an individual who applies for a license or certificate of registry under this section.

"(i) The Secretary shall require the testing of an individual who applies for issuance or renewal of a license or certificate of registry under this chapter for use of a dangerous drug in violation of law or Federal regulation.".

(b) MERCHANT MARINERS' DOCUMENTS.—Section 7302 of title 46, United States Code, is amended by adding at the end the following:

"(c) The Secretary may not issue a merchant mariner's document under this chapter unless the individual applying for the document makes available to the Secretary, under section 206(b)(7) of the National Driver Register Act of 1982 (23 U.S.C. 401 note), any information contained in the National Driver Register related to an offense described in section 205(a)(3) (A) or (B) of that Act committed by the individual.

"(d) The Secretary may review the criminal record of an individual who applies for a merchant mariner's document under this section.

"(e) The Secretary shall require the testing of an individual applying for issuance or renewal of a merchant mariner's document under this chapter for the use of a dangerous drug in violation of law or Federal regulation.".

SEC. 4102. TERM OF LICENSES, CERTIFICATES OF REGISTRY, AND MERCHANT MARINERS' DOCUMENTS; CRIMINAL RECORD REVIEWS IN RENEWALS.

(a) LICENSES.—Section 7106 of title 46, United States Code, is amended by inserting "and may be renewed for additional 5-year periods" after "is valid for 5 years".

(b) CERTIFICATES OF REGISTRY.—Section 7107 of title 46, United States Code, is amended by striking "is not limited in duration." and inserting "is valid for 5 years and may be renewed for additional 5-year periods.".

(c) MERCHANT MARINERS' DOCUMENTS.—Section 7302 of title 46, United States Code, is amended by adding at the end the following:

"(f) A merchant mariner's document issued under this chapter is valid for 5 years and may be renewed for additional 5-year periods.".

46 USC 7106 note.

(d) TERMINATION OF EXISTING LICENSES, CERTIFICATES, AND DOCUMENTS.—A license, certificate of registry, or merchant mariner's document issued before the date of the enactment of this section terminates on the day it would have expired if—

(1) subsections (a), (b), and (c) were in effect on the date it was issued; and

(2) it was renewed at the end of each 5-year period under section 7106, 7107, or 7302 of title 46, United States Code.

(e) CRIMINAL RECORD REVIEW IN RENEWALS OF LICENSES AND CERTIFICATES OF REGISTRY.—

(1) IN GENERAL.—Section 7109 of title 46, United States Code, is amended to read as follows:

"§ 7109. Review of criminal records

"The Secretary may review the criminal record of each holder of a license or certificate of registry issued under this part who applies for renewal of that license or certificate of registry.".

(2) CLERICAL AMENDMENT.—The analysis for chapter 71 of title 46, United States Code, is amended by striking the item relating to section 7109 and inserting the following:

"7109. Review of criminal records.".

SEC. 4103. SUSPENSION AND REVOCATION OF LICENSES, CERTIFICATES OF REGISTRY, AND MERCHANT MARINERS' DOCUMENTS FOR ALCOHOL AND DRUG ABUSE.

(a) AVAILABILITY OF INFORMATION IN NATIONAL DRIVER REGISTER.—

(1) IN GENERAL.—Section 7702 of title 46, United States Code, is amended by adding at the end the following:

"(c)(1) The Secretary shall request a holder of a license, certificate of registry, or merchant mariner's document to make available to the Secretary, under section 206(b)(4) of the National Driver Register Act of 1982 (23 U.S.C. 401 note), all information contained in the National Driver Register related to an offense described in section 205(a)(3) (A) or (B) of that Act committed by the individual.

"(2) The Secretary shall require the testing of the holder of a license, certificate of registry, or merchant mariner's document for use of alcohol and dangerous drugs in violation of law or Federal regulation. The testing may include preemployment (with respect to dangerous drugs only), periodic, random, reasonable cause, and post accident testing.

"(d)(1) The Secretary may temporarily, for not more than 45 days, suspend and take possession of the license, certificate of registry, or merchant mariner's document held by an individual if, when acting under the authority of that license, certificate, or document—

"(A) that individual performs a safety sensitive function on a vessel, as determined by the Secretary; and

"(B) there is probable cause to believe that the individual—

"(i) has performed the safety sensitive function in violation of law or Federal regulation regarding use of alcohol or a dangerous drug;

"(ii) has been convicted of an offense that would prevent the issuance or renewal of the license, certificate, or document; or

"(iii) within the 3-year period preceding the initiation of a suspension proceeding, has been convicted of an offense

described in section 205(a)(3) (A) or (B) of the National Driver Register Act of 1982.

"(2) If a license, certificate, or document is temporarily suspended under this section, an expedited hearing under subsection (a) of this section shall be held within 30 days after the temporary suspension.".

(2) DEFINITION OF DANGEROUS DRUG.—(A) Section 2101 of title 46, United States Code, is amended by inserting after paragraph (8) the following new paragraph:

"(8a) 'dangerous drug' means a narcotic drug, a controlled substance, or a controlled substance analog (as defined in section 102 of the Comprehensive Drug Abuse and Control Act of 1970 (21 U.S.C. 802)).".

(B) Sections 7503(a) and 7704(a) of title 46, United States Code, are repealed.

(b) BASES FOR SUSPENSION OR REVOCATION.—Section 7703 of title 46, United States Code, is amended to read as follows:

"§ 7703. Bases for suspension or revocation

"A license, certificate of registry, or merchant mariner's document issued by the Secretary may be suspended or revoked if the holder—

"(1) when acting under the authority of that license, certificate, or document—

"(A) has violated or fails to comply with this subtitle, a regulation prescribed under this subtitle, or any other law or regulation intended to promote marine safety or to protect navigable waters; or

"(B) has committed an act of incompetence, misconduct, or negligence;

"(2) is convicted of an offense that would prevent the issuance or renewal of a license, certificate of registry, or merchant mariner's document; or

"(3) within the 3-year period preceding the initiation of the suspension or revocation proceeding is convicted of an offense described in section 205(a)(3) (A) or (B) of the National Driver Register Act of 1982 (23 U.S.C. 401 note).".

(c) TERMINATION OF REVOCATION.—Section 7701(c) of title 46, United States Code, is amended to read as follows:

"(c) When a license, certificate of registry, or merchant mariner's document has been revoked under this chapter, the former holder may be issued a new license, certificate of registry, or merchant mariner's document only after—

"(1) the Secretary decides, under regulations prescribed by the Secretary, that the issuance is compatible with the requirement of good discipline and safety at sea; and Regulations.

"(2) the former holder provides satisfactory proof that the bases for revocation are no longer valid.".

SEC. 4104. REMOVAL OF MASTER OR INDIVIDUAL IN CHARGE.

Section 8101 of title 46, United States Code, is amended by adding at the end the following:

"(i) When the 2 next most senior licensed officers on a vessel reasonably believe that the master or individual in charge of the vessel is under the influence of alcohol or a dangerous drug and is incapable of commanding the vessel, the next most senior master,

mate, or operator licensed under section 7101(c) (1) or (3) of this title shall—

"(1) temporarily relieve the master or individual in charge;

"(2) temporarily take command of the vessel;

"(3) in the case of a vessel required to have a log under chapter 113 of this title, immediately enter the details of the incident in the log; and

"(4) report those details to the Secretary—

"(A) by the most expeditious means available; and

"(B) in written form transmitted within 12 hours after the vessel arrives at its next port.".

SEC. 4105. ACCESS TO NATIONAL DRIVER REGISTER.

(a) ACCESS TO REGISTER.—Section 206(b) of the National Driver Register Act of 1982 (23 U.S.C. 401 note) is amended—

(1) by redesignating the second paragraph (5) (as added to the end of that section by section 4(b)(1) of the Rail Safety Improvement Act of 1988) as paragraph (6); and

(2) by adding at the end the following:

"(7)(A) Any individual who holds or who has applied for a license or certificate of registry under section 7101 of title 46, United States Code, or a merchant mariner's document under section 7302 of title 46, United States Code, may request the chief driver licensing official of a State to transmit to the Secretary of the department in which the Coast Guard is operating in accordance with subsection (a) information regarding the motor vehicle driving record of the individual.

"(B) The Secretary—

"(i) may receive information transmitted by the chief driver licensing official of a State pursuant to a request under subparagraph (A);

"(ii) shall make the information available to the individual for review and written comment before denying, suspending, or revoking the license, certificate of registry, or merchant mariner's document of the individual based on that information and before using that information in any action taken under chapter 77 of title 46, United States Code; and

"(iii) may not otherwise divulge or use that information, except for the purposes of section 7101, 7302, or 7703 of title 46, United States Code.

"(C) Information regarding the motor vehicle driving record of an individual may not be transmitted to the Secretary under this paragraph if the information was entered in the Register more than 3 years before the date of the request for the information, unless the information relates to revocations or suspensions that are still in effect on the date of the request. Information submitted to the Register by States under the Act of July 14, 1960 (74 Stat. 526), or under this title shall be subject to access for the purpose of this paragraph during the transition to the Register described under section 203(c) of this title.".

(b) CONFORMING AMENDMENTS.—

(1) REVIEW OF INFORMATION RECEIVED FROM REGISTER.—Chapter 75 of title 46, United States Code, is amended by adding at the end the following:

"§ 7505. Review of information in National Driver Register

"The Secretary shall make information received from the National Driver Register under section 206(b)(7) of the National Driver Register Act of 1982 (23 U.S.C. 401 note) available to an individual for review and written comment before denying, suspending, revoking, or taking any other action relating to a license, certificate of registry, or merchant mariner's document authorized to be issued for that individual under this part, based on that information.".

(2) PENALTY FOR NEGLIGENT OPERATION OF VESSEL.—Section 2302(c) of title 46, United States Code, is amended by striking "intoxicated" and inserting "under the influence of alcohol, or a dangerous drug in violation of a law of the United States".

(c) CLERICAL AMENDMENT.—The analysis for chapter 75 of title 46, United States Code, is amended by adding at the end the following:

"7505. Review of information in National Driver Register.".

SEC. 4106. MANNING STANDARDS FOR FOREIGN TANK VESSELS.

(a) STANDARDS FOR FOREIGN TANK VESSELS.—Section 9101(a) of title 46, United States Code, is amended to read as follows:

"(a)(1) The Secretary shall evaluate the manning, training, qualification, and watchkeeping standards of a foreign country that issues documentation for any vessel to which chapter 37 of this title applies—

"(A) on a periodic basis; and

"(B) when the vessel is involved in a marine casualty required to be reported under section 6101(a) (4) or (5) of this title.

"(2) After each evaluation made under paragraph (1) of this subsection, the Secretary shall determine whether—

"(A) the foreign country has standards for licensing and certification of seamen that are at least equivalent to United States law or international standards accepted by the United States; and

"(B) those standards are being enforced.

"(3) If the Secretary determines under this subsection that a country has failed to maintain or enforce standards at least equivalent to United States law or international standards accepted by the United States, the Secretary shall prohibit vessels issued documentation by that country from entering the United States until the Secretary determines those standards have been established and are being enforced.

"(4) The Secretary may allow provisional entry of a vessel prohibited from entering the United States under paragraph (3) of this subsection if—

"(A) the owner or operator of the vessel establishes, to the satisfaction of the Secretary, that the vessel is not unsafe or a threat to the marine environment; or

"(B) the entry is necessary for the safety of the vessel or individuals on the vessel.".

(b) REPORTING MARINE CASUALTIES.—

(1) REPORTING REQUIREMENT.—Section 6101(a) of title 46, United States Code, is amended by adding at the end the following:

"(5) significant harm to the environment.".

(2) APPLICATION TO FOREIGN VESSELS.—Section 6101(d) of title 46, United States Code, is amended—

(A) by inserting "(1)" before "This part"; and

(B) by adding at the end the following:

"(2) This part applies, to the extent consistent with generally recognized principles of international law, to a foreign vessel constructed or adapted to carry, or that carries, oil in bulk as cargo or cargo residue involved in a marine casualty described under subsection (a) (4) or (5) in waters subject to the jurisdiction of the United States, including the Exclusive Economic Zone.".

(c) TECHNICAL AND CONFORMING AMENDMENTS.—Section 9(a) of the Ports and Waterways Safety Act (33 U.S.C. 1228(a)) is amended—

(1) in the matter preceding paragraph (1), by striking "section 4417a of the Revised Statutes, as amended," and inserting "chapter 37 of title 46, United States Code,";

(2) in paragraph (2), by striking "section 4417a of the Revised Statutes, as amended," and inserting "chapter 37 of title 46, United States Code,"; and

(3) in paragraph (5), by striking "section 4417a(11) of the Revised Statutes, as amended," and inserting "section 9101 of title 46, United States Code,".

SEC. 4107. VESSEL TRAFFIC SERVICE SYSTEMS.

(a) IN GENERAL.—Section 4(a) of the Ports and Waterways Safety Act (33 U.S.C. 1223(a)) is amended—

(1) by striking "Secretary may—" and inserting "Secretary—";

(2) in paragraph (1) by striking "establish, operate, and maintain" and inserting "may construct, operate, maintain, improve, or expand";

(3) in paragraph (2) by striking "require" and inserting "shall require appropriate";

(4) in paragraph (3) by inserting "may" before "require";

(5) in paragraph (4) by inserting "may" before "control"; and

(6) in paragraph (5) by inserting "may" before "require".

(b) DIRECTION OF VESSEL MOVEMENT.—

(1) STUDY.—The Secretary shall conduct a study—

(A) of whether the Secretary should be given additional authority to direct the movement of vessels on navigable waters and should exercise such authority; and

(B) to determine and prioritize the United States ports and channels that are in need of new, expanded, or improved vessel traffic service systems, by evaluating—

(i) the nature, volume, and frequency of vessel traffic;

(ii) the risks of collisions, spills, and damages associated with that traffic;

(iii) the impact of installation, expansion, or improvement of a vessel traffic service system; and

(iv) all other relevant costs and data.

(2) REPORT.—Not later than 1 year after the date of the enactment of this Act, the Secretary shall submit to the Congress a report on the results of the study conducted under paragraph (1) and recommendations for implementing the results of that study.

SEC. 4108. GREAT LAKES PILOTAGE.

(a) INDIVIDUALS WHO MAY SERVE AS PILOT ON UNDESIGNATED GREAT LAKE WATERS.—Section 9302(b) of title 46, United States Code, is amended to read as follows:

"(b) A member of the complement of a vessel of the United States operating on register or of a vessel of Canada may serve as the pilot required on waters not designated by the President if the member is licensed under section 7101 of this title, or under equivalent provisions of Canadian law, to direct the navigation of the vessel on the waters being navigated.".

(b) PENALTIES.—Section 9308 of title 46, United States Code, is amended in each of subsections (a), (b), and (c) by striking "$500" and inserting "no more than $10,000".

SEC. 4109. PERIODIC GAUGING OF PLATING THICKNESS OF COMMERCIAL VESSELS. 46 USC 3703 note

Not later than 1 year after the date of the enactment of this Act, the Secretary shall issue regulations for vessels constructed or adapted to carry, or that carry, oil in bulk as cargo or cargo residue— Regulations.

(1) establishing minimum standards for plating thickness; and

(2) requiring, consistent with generally recognized principles of international law, periodic gauging of the plating thickness of all such vessels over 30 years old operating on the navigable waters or the waters of the exclusive economic zone.

SEC. 4110. OVERFILL AND TANK LEVEL OR PRESSURE MONITORING DEVICES. Regulations. 46 USC 3703 note.

(a) STANDARDS.—Not later than 1 year after the date of the enactment of this Act, the Secretary shall establish, by regulation, minimum standards for devices for warning persons of overfills and tank levels of oil in cargo tanks and devices for monitoring the pressure of oil cargo tanks.

(b) USE.—Not later than 1 year after the date of the enactment of this Act, the Secretary shall issue regulations establishing, consistent with generally recognized principles of international law, requirements concerning the use of—

(1) overfill devices, and

(2) tank level or pressure monitoring devices,

which are referred to in subsection (a) and which meet the standards established by the Secretary under subsection (a), on vessels constructed or adapted to carry, or that carry, oil in bulk as cargo or cargo residue on the navigable waters and the waters of the exclusive economic zone.

SEC. 4111. STUDY ON TANKER NAVIGATION SAFETY STANDARDS. 46 USC 3703 note.

(a) IN GENERAL.—Not later than 1 year after the date of enactment of this Act, the Secretary shall initiate a study to determine whether existing laws and regulations are adequate to ensure the safe navigation of vessels transporting oil or hazardous substances in bulk on the navigable waters and the waters of the exclusive economic zone.

(b) CONTENT.—In conducting the study required under subsection (a), the Secretary shall—

(1) determine appropriate crew sizes on tankers;

(2) evaluate the adequacy of qualifications and training of crewmembers on tankers;

(3) evaluate the ability of crewmembers on tankers to take emergency actions to prevent or remove a discharge of oil or a hazardous substance from their tankers;

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(4) evaluate the adequacy of navigation equipment and systems on tankers (including sonar, electronic chart display, and satellite technology);

(5) evaluate and test electronic means of position-reporting and identification on tankers, consider the minimum standards suitable for equipment for that purpose, and determine whether to require that equipment on tankers;

(6) evaluate the adequacy of navigation procedures under different operating conditions, including such variables as speed, daylight, ice, tides, weather, and other conditions;

(7) evaluate whether areas of navigable waters and the exclusive economic zone should be designated as zones where the movement of tankers should be limited or prohibited;

(8) evaluate whether inspection standards are adequate;

(9) review and incorporate the results of past studies, including studies conducted by the Coast Guard and the Office of Technology Assessment;

(10) evaluate the use of computer simulator courses for training bridge officers and pilots of vessels transporting oil or hazardous substances on the navigable waters and waters of the exclusive economic zone, and determine the feasibility and practicality of mandating such training;

(11) evaluate the size, cargo capacity, and flag nation of tankers transporting oil or hazardous substances on the navigable waters and the waters of the exclusive economic zone—

(A) identifying changes occurring over the past 20 years in such size and cargo capacity and in vessel navigation and technology; and

(B) evaluating the extent to which the risks or difficulties associated with tanker navigation, vessel traffic control, accidents, oil spills, and the containment and cleanup of such spills are influenced by or related to an increase in tanker size and cargo capacity; and

(12) evaluate and test a program of remote alcohol testing for masters and pilots aboard tankers carrying significant quantities of oil.

(c) REPORT.—Not later than 2 years after the date of enactment of this Act, the Secretary shall transmit to the Congress a report on the results of the study conducted under subsection (a), including recommendations for implementing the results of that study.

SEC. 4112. DREDGE MODIFICATION STUDY.

(a) STUDY.—The Secretary of the Army shall conduct a study and demonstration to determine the feasibility of modifying dredges to make them usable in removing discharges of oil and hazardous substances.

(b) REPORT.—Not later than 1 year after the date of enactment of this Act, the Secretary of the Army shall submit to the Congress a report on the results of the study conducted under subsection (a) and recommendations for implementing the results of that study.

President of U.S.

SEC. 4113. USE OF LINERS.

(a) STUDY.—The President shall conduct a study to determine whether liners or other secondary means of containment should be used to prevent leaking or to aid in leak detection at onshore facilities used for the bulk storage of oil and located near navigable waters.

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(b) REPORT.—Not later than 1 year after the date of enactment of this Act, the President shall submit to the Congress a report on the results of the study conducted under subsection (a) and recommendations to implement the results of the study.

(c) IMPLEMENTATION.—Not later than 6 months after the date the report required under subsection (b) is submitted to the Congress, the President shall implement the recommendations contained in the report.

SEC. 4114. TANK VESSEL MANNING.

46 USC 3703 note.

(a) RULEMAKING.—In order to protect life, property, and the environment, the Secretary shall initiate a rulemaking proceeding within 180 days after the date of the enactment of this Act to define the conditions under, and designate the waters upon, which tank vessels subject to section 3703 of title 46, United States Code, may operate in the navigable waters with the auto-pilot engaged or with an unattended engine room.

(b) WATCHES.—Section 8104 of title 46, United States Code, is amended by adding at the end the following new subsection:

"(n) On a tanker, a licensed individual or seaman may not be permitted to work more than 15 hours in any 24-hour period, or more than 36 hours in any 72-hour period, except in an emergency or a drill. In this subsection, 'work' includes any administrative duties associated with the vessel whether performed on board the vessel or onshore.".

(c) MANNING REQUIREMENT.—Section 8101(a) of title 46, United States Code, is amended—

(1) by striking "and" at the end of paragraph (1);

(2) by striking the period at the end of paragraph (2) and inserting "; and"; and

(3) by adding at the end the following new paragraph:

"(3) a tank vessel shall consider the navigation, cargo handling, and maintenance functions of that vessel for protection of life, property, and the environment.".

(d) STANDARDS.—Section 9102(a) of title 46, United States Code, is amended—

(1) by striking "and" at the end of paragraph (6);

(2) by striking the period at the end of paragraph (7) and inserting "; and"; and

(3) by adding at the end the following new paragraph:

"(8) instruction in vessel maintenance functions.".

(e) RECORDS.—Section 7502 of title 46, United States Code, is amended by striking "maintain records" and inserting "maintain computerized records".

SEC. 4115. ESTABLISHMENT OF DOUBLE HULL REQUIREMENT FOR TANK VESSELS.

(a) DOUBLE HULL REQUIREMENT.—Chapter 37 of title 46, United States Code, is amended by inserting after section 3703 the following new section:

"§ 3703a. Tank vessel construction standards

"(a) Except as otherwise provided in this section, a vessel to which this chapter applies shall be equipped with a double hull—

"(1) if it is constructed or adapted to carry, or carries, oil in bulk as cargo or cargo residue; and

"(2) when operating on the waters subject to the jurisdiction of the United States, including the Exclusive Economic Zone.

"(b) This section does not apply to—

"(1) a vessel used only to respond to a discharge of oil or a hazardous substance;

"(2) a vessel of less than 5,000 gross tons equipped with a double containment system determined by the Secretary to be as effective as a double hull for the prevention of a discharge of oil; or

"(3) before January 1, 2015—

"(A) a vessel unloading oil in bulk at a deepwater port licensed under the Deepwater Port Act of 1974 (33 U.S.C. 1501 et seq.); or

"(B) a delivering vessel that is offloading in lightering activities—

"(i) within a lightering zone established under section 3715(b)(5) of this title; and

"(ii) more than 60 miles from the baseline from which the territorial sea of the United States is measured.

"(c)(1) In this subsection, the age of a vessel is determined from the later of the date on which the vessel—

"(A) is delivered after original construction;

"(B) is delivered after completion of a major conversion; or

"(C) had its appraised salvage value determined by the Coast Guard and is qualified for documentation under section 4136 of the Revised Statutes of the United States (46 App. U.S.C. 14).

"(2) A vessel of less than 5,000 gross tons for which a building contract or contract for major conversion was placed before June 30, 1990, and that is delivered under that contract before January 1, 1994, and a vessel of less than 5,000 gross tons that had its appraised salvage value determined by the Coast Guard before June 30, 1990, and that qualifies for documentation under section 4136 of the Revised Statutes of the United States (46 App. U.S.C. 14) before January 1, 1994, may not operate in the navigable waters or the Exclusive Economic Zone of the United States after January 1, 2015, unless the vessel is equipped with a double hull or with a double containment system determined by the Secretary to be as effective as a double hull for the prevention of a discharge of oil.

"(3) A vessel for which a building contract or contract for major conversion was placed before June 30, 1990, and that is delivered under that contract before January 1, 1994, and a vessel that had its appraised salvage value determined by the Coast Guard before June 30, 1990, and that qualifies for documentation under section 4136 of the Revised Statutes of the United States (46 App. U.S.C. 14) before January 1, 1994, may not operate in the navigable waters or Exclusive Economic Zone of the United States unless equipped with a double hull—

"(A) in the case of a vessel of at least 5,000 gross tons but less than 15,000 gross tons—

"(i) after January 1, 1995, if the vessel is 40 years old or older and has a single hull, or is 45 years old or older and has a double bottom or double sides;

"(ii) after January 1, 1996, if the vessel is 39 years old or older and has a single hull, or is 44 years old or older and has a double bottom or double sides;

"(iii) after January 1, 1997, if the vessel is 38 years old or older and has a single hull, or is 43 years old or older and has a double bottom or double sides;

"(iv) after January 1, 1998, if the vessel is 37 years old or older and has a single hull, or is 42 years old or older and has a double bottom or double sides;

"(v) after January 1, 1999, if the vessel is 36 years old or older and has a single hull, or is 41 years old or older and has a double bottom or double sides;

"(vi) after January 1, 2000, if the vessel is 35 years old or older and has a single hull, or is 40 years old or older and has a double bottom or double sides; and

"(vii) after January 1, 2005, if the vessel is 25 years old or older and has a single hull, or is 30 years old or older and has a double bottom or double sides;

"(B) in the case of a vessel of at least 15,000 gross tons but less than 30,000 gross tons—

"(i) after January 1, 1995, if the vessel is 40 years old or older and has a single hull, or is 45 years old or older and has a double bottom or double sides;

"(ii) after January 1, 1996, if the vessel is 38 years old or older and has a single hull, or is 43 years old or older and has a double bottom or double sides;

"(iii) after January 1, 1997, if the vessel is 36 years old or older and has a single hull, or is 41 years old or older and has a double bottom or double sides;

"(iv) after January 1, 1998, if the vessel is 34 years old or older and has a single hull, or is 39 years old or older and has a double bottom or double sides;

"(v) after January 1, 1999, if the vessel is 32 years old or older and has a single hull, or 37 years old or older and has a double bottom or double sides;

"(vi) after January 1, 2000, if the vessel is 30 years old or older and has a single hull, or is 35 years old or older and has a double bottom or double sides;

"(vii) after January 1, 2001, if the vessel is 29 years old or older and has a single hull, or is 34 years old or older and has a double bottom or double sides;

"(viii) after January 1, 2002, if the vessel is 28 years old or older and has a single hull, or is 33 years old or older and has a double bottom or double sides;

"(ix) after January 1, 2003, if the vessel is 27 years old or older and has a single hull, or is 32 years old or older and has a double bottom or double sides;

"(x) after January 1, 2004, if the vessel is 26 years old or older and has a single hull, or is 31 years old or older and has a double bottom or double sides; and

"(xi) after January 1, 2005, if the vessel is 25 years old or older and has a single hull, or is 30 years old or older and has a double bottom or double sides; and

"(C) in the case of a vessel of at least 30,000 gross tons—

"(i) after January 1. 1995, if the vessel is 28 years old or older and has a single hull, or 33 years old or older and has a double bottom or double sides;

"(ii) after January 1, 1996, if the vessel is 27 years old or older and has a single hull, or is 32 years old or older and has a double bottom or double sides;

"(iii) after January 1, 1997, if the vessel is 26 years old or older and has a single hull, or is 31 years old or older and has a double bottom or double sides;

"(iv) after January 1, 1998, if the vessel is 25 years old or older and has a single hull, or is 30 years old or older and has a double bottom or double sides;

"(v) after January 1, 1999, if the vessel is 24 years old or older and has a single hull, or 29 years old or older and has a double bottom or double sides; and

"(vi) after January 1, 2000, if the vessel is 23 years old or older and has a single hull, or is 28 years old or older and has a double bottom or double sides.

"(4) Except as provided in subsection (b) of this section—

"(A) a vessel that has a single hull may not operate after January 1, 2010; and

"(B) a vessel that has a double bottom or double sides may not operate after January 1, 2015.".

46 USC 3703a note.

(b) RULEMAKING.—The Secretary shall, within 12 months after the date of the enactment of this Act, complete a rulemaking proceeding and issue a final rule to require that tank vessels over 5,000 gross tons affected by section 3703a of title 46, United States Code, as added by this section, comply until January 1, 2015, with structural and operational requirements that the Secretary determines will provide as substantial protection to the environment as is economically and technologically feasible.

(c) CLERICAL AMENDMENT.—The analysis for chapter 37 of title 46, United States Code, is amended by inserting after the item relating to section 3703 the following:

"3703a. Tank vessel construction standards.".

(d) LIGHTERING REQUIREMENTS.—Section 3715(a) of title 46, United States Code, is amended—

(1) in paragraph (1), by striking "; and" and inserting a semicolon;

(2) in paragraph (2), by striking the period and inserting "; and"; and

(3) by adding at the end the following:

"(3) the delivering and the receiving vessel had on board at the time of transfer, a certificate of financial responsibility as would have been required under section 1016 of the Oil Pollution Act of 1990, had the transfer taken place in a place subject to the jurisdiction of the United States;

"(4) the delivering and the receiving vessel had on board at the time of transfer, evidence that each vessel is operating in compliance with section 311(j) of the Federal Water Pollution Control Act (33 U.S.C. 1321(j)); and

"(5) the delivering and the receiving vessel are operating in compliance with section 3703a of this title.".

46 USC 3703a note. Reports.

(e) SECRETARIAL STUDIES.—

(1) OTHER REQUIREMENTS.—Not later than 6 months after the date of enactment of this Act, the Secretary shall determine, based on recommendations from the National Academy of Sciences or other qualified organizations, whether other structural and operational tank vessel requirements will provide protection to the marine environment equal to or greater than that provided by double hulls, and shall report to the Congress that determination and recommendations for legislative action.

(2) REVIEW AND ASSESSMENT.—The Secretary shall—

(A) periodically review recommendations from the National Academy of Sciences and other qualified organizations on methods for further increasing the environmental and operational safety of tank vessels;

(B) not later than 5 years after the date of enactment of this Act, assess the impact of this section on the safety of the marine environment and the economic viability and operational makeup of the maritime oil transportation industry; and

(C) report the results of the review and assessment to the Congress with recommendations for legislative or other action. Reports.

(f) VESSEL FINANCING.—Section 1104 of the Merchant Marine Act of 1936 (46 App. U.S.C. 1274) is amended—

(1) by striking "SEC. 1104." and inserting "SEC. 1104A."; and

(2) by inserting after section 1104A (as redesignated by paragraph (1)) the following:

"SEC. 1104B. (a) Notwithstanding the provisions of this title, except as provided in subsection (d) of this section, the Secretary, upon the terms the Secretary may prescribe, may guarantee or make a commitment to guarantee, payment of the principal of and interest on an obligation which aids in financing and refinancing, including reimbursement to an obligor for expenditures previously made, of a contract for construction or reconstruction of a vessel or vessels owned by citizens of the United States which are designed and to be employed for commercial use in the coastwise or intercoastal trade or in foreign trade as defined in section 905 of this Act if— 46 USC app. 1274a.

"(1) the construction or reconstruction by an applicant is made necessary to replace vessels the continued operation of which is denied by virtue of the imposition of a statutorily mandated change in standards for the operation of vessels, and where, as a matter of law, the applicant would otherwise be denied the right to continue operating vessels in the trades in which the applicant operated prior to the taking effect of the statutory or regulatory change;

"(2) the applicant is presently engaged in transporting cargoes in vessels of the type and class that will be constructed or reconstructed under this section, and agrees to employ vessels constructed or reconstructed under this section as replacements only for vessels made obsolete by changes in operating standards imposed by statute;

"(3) the capacity of the vessels to be constructed or reconstructed under this title will not increase the cargo carrying capacity of the vessels being replaced;

"(4) the Secretary has not made a determination that the market demand for the vessel over its useful life will diminish so as to make the granting of the guarantee fiduciarily imprudent; and

"(5) the Secretary has considered the provisions of section 1104A(d)(1)(A) (iii), (iv), and (v) of this title.

"(b) For the purposes of this section—

"(1) the maximum term for obligations guaranteed under this program may not exceed 25 years;

"(2) obligations guaranteed may not exceed 75 percent of the actual cost or depreciated actual cost to the applicant for the construction or reconstruction of the vessel; and

"(3) reconstruction cost obligations may not be guaranteed unless the vessel after reconstruction will have a useful life of at least 15 years.

"(c)(1) The Secretary shall by rule require that the applicant provide adequate security against default. The Secretary may, in addition to any fees assessed under section 1104A(e), establish a Vessel Replacement Guarantee Fund into which shall be paid by obligors under this section—

"(A) annual fees which may be an additional amount on the loan guarantee fee in section 1104A(e) not to exceed an additional 1 percent; or

"(B) fees based on the amount of the obligation versus the percentage of the obligor's fleet being replaced by vessels constructed or reconstructed under this section.

"(2) The Vessel Replacement Guarantee Fund shall be a subaccount in the Federal Ship Financing Fund, and shall—

"(A) be the depository for all moneys received by the Secretary under sections 1101 through 1107 of this title with respect to guarantee or commitments to guarantee made under this section;

"(B) not include investigation fees payable under section 1104A(f) which shall be paid to the Federal Ship Financing Fund; and

"(C) be the depository, whenever there shall be outstanding any notes or obligations issued by the Secretary under section 1105(d) with respect to the Vessel Replacement Guarantee Fund, for all moneys received by the Secretary under sections 1101 through 1107 from applicants under this section.

"(d) The program created by this section shall, in addition to the requirements of this section, be subject to the provisions of sections 1101 through 1103; 1104A(b) (1), (4), (5), (6); 1104A(e); 1104A(f); 1104A(h); and 1105 through 1107; except that the Federal Ship Financing Fund is not liable for any guarantees or commitments to guarantee issued under this section.".

SEC. 4116. PILOTAGE.

(a) PILOT REQUIRED.—Section 8502(g) of title 46, United States Code, is amended to read as follows:

Regulations
Alaska.

"(g)(1) The Secretary shall designate by regulation the areas of the approaches to and waters of Prince William Sound, Alaska, if any, on which a vessel subject to this section is not required to be under the direction and control of a pilot licensed under section 7101 of this title.

"(2) In any area of Prince William Sound, Alaska, where a vessel subject to this section is required to be under the direction and control of a pilot licensed under section 7101 of this title, the pilot may not be a member of the crew of that vessel and shall be a pilot licensed by the State of Alaska who is operating under a Federal license, when the vessel is navigating waters between 60°49' North latitude and the Port of Valdez, Alaska.".

(b) SECOND PERSON REQUIRED.—Section 8502 of title 46, United States Code, is amended by adding at the end the following:

"(h) The Secretary shall designate waters on which tankers over 1,600 gross tons subject to this section shall have on the bridge a

master or mate licensed to direct and control the vessel under section 7101(c)(1) of this title who is separate and distinct from the pilot required under subsection (a) of this section.".

(c) ESCORTS FOR CERTAIN TANKERS.—Not later than 6 months after the date of the enactment of this Act, the Secretary shall initiate issuance of regulations under section 3703(a)(3) of title 46, United States Code, to define those areas, including Prince William Sound, Alaska, and Rosario Strait and Puget Sound, Washington (including those portions of the Strait of Juan de Fuca east of Port Angeles, Haro Strait, and the Strait of Georgia subject to United States jurisdiction), on which single hulled tankers over 5,000 gross tons transporting oil in bulk shall be escorted by at least two towing vessels (as defined under section 2101 of title 46, United States Code) or other vessels considered appropriate by the Secretary. Regulations. Alaska. Washington. 46 USC 3703 note.

(d) TANKER DEFINED.—In this section the term "tanker" has the same meaning the term has in section 2101 of title 46, United States Code. 46 USC 3703 note.

SEC. 4117. MARITIME POLLUTION PREVENTION TRAINING PROGRAM STUDY. 46 USC app. 1295 note.

The Secretary shall conduct a study to determine the feasibility of a Maritime Oil Pollution Prevention Training program to be carried out in cooperation with approved maritime training institutions. The study shall assess the costs and benefits of transferring suitable vessels to selected maritime training institutions, equipping the vessels for oil spill response, and training students in oil pollution response skills. The study shall be completed and transmitted to the Congress no later than one year after the date of the enactment of this Act.

SEC. 4118. VESSEL COMMUNICATION EQUIPMENT REGULATIONS. 33 USC 1203 note.

The Secretary shall, not later than one year after the date of the enactment of this Act, issue regulations necessary to ensure that vessels subject to the Vessel Bridge-to-Bridge Radiotelephone Act of 1971 (33 U.S.C. 1203) are also equipped as necessary to—

(1) receive radio marine navigation safety warnings; and

(2) engage in radio communications on designated frequencies with the Coast Guard, and such other vessels and stations as may be specified by the Secretary.

Subtitle B—Removal

SEC. 4201. FEDERAL REMOVAL AUTHORITY. President of U.S. Hazardous materials.

(a) IN GENERAL.—Subsection (c) of section 311 of the Federal Water Pollution Control Act (33 U.S.C. 1321(c)) is amended to read as follows:

"(c) FEDERAL REMOVAL AUTHORITY.—

"(1) GENERAL REMOVAL REQUIREMENT.—(A) The President shall, in accordance with the National Contingency Plan and any appropriate Area Contingency Plan, ensure effective and immediate removal of a discharge, and mitigation or prevention of a substantial threat of a discharge, of oil or a hazardous substance—

"(i) into or on the navigable waters;

"(ii) on the adjoining shorelines to the navigable waters;

"(iii) into or on the waters of the exclusive economic zone; or

"(iv) that may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States.

"(B) In carrying out this paragraph, the President may—

"(i) remove or arrange for the removal of a discharge, and mitigate or prevent a substantial threat of a discharge, at any time;

"(ii) direct or monitor all Federal, State, and private actions to remove a discharge; and

"(iii) remove and, if necessary, destroy a vessel discharging, or threatening to discharge, by whatever means are available.

"(2) DISCHARGE POSING SUBSTANTIAL THREAT TO PUBLIC HEALTH OR WELFARE.—(A) If a discharge, or a substantial threat of a discharge, of oil or a hazardous substance from a vessel, offshore facility, or onshore facility is of such a size or character as to be a substantial threat to the public health or welfare of the United States (including but not limited to fish, shellfish, wildlife, other natural resources, and the public and private beaches and shorelines of the United States), the President shall direct all Federal, State, and private actions to remove the discharge or to mitigate or prevent the threat of the discharge.

"(B) In carrying out this paragraph, the President may, without regard to any other provision of law governing contracting procedures or employment of personnel by the Federal Government—

"(i) remove or arrange for the removal of the discharge, or mitigate or prevent the substantial threat of the discharge; and

"(ii) remove and, if necessary, destroy a vessel discharging, or threatening to discharge, by whatever means are available.

"(3) ACTIONS IN ACCORDANCE WITH NATIONAL CONTINGENCY PLAN.—(A) Each Federal agency, State, owner or operator, or other person participating in efforts under this subsection shall act in accordance with the National Contingency Plan or as directed by the President.

"(B) An owner or operator participating in efforts under this subsection shall act in accordance with the National Contingency Plan and the applicable response plan required under subsection (j), or as directed by the President.

"(4) EXEMPTION FROM LIABILITY.—(A) A person is not liable for removal costs or damages which result from actions taken or omitted to be taken in the course of rendering care, assistance, or advice consistent with the National Contingency Plan or as otherwise directed by the President.

"(B) Subparagraph (A) does not apply—

"(i) to a responsible party;

"(ii) to a response under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9601 et seq.);

"(iii) with respect to personal injury or wrongful death; or

"(iv) if the person is grossly negligent or engages in willful misconduct.

"(C) A responsible party is liable for any removal costs and damages that another person is relieved of under subparagraph (A).

"(5) OBLIGATION AND LIABILITY OF OWNER OR OPERATOR NOT AFFECTED.—Nothing in this subsection affects—

"(A) the obligation of an owner or operator to respond immediately to a discharge, or the threat of a discharge, of oil; or

"(B) the liability of a responsible party under the Oil Pollution Act of 1990.

"(6) RESPONSIBLE PARTY DEFINED.—For purposes of this subsection, the term 'responsible party' has the meaning given that term under section 1001 of the Oil Pollution Act of 1990.".

(b) NATIONAL CONTINGENCY PLAN.—Subsection (d) of section 311 of the Federal Water Pollution Control Act (33 U.S.C. 1321(d)) is amended to read as follows:

"(d) NATIONAL CONTINGENCY PLAN.—

"(1) PREPARATION BY PRESIDENT.—The President shall prepare and publish a National Contingency Plan for removal of oil and hazardous substances pursuant to this section.

"(2) CONTENTS.—The National Contingency Plan shall provide for efficient, coordinated, and effective action to minimize damage from oil and hazardous substance discharges, including containment, dispersal, and removal of oil and hazardous substances, and shall include, but not be limited to, the following:

"(A) Assignment of duties and responsibilities among Federal departments and agencies in coordination with State and local agencies and port authorities including, but not limited to, water pollution control and conservation and trusteeship of natural resources (including conservation of fish and wildlife).

"(B) Identification, procurement, maintenance, and storage of equipment and supplies.

"(C) Establishment or designation of Coast Guard strike teams, consisting of—

"(i) personnel who shall be trained, prepared, and available to provide necessary services to carry out the National Contingency Plan;

"(ii) adequate oil and hazardous substance pollution control equipment and material; and

"(iii) a detailed oil and hazardous substance pollution and prevention plan, including measures to protect fisheries and wildlife.

"(D) A system of surveillance and notice designed to safeguard against as well as ensure earliest possible notice of discharges of oil and hazardous substances and imminent threats of such discharges to the appropriate State and Federal agencies.

"(E) Establishment of a national center to provide coordination and direction for operations in carrying out the Plan.

"(F) Procedures and techniques to be employed in identifying, containing, dispersing, and removing oil and hazardous substances.

"(G) A schedule, prepared in cooperation with the States, identifying—

"(i) dispersants, other chemicals, and other spill mitigating devices and substances, if any, that may be used in carrying out the Plan,

"(ii) the waters in which such dispersants, other chemicals, and other spill mitigating devices and substances may be used, and

"(iii) the quantities of such dispersant, other chemicals, or other spill mitigating device or substance which can be used safely in such waters,

which schedule shall provide in the case of any dispersant, chemical, spill mitigating device or substance, or waters not specifically identified in such schedule that the President, or his delegate, may, on a case-by-case basis, identify the dispersants, other chemicals, and other spill mitigating devices and substances which may be used, the waters in which they may be used, and the quantities which can be used safely in such waters.

"(H) A system whereby the State or States affected by a discharge of oil or hazardous substance may act where necessary to remove such discharge and such State or States may be reimbursed in accordance with the Oil Pollution Act of 1990, in the case of any discharge of oil from a vessel or facility, for the reasonable costs incurred for that removal, from the Oil Spill Liability Trust Fund.

"(I) Establishment of criteria and procedures to ensure immediate and effective Federal identification of, and response to, a discharge, or the threat of a discharge, that results in a substantial threat to the public health or welfare of the United States, as required under subsection (c)(2).

"(J) Establishment of procedures and standards for removing a worst case discharge of oil, and for mitigating or preventing a substantial threat of such a discharge.

"(K) Designation of the Federal official who shall be the Federal On-Scene Coordinator for each area for which an Area Contingency Plan is required to be prepared under subsection (j).

"(L) Establishment of procedures for the coordination of activities of—

"(i) Coast Guard strike teams established under subparagraph (C);

"(ii) Federal On-Scene Coordinators designated under subparagraph (K);

"(iii) District Response Groups established under subsection (j); and

"(iv) Area Committees established under subsection (j).

Fish and fishing.
Wildlife.

"(M) A fish and wildlife response plan, developed in consultation with the United States Fish and Wildlife Service, the National Oceanic and Atmospheric Administration, and other interested parties (including State fish and wildlife conservation officials), for the immediate and effective protection, rescue, and rehabilitation of, and the minimization of risk of damage to, fish and wildlife resources and their habitat that are harmed or that may be jeopardized by a discharge.

"(3) REVISIONS AND AMENDMENTS.—The President may, from time to time, as the President deems advisable, revise or otherwise amend the National Contingency Plan.

"(4) ACTIONS IN ACCORDANCE WITH NATIONAL CONTINGENCY PLAN.—After publication of the National Contingency Plan, the removal of oil and hazardous substances and actions to minimize damage from oil and hazardous substance discharges shall, to the greatest extent possible, be in accordance with the National Contingency Plan.".

(b) DEFINITIONS.— Section 311(a) of the Federal Water Pollution Control Act (33 U.S.C. 1321(a)) is amended—

(1) in paragraph (8), by inserting "containment and" after "refers to"; and

(2) in paragraph (16) by striking the period at the end and inserting a semicolon;

(3) in paragraph (17)—

(A) by striking "Otherwise" and inserting "otherwise"; and

(B) by striking the period at the end and inserting a semicolon; and

(4) by adding at the end the following:

"(18) 'Area Committee' means an Area Committee established under subsection (j);

"(19) 'Area Contingency Plan' means an Area Contingency Plan prepared under subsection (j);

"(20) 'Coast Guard District Response Group' means a Coast Guard District Response Group established under subsection (j);

"(21) 'Federal On-Scene Coordinator' means a Federal On-Scene Coordinator designated in the National Contingency Plan;

"(22) 'National Contingency Plan' means the National Contingency Plan prepared and published under subsection (d);

"(23) 'National Response Unit' means the National Response Unit established under subsection (j); and

"(24) 'worst case discharge' means—

"(A) in the case of a vessel, a discharge in adverse weather conditions of its entire cargo; and

"(B) in the case of an offshore facility or onshore facility, the largest foreseeable discharge in adverse weather conditions.".

(c) REVISION OF NATIONAL CONTINGENCY PLAN.—Not later than one year after the date of the enactment of this Act, the President shall revise and republish the National Contingency Plan prepared under section 311(c)(2) of the Federal Water Pollution Control Act (as in effect immediately before the date of the enactment of this Act) to implement the amendments made by this section and section 4202. 33 USC 1321 note.

SEC. 4202. NATIONAL PLANNING AND RESPONSE SYSTEM.

(a) IN GENERAL.—Subsection (j) of section 311 of the Federal Water Pollution Control Act (33 U.S.C. 1321(j)) is amended—

(1) by striking "(j)" and inserting the following:

"(j) NATIONAL RESPONSE SYSTEM.—";

(2) by moving paragraph (1) so as to begin immediately below the heading for subsection (j) (as added by paragraph (1) of this subsection);

(3) by moving paragraph (1) two ems to the right, so the left margin of that paragraph is aligned with the left margin of paragraph (2) of that subsection (as added by paragraph (6) of this subsection);

(4) in paragraph (1) by striking "(1)" and inserting the following:

"(1) IN GENERAL.—";

(5) by striking paragraph (2); and

(6) by adding at the end the following:

Uniformed services. North Carolina.

"(2) NATIONAL RESPONSE UNIT.—The Secretary of the department in which the Coast Guard is operating shall establish a National Response Unit at Elizabeth City, North Carolina. The Secretary, acting through the National Response Unit—

Public information.

"(A) shall compile and maintain a comprehensive computer list of spill removal resources, personnel, and equipment that is available worldwide and within the areas designated by the President pursuant to paragraph (4), which shall be available to Federal and State agencies and the public;

"(B) shall provide technical assistance, equipment, and other resources requested by a Federal On-Scene Coordinator;

"(C) shall coordinate use of private and public personnel and equipment to remove a worst case discharge, and to mitigate or prevent a substantial threat of such a discharge, from a vessel, offshore facility, or onshore facility operating in or near an area designated by the President pursuant to paragraph (4);

"(D) may provide technical assistance in the preparation of Area Contingency Plans required under paragraph (4);

"(E) shall administer Coast Guard strike teams established under the National Contingency Plan;

Records.

"(F) shall maintain on file all Area Contingency Plans approved by the President under this subsection; and

"(G) shall review each of those plans that affects its responsibilities under this subsection.

"(3) COAST GUARD DISTRICT RESPONSE GROUPS.—(A) The Secretary of the department in which the Coast Guard is operating shall establish in each Coast Guard district a Coast Guard District Response Group.

"(B) Each Coast Guard District Response Group shall consist of—

"(i) the Coast Guard personnel and equipment, including firefighting equipment, of each port within the district;

"(ii) additional prepositioned equipment; and

"(iii) a district response advisory staff.

"(C) Coast Guard district response groups—

"(i) shall provide technical assistance, equipment, and other resources when required by a Federal On-Scene Coordinator;

"(ii) shall maintain all Coast Guard response equipment within its district;

"(iii) may provide technical assistance in the preparation of Area Contingency Plans required under paragraph (4); and

"(iv) shall review each of those plans that affect its area of geographic responsibility.

"(4) AREA COMMITTEES AND AREA CONTINGENCY PLANS.—(A) There is established for each area designated by the President an Area Committee comprised of members appointed by the President from qualified personnel of Federal, State, and local agencies. Establishment.

"(B) Each Area Committee, under the direction of the Federal On-Scene Coordinator for its area, shall—

"(i) prepare for its area the Area Contingency Plan required under subparagraph (C);

"(ii) work with State and local officials to enhance the contingency planning of those officials and to assure preplanning of joint response efforts, including appropriate procedures for mechanical recovery, dispersal, shoreline cleanup, protection of sensitive environmental areas, and protection, rescue, and rehabilitation of fisheries and wildlife; and

"(iii) work with State and local officials to expedite decisions for the use of dispersants and other mitigating substances and devices.

"(C) Each Area Committee shall prepare and submit to the President for approval an Area Contingency Plan for its area. The Area Contingency Plan shall—

"(i) when implemented in conjunction with the National Contingency Plan, be adequate to remove a worst case discharge, and to mitigate or prevent a substantial threat of such a discharge, from a vessel, offshore facility, or onshore facility operating in or near the area;

"(ii) describe the area covered by the plan, including the areas of special economic or environmental importance that might be damaged by a discharge;

"(iii) describe in detail the responsibilities of an owner or operator and of Federal, State, and local agencies in removing a discharge, and in mitigating or preventing a substantial threat of a discharge;

"(iv) list the equipment (including firefighting equipment), dispersants or other mitigating substances and devices, and personnel available to an owner or operator and Federal, State, and local agencies, to ensure an effective and immediate removal of a discharge, and to ensure mitigation or prevention of a substantial threat of a discharge;

"(v) describe the procedures to be followed for obtaining an expedited decision regarding the use of dispersants;

"(vi) describe in detail how the plan is integrated into other Area Contingency Plans and vessel, offshore facility, and onshore facility response plans approved under this subsection, and into operating procedures of the National Response Unit;

"(vii) include any other information the President requires; and

"(viii) be updated periodically by the Area Committee.

"(D) The President shall—

"(i) review and approve Area Contingency Plans under this paragraph; and

"(ii) periodically review Area Contingency Plans so approved.

"(5) TANK VESSEL AND FACILITY RESPONSE PLANS.—(A) The President shall issue regulations which require an owner or Regulations.

operator of a tank vessel or facility described in subparagraph (B) to prepare and submit to the President a plan for responding, to the maximum extent practicable, to a worst case discharge, and to a substantial threat of such a discharge, of oil or a hazardous substance.

"(B) The tank vessels and facilities referred to in subparagraph (A) are the following:

"(i) A tank vessel, as defined under section 2101 of title 46, United States Code.

"(ii) An offshore facility.

"(iii) An onshore facility that, because of its location, could reasonably be expected to cause substantial harm to the environment by discharging into or on the navigable waters, adjoining shorelines, or the exclusive economic zone.

"(C) A response plan required under this paragraph shall—

"(i) be consistent with the requirements of the National Contingency Plan and Area Contingency Plans;

"(ii) identify the qualified individual having full authority to implement removal actions, and require immediate communications between that individual and the appropriate Federal official and the persons providing personnel and equipment pursuant to clause (iii);

"(iii) identify, and ensure by contract or other means approved by the President the availability of, private personnel and equipment necessary to remove to the maximum extent practicable a worst case discharge (including a discharge resulting from fire or explosion), and to mitigate or prevent a substantial threat of such a discharge;

"(iv) describe the training, equipment testing, periodic unannounced drills, and response actions of persons on the vessel or at the facility, to be carried out under the plan to ensure the safety of the vessel or facility and to mitigate or prevent the discharge, or the substantial threat of a discharge;

"(v) be updated periodically; and

"(vi) be resubmitted for approval of each significant change.

President of U.S.

"(D) With respect to any response plan submitted under this paragraph for an onshore facility that, because of its location, could reasonably be expected to cause significant and substantial harm to the environment by discharging into or on the navigable waters or adjoining shorelines or the exclusive economic zone, and with respect to each response plan submitted under this paragraph for a tank vessel or offshore facility, the President shall—

"(i) promptly review such response plan;

"(ii) require amendments to any plan that does not meet the requirements of this paragraph;

"(iii) approve any plan that meets the requirements of this paragraph; and

"(iv) review each plan periodically thereafter.

"(E) A tank vessel, offshore facility, or onshore facility required to prepare a response plan under this subsection may not handle, store, or transport oil unless—

"(i) in the case of a tank vessel, offshore facility, or onshore facility for which a response plan is reviewed by

the President under subparagraph (D), the plan has been approved by the President; and

"(ii) the vessel or facility is operating in compliance with the plan.

"(F) Notwithstanding subparagraph (E), the President may authorize a tank vessel, offshore facility, or onshore facility to operate without a response plan approved under this paragraph, until not later than 2 years after the date of the submission to the President of a plan for the tank vessel or facility, if the owner or operator certifies that the owner or operator has ensured by contract or other means approved by the President the availability of private personnel and equipment necessary to respond, to the maximum extent practicable, to a worst case discharge or a substantial threat of such a discharge.

"(G) The owner or operator of a tank vessel, offshore facility, or onshore facility may not claim as a defense to liability under title I of the Oil Pollution Act of 1990 that the owner or operator was acting in accordance with an approved response plan.

"(H) The Secretary shall maintain, in the Vessel Identification System established under chapter 125 of title 46, United States Code, the dates of approval and review of a response plan under this paragraph for each tank vessel that is a vessel of the United States.

"(6) EQUIPMENT REQUIREMENTS AND INSPECTION.—Not later than 2 years after the date of enactment of this section, the President shall require— President of U.S

"(A) periodic inspection of containment booms, skimmers, vessels, and other major equipment used to remove discharges; and

"(B) vessels operating on navigable waters and carrying oil or a hazardous substance in bulk as cargo to carry appropriate removal equipment that employs the best technology economically feasible and that is compatible with the safe operation of the vessel.

"(7) AREA DRILLS.—The President shall periodically conduct drills of removal capability, without prior notice, in areas for which Area Contingency Plans are required under this subsection and under relevant tank vessel and facility response plans. The drills may include participation by Federal, State, and local agencies, the owners and operators of vessels and facilities in the area, and private industry. The President may publish annual reports on these drills, including assessments of the effectiveness of the plans and a list of amendments made to improve plans. President of U.S.

"(8) UNITED STATES GOVERNMENT NOT LIABLE.—The United States Government is not liable for any damages arising from its actions or omissions relating to any response plan required by this section.".

(b) IMPLEMENTATION.—

(1) AREA COMMITTEES AND CONTINGENCY PLANS.—(A) Not later than 6 months after the date of the enactment of this Act, the President shall designate the areas for which Area Committees are established under section 311(j)(4) of the Federal Water Pollution Control Act, as amended by this Act. In designating such areas, the President shall ensure that all navigable waters, adjoining shorelines, and waters of the exclusive economic zone are subject to an Area Contingency Plan under that section. 33 USC 1321 note. President of U.S

(B) Not later than 18 months after the date of the enactment of this Act, each Area Committee established under that section shall submit to the President the Area Contingency Plan required under that section.

(C) Not later than 24 months after the date of the enactment of this Act, the President shall—

(i) promptly review each plan;

(ii) require amendments to any plan that does not meet the requirements of section 311(j)(4) of the Federal Water Pollution Control Act; and

(iii) approve each plan that meets the requirements of that section.

Establishment.

(2) NATIONAL RESPONSE UNIT.—Not later than one year after the date of the enactment of this Act, the Secretary of the department in which the Coast Guard is operating shall establish a National Response Unit in accordance with section 311(j)(2) of the Federal Water Pollution Control Act, as amended by this Act.

Establishment.

(3) COAST GUARD DISTRICT RESPONSE GROUPS.—Not later than 1 year after the date of the enactment of this Act, the Secretary of the department in which the Coast Guard is operating shall establish Coast Guard District Response Groups in accordance with section 311(j)(3) of the Federal Water Pollution Control Act, as amended by this Act.

President of U.S. Regulations.

(4) TANK VESSEL AND FACILITY RESPONSE PLANS; TRANSITION PROVISION; EFFECTIVE DATE OF PROHIBITION.—(A) Not later than 24 months after the date of the enactment of this Act, the President shall issue regulations for tank vessel and facility response plans under section 311(j)(5) of the Federal Water Pollution Control Act, as amended by this Act.

(B) During the period beginning 30 months after the date of the enactment of this paragraph and ending 36 months after that date of enactment, a tank vessel or facility for which a response plan is required to be prepared under section 311(j)(5) of the Federal Water Pollution Control Act, as amended by this Act, may not handle, store, or transport oil unless the owner or operator thereof has submitted such a plan to the President.

(C) Subparagraph (E) of section 311(j)(5) of the Federal Water Pollution Control Act, as amended by this Act, shall take effect 36 months after the date of the enactment of this Act.

(c) STATE LAW NOT PREEMPTED.— Section 311(o)(2) of the Federal Water Pollution Control Act (33 U.S.C. 1321(o)(2)) is amended by inserting before the period the following: ", or with respect to any removal activities related to such discharge".

14 USC 92 note.

SEC. 4203. COAST GUARD VESSEL DESIGN.

The Secretary shall ensure that vessels designed and constructed to replace Coast Guard buoy tenders are equipped with oil skimming systems that are readily available and operable, and that complement the primary mission of servicing aids to navigation.

SEC. 4204. DETERMINATION OF HARMFUL QUANTITIES OF OIL AND HAZARDOUS SUBSTANCES.

Section 311(b)(4) of the Federal Water Pollution Control Act (33 U.S.C. 1321(b)(4)) is amended by inserting "or the environment" after "the public health or welfare".

SEC. 4205. COASTWISE OIL SPILL RESPONSE COOPERATIVES.

Section 12106 of title 46, United States Code, is amended by adding at the end the following:

"(d)(1) A vessel may be issued a certificate of documentation with a coastwise endorsement if—

"(A) the vessel is owned by a not-for-profit oil spill response cooperative or by members of such a cooperative who dedicate the vessel to use by the cooperative;

"(B) the vessel is at least 50 percent owned by persons or entities described in section 12102(a) of this title;

"(C) the vessel otherwise qualifies under section 12106 to be employed in the coastwise trade; and

"(D) use of the vessel is restricted to—

"(i) the deployment of equipment, supplies, and personnel to recover, contain, or transport oil discharged into the navigable waters of the United States, or within the Exclusive Economic Zone, or

"(ii) for training exercises to prepare to respond to such a discharge.

"(2) For purposes of the first proviso of section 27 of the Merchant Marine Act, 1920, section 2 of the Shipping Act of 1916, and section 12102(a) of this title, a vessel meeting the criteria of this subsection shall be considered to be owned exclusively by citizens of the United States.".

Subtitle C—Penalties and Miscellaneous

SEC. 4301. FEDERAL WATER POLLUTION CONTROL ACT PENALTIES.

(a) NOTICE TO STATE AND FAILURE TO REPORT.—Section 311(b)(5) of the Federal Water Pollution Control Act (33 U.S.C. 1321(b)(5)) is amended—

(1) by inserting after the first sentence the following: "The Federal agency shall immediately notify the appropriate State agency of any State which is, or may reasonably be expected to be, affected by the discharge of oil or a hazardous substance.";

(2) by striking "fined not more than $10,000, or imprisoned for not more than one year, or both" and inserting "fined in accordance with title 18, United States Code, or imprisoned for not more than 5 years, or both"; and

(3) in the last sentence by—

(A) striking "or information obtained by the exploitation of such notification"; and

(B) inserting "natural" before "person".

(b) PENALTIES FOR DISCHARGES AND VIOLATIONS OF REGULATIONS.—Section 311(b) of the Federal Water Pollution Control Act (33 U.S.C. 1321(b)) is amended by striking paragraph (6) and inserting the following new paragraphs:

"(6) ADMINISTRATIVE PENALTIES.—

"(A) VIOLATIONS.—Any owner, operator, or person in charge of any vessel, onshore facility, or offshore facility—

"(i) from which oil or a hazardous substance is discharged in violation of paragraph (3), or

"(ii) who fails or refuses to comply with any regulation issued under subsection (j) to which that owner, operator, or person in charge is subject,

may be assessed a class I or class II civil penalty by the Secretary of the department in which the Coast Guard is operating or the Administrator.

"(B) CLASSES OF PENALTIES.—

"(i) CLASS I.—The amount of a class I civil penalty under subparagraph (A) may not exceed $10,000 per violation, except that the maximum amount of any class I civil penalty under this subparagraph shall not exceed $25,000. Before assessing a civil penalty under this clause, the Administrator or Secretary, as the case may be, shall give to the person to be assessed such penalty written notice of the Administrator's or Secretary's proposal to assess the penalty and the opportunity to request, within 30 days of the date the notice is received by such person, a hearing on the proposed penalty. Such hearing shall not be subject to section 554 or 556 of title 5, United States Code, but shall provide a reasonable opportunity to be heard and to present evidence.

"(ii) CLASS II.—The amount of a class II civil penalty under subparagraph (A) may not exceed $10,000 per day for each day during which the violation continues; except that the maximum amount of any class II civil penalty under this subparagraph shall not exceed $125,000. Except as otherwise provided in this subsection, a class II civil penalty shall be assessed and collected in the same manner, and subject to the same provisions, as in the case of civil penalties assessed and collected after notice and opportunity for a hearing on the record in accordance with section 554 of title 5, United States Code. The Administrator and Secretary may issue rules for discovery procedures for hearings under this paragraph.

"(C) RIGHTS OF INTERESTED PERSONS.—

"(i) PUBLIC NOTICE.—Before issuing an order assessing a class II civil penalty under this paragraph the Administrator or Secretary, as the case may be, shall provide public notice of and reasonable opportunity to comment on the proposed issuance of such order.

"(ii) PRESENTATION OF EVIDENCE.—Any person who comments on a proposed assessment of a class II civil penalty under this paragraph shall be given notice of any hearing held under this paragraph and of the order assessing such penalty. In any hearing held under this paragraph, such person shall have a reasonable opportunity to be heard and to present evidence.

Federal Register, publication.

"(iii) RIGHTS OF INTERESTED PERSONS TO A HEARING.—If no hearing is held under subparagraph (B) before issuance of an order assessing a class II civil penalty under this paragraph, any person who commented on the proposed assessment may petition, within 30 days after the issuance of such order, the Administrator or Secretary, as the case may be, to set aside such order and to provide a hearing on the penalty. If the evidence presented by the petitioner in support of the petition is material and was not considered in the issuance of the order, the Administrator or Secretary shall imme-

diately set aside such order and provide a hearing in accordance with subparagraph (B)(ii). If the Administrator or Secretary denies a hearing under this clause, the Administrator or Secretary shall provide to the petitioner, and publish in the Federal Register, notice of and the reasons for such denial.

"(D) FINALITY OF ORDER.—An order assessing a class II civil penalty under this paragraph shall become final 30 days after its issuance unless a petition for judicial review is filed under subparagraph (G) or a hearing is requested under subparagraph (C)(iii). If such a hearing is denied, such order shall become final 30 days after such denial.

"(E) EFFECT OF ORDER.—Action taken by the Administrator or Secretary, as the case may be, under this paragraph shall not affect or limit the Administrator's or Secretary's authority to enforce any provision of this Act; except that any violation—

"(i) with respect to which the Administrator or Secretary has commenced and is diligently prosecuting an action to assess a class II civil penalty under this paragraph, or

"(ii) for which the Administrator or Secretary has issued a final order assessing a class II civil penalty not subject to further judicial review and the violator has paid a penalty assessed under this paragraph,

shall not be the subject of a civil penalty action under section 309(d), 309(g), or 505 of this Act or under paragraph (7).

"(F) EFFECT OF ACTION ON COMPLIANCE.—No action by the Administrator or Secretary under this paragraph shall affect any person's obligation to comply with any section of this Act.

"(G) JUDICIAL REVIEW.—Any person against whom a civil penalty is assessed under this paragraph or who commented on the proposed assessment of such penalty in accordance with subparagraph (C) may obtain review of such assessment—

"(i) in the case of assessment of a class I civil penalty, in the United States District Court for the District of Columbia or in the district in which the violation is alleged to have occurred, or

District of Columbia.

"(ii) in the case of assessment of a class II civil penalty, in United States Court of Appeals for the District of Columbia Circuit or for any other circuit in which such person resides or transacts business,

by filing a notice of appeal in such court within the 30-day period beginning on the date the civil penalty order is issued and by simultaneously sending a copy of such notice by certified mail to the Administrator or Secretary, as the case may be, and the Attorney General. The Administrator or Secretary shall promptly file in such court a certified copy of the record on which the order was issued. Such court shall not set aside or remand such order unless there is not substantial evidence in the record, taken as a whole, to support the finding of a violation or unless the Administrator's or Secretary's assessment of the penalty constitutes an abuse of discretion and shall not impose additional civil

penalties for the same violation unless the Administrator's or Secretary's assessment of the penalty constitutes an abuse of discretion.

"(H) COLLECTION.—If any person fails to pay an assessment of a civil penalty—

"(i) after the assessment has become final, or

"(ii) after a court in an action brought under subparagraph (G) has entered a final judgment in favor of the Administrator or Secretary, as the case may be,

the Administrator or Secretary shall request the Attorney General to bring a civil action in an appropriate district court to recover the amount assessed (plus interest at currently prevailing rates from the date of the final order or the date of the final judgment, as the case may be). In such an action, the validity, amount, and appropriateness of such penalty shall not be subject to review. Any person who fails to pay on a timely basis the amount of an assessment of a civil penalty as described in the first sentence of this subparagraph shall be required to pay, in addition to such amount and interest, attorneys fees and costs for collection proceedings and a quarterly nonpayment penalty for each quarter during which such failure to pay persists. Such nonpayment penalty shall be in an amount equal to 20 percent of the aggregate amount of such person's penalties and nonpayment penalties which are unpaid as of the beginning of such quarter.

"(I) SUBPOENAS.—The Administrator or Secretary, as the case may be, may issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, or documents in connection with hearings under this paragraph. In case of contumacy or refusal to obey a subpoena issued pursuant to this subparagraph and served upon any person, the district court of the United States for any district in which such person is found, resides, or transacts business, upon application by the United States and after notice to such person, shall have jurisdiction to issue an order requiring such person to appear and give testimony before the administrative law judge or to appear and produce documents before the administrative law judge, or both, and any failure to obey such order of the court may be punished by such court as a contempt thereof.

Hazardous materials.

"(7) CIVIL PENALTY ACTION.—

"(A) DISCHARGE, GENERALLY.—Any person who is the owner, operator, or person in charge of any vessel, onshore facility, or offshore facility from which oil or a hazardous substance is discharged in violation of paragraph (3), shall be subject to a civil penalty in an amount up to $25,000 per day of violation or an amount up to $1,000 per barrel of oil or unit of reportable quantity of hazardous substances discharged.

"(B) FAILURE TO REMOVE OR COMPLY.—Any person described in subparagraph (A) who, without sufficient cause—

"(i) fails to properly carry out removal of the discharge under an order of the President pursuant to subsection (c); or

"(ii) fails to comply with an order pursuant to subsection (e)(1)(B);

shall be subject to a civil penalty in an amount up to $25,000 per day of violation or an amount up to 3 times the costs incurred by the Oil Spill Liability Trust Fund as a result of such failure.

"(C) FAILURE TO COMPLY WITH REGULATION.—Any person who fails or refuses to comply with any regulation issued under subsection (j) shall be subject to a civil penalty in an amount up to $25,000 per day of violation.

"(D) GROSS NEGLIGENCE.—In any case in which a violation of paragraph (3) was the result of gross negligence or willful misconduct of a person described in subparagraph (A), the person shall be subject to a civil penalty of not less than $100,000, and not more than $3,000 per barrel of oil or unit of reportable quantity of hazardous substance discharged.

"(E) JURISDICTION.—An action to impose a civil penalty under this paragraph may be brought in the district court of the United States for the district in which the defendant is located, resides, or is doing business, and such court shall have jurisdiction to assess such penalty. Courts, U.S.

"(F) LIMITATION.—A person is not liable for a civil penalty under this paragraph for a discharge if the person has been assessed a civil penalty under paragraph (6) for the discharge.

"(8) DETERMINATION OF AMOUNT.—In determining the amount of a civil penalty under paragraphs (6) and (7), the Administrator, Secretary, or the court, as the case may be, shall consider the seriousness of the violation or violations, the economic benefit to the violator, if any, resulting from the violation, the degree of culpability involved, any other penalty for the same incident, any history of prior violations, the nature, extent, and degree of success of any efforts of the violator to minimize or mitigate the effects of the discharge, the economic impact of the penalty on the violator, and any other matters as justice may require.

"(9) MITIGATION OF DAMAGE.—In addition to establishing a penalty for the discharge of oil or a hazardous substance, the Administrator or the Secretary of the department in which the Coast Guard is operating may act to mitigate the damage to the public health or welfare caused by such discharge. The cost of such mitigation shall be deemed a cost incurred under subsection (c) of this section for the removal of such substance by the United States Government. Hazardous materials.

"(10) RECOVERY OF REMOVAL COSTS.—Any costs of removal incurred in connection with a discharge excluded by subsection (a)(2)(C) of this section shall be recoverable from the owner or operator of the source of the discharge in an action brought under section 309(b) of this Act.

"(11) LIMITATION.—Civil penalties shall not be assessed under both this section and section 309 for the same discharge.".

(c) CRIMINAL PENALTIES.—Section 309(c) of the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) is amended by inserting after "308," each place it appears the following: "311(b)(3),".

SEC. 4302. OTHER PENALTIES.

(a) NEGLIGENT OPERATIONS.—Section 2302 of title 46, United States Code, is amended—

(1) in subsection (b) by striking "shall be fined not more than $5,000, imprisoned for not more than one year, or both.", and inserting "commits a class A misdemeanor."; and

(2) in subsection (c)—

(A) by striking ", shall be" in the matter preceding paragraph (1);

(B) by inserting "is" before "liable" in paragraph (1); and

(C) by amending paragraph (2) to read as follows:

"(2) commits a class A misdemeanor.".

(b) INSPECTIONS.—Section 3318 of title 46, United States Code, is amended—

(1) in subsection (b) by striking "shall be fined not more than $10,000, imprisoned for not more than 5 years, or both." and inserting "commits a class D felony.";

(2) in subsection (c) by striking "shall be fined not more than $5,000, imprisoned for not more than 5 years, or both." and inserting "commits a class D felony.";

(3) in subsection (d) by striking "shall be fined not more than $5,000, imprisoned for not more than 5 years, or both." and inserting "commits a class D felony.";

(4) in subsection (e) by striking "shall be fined not more than $10,000, imprisoned for not more than 2 years, or both." and inserting "commits a class A misdemeanor."; and

(5) in the matter preceding paragraph (1) of subsection (f) by striking "shall be fined not less than $1,000 but not more than $10,000, and imprisoned for not less than 2 years but not more than 5 years," and inserting "commits a class D felony.".

(c) CARRIAGE OF LIQUID BULK DANGEROUS CARGOES.—Section 3718 of title 46, United States Code, is amended—

(1) in subsection (b) by striking "shall be fined not more than $50,000, imprisoned for not more than 5 years, or both." and inserting "commits a class D felony."; and

(2) in subsection (c) by striking "shall be fined not more than $100,000, imprisoned for not more than 10 years, or both." and inserting "commits a class C felony.".

(d) LOAD LINES.—Section 5116 of title 46, United States Code, is amended—

(1) in subsection (d) by striking "shall be fined not more than $10,000, imprisoned for not more than one year, or both." and inserting "commits a class A misdemeanor."; and

(2) in subsection (e) by striking "shall be fined not more than $10,000, imprisoned for not more than 2 years, or both." and inserting "commits a class A misdemeanor.".

(e) COMPLEMENT OF INSPECTED VESSELS.—Section 8101 of title 46, United States Code, is amended—

(1) in subsection (e) by striking "$50" and inserting "$1,000";

(2) in subsection (f) by striking "$100, or, for a deficiency of a licensed individual, a penalty of $500." and inserting "$10,000."; and

(3) in subsection (g) by striking "$500." and inserting "$10,000.".

(f) WATCHES.—Section 8104 of title 46, United States Code, is amended—

(1) in subsection (i) by striking "$100." and inserting "$10,000."; and

(2) in subsection (j) by striking "$500." and inserting "$10,000.".

(g) COASTWISE PILOTAGE.—Section 8502 of title 46, United States Code, is amended—

(1) in subsection (e) by striking "$500." and inserting "$10,000."; and

(2) in subsection (f) by striking "$500." and inserting "$10,000.".

(h) FOREIGN COMMERCE PILOTAGE.—Section 8503(e) of title 46, United States Code, is amended by striking "shall be fined not more than $50,000, imprisoned for not more than five years, or both." and inserting "commits a class D felony.".

(i) CREW REQUIREMENTS.—Section 8702(e) of title 46, United States Code, is amended by striking "$500." and inserting "$10,000.".

(j) PORTS AND WATERWAYS SAFETY ACT.—Section 13(b) of the Port and Waterways Safety Act (33 U.S.C. 1232(b)) is amended—

(1) in paragraph (1) by striking "shall be fined not more than $50,000 for each violation or imprisoned for not more than five years, or both." and inserting "commits a class D felony."; and

(2) in paragraph (2) by striking "shall, in lieu of the penalties prescribed in paragraph (1), be fined not more than $100,000, or imprisoned for not more than 10 years, or both." and inserting "commits a class C felony.".

(k) VESSEL NAVIGATION.—Section 4 of the Act of April 28, 1908 (33 U.S.C. 1236) is amended—

(1) in subsection (b) by striking "$500." and inserting "$5,000.";

(2) in subsection (c) by striking "$500," and inserting "$5,000,"; and

(3) in subsection (d) by striking "$250." and inserting "$2,500.".

(l) INTERVENTION ON THE HIGH SEAS ACT.—Section 12(a) of the Intervention of the High Seas Act (33 U.S.C. 1481(a)) is amended—

(1) in the matter preceding paragraph (1) by striking "Any person who" and inserting "A person commits a class A misdemeanor if that person"; and

(2) in paragraph (3) by striking ", shall be fined not more than $10,000 or imprisoned not more than one year, or both".

(m) DEEPWATER PORT ACT OF 1974.—Section 15(a) of the Deepwater Port Act of 1974 (33 U.S.C. 1514(a)) is amended by striking "shall on conviction be fined not more than $25,000 for each day of violation or imprisoned for not more than 1 year, or both." and inserting "commits a class A misdemeanor for each day of violation.".

(n) ACT TO PREVENT POLLUTION FROM SHIPS.—Section 9(a) of the Act to Prevent Pollution from Ships (33 U.S.C. 1908(a)) is amended by striking "shall, for each violation, be fined not more than $50,000 or be imprisoned for not more than 5 years, or both." and inserting "commits a class D felony.".

SEC. 4303. FINANCIAL RESPONSIBILITY CIVIL PENALTIES.

President of U.S.
33 USC 2716a.

(a) ADMINISTRATIVE.—Any person who, after notice and an opportunity for a hearing, is found to have failed to comply with the requirements of section 1016 or the regulations issued under that section, or with a denial or detention order issued under subsection (c)(2) of that section, shall be liable to the United States for a civil penalty, not to exceed $25,000 per day of violation. The amount of the civil penalty shall be assessed by the President by written notice. In determining the amount of the penalty, the President

shall take into account the nature, circumstances, extent, and gravity of the violation, the degree of culpability, any history of prior violation, ability to pay, and such other matters as justice may require. The President may compromise, modify, or remit, with or without conditions, any civil penalty which is subject to imposition or which had been imposed under this paragraph. If any person fails to pay an assessed civil penalty after it has become final, the President may refer the matter to the Attorney General for collection.

(b) JUDICIAL.—In addition to, or in lieu of, assessing a penalty under subsection (a), the President may request the Attorney General to secure such relief as necessary to compel compliance with this section 1016, including a judicial order terminating operations. The district courts of the United States shall have jurisdiction to grant any relief as the public interest and the equities of the case may require.

26 USC 9509 note.

SEC. 4304. DEPOSIT OF CERTAIN PENALTIES INTO OIL SPILL LIABILITY TRUST FUND.

Penalties paid pursuant to section 311 of the Federal Water Pollution Control Act, section 309(c) of that Act, as a result of violations of section 311 of that Act, and the Deepwater Port Act of 1974, shall be deposited in the Oil Spill Liability Trust Fund created under section 9509 of the Internal Revenue Code of 1986 (26 U.S.C. 9509).

SEC. 4305. INSPECTION AND ENTRY.

Section 311(m) of the Federal Water Pollution Control Act (33 U.S.C. 1321(m)) is amended to read as follows:

"(m) ADMINISTRATIVE PROVISIONS.—

"(1) FOR VESSELS.—Anyone authorized by the President to enforce the provisions of this section with respect to any vessel may, except as to public vessels—

"(A) board and inspect any vessel upon the navigable waters of the United States or the waters of the contiguous zone,

"(B) with or without a warrant, arrest any person who in the presence or view of the authorized person violates the provisions of this section or any regulation issued thereunder, and

"(C) execute any warrant or other process issued by an officer or court of competent jurisdiction.

"(2) FOR FACILITIES.—

Reports. Records.

"(A) RECORDKEEPING.—Whenever required to carry out the purposes of this section, the Administrator or the Secretary of the Department in which the Coast Guard is operating shall require the owner or operator of a facility to which this section applies to establish and maintain such records, make such reports, install, use, and maintain such monitoring equipment and methods, and provide such other information as the Administrator or Secretary, as the case may be, may require to carry out the objectives of this section.

"(B) ENTRY AND INSPECTION.—Whenever required to carry out the purposes of this section, the Administrator or the Secretary of the Department in which the Coast Guard is operating or an authorized representative of the Adminis-

trator or Secretary, upon presentation of appropriate credentials, may—

"(i) enter and inspect any facility to which this section applies, including any facility at which any records are required to be maintained under subparagraph (A); and

"(ii) at reasonable times, have access to and copy any records, take samples, and inspect any monitoring equipment or methods required under subparagraph (A).

"(C) ARRESTS AND EXECUTION OF WARRANTS.—Anyone authorized by the Administrator or the Secretary of the department in which the Coast Guard is operating to enforce the provisions of this section with respect to any facility may—

"(i) with or without a warrant, arrest any person who violates the provisions of this section or any regulation issued thereunder in the presence or view of the person so authorized; and

"(ii) execute any warrant or process issued by an officer or court of competent jurisdiction.

"(D) PUBLIC ACCESS.—Any records, reports, or information obtained under this paragraph shall be subject to the same public access and disclosure requirements which are applicable to records, reports, and information obtained pursuant to section 308.".

SEC. 4306. CIVIL ENFORCEMENT UNDER FEDERAL WATER POLLUTION CONTROL ACT.

Section 311(e) of the Federal Water Pollution Control Act (33 U.S.C. 1321) is amended to read as follows:

"(e) CIVIL ENFORCEMENT.—

State and local governments.

"(1) ORDERS PROTECTING PUBLIC HEALTH.—In addition to any action taken by a State or local government, when the President determines that there may be an imminent and substantial threat to the public health or welfare of the United States, including fish, shellfish, and wildlife, public and private property, shorelines, beaches, habitat, and other living and nonliving natural resources under the jurisdiction or control of the United States, because of an actual or threatened discharge of oil or a hazardous substance from a vessel or facility in violation of subsection (b), the President may—

"(A) require the Attorney General to secure any relief from any person, including the owner or operator of the vessel or facility, as may be necessary to abate such endangerment; or

"(B) after notice to the affected State, take any other action under this section, including issuing administrative orders, that may be necessary to protect the public health and welfare.

"(2) JURISDICTION OF DISTRICT COURTS.—The district courts of the United States shall have jurisdiction to grant any relief under this subsection that the public interest and the equities of the case may require.".

Alaska.
Research and development.

TITLE V—PRINCE WILLIAM SOUND PROVISIONS

33 USC 2731.

SEC. 5001. OIL SPILL RECOVERY INSTITUTE.

(a) ESTABLISHMENT OF INSTITUTE.—The Secretary of Commerce shall provide for the establishment of a Prince William Sound Oil Spill Recovery Institute (hereinafter in this section referred to as the "Institute") to be administered by the Secretary of Commerce through the Prince William Sound Science and Technology Institute and located in Cordova, Alaska.

(b) FUNCTIONS.—The Institute shall conduct research and carry out educational and demonstration projects designed to—

(1) identify and develop the best available techniques, equipment, and materials for dealing with oil spills in the arctic and subarctic marine environment; and

(2) complement Federal and State damage assessment efforts and determine, document, assess, and understand the long-range effects of the EXXON VALDEZ oil spill on the natural resources of Prince William Sound and its adjacent waters (as generally depicted on the map entitled "EXXON VALDEZ oil spill dated March 1990"), and the environment, the economy, and the lifestyle and well-being of the people who are dependent on them, except that the Institute shall not conduct studies or make recommendations on any matter which is not directly related to the EXXON VALDEZ oil spill or the effects thereof.

(c) ADVISORY BOARD.—

(1) IN GENERAL.—The policies of the Institute shall be determined by an advisory board, composed of 18 members appointed as follows:

(A) One representative appointed by each of the Commissioners of Fish and Game, Environmental Conservation, Natural Resources, and Commerce and Economic Development of the State of Alaska, all of whom shall be State employees.

(B) One representative appointed by each of—

(i) the Secretaries of Commerce, the Interior, Agriculture, Transportation, and the Navy; and

(ii) the Administrator of the Environmental Protection Agency;

all of whom shall be Federal employees.

(C) 4 representatives appointed by the Secretary of Commerce from among residents of communities in Alaska that were affected by the EXXON VALDEZ oil spill who are knowledgeable about fisheries, other local industries, the marine environment, wildlife, public health, safety, or education. At least 2 of the representatives shall be appointed from among residents of communities located in Prince William Sound. The Secretary shall appoint residents to serve terms of 2 years each, from a list of 8 qualified individuals to be submitted by the Governor of the State of Alaska based on recommendations made by the governing body of each affected community. Each affected community may submit the names of 2 qualified individuals for the Governor's consideration. No more than 5 of the 8 qualified

persons recommended by the Governor shall be members of the same political party.

(D) 3 Alaska Natives who represent Native entities affected by the EXXON VALDEZ oil spill, at least one of whom represents an entity located in Prince William Sound, to serve terms of 2 years each from a list of 6 qualified individuals submitted by the Alaska Federation of Natives.

(E) One nonvoting representative of the Institute of Marine Science.

(F) One nonvoting representative appointed by the Prince William Sound Science and Technology Institute.

(2) CHAIRMAN.—The representative of the Secretary of Commerce shall serve as Chairman of the Advisory Board.

(3) POLICIES.—Policies determined by the Advisory Board under this subsection shall include policies for the conduct and support, through contracts and grants awarded on a nationally competitive basis, of research, projects, and studies to be supported by the Institute in accordance with the purposes of this section.

(d) SCIENTIFIC AND TECHNICAL COMMITTEE.— Establishment.

(1) IN GENERAL.—The Advisory Board shall establish a scientific and technical committee, composed of specialists in matters relating to oil spill containment and cleanup technology, arctic and subarctic marine ecology, and the living resources and socioeconomics of Prince William Sound and its adjacent waters, from the University of Alaska, the Institute of Marine Science, the Prince William Sound Science and Technology Institute, and elsewhere in the academic community.

(2) FUNCTIONS.—The Scientific and Technical Committee shall provide such advice to the Advisory Board as the Advisory Board shall request, including recommendations regarding the conduct and support of research, projects, and studies in accordance with the purposes of this section. The Advisory Board shall not request, and the Committee shall not provide, any advice which is not directly related to the EXXON VALDEZ oil spill or the effects thereof.

(e) DIRECTOR.—The Institute shall be administered by a Director appointed by the Secretary of Commerce. The Prince William Sound Science and Technology Institute, the Advisory Board, and the Scientific and Technical Committee may each submit independent recommendations for the Secretary's consideration for appointment as Director. The Director may hire such staff and incur such expenses on behalf of the Institute as are authorized by the Advisory Board.

(f) EVALUATION.—The Secretary of Commerce may conduct an ongoing evaluation of the activities of the Institute to ensure that funds received by the Institute are used in a manner consistent with this section.

(g) AUDIT.—The Comptroller General of the United States, and any of his or her duly authorized representatives, shall have access, for purposes of audit and examination, to any books, documents, papers, and records of the Institute and its administering agency that are pertinent to the funds received and expended by the Institute and its administering agency.

(h) STATUS OF EMPLOYEES.—Employees of the Institute shall not, by reason of such employment, be considered to be employees of the Federal Government for any purpose.

(i) TERMINATION.—The Institute shall terminate 10 years after the date of the enactment of this Act.

(j) USE OF FUNDS.—All funds authorized for the Institute shall be provided through the National Oceanic and Atmospheric Administration. No funds made available to carry out this section may be used to initiate litigation. No funds made available to carry out this section may be used for the acquisition of real property (including buildings) or construction of any building. No more than 20 percent of funds made available to carry out this section may be used to lease necessary facilities and to administer the Institute. None of the funds authorized by this section shall be used for any purpose other than the functions specified in subsection (b).

Public information.

(k) RESEARCH.—The Institute shall publish and make available to any person upon request the results of all research, educational, and demonstration projects conducted by the Institute. The Administrator shall provide a copy of all research, educational, and demonstration projects conducted by the Institute to the National Oceanic and Atmospheric Administration.

(l) DEFINITIONS.—In this section, the term "Prince William Sound and its adjacent waters" means such sound and waters as generally depicted on the map entitled "EXXON VALDEZ oil spill dated March 1990".

Oil Terminal and Oil Tanker Environmental Oversight and Monitoring Act of 1990.
33 USC 2732.

SEC. 5002. TERMINAL AND TANKER OVERSIGHT AND MONITORING.

(a) SHORT TITLE AND FINDINGS.—

(1) SHORT TITLE.—This section may be cited as the "Oil Terminal and Oil Tanker Environmental Oversight and Monitoring Act of 1990".

(2) FINDINGS.—The Congress finds that—

(A) the March 24, 1989, grounding and rupture of the fully loaded oil tanker, the EXXON VALDEZ, spilled 11 million gallons of crude oil in Prince William Sound, an environmentally sensitive area;

(B) many people believe that complacency on the part of the industry and government personnel responsible for monitoring the operation of the Valdez terminal and vessel traffic in Prince William Sound was one of the contributing factors to the EXXON VALDEZ oil spill;

(C) one way to combat this complacency is to involve local citizens in the process of preparing, adopting, and revising oil spill contingency plans;

(D) a mechanism should be established which fosters the long-term partnership of industry, government, and local communities in overseeing compliance with environmental concerns in the operation of crude oil terminals;

(E) such a mechanism presently exists at the Sullom Voe terminal in the Shetland Islands and this terminal should serve as a model for others;

(F) because of the effective partnership that has developed at Sullom Voe, Sullom Voe is considered the safest terminal in Europe;

(G) the present system of regulation and oversight of crude oil terminals in the United States has degenerated into a process of continual mistrust and confrontation;

(H) only when local citizens are involved in the process will the trust develop that is necessary to change the present system from confrontation to consensus;

(I) a pilot program patterned after Sullom Voe should be established in Alaska to further refine the concepts and relationships involved; and

(J) similar programs should eventually be established in other major crude oil terminals in the United States because the recent oil spills in Texas, Delaware, and Rhode Island indicate that the safe transportation of crude oil is a national problem.

(b) DEMONSTRATION PROGRAMS.—

(1) ESTABLISHMENT.—There are established 2 Oil Terminal and Oil Tanker Environmental Oversight and Monitoring Demonstration Programs (hereinafter referred to as "Programs") to be carried out in the State of Alaska.

(2) ADVISORY FUNCTION.—The function of these Programs shall be advisory only.

(3) PURPOSE.—The Prince William Sound Program shall be responsible for environmental monitoring of the terminal facilities in Prince William Sound and the crude oil tankers operating in Prince William Sound. The Cook Inlet Program shall be responsible for environmental monitoring of the terminal facilities and crude oil tankers operating in Cook Inlet located South of the latitude at Point Possession and North of the latitude at Amatuli Island, including offshore facilities in Cook Inlet.

(4) SUITS BARRED.—No program, association, council, committee or other organization created by this section may sue any person or entity, public or private, concerning any matter arising under this section except for the performance of contracts.

(c) OIL TERMINAL FACILITIES AND OIL TANKER OPERATIONS ASSOCIATION.—

(1) ESTABLISHMENT.—There is established an Oil Terminal Facilities and Oil Tanker Operations Association (hereinafter in this section referred to as the "Association") for each of the Programs established under subsection (b).

(2) MEMBERSHIP.—Each Association shall be comprised of 4 individuals as follows:

(A) One individual shall be designated by the owners and operators of the terminal facilities and shall represent those owners and operators.

(B) One individual shall be designated by the owners and operators of the crude oil tankers calling at the terminal facilities and shall represent those owners and operators.

(C) One individual shall be an employee of the State of Alaska, shall be designated by the Governor of the State of Alaska, and shall represent the State government.

(D) One individual shall be an employee of the Federal Government, shall be designated by the President, and shall represent the Federal Government.

(3) RESPONSIBILITIES.—Each Association shall be responsible for reviewing policies relating to the operation and maintenance of the oil terminal facilities and crude oil tankers which affect or may affect the environment in the vicinity of their respective terminals. Each Association shall provide a forum among the owners and operators of the terminal facilities, the owners and operators of crude oil tankers calling at those

facilities, the United States, and the State of Alaska to discuss and to make recommendations concerning all permits, plans, and site-specific regulations governing the activities and actions of the terminal facilities which affect or may affect the environment in the vicinity of the terminal facilities and of crude oil tankers calling at those facilities.

(4) DESIGNATION OF EXISTING ORGANIZATION.—The Secretary may designate an existing nonprofit organization as an Association under this subsection if the organization is organized to meet the purposes of this section and consists of at least the individuals listed in paragraph (2).

(d) REGIONAL CITIZENS' ADVISORY COUNCILS.—

(1) MEMBERSHIP.—There is established a Regional Citizens' Advisory Council (hereinafter in this section referred to as the "Council") for each of the programs established by subsection (b).

(2) MEMBERSHIP.—Each Council shall be composed of voting members and nonvoting members, as follows:

(A) VOTING MEMBERS.—Voting members shall be Alaska residents and, except as provided in clause (vii) of this paragraph, shall be appointed by the Governor of the State of Alaska from a list of nominees provided by each of the following interests, with one representative appointed to represent each of the following interests, taking into consideration the need for regional balance on the Council:

(i) Local commercial fishing industry organizations, the members of which depend on the fisheries resources of the waters in the vicinity of the terminal facilities.

(ii) Aquaculture associations in the vicinity of the terminal facilities.

(iii) Alaska Native Corporations and other Alaska Native organizations the members of which reside in the vicinity of the terminal facilities.

(iv) Environmental organizations the members of which reside in the vicinity of the terminal facilities.

(v) Recreational organizations the members of which reside in or use the vicinity of the terminal facilities.

(vi) The Alaska State Chamber of Commerce, to represent the locally based tourist industry.

(vii)(I) For the Prince William Sound Terminal Facilities Council, one representative selected by each of the following municipalities: Cordova, Whittier, Seward, Valdez, Kodiak, the Kodiak Island Borough, and the Kenai Peninsula Borough.

(II) For the Cook Inlet Terminal Facilities Council, one representative selected by each of the following municipalities: Homer, Seldovia, Anchorage, Kenai, Kodiak, the Kodiak Island Borough, and the Kenai Peninsula Borough.

(B) NONVOTING MEMBERS.—One ex-officio, nonvoting representative shall be designated by, and represent, each of the following:

(i) The Environmental Protection Agency.

(ii) The Coast Guard.

(iii) The National Oceanic and Atmospheric Administration.

(iv) The United States Forest Service.
(v) The Bureau of Land Management.
(vi) The Alaska Department of Environmental Conservation.
(vii) The Alaska Department of Fish and Game.
(viii) The Alaska Department of Natural Resources.
(ix) The Division of Emergency Services, Alaska Department of Military and Veterans Affairs.

(3) TERMS.—

(A) DURATION OF COUNCILS.—The term of the Councils shall continue throughout the life of the operation of the Trans-Alaska Pipeline System and so long as oil is transported to or from Cook Inlet.

(B) THREE YEARS.—The voting members of each Council shall be appointed for a term of 3 years except as provided for in subparagraph (C).

(C) INITIAL APPOINTMENTS.—The terms of the first appointments shall be as follows:

(i) For the appointments by the Governor of the State of Alaska, one-third shall serve for 3 years, one-third shall serve for 2 years, and one-third shall serve for one year.

(ii) For the representatives of municipalities required by subsection (d)(2)(A)(vii), a drawing of lots among the appointees shall determine that one-third of that group serves for 3 years, one-third serves for 2 years, and the remainder serves for 1 year.

(4) SELF-GOVERNING.—Each Council shall elect its own chairperson, select its own staff, and make policies with regard to its internal operating procedures. After the initial organizational meeting called by the Secretary under subsection (i), each Council shall be self-governing.

(5) DUAL MEMBERSHIP AND CONFLICTS OF INTEREST PROHIBITED.—(A) No individual selected as a member of the Council shall serve on the Association.

(B) No individual selected as a voting member of the Council shall be engaged in any activity which might conflict with such individual carrying out his functions as a member thereof.

(6) DUTIES.—Each Council shall—

(A) provide advice and recommendations to the Association on policies, permits, and site-specific regulations relating to the operation and maintenance of terminal facilities and crude oil tankers which affect or may affect the environment in the vicinity of the terminal facilities;

(B) monitor through the committee established under subsection (e), the environmental impacts of the operation of the terminal facilities and crude oil tankers;

(C) monitor those aspects of terminal facilities' and crude oil tankers' operations and maintenance which affect or may affect the environment in the vicinity of the terminal facilities;

(D) review through the committee established under subsection (f), the adequacy of oil spill prevention and contingency plans for the terminal facilities and the adequacy of oil spill prevention and contingency plans for crude oil tankers, operating in Prince William Sound or in Cook Inlet;

(E) provide advice and recommendations to the Association on port operations, policies and practices;

(F) recommend to the Association—

(i) standards and stipulations for permits and site-specific regulations intended to minimize the impact of the terminal facilities' and crude oil tankers' operations in the vicinity of the terminal facilities;

(ii) modifications of terminal facility operations and maintenance intended to minimize the risk and mitigate the impact of terminal facilities, operations in the vicinity of the terminal facilities and to minimize the risk of oil spills;

(iii) modifications of crude oil tanker operations and maintenance in Prince William Sound and Cook Inlet intended to minimize the risk and mitigate the impact of oil spills; and

(iv) modifications to the oil spill prevention and contingency plans for terminal facilities and for crude oil tankers in Prince William Sound and Cook Inlet intended to enhance the ability to prevent and respond to an oil spill; and

(G) create additional committees of the Council as necessary to carry out the above functions, including a scientific and technical advisory committee to the Prince William Sound Council.

(7) NO ESTOPPEL.—No Council shall be held liable under State or Federal law for costs or damages as a result of rendering advice under this section. Nor shall any advice given by a voting member of a Council, or program representative or agent, be grounds for estopping the interests represented by the voting Council members from seeking damages or other appropriate relief.

(8) SCIENTIFIC WORK.—In carrying out its research, development and monitoring functions, each Council is authorized to conduct its own scientific research and shall review the scientific work undertaken by or on behalf of the terminal operators or crude oil tanker operators as a result of a legal requirement to undertake that work. Each Council shall also review the relevant scientific work undertaken by or on behalf of any government entity relating to the terminal facilities or crude oil tankers. To the extent possible, to avoid unnecessary duplication, each Council shall coordinate its independent scientific work with the scientific work performed by or on behalf of the terminal operators and with the scientific work performed by or on behalf of the operators of the crude oil tankers.

(e) COMMITTEE FOR TERMINAL AND OIL TANKER OPERATIONS AND ENVIRONMENTAL MONITORING.—

(1) MONITORING COMMITTEE.—Each Council shall establish a standing Terminal and Oil Tanker Operations and Environmental Monitoring Committee (hereinafter in this section referred to as the "Monitoring Committee") to devise and manage a comprehensive program of monitoring the environmental impacts of the operations of terminal facilities and of crude oil tankers while operating in Prince William Sound and Cook Inlet. The membership of the Monitoring Committee shall be made up of members of the Council, citizens, and recognized scientific experts selected by the Council.

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(2) DUTIES.—In fulfilling its responsibilities, the Monitoring Committee shall—

(A) advise the Council on a monitoring strategy that will permit early detection of environmental impacts of terminal facility operations and crude oil tanker operations while in Prince William Sound and Cook Inlet;

(B) develop monitoring programs and make recommendations to the Council on the implementation of those programs;

(C) at its discretion, select and contract with universities and other scientific institutions to carry out specific monitoring projects authorized by the Council pursuant to an approved monitoring strategy;

(D) complete any other tasks assigned by the Council; and

(E) provide written reports to the Council which interpret and assess the results of all monitoring programs. Reports.

(f) COMMITTEE FOR OIL SPILL PREVENTION, SAFETY, AND EMERGENCY RESPONSE.—

(1) TECHNICAL OIL SPILL COMMITTEE.—Each Council shall establish a standing technical committee (hereinafter referred to as "Oil Spill Committee") to review and assess measures designed to prevent oil spills and the planning and preparedness for responding to, containing, cleaning up, and mitigating impacts of oil spills. The membership of the Oil Spill Committee shall be made up of members of the Council, citizens, and recognized technical experts selected by the Council.

(2) DUTIES.—In fulfilling its responsibilities, the Oil Spill Committee shall—

(A) periodically review the respective oil spill prevention and contingency plans for the terminal facilities and for the crude oil tankers while in Prince William Sound or Cook Inlet, in light of new technological developments and changed circumstances;

(B) monitor periodic drills and testing of the oil spill contingency plans for the terminal facilities and for crude oil tankers while in Prince William Sound and Cook Inlet;

(C) study wind and water currents and other environmental factors in the vicinity of the terminal facilities which may affect the ability to prevent, respond to, contain, and clean up an oil spill;

(D) identify highly sensitive areas which may require specific protective measures in the event of a spill in Prince William Sound or Cook Inlet;

(E) monitor developments in oil spill prevention, containment, response, and cleanup technology;

(F) periodically review port organization, operations, incidents, and the adequacy and maintenance of vessel traffic service systems designed to assure safe transit of crude oil tankers pertinent to terminal operations;

(G) periodically review the standards for tankers bound for, loading at, exiting from, or otherwise using the terminal facilities;

(H) complete any other tasks assigned by the Council; and Reports.

(I) provide written reports to the Council outlining its findings and recommendations.

(g) AGENCY COOPERATION.—On and after the expiration of the 180-day period following the date of the enactment of this section, each

Federal department, agency, or other instrumentality shall, with respect to all permits, site-specific regulations, and other matters governing the activities and actions of the terminal facilities which affect or may affect the vicinity of the terminal facilities, consult with the appropriate Council prior to taking substantive action with respect to the permit, site-specific regulation, or other matter. This consultation shall be carried out with a view to enabling the appropriate Association and Council to review the permit, site-specific regulation, or other matters and make appropriate recommendations regarding operations, policy or agency actions. Prior consultation shall not be required if an authorized Federal agency representative reasonably believes that an emergency exists requiring action without delay.

(h) RECOMMENDATIONS OF THE COUNCIL.—In the event that the Association does not adopt, or significantly modifies before adoption, any recommendation of the Council made pursuant to the authority granted to the Council in subsection (d), the Association shall provide to the Council, in writing, within 5 days of its decision, notice of its decision and a written statement of reasons for its rejection or significant modification of the recommendation.

(i) ADMINISTRATIVE ACTIONS.—Appointments, designations, and selections of individuals to serve as members of the Associations and Councils under this section shall be submitted to the Secretary prior to the expiration of the 120-day period following the date of the enactment of this section. On or before the expiration of the 180-day period following that date of enactment of this section, the Secretary shall call an initial meeting of each Association and Council for organizational purposes.

(j) LOCATION AND COMPENSATION.—

(1) LOCATION.—Each Association and Council established by this section shall be located in the State of Alaska.

(2) COMPENSATION.—No member of an Association or Council shall be compensated for the member's services as a member of the Association or Council, but shall be allowed travel expenses, including per diem in lieu of subsistence, at a rate established by the Association or Council not to exceed the rates authorized for employees of agencies under sections 5702 and 5703 of title 5, United States Code. However, each Council may enter into contracts to provide compensation and expenses to members of the committees created under subsections (d), (e), and (f).

(k) FUNDING.—

(1) REQUIREMENT.—Approval of the contingency plans required of owners and operators of the Cook Inlet and Prince William Sound terminal facilities and crude oil tankers while operating in Alaskan waters in commerce with those terminal facilities shall be effective only so long as the respective Association and Council for a facility are funded pursuant to paragraph (2).

(2) PRINCE WILLIAM SOUND PROGRAM.—The owners or operators of terminal facilities or crude oil tankers operating in Prince William Sound shall provide, on an annual basis, an aggregate amount of not more than $2,000,000, as determined by the Secretary. Such amount—

(A) shall provide for the establishment and operation on the environmental oversight and monitoring program in Prince William Sound;

(B) shall be adjusted annually by the Anchorage Consumer Price Index; and

(C) may be adjusted periodically upon the mutual consent of the owners or operators of terminal facilities or crude oil tankers operating in Prince William Sound and the Prince William Sound terminal facilities Council.

(3) COOK INLET PROGRAM.—The owners or operators of terminal facilities, offshore facilities, or crude oil tankers operating in Cook Inlet shall provide, on an annual basis, an aggregate amount of not more than $1,000,000, as determined by the Secretary. Such amount—

(A) shall provide for the establishment and operation of the environmental oversight and monitoring program in Cook Inlet;

(B) shall be adjusted annually by the Anchorage Consumer Price Index; and

(C) may be adjusted periodically upon the mutual consent of the owners or operators of terminal facilities, offshore facilities, or crude oil tankers operating in Cook Inlet and the Cook Inlet Council.

(l) REPORTS.—

(1) ASSOCIATIONS AND COUNCILS.—Prior to the expiration of the 36-month period following the date of the enactment of this section, each Association and Council established by this section shall report to the President and the Congress concerning its activities under this section, together with its recommendations.

(2) GAO.—Prior to the expiration of the 36-month period following the date of the enactment of this section, the General Accounting Office shall report to the President and the Congress as to the handling of funds, including donated funds, by the entities carrying out the programs under this section, and the effectiveness of the demonstration programs carried out under this section, together with its recommendations.

(m) DEFINITIONS.—As used in this section, the term—

(1) "terminal facilities" means—

(A) in the case of the Prince William Sound Program, the entire oil terminal complex located in Valdez, Alaska, consisting of approximately 1,000 acres including all buildings, docks (except docks owned by the City of Valdez if those docks are not used for loading of crude oil), pipes, piping, roads, ponds, tanks, crude oil tankers only while at the terminal dock, tanker escorts owned or operated by the operator of the terminal, vehicles, and other facilities associated with, and necessary for, assisting tanker movement of crude oil into and out of the oil terminal complex; and

(B) in the case of the Cook Inlet Program, the entire oil terminal complex including all buildings, docks, pipes, piping, roads, ponds, tanks, vessels, vehicles, crude oil tankers only while at the terminal dock, tanker escorts owned or operated by the operator of the terminal, emergency spill response vessels owned or operated by the operator of the terminal, and other facilities associated with, and necessary for, assisting tanker movement of crude oil into and out of the oil terminal complex;

(2) "crude oil tanker" means a tanker (as that term is defined under section 2101 of title 46, United States Code)—

(A) in the case of the Prince William Sound Program, calling at the terminal facilities for the purpose of receiving and transporting oil to refineries, operating north of Middleston Island and bound for or exiting from Prince William Sound; and

(B) in the case of the Cook Inlet Program, calling at the terminal facilities for the purpose of receiving and transporting oil to refineries and operating in Cook Inlet and the Gulf of Alaska north of Amatuli Island, including tankers transiting to Cook Inlet from Prince William Sound;

(3) "vicinity of the terminal facilities" means that geographical area surrounding the environment of terminal facilities which is directly affected or may be directly affected by the operation of the terminal facilities; and

(4) "Secretary" means the Secretary of Transportation.

(n) SAVINGS CLAUSE.—

(1) REGULATORY AUTHORITY.—Nothing in this section shall be construed as modifying, repealing, superseding, or preempting any municipal, State or Federal law or regulation, or in any way affecting litigation arising from oil spills or the rights and responsibilities of the United States or the State of Alaska, or municipalities thereof, to preserve and protect the environment through regulation of land, air, and water uses, of safety, and of related development. The monitoring provided for by this section shall be designed to help assure compliance with applicable laws and regulations and shall only extend to activities—

(A) that would affect or have the potential to affect the vicinity of the terminal facilities and the area of crude oil tanker operations included in the Programs; and

(B) are subject to the United States or State of Alaska, or municipality thereof, law, regulation, or other legal requirement.

(2) RECOMMENDATIONS.—This subsection is not intended to prevent the Association or Council from recommending to appropriate authorities that existing legal requirements should be modified or that new legal requirements should be adopted.

Contracts.

(o) ALTERNATIVE VOLUNTARY ADVISORY GROUP IN LIEU OF COUNCIL.—The requirements of subsections (c) through (l), as such subsections apply respectively to the Prince William Sound Program and the Cook Inlet Program, are deemed to have been satisfied so long as the following conditions are met:

(1) PRINCE WILLIAM SOUND.—With respect to the Prince William Sound Program, the Alyeska Pipeline Service Company or any of its owner companies enters into a contract for the duration of the operation of the Trans-Alaska Pipeline System with the Alyeska Citizens Advisory Committee in existence on the date of enactment of this section, or a successor organization, to fund that Committee or organization on an annual basis in the amount provided for by subsection (k)(2)(A) and the President annually certifies that the Committee or organization fosters the general goals and purposes of this section and is broadly representative of the communities and interests in the vicinity of the terminal facilities and Prince William Sound.

(2) COOK INLET.—With respect to the Cook Inlet Program, the terminal facilities, offshore facilities, or crude oil tanker owners and operators enter into a contract with a voluntary advisory

organization to fund that organization on an annual basis and the President annually certifies that the organization fosters the general goals and purposes of this section and is broadly representative of the communities and interests in the vicinity of the terminal facilities and Cook Inlet.

SEC. 5003. BLIGH REEF LIGHT. 33 USC 2733.

The Secretary of Transportation shall within one year after the date of the enactment of this title install and ensure operation of an automated navigation light on or adjacent to Bligh Reef in Prince William Sound, Alaska, of sufficient power and height to provide long-range warning of the location of Bligh Reef.

SEC. 5004. VESSEL TRAFFIC SERVICE SYSTEM. 33 USC 2734.

The Secretary of Transportation shall within one year after the date of the enactment of this title—

(1) acquire, install, and operate such additional equipment (which may consist of radar, closed circuit television, satellite tracking systems, or other shipboard dependent surveillance), train and locate such personnel, and issue such final regulations as are necessary to increase the range of the existing VTS system in the Port of Valdez, Alaska, sufficiently to track the locations and movements of tank vessels carrying oil from the Trans-Alaska Pipeline when such vessels are transiting Prince William Sound, Alaska, and to sound an audible alarm when such tankers depart from designated navigation routes; and Regulations.

(2) submit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Merchant Marine and Fisheries of the House of Representatives a report on the feasibility and desirability of instituting positive control of tank vessel movements in Prince William Sound by Coast Guard personnel using the Port of Valdez, Alaska, VTS system, as modified pursuant to paragraph (1). Reports.

SEC. 5005. EQUIPMENT AND PERSONNEL REQUIREMENTS UNDER TANK VESSEL AND FACILITY RESPONSE PLANS. 33 USC 2735.

(a) IN GENERAL.—In addition to the requirements for response plans for vessels established by section 311(j) of the Federal Water Pollution Control Act, as amended by this Act, a response plan for a tank vessel operating on Prince William Sound, or a facility permitted under the Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1651 et seq.), shall provide for—

(1) prepositioned oil spill containment and removal equipment in communities and other strategic locations within the geographic boundaries of Prince William Sound, including escort vessels with skimming capability; barges to receive recovered oil; heavy duty sea boom, pumping, transferring, and lightering equipment; and other appropriate removal equipment for the protection of the environment, including fish hatcheries;

(2) the establishment of an oil spill removal organization at appropriate locations in Prince William Sound, consisting of trained personnel in sufficient numbers to immediately remove, to the maximum extent practicable, a worst case discharge or a discharge of 200,000 barrels of oil, whichever is greater;

(3) training in oil removal techniques for local residents and individuals engaged in the cultivation or production of fish or fish products in Prince William Sound;

(4) practice exercises not less than 2 times per year which test the capacity of the equipment and personnel required under this paragraph; and

(5) periodic testing and certification of equipment required under this paragraph, as required by the Secretary.

(b) DEFINITIONS.—In this section—

(1) the term "Prince William Sound" means all State and Federal waters within Prince William Sound, Alaska, including the approach to Hinchenbrook Entrance out to and encompassing Seal Rocks; and

(2) the term "worst case discharge" means—

(A) in the case of a vessel, a discharge in adverse weather conditions of its entire cargo; and

(B) in the case of a facility, the largest foreseeable discharge in adverse weather conditions.

33 USC 2736.

SEC. 5006. FUNDING.

(a) SECTION 5001.—Amounts in the Fund shall be available, subject to appropriations, and shall remain available until expended, to carry out section 5001 as follows:

(1) $5,000,000 shall be available for the first fiscal year beginning after the date of enactment of this Act.

(2) $2,000,000 shall be available for each of the 9 fiscal years following the fiscal year described in paragraph (1).

(b) SECTIONS 5003 AND 5004.—Amounts in the Fund shall be available, without further appropriations and without fiscal year limitation, to carry out sections 5003 and 5004, in an amount not to exceed $5,000,000.

33 USC 2737

SEC. 5007. LIMITATION.

Notwithstanding any other law, tank vessels that have spilled more than 1,000,000 gallons of oil into the marine environment after March 22, 1989, are prohibited from operating on the navigable waters of Prince William Sound, Alaska.

TITLE VI—MISCELLANEOUS

33 USC 2751

SEC. 6001. SAVINGS PROVISIONS.

(a) CROSS-REFERENCES.—A reference to a law replaced by this Act, including a reference in a regulation, order, or other law, is deemed to refer to the corresponding provision of this Act.

(b) CONTINUATION OF REGULATIONS.—An order, rule, or regulation in effect under a law replaced by this Act continues in effect under the corresponding provision of this Act until repealed, amended, or superseded.

(c) RULE OF CONSTRUCTION.—An inference of legislative construction shall not be drawn by reason of the caption or catch line of a provision enacted by this Act.

(d) ACTIONS AND RIGHTS.—Nothing in this Act shall apply to any rights and duties that matured, penalties that were incurred, and proceedings that were begun before the date of enactment of this Act, except as provided by this section, and shall be adjudicated pursuant to the law applicable on the date prior to the date of the enactment of this Act.

(e) ADMIRALTY AND MARITIME LAW.—Except as otherwise provided in this Act, this Act does not affect—

(1) admiralty and maritime law; or

(2) the jurisdiction of the district courts of the United States with respect to civil actions under admiralty and maritime jurisdiction, saving to suitors in all cases all other remedies to which they are otherwise entitled.

SEC. 6002. ANNUAL APPROPRIATIONS. 33 USC 2752.

(a) REQUIRED.—Except as provided in subsection (b), amounts in the Fund shall be available only as provided in annual appropriation Acts.

(b) EXCEPTIONS.—Subsection (a) shall not apply to sections 1006(f), 1012(a)(4), or 5006(b), and shall not apply to an amount not to exceed $50,000,000 in any fiscal year which the President may make available from the Fund to carry out section 311(c) of the Federal Water Pollution Control Act, as amended by this Act, and to initiate the assessment of natural resources damages required under section 1006. Sums to which this subsection applies shall remain available until expended.

SEC. 6003. OUTER BANKS PROTECTION. Outer Banks Protection Act. North Carolina. 33 USC 2753.

(a) SHORT TITLE.—This section may be cited as the "Outer Banks Protection Act".

(b) FINDINGS.—The Congress finds that—

(1) the Outer Banks of North Carolina is an area of exceptional environmental fragility and beauty;

(2) the annual economic benefits of commercial and recreational fishing activities to North Carolina, which could be adversely affected by oil or gas development offshore the State's coast, exceeds $1,000,000,000;

(3) the major industry in coastal North Carolina is tourism, which is subject to potentially significant disruption by offshore oil or gas development;

(4) the physical oceanographic characteristics of the area offshore North Carolina between Cape Hatteras and the mouth of the Chesapeake Bay are not well understood, being affected by Gulf Stream western boundary perturbations and accompanying warm filaments, warm and cold core rings which separate from the Gulf Stream, wind stress, outflow from the Chesapeake Bay, Gulf Stream meanders, and intrusions of Virginia coastal waters around and over the Diamond shoals;

(5) diverse and abundant fisheries resources occur in the western boundary area of the Gulf Stream offshore North Carolina, but little is understood of the complex ecological relationships between the life histories of those species and their physical, chemical, and biological environment;

(6) the environmental impact statements prepared for Outer Continental Shelf lease sales numbered 56 (1981) and 78 (1983) contain insufficient and outdated environmental information from which to make decisions on approval of additional oil and gas leasing, exploration, and development activities;

(7) the draft environmental report, dated November 1, 1989, and the preliminary final environmental report dated June 1, 1990, prepared pursuant to a July 14, 1989 memorandum of understanding between the State of North Carolina, the Department of the Interior, and the Mobil Oil Company, have not allayed concerns about the adequacy of the environmental information available to determine whether to proceed with

additional offshore leasing, exploration, or development offshore North Carolina; and

(8) the National Research Council report entitled "The Adequacy of Environmental Information for Outer Continental Shelf Oil and Gas Decisions: Florida and California", issued in 1989, concluded that—

(A) information with respect to those States, which have received greater scrutiny than has North Carolina, is inadequate; and

(B) there are serious generic defects in the Minerals Management Service's methods of environmental analysis,

reinforcing concerns about the adequacy of the scientific and technical information which are the basis for a decision to lease additional tracts or approve an exploration plan offshore North Carolina, especially with respect to oceanographic, ecological, and socioeconomic information.

(c) PROHIBITION OF OIL AND GAS LEASING, EXPLORATION, AND DEVELOPMENT.—

(1) PROHIBITION.—The Secretary of the Interior shall not—

(A) conduct a lease sale;

(B) issue any new leases;

(C) approve any exploration plan;

(D) approve any development and production plan;

(E) approve any application for permit to drill; or

(F) permit any drilling,

for oil or gas under the Outer Continental Shelf Lands Act on any lands of the Outer Continental Shelf offshore North Carolina.

(2) BOUNDARIES.—For purposes of paragraph (1), the term "offshore North Carolina" means the area within the lateral seaward boundaries between areas offshore North Carolina and areas offshore—

(A) Virginia as provided in the joint resolution entitled "Joint resolution granting the consent of Congress to an agreement between the States of North Carolina and Virginia establishing their lateral seaward boundary" approved October 27, 1972 (86 Stat. 1298); and

(B) South Carolina as provided in the Act entitled "An Act granting the consent of Congress to the agreement between the States of North Carolina and South Carolina establishing their lateral seaward boundary" approved October 9, 1981 (95 Stat. 988).

(3) DURATION OF PROHIBITION.—

(A) IN GENERAL.—The prohibition under paragraph (1) shall remain in effect until the later of—

(i) October 1, 1991; or

Reports.

(ii) 45 days of continuous session of the Congress after submission of a written report to the Congress by the Secretary of the Interior, made after consideration of the findings and recommendations of the Environmental Sciences Review Panel under subsection (e)—

(I) certifying that the information available, including information acquired pursuant to subsection (d), is sufficient to enable the Secretary to carry out his responsibilities under the Outer Continental Shelf Lands Act with respect to authorizing the activities described in paragraph (1); and

(II) including a detailed explanation of any differences between such certification and the findings and recommendations of the Environmental Sciences Review Panel under subsection (e), and a detailed justification of each such difference.

(B) CONTINUOUS SESSION OF CONGRESS.—In computing any 45-day period of continuous session of Congress under subparagraph (A)(ii)—

(i) continuity of session is broken only by an adjournment of the Congress sine die; and

(ii) the days on which either House of Congress is not in session because of an adjournment of more than 3 days to a day certain are excluded.

(d) ADDITIONAL ENVIRONMENTAL INFORMATION.—The Secretary of the Interior shall undertake ecological and socioeconomic studies, additional physical oceanographic studies, including actual field work and the correlation of existing data, and other additional environmental studies, to obtain sufficient information about all significant conditions, processes, and environments which influence, or may be influenced by, oil and gas leasing, exploration, and development activities offshore North Carolina to enable the Secretary to carry out his responsibilities under the Outer Continental Shelf Lands Act with respect to authorizing the activities described in subsection (c)(1). During the time that the Environmental Sciences Review Panel established under subsection (e) is in existence, the Secretary of the Interior shall consult with such Panel in carrying out this subsection.

(e) ENVIRONMENTAL SCIENCES REVIEW PANEL.— Establishment.

(1) ESTABLISHMENT AND MEMBERSHIP.—There shall be established an Environmental Sciences Review Panel, to consist of—

(A) 1 marine scientist selected by the Secretary of the Interior;

(B) 1 marine scientist selected by the Governor of North Carolina; and

(C) 1 person each from the disciplines of physical oceanography, ecology, and social science, to be selected jointly by the Secretary of the Interior and the Governor of North Carolina from a list of individuals nominated by the National Academy of Sciences.

(2) FUNCTIONS.—Not later than 6 months after the date of the enactment of this Act, the Environmental Sciences Review Panel shall—

(A) prepare and submit to the Secretary of the Interior findings and recommendations—

(i) assessing the adequacy of available physical oceanographic, ecological, and socioeconomic information in enabling the Secretary to carry out his responsibilities under the Outer Continental Shelf Lands Act with respect to authorizing the activities described in subsection (c)(1); and

(ii) if such available information is not adequate for such purposes, indicating what additional information is required to enable the Secretary to carry out such responsibilities; and

(B) consult with the Secretary of the Interior as provided in subsection (d).

(3) EXPENSES.—Each member of the Environmental Sciences Review Panel shall be reimbursed for actual travel expenses and shall receive per diem in lieu of subsistence for each day such member is engaged in the business of the Environmental Sciences Review Panel.

(4) TERMINATION.—The Environmental Sciences Review Panel shall be terminated after the submission of all findings and recommendations required under paragraph (2)(A).

(f) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary of the Interior to carry out this section not to exceed $500,000 for fiscal year 1991, to remain available until expended.

SEC. 6004. COOPERATIVE DEVELOPMENT OF COMMON HYDROCARBON-BEARING AREAS.

(a) AMENDMENT TO OUTER CONTINENTAL SHELF LANDS ACT.—Section 5 of the Outer Continental Shelf Lands Act, as amended (43 U.S.C. 1334), is amended by adding a new subsection (j) as follows:

"(j) COOPERATIVE DEVELOPMENT OF COMMON HYDROCARBON-BEARING AREAS.—

"(1) FINDINGS.—

"(A) The Congress of the United States finds that the unrestrained competitive production of hydrocarbons from a common hydrocarbon-bearing geological area underlying the Federal and State boundary may result in a number of harmful national effects, including—

"(i) the drilling of unnecessary wells, the installation of unnecessary facilities and other imprudent operating practices that result in economic waste, environmental damage, and damage to life and property;

"(ii) the physical waste of hydrocarbons and an unnecessary reduction in the amounts of hydrocarbons that can be produced from certain hydrocarbon-bearing areas; and

"(iii) the loss of correlative rights which can result in the reduced value of national hydrocarbon resources and disorders in the leasing of Federal and State resources.

"(2) PREVENTION OF HARMFUL EFFECTS.—The Secretary shall prevent, through the cooperative development of an area, the harmful effects of unrestrained competitive production of hydrocarbons from a common hydrocarbon-bearing area underlying the Federal and State boundary.".

Louisiana.
43 USC 1334 note.

(b) EXCEPTION FOR WEST DELTA FIELD.—Section 5(j) of the Outer Continental Shelf Lands Act, as added by this section, shall not be applicable with respect to Blocks 17 and 18 of the West Delta Field offshore Louisiana.

(c) AUTHORIZATION OF APPROPRIATIONS.—There are hereby authorized to be appropriated such sums as may be necessary to provide compensation, including interest, to the State of Louisiana and its lessees, for net drainage of oil and gas resources as determined in the Third Party Factfinder Louisiana Boundary Study dated March 21, 1989. For purposes of this section, such lessees shall include those persons with an ownership interest in State of Louisiana leases SL10087, SL10088 or SL10187, or ownership interests in the production or proceeds therefrom, as established by assignment,

contract or otherwise. Interest shall be computed for the period March 21, 1989 until the date of payment.

TITLE VII—OIL POLLUTION RESEARCH AND DEVELOPMENT PROGRAM

SEC. 7001. OIL POLLUTION RESEARCH AND DEVELOPMENT PROGRAM. 33 USC 2761.

(a) INTERAGENCY COORDINATING COMMITTEE ON OIL POLLUTION RESEARCH.—

(1) ESTABLISHMENT.—There is established an Interagency Coordinating Committee on Oil Pollution Research (hereinafter in this section referred to as the "Interagency Committee").

(2) PURPOSES.—The Interagency Committee shall coordinate a comprehensive program of oil pollution research, technology development, and demonstration among the Federal agencies, in cooperation and coordination with industry, universities, research institutions, State governments, and other nations, as appropriate, and shall foster cost-effective research mechanisms, including the joint funding of research.

(3) MEMBERSHIP.—The Interagency Committee shall include representatives from the Department of Commerce (including the National Oceanic and Atmospheric Administration and the National Institute of Standards and Technology), the Department of Energy, the Department of the Interior (including the Minerals Management Service and the United States Fish and Wildlife Service), the Department of Transportation (including the United States Coast Guard, the Maritime Administration, and the Research and Special Projects Administration), the Department of Defense (including the Army Corps of Engineers and the Navy), the Environmental Protection Agency, the National Aeronautics and Space Administration, and the United States Fire Administration in the Federal Emergency Management Agency, as well as such other Federal agencies as the President may designate.

A representative of the Department of Transportation shall serve as Chairman.

(b) OIL POLLUTION RESEARCH AND TECHNOLOGY PLAN.—

(1) IMPLEMENTATION PLAN.—Within 180 days after the date of enactment of this Act, the Interagency Committee shall submit to Congress a plan for the implementation of the oil pollution research, development, and demonstration program established pursuant to subsection (c). The research plan shall—

(A) identify agency roles and responsibilities;

(B) assess the current status of knowledge on oil pollution prevention, response, and mitigation technologies and effects of oil pollution on the environment;

(C) identify significant oil pollution research gaps including an assessment of major technological deficiencies in responses to past oil discharges;

(D) establish research priorities and goals for oil pollution technology development related to prevention, response, mitigation, and environmental effects;

(E) estimate the resources needed to conduct the oil pollution research and development program established

pursuant to subsection (c), and timetables for completing research tasks; and

(F) identify, in consultation with the States, regional oil pollution research needs and priorities for a coordinated, multidisciplinary program of research at the regional level.

Contracts.

(2) ADVICE AND GUIDANCE.—The Chairman, through the Department of Transportation, shall contract with the National Academy of Sciences to—

(A) provide advice and guidance in the preparation and development of the research plan; and

Reports.

(B) assess the adequacy of the plan as submitted, and submit a report to Congress on the conclusions of such assessment.

The National Institute of Standards and Technology shall provide the Interagency Committee with advice and guidance on issues relating to quality assurance and standards measurements relating to its activities under this section.

(c) OIL POLLUTION RESEARCH AND DEVELOPMENT PROGRAM.—

(1) ESTABLISHMENT.—The Interagency Committee shall coordinate the establishment, by the agencies represented on the Interagency Committee, of a program for conducting oil pollution research and development, as provided in this subsection.

(2) INNOVATIVE OIL POLLUTION TECHNOLOGY.—The program established under this subsection shall provide for research, development, and demonstration of new or improved technologies which are effective in preventing or mitigating oil discharges and which protect the environment, including—

(A) development of improved designs for vessels and facilities, and improved operational practices;

(B) research, development, and demonstration of improved technologies to measure the ullage of a vessel tank, prevent discharges from tank vents, prevent discharges during lightering and bunkering operations, contain discharges on the deck of a vessel, prevent discharges through the use of vacuums in tanks, and otherwise contain discharges of oil from vessels and facilities;

(C) research, development, and demonstration of new or improved systems of mechanical, chemical, biological, and other methods (including the use of dispersants, solvents, and bioremediation) for the recovery, removal, and disposal of oil, including evaluation of the environmental effects of the use of such systems;

Texas.

(D) research and training, in consultation with the National Response Team, to improve industry's and Government's ability to quickly and effectively remove an oil discharge, including the long-term use, as appropriate, of the National Spill Control School in Corpus Christi, Texas;

(E) research to improve information systems for decision-making, including the use of data from coastal mapping, baseline data, and other data related to the environmental effects of oil discharges, and cleanup technologies;

(F) development of technologies and methods to protect public health and safety from oil discharges, including the population directly exposed to an oil discharge;

(G) development of technologies, methods, and standards for protecting removal personnel, including training, ade-

quate supervision, protective equipment, maximum exposure limits, and decontamination procedures;

(H) research and development of methods to restore and rehabilitate natural resources damaged by oil discharges;

(I) research to evaluate the relative effectiveness and environmental impacts of bioremediation technologies; and

(J) the demonstration of a satellite-based, dependent surveillance vessel traffic system in Narragansett Bay to evaluate the utility of such system in reducing the risk of oil discharges from vessel collisions and groundings in confined waters.

(3) OIL POLLUTION TECHNOLOGY EVALUATION.—The program established under this subsection shall provide for oil pollution prevention and mitigation technology evaluation including—

(A) the evaluation and testing of technologies developed independently of the research and development program established under this subsection;

(B) the establishment, where appropriate, of standards and testing protocols traceable to national standards to measure the performance of oil pollution prevention or mitigation technologies; and

(C) the use, where appropriate, of controlled field testing to evaluate real-world application of oil discharge prevention or mitigation technologies.

(4) OIL POLLUTION EFFECTS RESEARCH.—(A) The Committee shall establish a research program to monitor and evaluate the environmental effects of oil discharges. Such program shall include the following elements:

(i) The development of improved models and capabilities for predicting the environmental fate, transport, and effects of oil discharges.

(ii) The development of methods, including economic methods, to assess damages to natural resources resulting from oil discharges.

(iii) The identification of types of ecologically sensitive areas at particular risk to oil discharges and the preparation of scientific monitoring and evaluation plans, one for each of several types of ecological conditions, to be implemented in the event of major oil discharges in such areas.

(iv) The collection of environmental baseline data in ecologically sensitive areas at particular risk to oil discharges where such data are insufficient.

(B) The Department of Commerce in consultation with the Environmental Protection Agency shall monitor and scientifically evaluate the long-term environmental effects of oil discharges if—

(i) the amount of oil discharged exceeds 250,000 gallons;

(ii) the oil discharge has occurred on or after January 1, 1989; and

(iii) the Interagency Committee determines that a study of the long-term environmental effects of the discharge would be of significant scientific value, especially for preventing or responding to future oil discharges.

Areas for study may include the following sites where oil discharges have occurred: the New York/New Jersey Harbor area, where oil was discharged by an Exxon underwater pipeline, the T/B CIBRO SAVANNAH, and the M/V BT NAUTILUS; State listing.

Narragansett Bay where oil was discharged by the WORLD PRODIGY; the Houston Ship Channel where oil was discharged by the RACHEL B; the Delaware River, where oil was discharged by the PRESIDENTE RIVERA, and Huntington Beach, California, where oil was discharged by the AMERICAN TRADER.

(C) Research conducted under this paragraph by, or through, the United States Fish and Wildlife Service shall be directed and coordinated by the National Wetland Research Center.

(5) MARINE SIMULATION RESEARCH.—The program established under this subsection shall include research on the greater use and application of geographic and vessel response simulation models, including the development of additional data bases and updating of existing data bases using, among others, the resources of the National Maritime Research Center. It shall include research and vessel simulations for—

(A) contingency plan evaluation and amendment;

(B) removal and strike team training;

(C) tank vessel personnel training; and

(D) those geographic areas where there is a significant likelihood of a major oil discharge.

State listing.

(6) DEMONSTRATION PROJECTS.—The United States Coast Guard, in conjunction with other such agencies in the Department of Transportation as the Secretary of Transportation may designate, shall conduct 3 port oil pollution minimization demonstration projects, one each with (A) the Port Authority of New York and New Jersey, (B) the Ports of Los Angeles and Long Beach, California, and (C) the Port of New Orleans, Louisiana, for the purpose of developing and demonstrating integrated port oil pollution prevention and cleanup systems which utilize the information and implement the improved practices and technologies developed from the research, development, and demonstration program established in this section. Such systems shall utilize improved technologies and management practices for reducing the risk of oil discharges, including, as appropriate, improved data access, computerized tracking of oil shipments, improved vessel tracking and navigation systems, advanced technology to monitor pipeline and tank conditions, improved oil spill response capability, improved capability to predict the flow and effects of oil discharges in both the inner and outer harbor areas for the purposes of making infrastructure decisions, and such other activities necessary to achieve the purposes of this section.

New Jersey.

(7) SIMULATED ENVIRONMENTAL TESTING.—Agencies represented on the Interagency Committee shall ensure the long-term use and operation of the Oil and Hazardous Materials Simulated Environmental Test Tank (OHMSETT) Research Center in New Jersey for oil pollution technology testing and evaluations.

Grants.
Schools and colleges.

(8) REGIONAL RESEARCH PROGRAM.—(A) Consistent with the research plan in subsection (b), the Interagency Committee shall coordinate a program of competitive grants to universities or other research institutions, or groups of universities or research institutions, for the purposes of conducting a coordinated research program related to the regional aspects of oil pollution, such as prevention, removal, mitigation, and the effects of discharged oil on regional environments. For the purposes of

this paragraph, a region means a Coast Guard district as set out in part 3 of title 33, Code of Federal Regulations (1989).

(B) The Interagency Committee shall coordinate the publication by the agencies represented on the Interagency Committee of a solicitation for grants under this subsection. The application shall be in such form and contain such information as may be required in the published solicitation. The applications shall be reviewed by the Interagency Committee, which shall make recommendations to the appropriate granting agency represented on the Interagency Committee for awarding the grant. The granting agency shall award the grants recommended by the Interagency Committee unless the agency decides not to award the grant due to budgetary or other compelling considerations and publishes its reasons for such a determination in the Federal Register. No grants may be made by any agency from any funds authorized for this paragraph unless such grant award has first been recommended by the Interagency Committee.

(C) Any university or other research institution, or group of universities or research institutions, may apply for a grant for the regional research program established by this paragraph. The applicant must be located in the region, or in a State a part of which is in the region, for which the project is proposed as part of the regional research program. With respect to a group application, the entity or entities which will carry out the substantial portion of the proposed research must be located in the region, or in a State a part of which is in the region, for which the project is proposed as part of the regional research program.

(D) The Interagency Committee shall make recommendations on grants in such a manner as to ensure an appropriate balance within a region among the various aspects of oil pollution research, including prevention, removal, mitigation, and the effects of discharged oil on regional environments. In addition, the Interagency Committee shall make recommendations for grants based on the following criteria:

(i) There is available to the applicant for carrying out this paragraph demonstrated research resources.

(ii) The applicant demonstrates the capability of making a significant contribution to regional research needs.

(iii) The projects which the applicant proposes to carry out under the grant are consistent with the research plan under subsection (b)(1)(F) and would further the objectives of the research and development program established in this section.

(E) Grants provided under this paragraph shall be for a period up to 3 years, subject to annual review by the granting agency, and provide not more than 80 percent of the costs of the research activities carried out in connection with the grant.

(F) No funds made available to carry out this subsection may be used for the acquisition of real property (including buildings) or construction of any building.

(G) Nothing in this paragraph is intended to alter or abridge the authority under existing law of any Federal agency to make grants, or enter into contracts or cooperative agreements, using funds other than those authorized in this Act for the purposes of carrying out this paragraph.

(9) FUNDING.—For each of the fiscal years 1991, 1992, 1993, 1994, and 1995, $6,000,000 of amounts in the Fund shall be available to carry out the regional research program in paragraph (8), such amounts to be available in equal amounts for the regional research program in each region; except that if the agencies represented on the Interagency Committee determine that regional research needs exist which cannot be addressed within such funding limits, such agencies may use their authority under paragraph (10) to make additional grants to meet such needs. For the purposes of this paragraph, the research program carried out by the Prince William Sound Oil Spill Recovery Institute established under section 5001, shall not be eligible to receive grants under this paragraph.

(10) GRANTS.—In carrying out the research and development program established under this subsection, the agencies represented on the Interagency Committee may enter into contracts and cooperative agreements and make grants to universities, research institutions, and other persons. Such contracts, cooperative agreements, and grants shall address research and technology priorities set forth in the oil pollution research plan under subsection (b).

(11) In carrying out research under this section, the Department of Transportation shall continue to utilize the resources of the Research and Special Programs Administration of the Department of Transportation, to the maximum extent practicable.

(d) INTERNATIONAL COOPERATION.—In accordance with the research plan submitted under subsection (b), the Interagency Committee shall coordinate and cooperate with other nations and foreign research entities in conducting oil pollution research, development, and demonstration activities, including controlled field tests of oil discharges.

(e) BIENNIAL REPORTS.—The Chairman of the Interagency Committee shall submit to Congress every 2 years on October 30 a report on the activities carried out under this section in the preceding 2 fiscal years, and on activities proposed to be carried out under this section in the current 2 fiscal year period.

(f) FUNDING.—Not to exceed $21,250,000 of amounts in the Fund shall be available annually to carry out this section except for subsection (c)(8). Of such sums—

(1) funds authorized to be appropriated to carry out the activities under subsection (c)(4) shall not exceed $5,000,000 for fiscal year 1991 or $3,500,000 for any subsequent fiscal year; and

(2) not less than $2,250,000 shall be available for carrying out the activities in subsection (c)(6) for fiscal years 1992, 1993, 1994, and 1995.

All activities authorized in this section, including subsection (c)(8), are subject to appropriations.

Trans-Alaska Pipeline System Reform Act of 1990.

TITLE VIII—TRANS-ALASKA PIPELINE SYSTEM

43 USC 1651 note.

SEC. 8001. SHORT TITLE.

This title may be cited as the "Trans-Alaska Pipeline System Reform Act of 1990".

Subtitle A—Improvements to Trans-Alaska Pipeline System

SEC. 8101. LIABILITY WITHIN THE STATE OF ALASKA AND CLEANUP EFFORTS.

(a) CAUSE OF ACCIDENT.—Section 204(a)(1) of the Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1653(a)(1)) is amended by striking out "caused by" in the first sentence and inserting in lieu thereof "caused solely by".

(b) LIMITATION OF LIABILITY.—Section 204(a)(2) of the Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1653(a)(2)) is amended by striking "$50,000,000" each place it occurs and inserting in lieu thereof "$350,000,000".

(c) CLEANUP EFFORTS.—Section 204(b) of the Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1653(b)) is amended in the first sentence—

(1) by inserting after "any area" the following: "in the State of Alaska";

(2) by inserting after "any activities" the following: "related to the Trans-Alaska Pipeline System, including operation of the terminal,"; and

(3) by inserting after "other Federal" the first place it appears the following: "or State".

SEC. 8102. TRANS-ALASKA PIPELINE LIABILITY FUND.

(a) TERMINATION OF CERTAIN PROVISIONS.—

(1) REPEAL.—Section 204(c) of the Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1653(c)) is repealed, effective as provided in paragraph (5).

(2) DISPOSITION OF FUND BALANCE.— 43 USC 1653 note.

(A) RESERVATION OF AMOUNTS.—The trustees of the Trans-Alaska Pipeline Liability Fund (hereafter in this subsection referred to as the "TAPS Fund") shall reserve the following amounts in the TAPS Fund—

(i) necessary to pay claims arising under section 204(c) of the Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1653(c)); and

(ii) administrative expenses reasonably necessary for and incidental to the implementation of section 204(c) of that Act.

(B) DISPOSITION OF THE BALANCE.—After the Comptroller General of the United States certifies that the requirements of subparagraph (A) have been met, the trustees of the TAPS Fund shall dispose of the balance in the TAPS Fund after the reservation of amounts are made under subparagraph (A) by—

(i) rebating the pro rata share of the balance to the State of Alaska for its contributions as an owner of oil; and then

(ii) transferring and depositing the remainder of the balance into the Oil Spill Liability Trust Fund established under section 9509 of the Internal Revenue Code of 1986 (26 U.S.C. 9509).

(C) DISPOSITION OF THE RESERVED AMOUNTS.—After payment of all claims arising from an incident for which funds

are reserved under subparagraph (A) and certification by the Comptroller General of the United States that the claims arising from that incident have been paid, the excess amounts, if any, for that incident shall be disposed of as set forth under subparagraphs (A) and (B).

(D) AUTHORIZATION.—The amounts transferred and deposited in the Fund shall be available for the purposes of section 1012 of the Oil Pollution Act of 1990 after funding sections 5001 and 8103 to the extent that funds have not otherwise been provided for the purposes of such sections.

43 USC 1653 note.

(3) SAVINGS CLAUSE.—The repeal made by paragraph (1) shall have no effect on any right to recover or responsibility that arises from incidents subject to section 204(c) of the Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1653(c)) occurring prior to the date of enactment of this Act.

(4) TAPS COLLECTION.—Paragraph (5) of section 204(c) of the Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1653(c)) is amended by striking the period at the end of the second sentence and adding at the end the following: ", except that after the date of enactment of the Oil Pollution Act of 1990, the amount to be accumulated shall be $100,000,000 or the amount determined by the trustees and certified to the Congress by the Comptroller General as necessary to pay claims arising from incidents occurring prior to the date of enactment of that Act and administrative costs, whichever is less.".

43 USC 1653 note.

(5) EFFECTIVE DATE.—(A) The repeal by paragraph (1) shall be effective 60 days after the date on which the Comptroller General of the United States certifies to the Congress that—

(i) all claims arising under section 204(c) of the Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1653(c)) have been resolved,

(ii) all actions for the recovery of amounts subject to section 204(c) of the Trans-Alaska Pipeline Authorization Act have been resolved, and

(iii) all administrative expenses reasonably necessary for and incidental to the implementation of section 204(c) of the Trans-Alaska Pipeline Authorization Act have been paid.

(B) Upon the effective date of the repeal pursuant to subparagraph (A), the trustees of the TAPS Fund shall be relieved of all responsibilities under section 204(c) of the Trans-Alaska Pipeline Authorization Act, but not any existing legal liability.

43 USC 1653 note.

(6) TUCKER ACT.—This subsection is intended expressly to preserve any and all rights and remedies of contributors to the TAPS Fund under section 1491 of title 28, United States Code (commonly referred to as the "Tucker Act").

(b) CAUSE OF ACCIDENT.—Section 204(c)(2) of the Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1653(c)(2)) is amended by striking out "caused by" in the first sentence and inserting in lieu thereof "caused solely by".

(c) DAMAGES.—Section 204(c) of the Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1653(c)), as amended by this title, is further amended by adding at the end the following new paragraphs:

"(13) For any claims against the Fund, the term 'damages' shall include, but not be limited to—

"(A) the net loss of taxes, revenues, fees, royalties, rents, or other revenues incurred by a State or a political subdivision of a

State due to injury, destruction, or loss of real property, personal property, or natural resources, or diminished economic activity due to a discharge of oil; and

"(B) the net cost of providing increased or additional public services during or after removal activities due to a discharge of oil, including protection from fire, safety, or health hazards, incurred by a State or political subdivision of a State.

"(14) Paragraphs (1) through (13) shall apply only to claims arising from incidents occurring before the date of enactment of the Trans-Alaska Pipeline System Reform Act of 1990. The Oil Pollution Act of 1990 shall apply to any incident, or any claims arising from an incident, occurring on or after the date of the enactment of that Act.".

(d) PAYMENT OF CLAIMS BY FUND.—Section 204(c)(3) of the Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1653(c)(3)) is amended by adding at the end the following: "The Fund shall expeditiously pay claims under this subsection, including such $14,000,000, if the owner or operator of a vessel has not paid any such claim within 90 days after such claim has been submitted to such owner or operator. Upon payment of any such claim, the Fund shall be subrogated under applicable State and Federal laws to all rights of any person entitled to recover under this subsection. In any action brought by the Fund against an owner or operator or an affiliate thereof to recover amounts under this paragraph, the Fund shall be entitled to recover prejudgment interest, costs, reasonable attorney's fees, and, in the discretion of the court, penalties.".

(e) OFFICERS OR TRUSTEES.—Section 204(c)(4) of the Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1653(c)(4)) is amended—

(1) by inserting "(A)" after "(4)"; and

(2) by adding at the end the following:

"(B) No present or former officer or trustee of the Fund shall be subject to any liability incurred by the Fund or by the present or former officers or trustees of the Fund, other than liability for gross negligence or willful misconduct.

"(C)(i) Subject to clause (ii), each officer and each trustee of the Fund—

"(I) shall be indemnified against all claims and liabilities to which he or she has or shall become subject by reason of serving or having served as an officer or trustee, or by reason of any action taken, omitted, or neglected by him or her as an officer or trustee; and

"(II) shall be reimbursed for all attorney's fees reasonably incurred in connection with any claim or liability.

"(ii) No officer or trustee shall be indemnified against, or be reimbursed for, any expenses incurred in connection with, any claim or liability arising out of his or her gross negligence or willful misconduct.".

SEC. 8103. PRESIDENTIAL TASK FORCE. 43 USC 1651 note.

(a) ESTABLISHMENT OF TASK FORCE.—

(1) ESTABLISHMENT AND MEMBERS.—(A) There is hereby established a Presidential Task Force on the Trans-Alaska Pipeline System (hereinafter referred to as the "Task Force") composed of the following members appointed by the President:

(i) Three members, one of whom shall be nominated by the Secretary of the Interior, one by the Administrator of

the Environmental Protection Agency, and one by the Secretary of Transportation.

(ii) Three members nominated by the Governor of the State of Alaska, one of whom shall be an employee of the Alaska Department of Natural Resources and one of whom shall be an employee of the Alaska Department of Environmental Conservation.

(iii) One member nominated by the Office of Technology Assessment.

(B) Any member appointed to fill a vacancy occurring before the expiration of the term for which his or her predecessor was appointed shall be appointed only for the remainder of such term. A member may serve after the expiration of his or her term until a successor, if applicable, has taken office.

(2) COCHAIRMEN.—The President shall appoint a Federal cochairman from among the Federal members of the Task Force appointed pursuant to paragraph (1)(A) and the Governor shall designate a State cochairman from among the State members of the Task Force appointed pursuant to paragraph (1)(B).

(3) COMPENSATION.—Members shall, to the extent approved in appropriations Acts, receive the daily equivalent of the minimum annual rate of basic pay in effect for grade GS-15 of the General Schedule for each day (including travel time) during which they are engaged in the actual performance of duties vested in the Task Force, except that members who are State, Federal, or other governmental employees shall receive no compensation under this paragraph in addition to the salaries they receive as such employees.

(4) STAFF.—The cochairman of the Task Force shall appoint a Director to carry out administrative duties. The Director may hire such staff and incur such expenses on behalf of the Task Force for which funds are available.

(5) RULE.—Employees of the Task Force shall not, by reason of such employment, be considered to be employees of the Federal Government for any purpose.

(b) DUTIES OF THE TASK FORCE.—

(1) AUDIT.—The Task Force shall conduct an audit of the Trans-Alaska Pipeline System (hereinafter referred to as "TAPS") including the terminal at Valdez, Alaska, and other related onshore facilities, make recommendations to the President, the Congress, and the Governor of Alaska.

(2) COMPREHENSIVE REVIEW.—As part of such audit, the Task Force shall conduct a comprehensive review of the TAPS in order to specifically advise the President, the Congress, and the Governor of Alaska concerning whether—

(A) the holder of the Federal and State right-of-way is, and has been, in full compliance with applicable laws, regulations, and agreements;

(B) the laws, regulations, and agreements are sufficient to prevent the release of oil from TAPS and prevent other damage or degradation to the environment and public health;

(C) improvements are necessary to TAPS to prevent release of oil from TAPS and to prevent other damage or degradation to the environment and public health;

(D) improvements are necessary in the onshore oil spill response capabilities for the TAPS; and

(E) improvements are necessary in security for TAPS.

(3) CONSULTANTS.—(A) The Task Force shall retain at least one independent consulting firm with technical expertise in engineering, transportation, safety, the environment, and other applicable areas to assist the Task Force in carrying out this subsection.

(B) Contracts with any such firm shall be entered into on a nationally competitive basis, and the Task Force shall not select any firm with respect to which there may be a conflict of interest in assisting the Task Force in carrying out the audit and review. All work performed by such firm shall be under the direct and immediate supervision of a registered engineer. Contracts.

(4) PUBLIC COMMENT.—The Task Force shall provide an opportunity for public comment on its activities including at a minimum the following:

(A) Before it begins its audit and review, the Task Force shall review reports prepared by other Government entities conducting reviews of TAPS and shall consult with those Government entities that are conducting ongoing investigations including the General Accounting Office. It shall also hold at least 2 public hearings, at least 1 of which shall be held in a community affected by the Exxon Valdez oil spill. Members of the public shall be given an opportunity to present both oral and written testimony.

(B) The Task Force shall provide a mechanism for the confidential receipt of information concerning TAPS, which may include a designated telephone hotline. Classified information.

(5) TASK FORCE REPORT.—The Task Force shall publish a draft report which it shall make available to the public. The public will have at least 30 days to provide comments on the draft report. Based on its draft report and the public comments thereon, the Task Force shall prepare a final report which shall include its findings, conclusions, and recommendations made as a result of carrying out such audit. The Task Force shall transmit (and make available to the public), no later than 2 years after the date on which funding is made available under paragraph (7), its final report to the President, the Congress, and the Governor of Alaska.

(6) PRESIDENTIAL REPORT.—The President shall, within 90 days after receiving the Task Force's report, transmit a report to the Congress and the Governor of Alaska outlining what measures have been taken or will be taken to implement the Task Force's recommendations. The President's report shall include recommended changes, if any, in Federal and State law to enhance the safety and operation of TAPS.

(7) EARMARK.—Of amounts in the Fund, $5,000,000 shall be available, subject to appropriations, annually without fiscal year limitation to carry out the requirements of this section.

(c) GENERAL ADMINISTRATION AND POWERS OF THE TASK FORCE.—

(1) AUDIT ACCESS.—The Comptroller General of the United States, and any of his or her duly appointed representatives, shall have access, for purposes of audit and examination, to any books, documents, papers, and records of the Task Force that are pertinent to the funds received and expended by the Task Force.

(2) TERMINATION.—The Task Force shall cease to exist on the date on which the final report is provided pursuant to subsection (b)(5).

Safety.

(3) FUNCTIONS LIMITATION.—With respect to safety, operations, and other matters related to the pipeline facilities (as such term is defined in section 202(4) of the Hazardous Liquid Pipeline Safety Act of 1979) of the TAPS, the Task Force shall not perform any functions which are the responsibility of the Secretary of Transportation under the Hazardous Liquid Pipeline Safety Act of 1979, as amended. The Secretary may use the information gathered by and reports issued by the Task Force in carrying out the Secretary's responsibilities under that Act.

(4) POWERS.—The Task Force may, to the extent necessary to carry out its responsibilities, conduct investigations, make reports, issue subpoenas, require the production of relevant documents and records, take depositions, and conduct directly or, by contract, or otherwise, research, testing, and demonstration activities.

(5) EXAMINATION OF RECORDS AND PROPERTIES.—The Task Force, and the employees and agents it so designates, are authorized, upon presenting appropriate credentials to the person in charge, to enter upon, inspect, and examine, at reasonable times and in a reasonable manner, the records and properties of persons to the extent such records and properties are relevant to determining whether such persons have acted or are acting in compliance with applicable laws and agreements.

(6) FOIA.—The information gathered by the Task Force pursuant to subsection (b) shall not be subject to section 552 of title 5, United States Code (commonly referred to as the "Freedom of Information Act"), until its final report is issued pursuant to subsection (b)(6).

Subtitle B—Penalties

SEC. 8201. AUTHORITY OF THE SECRETARY OF THE INTERIOR TO IMPOSE PENALTIES ON OUTER CONTINENTAL SHELF FACILITIES.

Section 24(b) of the Outer Continental Shelf Lands Act (43 U.S.C. 1350(b)) is amended—

(1) by striking out "If any" and inserting in lieu thereof "(1) Except as provided in paragraph (2), if any";

(2) by striking out "$10,000" and inserting in lieu thereof "$20,000";

Regulations.

(3) by adding at the end of paragraph (1) the following new sentence: "The Secretary shall, by regulation at least every 3 years, adjust the penalty specified in this paragraph to reflect any increases in the Consumer Price Index (all items, United States city average) as prepared by the Department of Labor."; and

(4) by adding at the end the following new paragraph:

"(2) If a failure described in paragraph (1) constitutes or constituted a threat of serious, irreparable, or immediate harm or damage to life (including fish and other aquatic life), property, any mineral deposit, or the marine, coastal, or human environment, a civil penalty may be assessed without regard to the requirement of expiration of a period allowed for corrective action.".

SEC. 8202. TRANS-ALASKA PIPELINE SYSTEM CIVIL PENALTIES.

The Trans-Alaska Pipeline Authorization Act (43 U.S.C. 1651 et seq.) is amended by adding at the end thereof the following new section:

"CIVIL PENALTIES

"SEC. 207. (a) PENALTY.—Except as provided in subsection (c)(4), the Secretary of the Interior may assess and collect a civil penalty under this section with respect to any discharge of oil— 43 USC 1656.

"(1) in transit from fields or reservoirs supplying oil to the trans-Alaska pipeline; or

"(2) during transportation through the trans-Alaska pipeline or handling at the terminal facilities, that causes damage to, or threatens to damage, natural resources or public or private property.

"(b) PERSONS LIABLE.—In addition to the person causing or permitting the discharge, the owner or owners of the oil at the time the discharge occurs shall be jointly, severally, and strictly liable for the full amount of penalties assessed pursuant to this section, except that the United States and the several States, and political subdivisions thereof, shall not be liable under this section.

"(c) AMOUNT.—(1) The amount of the civil penalty shall not exceed $1,000 per barrel of oil discharged.

"(2) In determining the amount of civil penalty under this section, the Secretary shall consider the seriousness of the damages from the discharge, the cause of the discharge, any history of prior violations of applicable rules and laws, and the degree of success of any efforts by the violator to minimize or mitigate the effects of such discharge.

"(3) The Secretary may reduce or waive the penalty imposed under this section if the discharge was solely caused by an act of war, act of God, or third party action beyond the control of the persons liable under this section.

"(4) No civil penalty assessed by the Secretary pursuant to this section shall be in addition to a penalty assessed pursuant to section 311(b) of the Federal Water Pollution Control Act (33 U.S.C. 1321(b)).

"(d) PROCEDURES.—A civil penalty may be assessed and collected under this section only after notice and opportunity for a hearing on the record in accordance with section 554 of title 5, United States Code. In any proceeding for the assessment of a civil penalty under this section, the Secretary may issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents and may promulgate rules for discovery procedures. Any person who requested a hearing with respect to a civil penalty under this subsection and who is aggrieved by an order assessing the civil penalty may file a petition for judicial review of such order with the United States Court of Appeals for the District of Columbia circuit or for any other circuit in which such person resides or transacts business. Such a petition may only be filed within the 30-day period beginning on the date the order making such assessment was issued.

"(e) STATE LAW.—(1) Nothing in this section shall be construed or interpreted as preempting any State or political subdivision thereof from imposing any additional liability or requirements with respect to the discharge, or threat of discharge, of oil or other pollution by oil.

"(2) Nothing in this section shall affect or modify in any way the obligations or liabilities of any person under other Federal or State law, including common law, with respect to discharges of oil.".

Subtitle C—Provisions Applicable to Alaska Natives

SEC. 8301. LAND CONVEYANCES.

The Alaska National Interest Lands Conservation Act (Public Law 96-487) is amended by adding the following after section 1437:

Claims.
43 USC 1642.

"SEC. 1438. Solely for the purpose of bringing claims that arise from the discharge of oil, the Congress confirms that all right, title, and interest of the United States in and to the lands validly selected pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601 et seq.) by Alaska Native corporations are deemed to have vested in the respective corporations as of March 23, 1989. This section shall take effect with respect to each Alaska Native corporation only upon its irrevocable election to accept an interim conveyance of such land and notice of such election has been formally transmitted to the Secretary of the Interior.".

SEC. 8302. IMPACT OF POTENTIAL SPILLS IN THE ARCTIC OCEAN ON ALASKA NATIVES.

Section 1005 of the Alaska National Interest Lands Conservation Act (16 U.S.C. 3145) is amended—

(1) by amending the heading to read as follows:

"WILDLIFE RESOURCES PORTION OF STUDY AND IMPACT OF POTENTIAL *OIL SPILLS IN THE ARCTIC OCEAN*";

(2) by inserting "(a)" after "SEC. 1005."; and

(3) by adding at the end the following:

"(b)(1) The Congress finds that—

Canada.

"(A) Canada has discovered commercial quantities of oil and gas in the Amalagak region of the Northwest Territory;

"(B) Canada is exploring alternatives for transporting the oil from the Amalagak field to markets in Asia and the Far East;

"(C) one of the options the Canadian Government is exploring involves transshipment of oil from the Amalagak field across the Beaufort Sea to tankers which would transport the oil overseas;

"(D) the tankers would traverse the American Exclusive Economic Zone through the Beaufort Sea into the Chuckchi Sea and then through the Bering Straits;

"(E) the Beaufort and Chuckchi Seas are vital to Alaska's Native people, providing them with subsistence in the form of walrus, seals, fish, and whales;

"(F) the Secretary of the Interior has conducted Outer Continental Shelf lease sales in the Beaufort and Chuckchi Seas and oil and gas exploration is ongoing;

"(G) an oil spill in the Arctic Ocean, if not properly contained and cleaned up, could have significant impacts on the indigenous people of Alaska's North Slope and on the Arctic environment; and

"(H) there are no international contingency plans involving our two governments concerning containment and cleanup of an oil spill in the Arctic Ocean.

"(2)(A) The Secretary of the Interior, in consultation with the Governor of Alaska, shall conduct a study of the issues of recovery of damages, contingency plans, and coordinated actions in the event of an oil spill in the Arctic Ocean.

"(B) The Secretary shall, no later than January 31, 1991, transmit a report to the Congress on the findings and conclusions reached as the result of the study carried out under this subsection. Reports.

"(c) The Congress calls upon the Secretary of State, in consultation with the Secretary of the Interior, the Secretary of Transportation, and the Governor of Alaska, to begin negotiations with the Foreign Minister of Canada regarding a treaty dealing with the complex issues of recovery of damages, contingency plans, and coordinated actions in the event of an oil spill in the Arctic Ocean. Canada. International agreements.

"(d) The Secretary of State shall report to the Congress on the Secretary's efforts pursuant to this section no later than June 1, 1991.". Reports.

TITLE IX—AMENDMENTS TO OIL SPILL LIABILITY TRUST FUND, ETC.

SEC. 9001. AMENDMENTS TO OIL SPILL LIABILITY TRUST FUND.

(a) TRANSFERS TO TRUST FUND.—Subsection (b) of section 9509 of the Internal Revenue Code of 1986 is amended by striking all that follows paragraph (1) and inserting the following: 26 USC 9509.

"(2) amounts recovered under the Oil Pollution Act of 1990 for damages to natural resources which are required to be deposited in the Fund under section 1006(f) of such Act,

"(3) amounts recovered by such Trust Fund under section 1015 of such Act,

"(4) amounts required to be transferred by such Act from the revolving fund established under section 311(k) of the Federal Water Pollution Control Act,

"(5) amounts required to be transferred by the Oil Pollution Act of 1990 from the Deepwater Port Liability Fund established under section 18(f) of the Deepwater Port Act of 1974,

"(6) amounts required to be transferred by the Oil Pollution Act of 1990 from the Offshore Oil Pollution Compensation Fund established under section 302 of the Outer Continental Shelf Lands Act Amendments of 1978,

"(7) amounts required to be transferred by the Oil Pollution Act of 1990 from the Trans-Alaska Pipeline Liability Fund established under section 204 of the Trans-Alaska Pipeline Authorization Act, and

"(8) any penalty paid pursuant to section 311 of the Federal Water Pollution Control Act, section 309(c) of such Act (as a result of violations of such section 311), the Deepwater Port Act of 1974, or section 207 of the Trans-Alaska Pipeline Authorization Act."

(b) EXPENDITURES FROM TRUST FUND.—Paragraph (1) of section 9509(c) of such Code is amended to read as follows:

"(1) EXPENDITURE PURPOSES.—Amounts in the Oil Spill Liability Trust Fund shall be available, as provided in appropriation

Acts or section 6002(b) of the Oil Pollution Act of 1990, only for purposes of making expenditures—

"(A) for the payment of removal costs and other costs, expenses, claims, and damages referred to in section 1012 of such Act,

"(B) to carry out sections 5 and 7 of the Intervention on the High Seas Act relating to oil pollution or the substantial threat of oil pollution,

"(C) for the payment of liabilities incurred by the revolving fund established by section 311(k) of the Federal Water Pollution Control Act,

"(D) to carry out subsections (b), (c), (d), (j), and (l) of section 311 of the Federal Water Pollution Control Act with respect to prevention, removal, and enforcement related to oil discharges (as defined in such section),

"(E) for the payment of liabilities incurred by the Deepwater Port Liability Fund, and

"(F) for the payment of liabilities incurred by the Offshore Oil Pollution Compensation Fund."

(c) INCREASE IN EXPENDITURES PERMITTED PER INCIDENT.—Subparagraph (A) of section 9509(c)(2) of such Code is amended— 26 USC 9509.

(1) by striking "$500,000,000" each place it appears and inserting "$1,000,000,000", and

(2) by striking "$250,000,000" and inserting "$500,000,000".

(d) INCREASE IN BORROWING AUTHORITY.—

(1) INCREASE IN BORROWING PERMITTED.—Paragraph (2) of section 9509(d) of such Code is amended by striking "$500,000,000" and inserting "$1,000,000,000".

(2) CHANGE IN FINAL REPAYMENT DATE.—Subparagraph (B) of section 9509(d)(3) of such Code is amended by striking "December 31, 1991" and inserting "December 31, 1994".

(e) OTHER CHANGES.—

(1) Paragraph (2) of section 9509(e) of such Code is amended by striking "Comprehensive Oil Pollution Liability and Compensation Act" and inserting "Oil Pollution Act of 1990".

(2) Subparagraph (B) of section 9509(c)(2) of such Code is amended by striking "described in paragraph (1)(A)(i)" and inserting "of removal costs".

(3) Subsection (f) of section 9509 of such Code is amended to read as follows:

"(f) REFERENCES TO OIL POLLUTION ACT OF 1990.—Any reference in this section to the Oil Pollution Act of 1990 or any other Act referred to in a subparagraph of subsection (c)(1) shall be treated as a reference to such Act as in effect on the date of the enactment of this subsection."

SEC. 9002. CHANGES RELATING TO OTHER FUNDS.

(a) REPEAL OF PROVISION RELATING TO TRANSFERS TO OIL SPILL LIABILITY FUND.—Subsection (d) of section 4612 of the Internal Revenue Code of 1986 is amended by striking the last sentence. 26 USC 4612.

(b) CREDIT AGAINST OIL SPILL RATE ALLOWED ON AFFILIATED GROUP BASIS.—Subsection (d) of section 4612 of such Code is amended by adding at the end thereof the following new sentence: "For purposes of this subsection, all taxpayers which would be members of the same affiliated group (as defined in section 1504(a)) if section

1504(a)(2) were applied by substituting '100 percent' for '80 percent' shall be treated as 1 taxpayer."

Approved August 18, 1990.

LEGISLATIVE HISTORY—H.R. 1465 (H.R. 3027) (S. 686):

HOUSE REPORTS: No. 101-241, Pt. 1 (Comm. on Public Works and Transportation) and Pt. 2 (Comm. on Science, Space, and Technology), both accompanying H.R. 3027; No. 101-242, Pt. 1 (Comm. on Public Works and Transportation), Pt. 2 (Comm. on Merchant Marine and Fisheries), Pt. 3 (Comm. on Science, Space, and Technology), Pt. 4 (Comm. on Public Works and Transportation), and Pt. 5 (Comm. on Merchant Marine and Fisheries); and No. 101-653 (Comm. of Conference).

SENATE REPORTS: No. 101-94 accompanying S. 686 (Comm. on Environment and Public Works).

CONGRESSIONAL RECORD:

Vol. 135 (1989): Aug. 3, 4, S. 686 considered and passed Senate.
Nov. 2, 8, 9, H.R. 1465 considered and passed House.
Nov. 19, considered and passed Senate, amended, in lieu of S. 686.

Vol. 136 (1990): Aug. 2, Senate agreed to conference report.
Aug. 3, House agreed to conference report.

WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS, Vol. 26 (1990):
Aug. 18, Presidential statement.

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SECTION 2

PART II

RULES AND REGULATIONS
(FEDERAL REGISTER)

THE NATIONAL OIL AND HAZARDOUS SUBSTANCES POLLUTION CONTINGENCY PLAN

SUBCHAPTER J—SUPERFUND, EMERGENCY PLANNING, AND COMMUNITY RIGHT-TO-KNOW PROGRAMS

PART 300—NATIONAL OIL AND HAZARDOUS SUBSTANCES POLLUTION CONTINGENCY PLAN

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APPENDIX D TO PART 300—APPROPRIATE ACTIONS AND METHODS OF REMEDYING RELEASES

AUTHORITY: 42 U.S.C. 9605; 42 U.S.C. 9620; 33 U.S.C. 1321(c)(2); E.O. 11735, 3 CFR, 1971-1975 Comp., p. 793; E.O. 12580, 3 CFR, 1987 Comp., p. 193.

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Subpart A—Introduction

SOURCE: 55 FR 8813, Mar. 8, 1990, unless otherwise noted.

§ 300.1 Purpose and objectives.

The purpose of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) is to provide the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants.

§ 300.2 Authority and applicability.

The NCP is required by section 105 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9605, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), Pub.L. 99-499, (hereinafter CERCLA), and by section 311(c)(2) of the Clean Water Act (CWA), as amended, 33 U.S.C. 1321(c)(2). In Executive Order (E.O.) 12580 (52 FR 2923, January 29, 1987), the President delegated to the Environmental Protection Agency (EPA) the responsibility for the amendment of the NCP. Amendments to the NCP are coordinated with members of the National Response Team (NRT) prior to publication for notice and comment. This includes coordination with the Federal Emergency Management Agency and the Nuclear Regulatory Commission in order to avoid inconsistent or duplicative requirements in the emergency planning responsibilities of those agencies. The NCP is applicable to response actions taken pursuant to the authorities under CERCLA and section 311 of the CWA.

§ 300.3 Scope.

(a) The NCP applies to and is in effect for:

(1) Discharges of oil into or upon the navigable waters of the United States and adjoining shorelines, the waters of the contiguous zone, and the high seas beyond the contiguous zone in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974, or which may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States (including resources under the Magnuson Fishery Conservation and Management Act). (See sections 311(b)(1) and 502(7) of the CWA.)

(2) Releases into the environment of hazardous substances, and pollutants or contaminants which may present an imminent and substantial danger to public health or welfare.

(b) The NCP provides for efficient, coordinated, and effective response to discharges of oil and releases of hazardous substances, pollutants, and contaminants in accordance with the authorities of CERCLA and the CWA. It provides for:

(1) The national response organization that may be activated in response actions. It specifies responsibilities among the federal, state, and local governments and describes resources that are available for response.

(2) The establishment of requirements for federal regional and on-

scene coordinator (OSC) contingency plans. It also summarizes state and local emergency planning requirements under SARA Title III.

(3) Procedures for undertaking removal actions pursuant to section 311 of the CWA.

(4) Procedures for undertaking response actions pursuant to CERCLA.

(5) Procedures for involving state governments in the initiation, development, selection, and implementation of response actions.

(6) Designation of federal trustees for natural resources for purposes of CERCLA and the CWA.

(7) Procedures for the participation of other persons in response actions.

(8) Procedures for compiling and making available an administrative record for response actions.

(9) National procedures for the use of dispersants and other chemicals in removals under the CWA and response actions under CERCLA.

(c) In implementing the NCP, consideration shall be given to international assistance plans and agreements, security regulations and responsibilities based on international agreements, federal statutes, and executive orders. Actions taken pursuant to the NCP shall conform to the provisions of international joint contingency plans, where they are applicable. The Department of State shall be consulted, as appropriate, prior to taking any action which may affect its activities.

§ 300.4 Abbreviations.

(a) *Department and Agency Title Abbreviations:*

ATSDR—Agency for Toxic Substances and Disease Registry
DOC—Department of Commerce
DOD—Department of Defense
DOE—Department of Energy
DOI—Department of the Interior
DOJ—Department of Justice
DOL—Department of Labor
DOS—Department of State
DOT—Department of Transportation
EPA—Environmental Protection Agency
FEMA—Federal Emergency Management Agency
HHS—Department of Health and Human Services
NIOSH—National Institute for Occupational Safety and Health
NOAA—National Oceanic and Atmospheric Administration
RSPA—Research and Special Programs Administration
USCG—United States Coast Guard
USDA—United States Department of Agriculture

NOTE: Reference is made in the NCP to both the Nuclear Regulatory Commission and the National Response Center. In order to avoid confusion, the NCP will spell out Nuclear Regulatory Commission and use the abbreviation "NRC" only with respect to the National Response Center.

(b) *Operational Abbreviations:*

ARARs—Applicable or Relevant and Appropriate Requirements
CERCLIS—CERCLA Information System
CRC—Community Relations Coordinator
CRP—Community Relations Plan
ERT—Environmental Response Team
FCO—Federal Coordinating Officer
FS—Feasibility Study
HRS—Hazard Ranking System
LEPC—Local Emergency Planning Committee
NCP—National Contingency Plan
NPL—National Priorities List
NRC—National Response Center
NRT—National Response Team
NSF—National Strike Force
O&M—Operation and Maintenance
OSC—On-Scene Coordinator
PA—Preliminary Assessment
PIAT—Public Information Assist Team
RA—Remedial Action
RAT—Radiological Assistance Team
RCP—Regional Contingency Plan
RD—Remedial Design
RI—Remedial Investigation
ROD—Record of Decision
RPM—Remedial Project Manager
RRC—Regional Response Center
RRT—Regional Response Team
SAC—Support Agency Coordinator
SERC—State Emergency Response Commission
SI—Site Inspection
SMOA—Superfund Memorandum of Agreement
SSC—Scientific Support Coordinator

§ 300.5 Definitions.

Terms not defined in this section have the meaning given by CERCLA or the CWA.

Activation means notification by telephone or other expeditious manner or, when required, the assembly of some or all appropriate members of the RRT or NRT.

Alternative water supplies as defined by section 101(34) of CERCLA, includes, but is not limited to, drinking water and household water supplies.

Applicable requirements means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable.

Biological additives means microbiological cultures, enzymes, or nutrient additives that are deliberately introduced into an oil discharge for the specific purpose of encouraging biodegradation to mitigate the effects of the discharge.

Burning agents means those additives that, through physical or chemical means, improve the combustibility of the materials to which they are applied.

CERCLA is the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986.

CERCLIS is the abbreviation of the CERCLA Information System, EPA's comprehensive data base and management system that inventories and tracks releases addressed or needing to be addressed by the Superfund program. CERCLIS contains the official inventory of CERCLA sites and supports EPA's site planning and tracking functions. Sites that EPA decides do not warrant moving further in the site evaluation process are given a "No Further Response Action Planned" (NFRAP) designation in CERCLIS. This means that no additional federal steps under CERCLA will be taken at the site unless future information so warrants. Sites are not removed from the data base after completion of evaluations in order to document that these evaluations took place and to preclude the possibility that they be needlessly repeated. Inclusion of a specific site or area in the CERCLIS data base does not represent a determination of any party's liability, nor does it represent a finding that any response action is necessary. Sites that are deleted from the NPL are not designated NFRAP sites. Deleted sites are listed in a separate category in the CERCLIS data base.

Chemical agents means those elements, compounds, or mixtures that coagulate, disperse, dissolve, emulsify, foam, neutralize, precipitate, reduce, solubilize, oxidize, concentrate, congeal, entrap, fix, make the pollutant mass more rigid or viscous, or otherwise facilitate the mitigation of deleterious effects or the removal of the pollutant from the water.

Claim as defined by section 101(4) of CERCLA, means a demand in writing for a sum certain.

Coastal waters for the purposes of classifying the size of discharges, means the waters of the coastal zone except for the Great Lakes and specified ports and harbors on inland rivers.

Coastal zone as defined for the purpose of the NCP, means all United States waters subject to the tide, United States waters of the Great Lakes, specified ports and harbors on inland rivers, waters of the contiguous zone, other waters of the high seas subject to the NCP, and the land surface or land substrata, ground waters, and ambient air proximal to those waters. The term coastal zone delineates an area of federal responsibility for response action. Precise boundaries are determined by EPA/USCG agreements and identified in federal regional contingency plans.

Community relations means EPA's program to inform and encourage public participation in the Superfund process and to respond to community concerns. The term *public* includes citizens directly affected by the site,

other interested citizens or parties, organized groups, elected officials, and potentially responsible parties.

Community relations coordinator means lead agency staff who work with the OSC/RPM to involve and inform the public about the Superfund process and response actions in accordance with the interactive community relations requirements set forth in the NCP.

Contiguous zone means the zone of the high seas, established by the United States under Article 24 of the Convention on the Territorial Sea and Contiguous Zone, which is contiguous to the territorial sea and which extends nine miles seaward from the outer limit of the territorial sea.

Cooperative agreement is a legal instrument EPA uses to transfer money, property, services, or anything of value to a recipient to accomplish a public purpose in which substantial EPA involvement is anticipated during the performance of the project.

Discharge as defined by section 311(a)(2) of the CWA, includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping of oil, but excludes discharges in compliance with a permit under section 402 of the CWA, discharges resulting from circumstances identified and reviewed and made a part of the public record with respect to a permit issued or modified under section 402 of the CWA, and subject to a condition in such permit, or continuous or anticipated intermittent discharges from a point source, identified in a permit or permit application under section 402 of the CWA, that are caused by events occurring within the scope of relevant operating or treatment systems. For purposes of the NCP, discharge also means threat of discharge.

Dispersants means those chemical agents that emulsify, disperse, or solubilize oil into the water column or promote the surface spreading of oil slicks to facilitate dispersal of the oil into the water column.

Drinking water supply as defined by section 101(7) of CERCLA, means any raw or finished water source that is or may be used by a public water system (as defined in the Safe Drinking Water Act) or as drinking water by one or more individuals.

Environment as defined by section 101(8) of CERCLA, means the navigable waters, the waters of the contiguous zone, and the ocean waters of which the natural resources are under the exclusive management authority of the United States under the Magnuson Fishery Conservation and Management Act; and any other surface water, ground water, drinking water supply, land surface or subsurface strata, or ambient air within the United States or under the jurisdiction of the United States.

Facility as defined by section 101(9) of CERCLA, means any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, or any site or area, where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any vessel.

Feasibility study (FS) means a study undertaken by the lead agency to develop and evaluate options for remedial action. The FS emphasizes data analysis and is generally performed concurrently and in an interactive fashion with the remedial investigation (RI), using data gathered during the RI. The RI data are used to define the objectives of the response action, to develop remedial action alternatives, and to undertake an initial screening and detailed analysis of the alternatives. The term also refers to a report that describes the results of the study.

First federal official means the first federal representative of a participating agency of the National Response Team to arrive at the scene of a discharge or a release. This official coordinates activities under the NCP and may initiate, in consultation with the OSC, any necessary actions until the arrival of the predesignated OSC. A state with primary jurisdiction over a site covered by a cooperative agreement will act in the stead of the first

federal official for any incident at the site.

Fund or *Trust Fund* means the Hazardous Substance Superfund established by section 9507 of the Internal Revenue Code of 1986.

Ground water as defined by section 101(12) of CERCLA, means water in a saturated zone or stratum beneath the surface of land or water.

Hazard Ranking System (HRS) means the method used by EPA to evaluate the relative potential of hazardous substance releases to cause health or safety problems, or ecological or environmental damage.

Hazardous substance as defined by section 101(14) of CERCLA, means: Any substance designated pursuant to section 311(b)(2)(A) of the CWA; any element, compound, mixture, solution, or substance designated pursuant to section 102 of CERCLA; any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress); any toxic pollutant listed under section 307(a) of the CWA; any hazardous air pollutant listed under section 112 of the Clean Air Act; and any imminently hazardous chemical substance or mixture with respect to which the EPA Administrator has taken action pursuant to section 7 of the Toxic Substances Control Act. The term does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance in the first sentence of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).

Indian tribe as defined by section 101(36) of CERCLA, means any Indian tribe, band, nation, or other organized group or community, including any Alaska Native village but not including any Alaska Native regional or village corporation, which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians.

Inland waters, for the purposes of classifying the size of discharges, means those waters of the United States in the inland zone, waters of the Great Lakes, and specified ports and harbors on inland rivers.

Inland zone means the environment inland of the coastal zone excluding the Great Lakes and specified ports and harbors on inland rivers. The term inland zone delineates an area of federal responsibility for response action. Precise boundaries are determined by EPA/USCG agreements and identified in federal regional contingency plans.

Lead agency means the agency that provides the OSC/RPM to plan and implement response action under the NCP. EPA, the USCG, another federal agency, or a state (or political subdivision of a state) operating pursuant to a contract or cooperative agreement executed pursuant to section 104(d)(1) of CERCLA, or designated pursuant to a Superfund Memorandum of Agreement (SMOA) entered into pursuant to subpart F of the NCP or other agreements may be the lead agency for a response action. In the case of a release of a hazardous substance, pollutant, or contaminant, where the release is on, or the sole source of the release is from, any facility or vessel under the jurisdiction, custody, or control of Department of Defense (DOD) or Department of Energy (DOE), then DOD or DOE will be the lead agency. Where the release is on, or the sole source of the release is from, any facility or vessel under the jurisdiction, custody, or control of a federal agency other than EPA, the USCG, DOD, or DOE, then that agency will be the lead agency for remedial actions and removal actions other than emergencies. The federal agency maintains its lead agency responsibilities whether the remedy is selected by the federal agency for non-NPL sites or by EPA and the federal agency or by EPA alone under CERCLA section 120. The lead agency will consult with the support agency, if one exists, throughout the response process.

Management of migration means actions that are taken to minimize and

mitigate the migration of hazardous substances or pollutants or contaminants and the effects of such migration. Measures may include, but are not limited to, management of a plume of contamination, restoration of a drinking water aquifer, or surface water restoration.

Miscellaneous oil spill control agent is any product, other than a dispersant, sinking agent, surface collecting agent, biological additive, or burning agent, that can be used to enhance oil spill cleanup, removal, treatment, or mitigation.

National Priorities List (NPL) means the list, compiled by EPA pursuant to CERCLA section 105, of uncontrolled hazardous substance releases in the United States that are priorities for long-term remedial evaluation and response.

Natural resources means land, fish, wildlife, biota, air, water, ground water, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the United States (including the resources of the exclusive economic zone defined by the Magnuson Fishery Conservation and Management Act of 1976), any state or local government, any foreign government, any Indian tribe, or, if such resources are subject to a trust restriction on alienation, any member of an Indian tribe.

Navigable waters, as defined by 40 CFR 110.1, means the waters of the United States, including the territorial seas. The term includes:

(a) All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide;

(b) Interstate waters, including interstate wetlands;

(c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, and wetlands, the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

(1) That are or could be used by interstate or foreign travelers for recreational or other purposes;

(2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce;

(3) That are used or could be used for industrial purposes by industries in interstate commerce;

(d) All impoundments of waters otherwise defined as navigable waters under this section;

(e) Tributaries of waters identified in paragraphs (a) through (d) of this definition, including adjacent wetlands; and

(f) Wetlands adjacent to waters identified in paragraphs (a) through (e) of this definition: Provided, that waste treatment systems (other than cooling ponds meeting the criteria of this paragraph) are not waters of the United States.

Offshore facility as defined by section 101(17) of CERCLA and section 311(a)(11) of the CWA, means any facility of any kind located in, on, or under any of the navigable waters of the United States and any facility of any kind which is subject to the jurisdiction of the United States and is located in, on, or under any other waters, other than a vessel or a public vessel.

Oil as defined by section 311(a)(1) of the CWA, means oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil.

Oil pollution fund means the fund established by section 311(k) of the CWA.

On-scene coordinator (OSC) means the federal official predesignated by EPA or the USCG to coordinate and direct federal responses under subpart D, or the official designated by the lead agency to coordinate and direct removal actions under subpart E of the NCP.

Onshore facility as defined by section 101(18) of CERCLA, means any facility (including, but not limited to, motor vehicles and rolling stock) of any kind located in, on, or under any land or non-navigable waters within the United States; and, as defined by section 311(a)(10) of the CWA, means

any facility (including, but not limited to, motor vehicles and rolling stock) of any kind located in, on, or under any land within the United States other than submerged land.

On-site means the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action.

Operable unit means a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the site. Operable units may address geographical portions of a site, specific site problems, or initial phases of an action, or may consist of any set of actions performed over time or any actions that are concurrent but located in different parts of a site.

Operation and maintenance (O&M) means measures required to maintain the effectiveness of response actions.

Person as defined by section 101(21) of CERCLA, means an individual, firm, corporation, association, partnership, consortium, joint venture, commercial entity, United States government, state, municipality, commission, political subdivision of a state, or any interstate body.

Pollutant or contaminant as defined by section 101(33) of CERCLA, shall include, but not be limited to, any element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations, in such organisms or their offspring. The term does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under section 101(14) (A) through (F) of CERCLA, nor does it include natural gas, liquified natural gas, or synthetic gas of pipeline quality (or mixtures of natural gas and such synthetic gas). For purposes of the NCP, the term pollutant or contaminant means any pollutant or contaminant that may present an imminent and substantial danger to public health or welfare.

Post-removal site control means those activities that are necessary to sustain the integrity of a Fund-financed removal action following its conclusion. Post-removal site control may be a removal or remedial action under CERCLA. The term includes, without being limited to, activities such as relighting gas flares, replacing filters, and collecting leachate.

Preliminary assessment (PA) means review of existing information and an off-site reconnaissance, if appropriate, to determine if a release may require additional investigation or action. A PA may include an on-site reconnaissance, if appropriate.

Public participation, see the definition for community relations.

Public vessel as defined by section 311(a)(4) of the CWA, means a vessel owned or bareboat-chartered and operated by the United States, or by a state or political subdivision thereof, or by a foreign nation, except when such vessel is engaged in commerce.

Quality assurance project plan (QAPP) is a written document, associated with all remedial site sampling activities, which presents in specific terms the organization (where applicable), objectives, functional activities, and specific quality assurance (QA) and quality control (QC) activities designed to achieve the data quality objectives of a specific project(s) or continuing operation(s). The QAPP is prepared for each specific project or continuing operation (or group of similar projects or continuing operations). The QAPP will be prepared by the responsible program office, regional office, laboratory, contractor, recipient of an assistance agreement, or other organization. For an enforcement action, potentially responsible

parties may prepare a QAPP subject to lead agency approval.

Release as defined by section 101(22) of CERCLA, means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance or pollutant or contaminant), but excludes: Any release which results in exposure to persons solely within a workplace, with respect to a claim which such persons may assert against the employer of such persons; emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine; release of source, byproduct, or special nuclear material from a nuclear incident, as those terms are defined in the Atomic Energy Act of 1954, if such release is subject to requirements with respect to financial protection established by the Nuclear Regulatory Commission under section 170 of such Act, or, for the purposes of section 104 of CERCLA or any other response action, any release of source, byproduct, or special nuclear material from any processing site designated under section 102(a)(1) or 302(a) of the Uranium Mill Tailings Radiation Control Act of 1978; and the normal application of fertilizer. For purposes of the NCP, release also means threat of release.

Relevant and appropriate requirements means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

Remedial design (RD) means the technical analysis and procedures which follow the selection of remedy for a site and result in a detailed set of plans and specifications for implementation of the remedial action.

Remedial investigation (RI) is a process undertaken by the lead agency to determine the nature and extent of the problem presented by the release. The RI emphasizes data collection and site characterization, and is generally performed concurrently and in an interactive fashion with the feasibility study. The RI includes sampling and monitoring, as necessary, and includes the gathering of sufficient information to determine the necessity for remedial action and to support the evaluation of remedial alternatives.

Remedial project manager (RPM) means the official designated by the lead agency to coordinate, monitor, or direct remedial or other response actions under subpart E of the NCP.

Remedy or remedial action (RA) means those actions consistent with permanent remedy taken instead of, or in addition to, removal action in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment. The term includes, but is not limited to, such actions at the location of the release as storage, confinement, perimeter protection using dikes, trenches, or ditches, clay cover, neutralization, cleanup of released hazardous substances and associated contaminated materials, recycling or reuse, diversion, destruction, segregation of reactive wastes, dredging or excavations, repair or replacement of leaking containers, collection of leachate and runoff, on-site treatment or incineration, provision of alternative water supplies, any monitoring reasonably required to assure that such actions protect the public health and welfare and the environment and, where appropriate, post-removal site control activities. The term includes the costs of permanent relocation of residents and businesses and community facilities (including the cost of

providing "alternative land of equivalent value" to an Indian tribe pursuant to CERCLA section 126(b)) where EPA determines that, alone or in combination with other measures, such relocation is more cost-effective than, and environmentally preferable to, the transportation, storage, treatment, destruction, or secure disposition off-site of such hazardous substances, or may otherwise be necessary to protect the public health or welfare; the term includes off-site transport and off-site storage, treatment, destruction, or secure disposition of hazardous substances and associated contaminated materials. For the purpose of the NCP, the term also includes enforcement activities related thereto.

Remove or removal as defined by section 311(a)(8) of the CWA, refers to removal of oil or hazardous substances from the water and shorelines or the taking of such other actions as may be necessary to minimize or mitigate damage to the public health or welfare or to the environment. As defined by section 101(23) of CERCLA, remove or removal means the cleanup or removal of released hazardous substances from the environment; such actions as may be necessary taken in the event of the threat of release of hazardous substances into the environment; such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances; the disposal of removed material; or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release. The term includes, in addition, without being limited to, security fencing or other measures to limit access, provision of alternative water supplies, temporary evacuation and housing of threatened individuals not otherwise provided for, action taken under section 104(b) of CERCLA, post-removal site control, where appropriate, and any emergency assistance which may be provided under the Disaster Relief Act of 1974. For the purpose of the NCP, the term also includes enforcement activities related thereto.

Respond or response as defined by section 101(25) of CERCLA, means remove, removal, remedy, or remedial action, including enforcement activities related thereto.

SARA is the Superfund Amendments and Reauthorization Act of 1986. In addition to certain free-standing provisions of law, it includes amendments to CERCLA, the Solid Waste Disposal Act, and the Internal Revenue Code. Among the free-standing provisions of law is Title III of SARA, also known as the "Emergency Planning and Community Right-to-Know Act of 1986" and Title IV of SARA, also known as the "Radon Gas and Indoor Air Quality Research Act of 1986." Title V of SARA amending the Internal Revenue Code is also known as the "Superfund Revenue Act of 1986."

Sinking agents means those additives applied to oil discharges to sink floating pollutants below the water surface.

Site inspection (SI) means an on-site investigation to determine whether there is a release or potential release and the nature of the associated threats. The purpose is to augment the data collected in the preliminary assessment and to generate, if necessary, sampling and other field data to determine if further action or investigation is appropriate.

Size classes of discharges refers to the following size classes of oil discharges which are provided as guidance to the OSC and serve as the criteria for the actions delineated in subpart D. They are not meant to imply associated degrees of hazard to public health or welfare, nor are they a measure of environmental injury. Any oil discharge that poses a substantial threat to public health or welfare or the environment or results in significant public concern shall be classified as a major discharge regardless of the following quantitative measures:

(a) Minor discharge means a discharge to the inland waters of less than 1,000 gallons of oil or a discharge to the coastal waters of less than 10,000 gallons of oil.

(b) Medium discharge means a discharge of 1,000 to 10,000 gallons of oil to the inland waters or a discharge of

10,000 to 100,000 gallons of oil to the coastal waters.

(c) Major discharge means a discharge of more than 10,000 gallons of oil to the inland waters or more than 100,000 gallons of oil to the coastal waters.

Size classes of releases refers to the following size classifications which are provided as guidance to the OSC for meeting pollution reporting requirements in subpart B. The final determination of the appropriate classification of a release will be made by the OSC based on consideration of the particular release (e.g., size, location, impact, etc.):

(a) Minor release means a release of a quantity of hazardous substance(s), pollutant(s), or contaminant(s) that poses minimal threat to public health or welfare or the environment.

(b) Medium release means a release not meeting the criteria for classification as a minor or major release.

(c) Major release means a release of any quantity of hazardous substance(s), pollutant(s), or contaminant(s) that poses a substantial threat to public health or welfare or the environment or results in significant public concern.

Source control action is the construction or installation and start-up of those actions necessary to prevent the continued release of hazardous substances or pollutants or contaminants (primarily from a source on top of or within the ground, or in buildings or other structures) into the environment.

Source control maintenance measures are those measures intended to maintain the effectiveness of source control actions once such actions are operating and functioning properly, such as the maintenance of landfill caps and leachate collection systems.

Specified ports and harbors means those ports and harbor areas on inland rivers, and land areas immediately adjacent to those waters, where the USCG acts as predesignated on-scene coordinator. Precise locations are determined by EPA/USCG regional agreements and identified in federal regional contingency plans.

State means the several states of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the Virgin Islands, the Commonwealth of Northern Marianas, and any other territory or possession over which the United States has jurisdiction. For purposes of the NCP, the term includes Indian tribes as defined in the NCP except where specifically noted. Section 126 of CERCLA provides that the governing body of an Indian tribe shall be afforded substantially the same treatment as a state with respect to certain provisions of CERCLA. Section 300.515(b) of the NCP describes the requirements pertaining to Indian tribes that wish to be treated as states.

Superfund Memorandum of Agreement (SMOA) means a nonbinding, written document executed by an EPA Regional Administrator and the head of a state agency that may establish the nature and extent of EPA and state interaction during the removal, pre-remedial, remedial, and/or enforcement response process. The SMOA is not a site-specific document although attachments may address specific sites. The SMOA generally defines the role and responsibilities of both the lead and the support agencies.

Superfund state contract is a joint, legally binding agreement between EPA and a state to obtain the necessary assurances before a federal-lead remedial action can begin at a site. In the case of a political subdivision-lead remedial response, a three-party Superfund state contract among EPA, the state, and political subdivision thereof, is required before a political subdivision takes the lead for any phase of remedial response to ensure state involvement pursuant to section 121(f)(1) of CERCLA. The Superfund state contract may be amended to provide the state's CERCLA section 104 assurances before a political subdivision can take the lead for remedial action.

Support agency means the agency or agencies that provide the support agency coordinator to furnish necessary data to the lead agency, review response data and documents, and provide other assistance as requested by the OSC or RPM. EPA, the USCG, another federal agency, or a state may

be support agencies for a response action if operating pursuant to a contract executed under section 104(d)(1) of CERCLA or designated pursuant to a Superfund Memorandum of Agreement entered into pursuant to subpart F of the NCP or other agreement. The support agency may also concur on decision documents.

Support agency coordinator (SAC) means the official designated by the support agency, as appropriate, to interact and coordinate with the lead agency in response actions under subpart E of this part.

Surface collecting agents means those chemical agents that form a surface film to control the layer thickness of oil.

Threat of discharge or release, see definitions for discharge and release.

Threat of release, see definition for release.

Treatment technology means any unit operation or series of unit operations that alters the composition of a hazardous substance or pollutant or contaminant through chemical, biological, or physical means so as to reduce toxicity, mobility, or volume of the contaminated materials being treated. Treatment technologies are an alternative to land disposal of hazardous wastes without treatment.

Trustee means an official of a federal natural resources management agency designated in subpart G of the NCP or a designated state official or Indian tribe who may pursue claims for damages under section 107(f) of CERCLA.

United States when used in relation to section 311(a)(5) of the CWA, means the states, the District of Columbia, the Commonwealth of Puerto Rico, the Northern Mariana Islands, Guam, American Samoa, the United States Virgin Islands, and the Pacific Island Governments. United States, when used in relation to section 101(27) of CERCLA, includes the several states of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Commonwealth of the Northern Marianas, and any other territory or possession over which the United States has jurisdiction.

Vessel as defined by section 101(28) of CERCLA, means every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water; and, as defined by section 311(a)(3) of the CWA, means every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water other than a public vessel.

Volunteer means any individual accepted to perform services by the lead agency which has authority to accept volunteer services (examples: See 16 U.S.C. 742f(c)). A volunteer is subject to the provisions of the authorizing statute and the NCP.

§ 300.6 Use of number and gender.

As used in this regulation, words in the singular also include the plural and words in the masculine gender also include the feminine and vice versa, as the case may require.

§ 300.7 Computation of time.

In computing any period of time prescribed or allowed in these rules of practice, except as otherwise provided, the day of the event from which the designated period begins to run shall not be included. Saturdays, Sundays, and federal legal holidays shall be included. When a stated time expires on a Saturday, Sunday, or legal holiday, the stated time period shall be extended to include the next business day.

Subpart B—Responsibility and Organization for Response

SOURCE: 55 FR 8819, Mar. 8, 1990, unless otherwise noted.

§ 300.100 Duties of President delegated to federal agencies.

In Executive Order 11735 and Executive Order 12580, the President delegated certain functions and responsibilities vested in him by the CWA and CERCLA, respectively.

§ 300.105 General organization concepts.

(a) Federal agencies should:

(1) Plan for emergencies and develop procedures for addressing oil discharges and releases of hazardous substances, pollutants, or contaminants;

(2) Coordinate their planning, preparedness, and response activities with one another;

(3) Coordinate their planning, preparedness, and response activities with affected states and local governments and private entities; and

(4) Make available those facilities or resources that may be useful in a response situation, consistent with agency authorities and capabilities.

(b) Three fundamental kinds of activities are performed pursuant to the NCP:

(1) Preparedness planning and coordination for response to a discharge of oil or release of a hazardous substance, pollutant, or contaminant;

(2) Notification and communications; and

(3) Response operations at the scene of a discharge or release.

(c) The organizational elements created to perform these activities are:

(1) The National Response Team (NRT), responsible for national response and preparedness planning, for coordinating regional planning, and for providing policy guidance and support to the Regional Response Teams. NRT membership consists of representatives from the agencies specified in § 300.175.

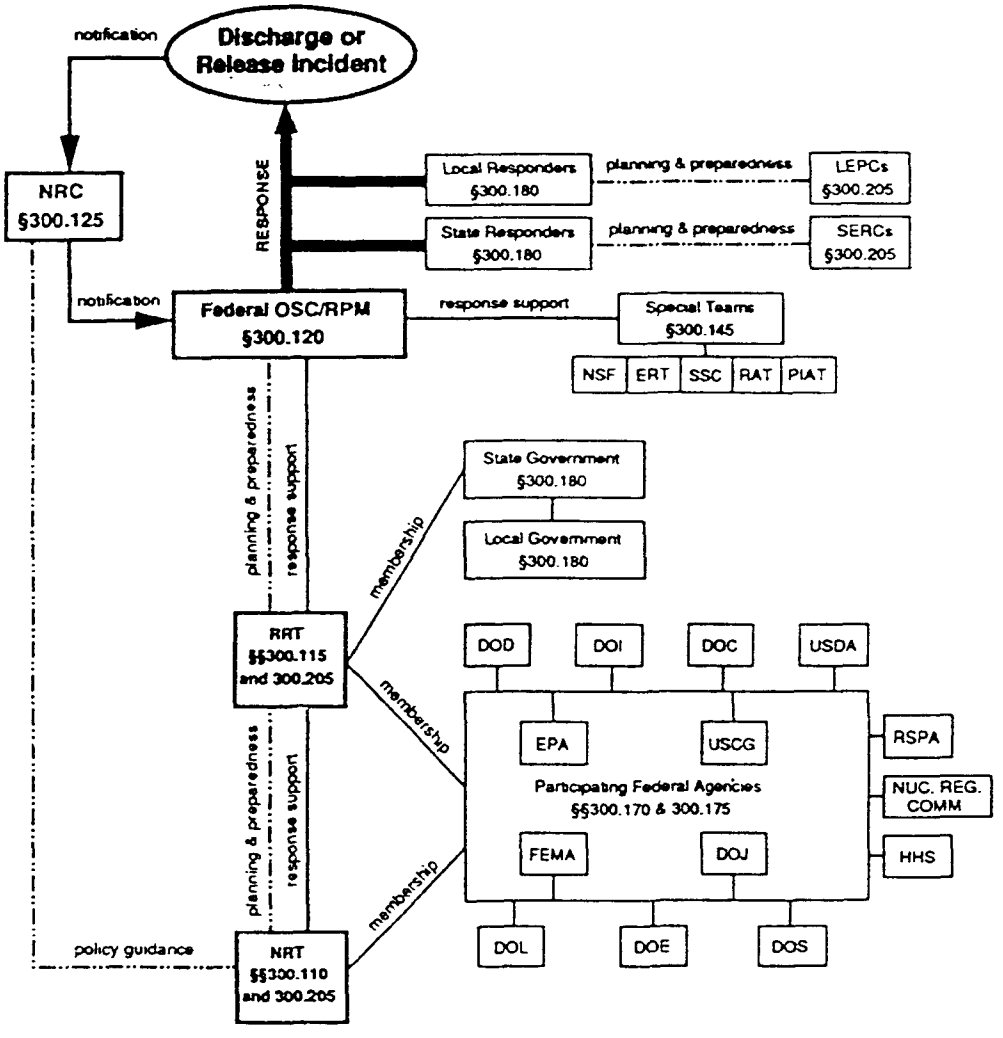
(2) Regional Response Teams (RRTs), responsible for regional planning and preparedness activities before response actions, and for providing advice and support to the on-scene coordinator (OSC) or remedial project manager (RPM) when activated during a response. RRT membership consists of designated representatives from each federal agency participating in the NRT together with state and (as agreed upon by the states) local government representatives.

(3) The OSC and the RPM, primarily responsible for directing response efforts and coordinating all other efforts at the scene of a discharge or release. The other responsibilities of OSCs and RPMs are described in § 300.135.

(d)(1) The organizational concepts of the national response system are depicted in the following Figure 1:

Figure 1

National Response System Concepts



The same federal agencies participate on both the National Response Team (NRT) and the Regional Response Team (RRT). Federal agencies on the RRT are represented by regional staff. Abbreviations used in this figure are explained in §300.4.

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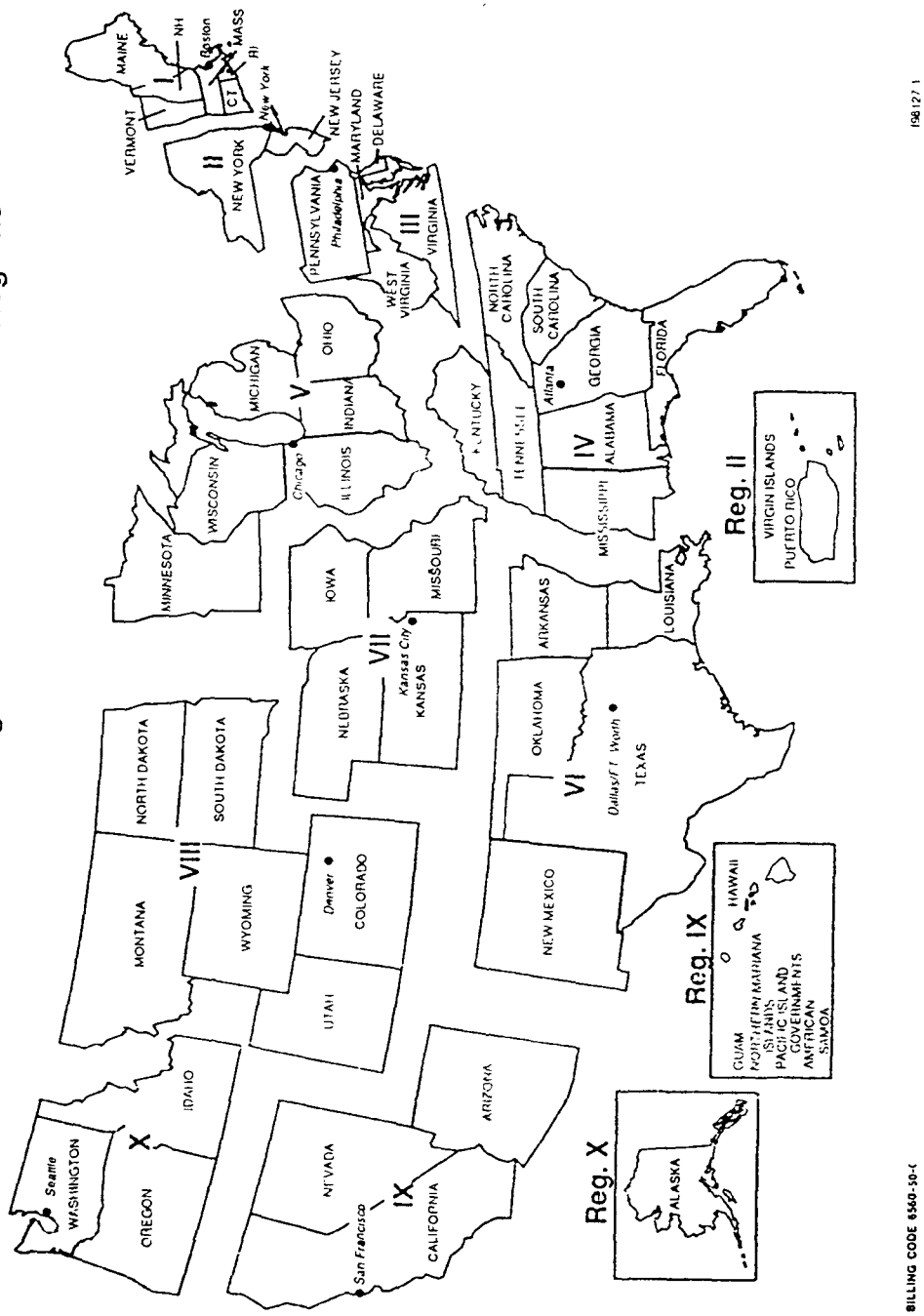
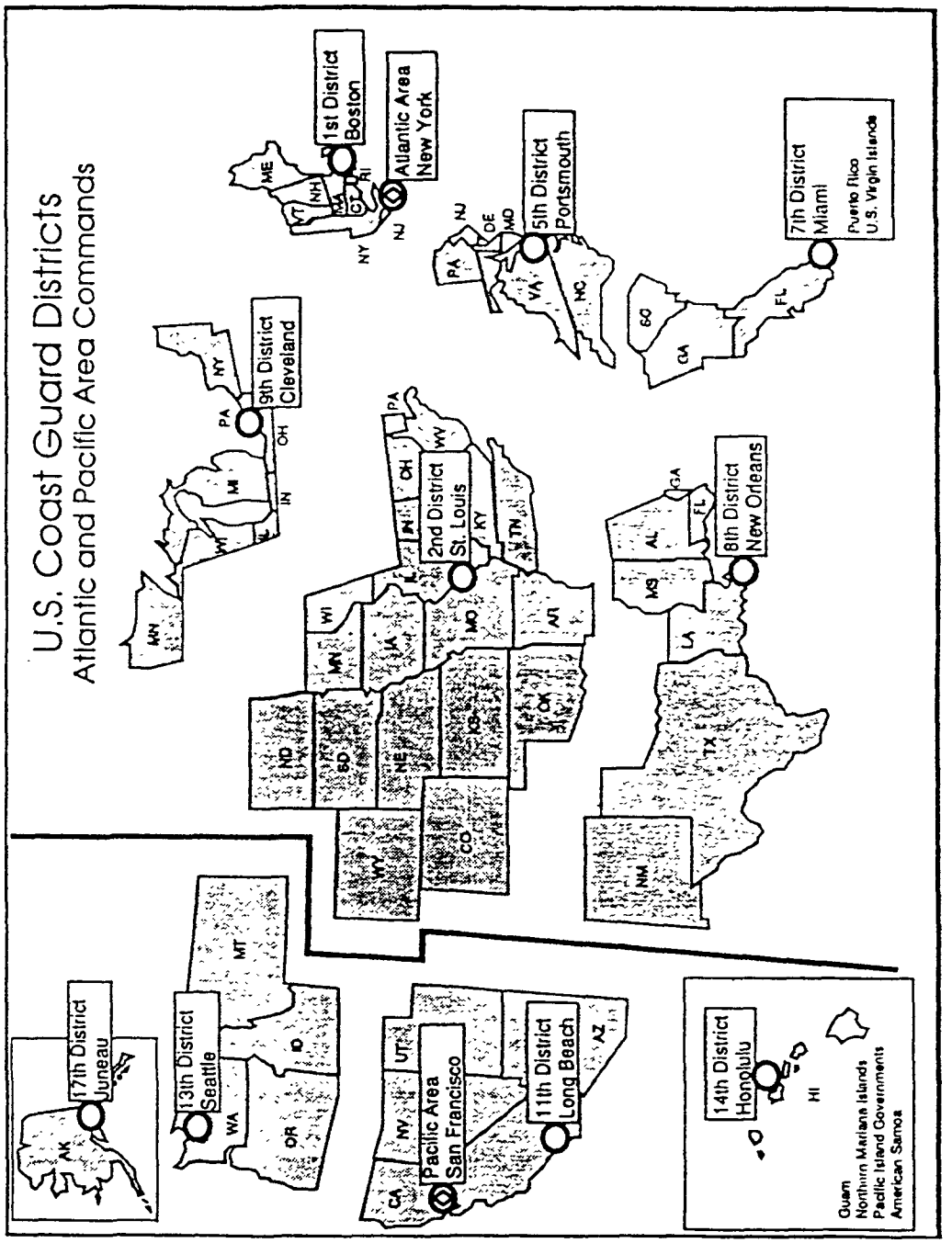
(2) The standard federal regional boundaries (which are also the geographic areas of responsibility for the Regional Response Teams) are shown in the following Figure 2:

Figure 2 -- Standard Regional Boundaries for Ten Regions



(3) The USCG District boundaries are shown in the following Figure 3:



§ 300.110 National Response Team.

National planning and coordination is accomplished through the National Response Team (NRT).

(a) The NRT consists of representatives from the agencies named in § 300.175. Each agency shall designate a member to the team and sufficient alternates to ensure representation, as agency resources permit. The NRT will consider requests for membership on the NRT from other agencies. Other agencies may request membership by forwarding such requests to the chair of the NRT.

(b) The chair of the NRT shall be the representative of EPA and the vice chair shall be the representative of the USCG, with the exception of periods of activation because of response action. During activation, the chair shall be the member agency providing the OSC/RPM. The vice chair shall maintain records of NRT activities along with national, regional, and OSC plans for response actions.

(c) While the NRT desires to achieve a consensus on all matters brought before it, certain matters may prove unresolvable by this means. In such cases, each agency serving as a participating agency on the NRT may be accorded one vote in NRT proceedings.

(d) The NRT may establish such bylaws and committees as it deems appropriate to further the purposes for which it is established.

(e) The NRT shall evaluate methods of responding to discharges or releases, shall recommend any changes needed in the response organization, and may recommend revisions to the NCP.

(f) The NRT shall provide policy and program direction to the RRTs.

(g) The NRT may consider and make recommendations to appropriate agencies on the training, equipping, and protection of response teams and necessary research, development, demonstration, and evaluation to improve response capabilities.

(h) Direct planning and preparedness responsibilities of the NRT include:

(1) Maintaining national preparedness to respond to a major discharge of oil or release of a hazardous substance, pollutant, or contaminant that is beyond regional capabilities;

(2) Publishing guidance documents for preparation and implementation of SARA Title III local emergency response plans;

(3) Monitoring incoming reports from all RRTs and activating for a response action, when necessary;

(4) Coordinating a national program to assist member agencies in preparedness planning and response, and enhancing coordination of member agency preparedness programs;

(5) Developing procedures to ensure the coordination of federal, state, and local governments, and private response to oil discharges and releases of hazardous substances, pollutants, or contaminants;

(6) Monitoring response-related research and development, testing, and evaluation activities of NRT agencies to enhance coordination and avoid duplication of effort;

(7) Developing recommendations for response training and for enhancing the coordination of available resources among agencies with training responsibilities under the NCP; and

(8) Reviewing regional responses to oil discharges and hazardous substance, pollutant, or contaminant releases, including an evaluation of equipment readiness and coordination among responsible public agencies and private organizations.

(i) The NRT will consider matters referred to it for advice or resolution by an RRT.

(j) The NRT should be activated as an emergency response team:

(1) When an oil discharge or hazardous substance release:

(i) Exceeds the response capability of the region in which it occurs;

(ii) Transects regional boundaries; or

(iii) Involves a significant threat to public health or welfare or the environment, substantial amounts of property, or substantial threats to natural resources; or

(2) If requested by any NRT member.

(k) When activated for a response action, the NRT shall meet at the call of the chair and may:

(1) Monitor and evaluate reports from the OSC/RPM and recommend

to the OSC/RPM, through the RRT, actions to combat the discharge or release;

(2) Request other federal, state, and local governments, or private agencies, to provide resources under their existing authorities to combat a discharge or release, or to monitor response operations; and

(3) Coordinate the supply of equipment, personnel, or technical advice to the affected region from other regions or districts.

§ 300.115 Regional Response Teams.

(a) Regional planning and coordination of preparedness and response actions is accomplished through the RRT. The RRT agency membership parallels that of the NRT, as described in § 300.110, but also includes state and local representation. The RRT provides the appropriate regional mechanism for development and coordination of preparedness activities before a response action is taken and for coordination of assistance and advice to the OSC/RPM during such response actions.

(b) The two principal components of the RRT mechanism are a standing team, which consists of designated representatives from each participating federal agency, state governments, and local governments (as agreed upon by the states); and incident-specific teams formed from the standing team when the RRT is activated for a response. On incident-specific teams, participation by the RRT member agencies will relate to the technical nature of the incident and its geographic location.

(1) The standing team's jurisdiction corresponds to the standard federal regions, except for Alaska, Oceania in the Pacific, and the Caribbean area, each of which has a separate standing RRT. The role of the standing RRT includes communications systems and procedures, planning, coordination, training, evaluation, preparedness, and related matters on a regionwide basis.

(2) The role of the incident-specific team is determined by the operational requirements of the response to a specific discharge or release. Appropriate levels of activation and/or notification of the incident-specific RRT, including participation by state and local governments, shall be determined by the designated RRT chair for the incident, based on the Regional Contingency Plan (RCP). The incident-specific RRT supports the designated OSC/RPM. The designated OSC/RPM directs response efforts and coordinates all other efforts at the scene of a discharge or release.

(c) The representatives of EPA and the USCG shall act as co-chairs of RRTs except when the RRT is activated. When the RRT is activated for response actions, the chair shall be the member agency providing the OSC/RPM.

(d) Each participating agency should designate one member and at least one alternate member to the RRT. Agencies whose regional subdivisions do not correspond to the standard federal regions may designate additional representatives to the standing RRT to ensure appropriate coverage of the standard federal region. Participating states may also designate one member and at least one alternate member to the RRT. Indian tribal governments may arrange for representation with the RRT appropriate to their geographical location. All agencies and states may also provide additional representatives as observers to meetings of the RRT.

(e) RRT members should designate representatives and alternates from their agencies as resource personnel for RRT activities, including RRT work planning, and membership on incident-specific teams in support of the OSCs/RPMs.

(f) Federal RRT members or their representatives should provide OSCs/RPMs with assistance from their respective federal agencies commensurate with agency responsibilities, resources, and capabilities within the region. During a response action, the members of the RRT should seek to make available the resources of their agencies to the OSC/RPM as specified in the RCP and OSC contingency plan.

(g) RRT members should designate appropriately qualified representatives from their agencies to work with OSCs in developing and maintaining OSC contingency plans, described in

§ 300.210, that provide for use of agency resources in responding to discharges and releases.

(h) Affected states are encouraged to participate actively in all RRT activities. Each state governor is requested to assign an office or agency to represent the state on the appropriate RRT; to designate representatives to work with the RRT and OSCs in developing RCPs and OSC contingency plans; to plan for, make available, and coordinate state resources; and to serve as the contact point for coordination of response with local government agencies, whether or not represented on the RRT. The state's RRT representative should keep the State Emergency Response Commission (SERC), described in § 300.205(c), apprised of RRT activities and coordinate RRT activities with the SERC. Local governments and Indian tribes are invited to participate in activities on the appropriate RRT as provided by state law or as arranged by the state's representative.

(i) The standing RRT shall recommend changes in the regional response organization as needed, revise the RCP as needed, evaluate the preparedness of the participating agencies and the effectiveness of OSC contingency plans for the federal response to discharges and releases, and provide technical assistance for preparedness to the response community. The RRT should:

(1) Review and comment, to the extent practicable, on local emergency response plans or other issues related to the preparation, implementation, or exercise of such plans upon request of a local emergency planning committee;

(2) Evaluate regional and local responses to discharges or releases on a continuing basis, considering available legal remedies, equipment readiness, and coordination among responsible public agencies and private organizations, and recommend improvements;

(3) Recommend revisions of the NCP to the NRT, based on observations of response operations;

(4) Review OSC actions to ensure that RCPs and OSC contingency plans are effective;

(5) Encourage the state and local response community to improve its preparedness for response;

(6) Conduct advance planning for use of dispersants, surface collection agents, burning agents, biological additives, or other chemical agents in accordance with subpart J of this part;

(7) Be prepared to provide response resources to major discharges or releases outside the region;

(8) Conduct or participate in training and exercises as necessary to encourage preparedness activities of the response community within the region;

(9) Meet at least semiannually to review response actions carried out during the preceding period and consider changes in RCPs and OSC contingency plans; and

(10) Provide letter reports on RRT activities to the NRT twice a year, no later than January 31 and July 31. At a minimum, reports should summarize recent activities, organizational changes, operational concerns, and efforts to improve state and local coordination.

(j)(1) The RRT may be activated by the chair as an incident-specific response team when a discharge or release:

(i) Exceeds the response capability available to the OSC/RPM in the place where it occurs;

(ii) Transects state boundaries; or

(iii) May pose a substantial threat to the public health or welfare or the environment, or to regionally significant amounts of property. RCPs shall specify detailed criteria for activation of RRTs.

(2) The RRT will be activated during any discharge or release upon a request from the OSC/RPM, or from any RRT representative, to the chair of the RRT. Requests for RRT activation shall later be confirmed in writing. Each representative, or an appropriate alternate, should be notified immediately when the RRT is activated.

(3) During prolonged removal or remedial action, the RRT may not need to be activated or may need to be activated only in a limited sense, or may need to have available only those member agencies of the RRT who are

directly affected or who can provide direct response assistance.

(4) When the RRT is activated for a discharge or release, agency representatives shall meet at the call of the chair and may:

(i) Monitor and evaluate reports from the OSC/RPM, advise the OSC/RPM on the duration and extent of response, and recommend to the OSC/RPM specific actions to respond to the discharge or release;

(ii) Request other federal, state, or local governments, or private agencies, to provide resources under their existing authorities to respond to a discharge or release or to monitor response operations;

(iii) Help the OSC/RPM prepare information releases for the public and for communication with the NRT;

(iv) If the circumstances warrant, make recommendations to the regional or district head of the agency providing the OSC/RPM that a different OSC/RPM should be designated; and

(v) Submit pollution reports to the NRC as significant developments occur.

(5) At the regional level, a Regional Response Center (RRC) may provide facilities and personnel for communications, information storage, and other requirements for coordinating response. The location of each RRC should be provided in the RCP.

(6) When the RRT is activated, affected states may participate in all RRT deliberations. State government representatives participating in the RRT have the same status as any federal member of the RRT.

(7) The RRT can be deactivated when the incident-specific RRT chair determines that the OSC/RPM no longer requires RRT assistance.

(8) Notification of the RRT may be appropriate when full activation is not necessary, with systematic communication of pollution reports or other means to keep RRT members informed as to actions of potential concern to a particular agency, or to assist in later RRT evaluation of regionwide response effectiveness.

(k) Whenever there is insufficient national policy guidance on a matter before the RRT, a technical matter requiring solution, or a question concerning interpretation of the NCP, or there is a disagreement on discretionary actions among RRT members that cannot be resolved at the regional level, it may be referred to the NRT, described in § 300.110, for advice.

§ 300.120 On-scene coordinators and remedial project managers: general responsibilities.

(a) The OSC/RPM directs response efforts and coordinates all other efforts at the scene of a discharge or release. As part of the planning and preparedness for response, OSCs shall be predesignated by the regional or district head of the lead agency. EPA and the USCG shall predesignate OSCs for all areas in each region, except as provided in paragraphs (b) and (c) of this section. RPMs shall be assigned by the lead agency to manage remedial or other response actions at NPL sites, except as provided in paragraphs (b) and (c) of this section.

(1) The USCG shall provide OSCs for oil discharges, including discharges from facilities and vessels under the jurisdiction of another federal agency, within or threatening the coastal zone. The USCG shall also provide OSCs for the removal of releases of hazardous substances, pollutants, or contaminants into or threatening the coastal zone, except as provided in paragraph (b) of this section. The USCG shall not provide predesignated OSCs for discharges or releases from hazardous waste management facilities or in similarly chronic incidents. The USCG shall provide an initial response to discharges or releases from hazardous waste management facilities within the coastal zone in accordance with DOT/EPA Instrument of Redelegation (May 27, 1988) except as provided by paragraph (b) of this section. The USCG OSC shall contact the cognizant RPM as soon as it is evident that a removal may require a follow-up remedial action, to ensure that the required planning can be initiated and an orderly transition to an EPA or state lead can occur.

(2) EPA shall provide OSCs for discharges or releases into or threatening the inland zone and shall provide RPMs for federally funded remedial

actions, except in the case of state-lead federally funded response and as provided in paragraph (b) of this section. EPA will also assume all remedial actions at NPL sites in the coastal zone, even where removals are initiated by the USCG, except as provided in paragraph (b) of this section.

(b) For releases of hazardous substances, pollutants, or contaminants, when the release is on, or the sole source of the release is from, any facility or vessel, including vessels bareboat-chartered and operated, under the jurisdiction, custody, or control of DOD, DOE, or other federal agency:

(1) In the case of DOD or DOE, DOD or DOE shall provide OSCs/RPMs responsible for taking all response actions; and

(2) In the case of a federal agency other than EPA, DOD, or DOE, such agency shall provide OSCs for all removal actions that are not emergencies and shall provide RPMs for all remedial actions.

(c) DOD will be the removal response authority with respect to incidents involving DOD military weapons and munitions or weapons and munitions under the jurisdiction, custody, or control of DOD.

(d) The OSC is responsible for developing any OSC contingency plans for the federal response in the area of the OSC's responsibility. The planning shall, as appropriate, be accomplished in cooperation with the RRT, described in § 300.115, and designated state and local representatives. The OSC coordinates, directs, and reviews the work of other agencies, responsible parties, and contractors to assure compliance with the NCP, decision document, consent decree, administrative order, and, lead agency-approved plans applicable to the response.

(e) The RPM is the prime contact for remedial or other response actions being taken (or needed) at sites on the proposed or promulgated NPL, and for sites not on the NPL but under the jurisdiction, custody, or control of a federal agency. The RPM's responsibilities include:

(1) Fund-financed response: The RPM coordinates, directs, and reviews the work of EPA, states and local governments, the U.S. Army Corps of Engineers, and all other agencies and contractors to assure compliance with the NCP. Based upon the reports of these parties, the RPM recommends action for decisions by lead-agency officials. The RPM's period of responsibility begins prior to initiation of the remedial investigation/feasibility study (RI/FS), described in § 300.430, and continues through design, remedial action, deletion of the site from the NPL, and the CERCLA cost recovery activity. When a removal and remedial action occur at the same site, the OSC and RPM should coordinate to ensure an orderly transition of responsibility.

(2) Federal-lead non-Fund-financed response: The RPM coordinates, directs, and reviews the work of other agencies, responsible parties, and contractors to assure compliance with the NCP, ROD, consent decree, administrative order, and lead agency-approved plans applicable to the response. Based upon the reports of these parties, the RPM shall recommend action for decisions by lead agency officials. The RPM's period of responsibility begins prior to initiation of the RI/FS, described in § 300.430, and continues through design and remedial action and the CERCLA cost recovery activity. The OSC and RPM shall ensure orderly transition of responsibilities from one to the other.

(3) The RPM shall participate in all decision-making processes necessary to ensure compliance with the NCP, including, as appropriate, agreements between EPA or other federal agencies and the state. The RPM may also review responses where EPA has preauthorized a person to file a claim for reimbursement to determine that the response was consistent with the terms of such preauthorization in cases where claims are filed for reimbursement.

(f)(1) Where a support agency has been identified through a cooperative agreement, SMOA, or other agreement, that agency may designate a support agency coordinator (SAC) to provide assistance, as requested, by the OSC/RPM. The SAC is the prime representative of the support agency for response actions.

(2) The SAC's responsibilities may include:

(i) Providing and reviewing data and documents as requested by the OSC/RPM during the planning, design, and cleanup activities of the response action; and

(ii) Providing other assistance as requested.

(g)(1) The lead agency should provide appropriate training for its OSCs, RPMs, and other response personnel to carry out their responsibilities under the NCP.

(2) OSCs/RPMs should ensure that persons designated to act as their on-scene representatives are adequately trained and prepared to carry out actions under the NCP, to the extent practicable.

§ 300.125 Notification and communications.

(a) The National Response Center (NRC), located at USCG Headquarters, is the national communications center, continuously manned for handling activities related to response actions. The NRC acts as the single point of contact for all pollution incident reporting, and as the NRT communications center. Notice of discharges must be made telephonically through a toll free number or a special local number (Telecommunication Device for the Deaf (TDD) and collect calls accepted). (Notification details appear in §§ 300.300 and 300.405.) The NRC receives and immediately relays telephone notices of discharges or releases to the appropriate predesignated federal OSC. The telephone report is distributed to any interested NRT member agency or federal entity that has established a written agreement or understanding with the NRC. The NRC evaluates incoming information and immediately advises FEMA of a potential major disaster or evacuation situation.

(b) The Commandant, USCG, in conjunction with other NRT agencies, shall provide the necessary personnel, communications, plotting facilities, and equipment for the NRC.

(c) Notice of an oil discharge or release of a hazardous substance in an amount equal to or greater than the reportable quantity must be made immediately in accordance with 33 CFR part 153, subpart B, and 40 CFR part 302, respectively. Notification shall be made to the NRC Duty Officer, HQ USCG, Washington, DC, telephone (800) 424-8802 or (202) 267-2675. All notices of discharges or releases received at the NRC will be relayed immediately by telephone to the OSC.

§ 300.130 Determinations to initiate response and special conditions.

(a) In accordance with CWA and CERCLA, the Administrator of EPA or the Secretary of the Department in which the USCG is operating, as appropriate, is authorized to act for the United States to take response measures deemed necessary to protect the public health or welfare or environment from discharges of oil or releases of hazardous substances, pollutants, or contaminants except with respect to such releases on or from vessels or facilities under the jurisdiction, custody, or control of other federal agencies.

(b) The Administrator of EPA or the Secretary of the Department in which the USCG is operating, as appropriate, is authorized to initiate appropriate response activities when the Administrator or Secretary determines that:

(1) Any oil is discharged from any vessel or offshore or onshore facility into or upon the navigable waters of the United States, adjoining shorelines, or into or upon the waters of the contiguous zone, or in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974, or which may affect natural resources belonging to, appertaining to, or under exclusive management authority of the United States;

(2) Any hazardous substance is released or there is a threat of such a release into the environment, or there is a release or threat of release into the environment of any pollutant or contaminant which may present an imminent and substantial danger to the public health or welfare; or

(3) A marine disaster in or upon the navigable waters of the United States has created a substantial threat of a pollution hazard to the public health or welfare because of a discharge or release, or an imminent discharge or release, from a vessel of large quantities of oil or hazardous substances des-

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ignated pursuant to section 311(b)(2)(A) of the CWA.

(c) Whenever there is such a marine disaster, the Administrator of EPA or Secretary of the Department in which the USCG is operating may:

(1) Coordinate and direct all public and private efforts to abate the threat; and

(2) Summarily remove and, if necessary, destroy the vessel by whatever means are available without regard to any provisions of law governing the employment of personnel or the expenditure of appropriated funds.

(d) In addition to any actions taken by a state or local government, the Administrator of EPA or the Secretary of the Department in which the USCG is operating may request the U.S. Attorney General to secure the relief necessary to abate a threat if the Administrator or Secretary determines:

(1) That there is an imminent and substantial threat to the public health or welfare or the environment because of discharge of oil from any offshore or onshore facility into or upon the navigable waters of the United States; or

(2) That there may be an imminent and substantial endangerment to the public health or welfare or the environment because of a release of a hazardous substance from a facility.

(e) Response actions to remove discharges originating from operations conducted subject to the Outer Continental Shelf Lands Act shall be in accordance with the NCP.

(f) Where appropriate, when a discharge or release involves radioactive materials, the lead or support federal agency shall act consistent with the notification and assistance procedures described in the appropriate Federal Radiological Plan. For the purpose of the NCP, the Federal Radiological Emergency Response Plan (FRERP) (50 FR 46542, November 8, 1985) is the appropriate plan.

(g) Removal actions involving nuclear weapons should be conducted in accordance with the joint Department of Defense, Department of Energy, and Federal Emergency Management Agency Agreement for Response to Nuclear Incidents and Nuclear Weapons Significant Incidents (January 8, 1981).

(h) If the situation is beyond the capability of state and local governments and the statutory authority of federal agencies, the President may, under the Disaster Relief Act of 1974, act upon a request by the governor and declare a major disaster or emergency and appoint a Federal Coordinating Officer (FCO) to coordinate all federal disaster assistance activities. In such cases, the OSC/RPM would continue to carry out OSC/RPM responsibilities under the NCP, but would coordinate those activities with the FCO to ensure consistency with other federal disaster assistance activities.

§ 300.135 Response operations.

(a) The OSC/RPM, consistent with §§ 300.120 and 300.125, shall direct response efforts and coordinate all other efforts at the scene of a discharge or release. As part of the planning and preparation for response, the OSCs/RPMs shall be predesignated by the regional or district head of the lead agency.

(b) The first federal official affiliated with an NRT member agency to arrive at the scene of a discharge or release should coordinate activities under the NCP and is authorized to initiate, in consultation with the OSC, any necessary actions normally carried out by the OSC until the arrival of the predesignated OSC. This official may initiate federal Fund-financed actions only as authorized by the OSC or, if the OSC is unavailable, the authorized representative of the lead agency.

(c) The OSC/RPM shall, to the extent practicable, collect pertinent facts about the discharge or release, such as its source and cause; the identification of potentially responsible parties; the nature, amount, and location of discharged or released materials; the probable direction and time of travel of discharged or released materials; the pathways to human and environmental exposure; the potential impact on human health, welfare, and safety and the environment; the potential impact on natural resources and property which may be affected; priorities for protecting human health

and welfare and the environment; and appropriate cost documentation.

(d) The OSC's/RPM's efforts shall be coordinated with other appropriate federal, state, local, and private response agencies. OSCs/RPMs may designate capable persons from federal, state, or local agencies to act as their on-scene representatives. State and local governments, however, are not authorized to take actions under subparts D and E of the NCP that involve expenditures of CWA section 311(k) or CERCLA funds unless an appropriate contract or cooperative agreement has been established.

(e) The OSC/RPM should consult regularly with the RRT in carrying out the NCP and keep the RRT informed of activities under the NCP.

(f) The OSC/RPM shall advise the support agency as promptly as possible of reported releases.

(g) The OSC/RPM shall immediately notify FEMA of situations potentially requiring evacuation, temporary housing, or permanent relocation. In addition, the OSC/RPM shall evaluate incoming information and immediately advise FEMA of potential major disaster situations.

(h) In those instances where a possible public health emergency exists, the OSC/RPM should notify the HHS representative to the RRT. Throughout response actions, the OSC/RPM may call upon the HHS representative for assistance in determining public health threats and call upon the Occupational Safety and Health Administration (OSHA) and HHS for advice on worker health and safety problems.

(i) All federal agencies should plan for emergencies and develop procedures for dealing with oil discharges and releases of hazardous substances, pollutants, or contaminants from vessels and facilities under their jurisdiction. All federal agencies, therefore, are responsible for designating the office that coordinates response to such incidents in accordance with the NCP and applicable federal regulations and guidelines.

(j) The OSC/RPM shall promptly notify the trustees for natural resources of discharges or releases that are injuring or may injure natural resources under their jurisdiction. The OSC or RPM shall seek to coordinate all response activities with the natural resource trustees.

(k) Where the OSC/RPM becomes aware that a discharge or release may adversely affect any endangered or threatened species, or result in destruction or adverse modification of the habitat of such species, the OSC/RPM should consult with the DOI or DOC (NOAA).

(l) The OSC/RPM is responsible for addressing worker health and safety concerns at a response scene, in accordance with § 300.150.

(m) The OSC shall submit pollution reports to the RRT and other appropriate agencies as significant developments occur during response actions, through communications networks or procedures agreed to by the RRT and covered in the RCP.

(n) OSCs/RPMs should ensure that all appropriate public and private interests are kept informed and that their concerns are considered throughout a response, to the extent practicable, consistent with the requirements of § 300.155 of this part.

§ 300.140 Multi-regional responses.

(a) If a discharge or release moves from the area covered by one RCP or OSC contingency plan into another area, the authority for response actions should likewise shift. If a discharge or release affects areas covered by two or more RCPs, the response mechanisms of both may be activated. In this case, response actions of all regions concerned shall be fully coordinated as detailed in the RCPs.

(b) There shall be only one OSC and/or RPM at any time during the course of a response operation. Should a discharge or release affect two or more areas, EPA, the USCG, DOD, DOE, or other lead agency, as appropriate, shall give prime consideration to the area vulnerable to the greatest threat, in determining which agency should provide the OSC and/or RPM. The RRT shall designate the OSC and/or RPM if the RRT member agencies who have response authority within the affected areas are unable to agree on the designation. The NRT shall designate the OSC and/or RPM

if members of one RRT or two adjacent RRTs are unable to agree on the designation.

(c) Where the USCG has initially provided the OSC for response to a release from hazardous waste management facilities located in the coastal zone, responsibility for response action shall shift to EPA or another federal agency, as appropriate.

§ 300.145 Special teams and other assistance available to OSCs/RPMs.

(a) Strike Teams, collectively known as the National Strike Force (NSF), are established by the USCG on the Pacific coast and Gulf coast (covering the Atlantic and Gulf coast regions), to provide assistance to the OSC/RPM.

(1) Strike Teams can provide communications support, advice, and assistance for oil and hazardous substances removal. These teams also have knowledge of shipboard damage control, are equipped with specialized containment and removal equipment, and have rapid transportation available. When possible, the Strike Teams will provide training for emergency task forces to support OSCs/RPMs and assist in the development of RCPs and OSC contingency plans.

(2) The OSC/RPM may request assistance from the Strike Teams. Requests for a team may be made directly to the Commanding Officer of the appropriate team, the USCG member of the RRT, the appropriate USCG Area Commander, or the Commandant of the USCG through the NRC.

(b) Each USCG OSC manages emergency task forces trained to evaluate, monitor, and supervise pollution responses. Additionally, they have limited "initial aid" response capability to deploy equipment prior to the arrival of a cleanup contractor or other response personnel.

(c)(1) The Environmental Response Team (ERT) is established by EPA in accordance with its disaster and emergency responsibilities. The ERT has expertise in treatment technology, biology, chemistry, hydrology, geology, and engineering.

(2) The ERT can provide access to special decontamination equipment for chemical releases and advice to the OSC/RPM in hazard evaluation; risk assessment; multimedia sampling and analysis program; on-site safety, including development and implementation plans; cleanup techniques and priorities; water supply decontamination and protection; application of dispersants; environmental assessment; degree of cleanup required; and disposal of contaminated material.

(3) The ERT also provides both introductory and intermediate level training courses to prepare response personnel.

(4) OSC/RPM or RRT requests for ERT support should be made to the EPA representative on the RRT; EPA Headquarters, Director, Emergency Response Division; or the appropriate EPA regional emergency coordinator.

(d) Scientific support coordinators (SSCs) are available, at the request of OSCs/RPMs, to assist with actual or potential responses to discharges of oil or releases of hazardous substances, pollutants, or contaminants. The SSC will also provide scientific support for the development of RCPs and OSC contingency plans. Generally, SSCs are provided by NOAA in coastal and marine areas, and by EPA in inland regions. In the case of NOAA, SSCs may be supported in the field by a team providing, as necessary, expertise in chemistry, trajectory modeling, natural resources at risk, and data management.

(1) During a response, the SSC serves under the direction of the OSC/RPM and is responsible for providing scientific support for operational decisions and for coordinating on-scene scientific activity. Depending on the nature of the incident, the SSC can be expected to provide certain specialized scientific skills and to work with governmental agencies, universities, community representatives, and industry to compile information that would assist the OSC/RPM in assessing the hazards and potential effects of discharges and releases and in developing response strategies.

(2) If requested by the OSC/RPM, the SSC will serve as the principal liaison for scientific information and will facilitate communications to and from the scientific community on response issues. The SSC, in this role, will strive

for a consensus on scientific issues surrounding the response but will also ensure that any differing opinions within the community are communicated to the OSC/RPM.

(3) The SSC will assist the OSC/RPM in responding to requests for assistance from state and federal agencies regarding scientific studies and environmental assessments. Details on access to scientific support shall be included in the RCPs.

(e) For marine salvage operations, OSCs/RPMs with responsibility for monitoring, evaluating, or supervising these activities should request technical assistance from DOD, the Strike Teams, or commercial salvors as necessary to ensure that proper actions are taken. Marine salvage operations generally fall into five categories: Afloat salvage; offshore salvage; river and harbor clearance; cargo salvage; and rescue towing. Each category requires different knowledge and specialized types of equipment. The complexity of such operations may be further compounded by local environmental and geographic conditions. The nature of marine salvage and the conditions under which it occurs combine to make such operations imprecise, difficult, hazardous, and expensive. Thus, responsible parties or other persons attempting to perform such operations without adequate knowledge, equipment, and experience could aggravate, rather than relieve, the situation.

(f) Radiological Assistance Teams (RATs) have been established by EPA's Office of Radiation Programs (ORP) to provide response and support for incidents or sites containing radiological hazards. Expertise is available in radiation monitoring, radionuclide analysis, radiation health physics, and risk assessment. Radiological Assistance Teams can provide on-site support including mobile monitoring laboratories for field analyses of samples and fixed laboratories for radiochemical sampling and analyses. Requests for support may be made 24 hours a day to the Radiological Response Coordinator in the EPA Office of Radiation Programs. Assistance is also available from the Department of Energy and other federal agencies.

(g) The USCG Public Information Assist Team (PIAT) is available to assist OSCs/RPMs and regional or district offices to meet the demands for public information and participation. Its use is encouraged any time the OSC/RPM requires outside public affairs support. Requests for the PIAT may be made through the NRC.

§ 300.150 Worker health and safety.

(a) Response actions under the NCP will comply with the provisions for response action worker safety and health in 29 CFR 1910.120.

(b) In a response action taken by a responsible party, the responsible party must assure that an occupational safety and health program consistent with 29 CFR 1910.120 is made available for the protection of workers at the response site.

(c) In a response taken under the NCP by a lead agency, an occupational safety and health program should be made available for the protection of workers at the response site, consistent with, and to the extent required by, 29 CFR 1910.120. Contracts relating to a response action under the NCP should contain assurances that the contractor at the response site will comply with this program and with any applicable provisions of the OSH Act and state OSH laws.

(d) When a state, or political subdivision of a state, without an OSHA-approved state plan is the lead agency for response, the state or political subdivision must comply with standards in 40 CFR part 311, promulgated by EPA pursuant to section 126(f) of SARA.

(e) Requirements, standards, and regulations of the Occupational Safety and Health Act of 1970 (29 U.S.C. 651 et seq.) (OSH Act) and of state laws with plans approved under section 18 of the OSH Act (state OSH laws), not directly referenced in paragraphs (a) through (d) of this section, must be complied with where applicable. Federal OSH Act requirements include, among other things, Construction Standards (29 CFR part 1926), General Industry Standards (29 CFR part 1910), and the general duty requirement of section 5(a)(1) of the OSH Act

(29 U.S.C. 654(a)(1)). No action by the lead agency with respect to response activities under the NCP constitutes an exercise of statutory authority within the meaning of section 4(b)(1) of the OSH Act. All governmental agencies and private employers are directly responsible for the health and safety of their own employees.

§ 300.155 Public information and community relations.

(a) When an incident occurs, it is imperative to give the public prompt, accurate information on the nature of the incident and the actions underway to mitigate the damage. OSCs/RPMs and community relations personnel should ensure that all appropriate public and private interests are kept informed and that their concerns are considered throughout a response. They should coordinate with available public affairs/community relations resources to carry out this responsibility.

(b) An on-scene news office may be established to coordinate media relations and to issue official federal information on an incident. Whenever possible, it will be headed by a representative of the lead agency. The OSC/RPM determines the location of the on-scene news office, but every effort should be made to locate it near the scene of the incident. If a participating agency believes public interest warrants the issuance of statements and an on-scene news office has not been established, the affected agency should recommend its establishment. All federal news releases or statements by participating agencies should be cleared through the OSC/RPM.

(c) The community relations requirements specified in §§ 300.415, 300.430, and 300.435 apply to removal, remedial, and enforcement actions and are intended to promote active communication between communities affected by discharges or releases and the lead agency responsible for response actions. Community Relations Plans (CRPs) are required by EPA for certain response actions. The OSC/RPM should ensure coordination with such plans which may be in effect at the scene of a discharge or release or which may need to be developed during follow-up activities.

§ 300.160 Documentation and cost recovery.

(a) For releases of a hazardous substance, pollutant, or contaminant, the following provisions apply:

(1) During all phases of response, the lead agency shall complete and maintain documentation to support all actions taken under the NCP and to form the basis for cost recovery. In general, documentation shall be sufficient to provide the source and circumstances of the release, the identity of responsible parties, the response action taken, accurate accounting of federal, state, or private party costs incurred for response actions, and impacts and potential impacts to the public health and welfare and the environment. Where applicable, documentation shall state when the NRC received notification of a release of a reportable quantity.

(2) The information and reports obtained by the lead agency for Fund-financed response actions shall, as appropriate, be transmitted to the chair of the RRT. Copies can then be forwarded to the NRT, members of the RRT, and others as appropriate. In addition, OSCs shall submit reports as required under § 300.165.

(3) The lead agency shall make available to the trustees of affected natural resources information and documentation that can assist the trustees in the determination of actual or potential natural resource injuries.

(b) For discharges of oil, documentation and cost recovery provisions are described in § 300.315.

(c) Response actions undertaken by the participating agencies shall be carried out under existing programs and authorities when available. Federal agencies are to make resources available, expend funds, or participate in response to discharges and releases under their existing authority. Interagency agreements may be signed when necessary to ensure that the federal resources will be available for a timely response to a discharge or release. The ultimate decision as to the appropriateness of expending funds rests with the agency that is held accountable for such expenditures. Fur-

ther funding provisions for discharges of oil are described in § 300.335.

(d) The Administrator of EPA and the Administrator of the Agency for Toxic Substances and Disease Registry (ATSDR) shall assure that the costs of health assessment or health effect studies conducted under the authority of CERCLA section 104(i) are documented in accordance with standard EPA procedures for cost recovery. Documentation shall include information on the nature of the hazardous substances addressed by the research, information concerning the locations where these substances have been found, and any available information on response actions taken concerning these substances at the location.

§ 300.165 OSC reports.

(a) Within one year after completion of removal activities at a major discharge of oil, a major release of a hazardous substance, pollutant, or contaminant, or when requested by the RRT, the OSC/RPM shall submit to the RRT a complete report on the removal operation and the actions taken. The OSC/RPM shall at the same time send a copy of the report to the Secretary of the NRT. The RRT shall review the OSC report and send to the NRT a copy of the OSC report with its comments or recommendations within 30 days after the RRT has received the OSC report.

(b) The OSC report shall record the situation as it developed, the actions taken, the resources committed, and the problems encountered.

(c) The format for the OSC report shall be as follows:

(1) Summary of Events—a chronological narrative of all events, including:

(i) The location of the hazardous substance, pollutant, or contaminant release or oil discharge, including, for oil discharges, an indication of whether the discharge was in connection with activities regulated under the Outer Continental Shelf Lands Act (OCSLA), the Trans-Alaska Pipeline Authorization Act, or the Deepwater Port Act;

(ii) The cause of the discharge or release;

(iii) The initial situation;

(iv) Efforts to obtain response by responsible parties;

(v) The organization of the response, including state participation;

(vi) The resources committed;

(vii) Content and time of notice to natural resource trustees relating injury or possible injury to natural resources;

(viii) Federal or state trustee damage assessment activities and efforts to replace or restore damaged natural resources;

(ix) Details of any threat abatement action taken under CERCLA or under section 311(c) or (d) of the CWA;

(x) Treatment/disposal/alternative technology approaches pursued and followed; and

(xi) Public information/community relations activities.

(2) Effectiveness of removal actions taken by:

(i) The responsible party(ies);

(ii) State and local forces;

(iii) Federal agencies and special teams; and

(iv) Contractors, private groups, and volunteers, if applicable.

(3) Difficulties Encountered—A list of items that affected the response, with particular attention to issues of intergovernmental coordination.

(4) Recommendations—OSC/RPM recommendations, including at a minimum:

(i) Means to prevent a recurrence of the discharge or release;

(ii) Improvement of response actions; and

(iii) Any recommended changes in the NCP, RCP, OSC contingency plan, and, as appropriate, plans developed under section 303 of SARA and other local emergency response plans.

§ 300.170 Federal agency participation.

Federal agencies listed in § 300.175 have duties established by statute, executive order, or Presidential directive which may apply to federal response actions following, or in prevention of, the discharge of oil or release of a hazardous substance, pollutant, or contaminant. Some of these agencies also have duties relating to the rehabilitation, restoration, or replacement of natural resources injured or lost as a

result of such discharge or release as described in subpart G of this part. The NRT and RRT organizational structure, and the NCP, federal regional contingency plans (RCPs), and OSC contingency plans, described in § 300.210, provide for agencies to coordinate with each other in carrying out these duties.

(a) Federal agencies may be called upon by an OSC/RPM during response planning and implementation to provide assistance in their respective areas of expertise, as described in § 300.175, consistent with the agencies' capabilities and authorities.

(b) In addition to their general responsibilities, federal agencies should:

(1) Make necessary information available to the Secretary of the NRT, RRTs, and OSCs/RPMs.

(2) Provide representatives to the NRT and RRTs and otherwise assist RRTs and OSCs, as necessary, in formulating RCPs and OSC contingency plans.

(3) Inform the NRT and RRTs, consistent with national security considerations, of changes in the availability of resources that would affect the operations implemented under the NCP.

(c) All federal agencies are responsible for reporting releases of hazardous substances from facilities or vessels under their jurisdiction or control in accordance with section 103 of CERCLA.

(d) All federal agencies are encouraged to report releases of pollutants or contaminants or discharges of oil from vessels under their jurisdiction or control to the NRC.

§ 300.175 Federal agencies: additional responsibilities and assistance.

(a) During preparedness planning or in an actual response, various federal agencies may be called upon to provide assistance in their respective areas of expertise, as indicated in paragraph (b) of this section, consistent with agency legal authorities and capabilities.

(b) The federal agencies include:

(1) The United States Coast Guard (USCG), as provided in 14 U.S.C. 1-3, is an agency in the Department of Transportation (DOT), except when operating as an agency in the United States Navy in time of war. The USCG provides the NRT vice chair, co-chairs for the standing RRTs, and predesignated OSCs for the coastal zone, as described in § 300.120(a)(1). The USCG maintains continuously manned facilities which can be used for command, control, and surveillance of oil discharges and hazardous substance releases occurring in the coastal zone. The USCG also offers expertise in domestic and international fields of port safety and security, maritime law enforcement, ship navigation and construction, and the manning, operation, and safety of vessels and marine facilities. The USCG may enter into a contract or cooperative agreement with the appropriate state in order to implement a response action.

(2) The Environmental Protection Agency (EPA) chairs the NRT and co-chairs, with the USCG, the standing RRTs; provides predesignated OSCs for the inland zone and RPMs for remedial actions except as otherwise provided; and generally provides the SSC for responses in the inland zone. EPA provides expertise on environmental effects of oil discharges or releases of hazardous substances, pollutants, or contaminants, and environmental pollution control techniques. EPA also provides legal expertise on the interpretation of CERCLA and other environmental statutes. EPA may enter into a contract or cooperative agreement with the appropriate state in order to implement a response action.

(3) The Federal Emergency Management Agency (FEMA) provides guidance, policy and program advice, and technical assistance in hazardous materials and radiological emergency preparedness activities (planning, training, and exercising). In a response, FEMA provides advice and assistance to the lead agency on coordinating relocation assistance and mitigation efforts with other federal agencies, state and local governments, and the private sector. FEMA may enter into a contract or cooperative agreement with the appropriate state or political subdivision in order to implement relocation assistance in a response. In the event of a hazardous materials incident at a major disaster or emergency

declared by the President, the lead agency shall coordinate hazardous materials response with the Federal Coordinating Officer (FCO) appointed by the President.

(4) The Department of Defense (DOD) has responsibility to take all action necessary with respect to releases where either the release is on, or the sole source of the release is from, any facility or vessel under the jurisdiction, custody, or control of DOD. DOD may also, consistent with its operational requirements and upon request of the OSC, provide locally deployed United States Navy oil spill equipment and provide assistance to other federal agencies on request. The following two branches of DOD have particularly relevant expertise:

(i) The United States Army Corps of Engineers has specialized equipment and personnel for maintaining navigation channels, for removing navigation obstruction, for accomplishing structural repairs, and for performing maintenance to hydropower electric generating equipment. The Corps can also provide design services, perform construction, and provide contract writing and contract administrative services for other federal agencies.

(ii) The United States Navy (USN) is the federal agency most knowledgeable and experienced in ship salvage, shipboard damage control, and diving. The USN has an extensive array of specialized equipment and personnel available for use in these areas as well as specialized containment, collection, and removal equipment specifically designed for salvage-related and open-sea pollution incidents.

(5) The Department of Energy (DOE) generally provides designated OSCs/RPMs that are responsible for taking all response actions with respect to releases where either the release is on, or the sole source of the release is from, any facility or vessel under its jurisdiction, custody, or control, including vessels bareboat-chartered and operated. In addition, under the Federal Radiological Emergency Response Plan (FRERP), DOE provides advice and assistance to other OSCs/RPMs for emergency actions essential for the control of immediate radiological hazards. Incidents that qualify for DOE radiological advice and assistance are those believed to involve source, by-product, or special nuclear material or other ionizing radiation sources, including radium, and other naturally occurring radionuclides, as well as particle accelerators. Assistance is available through direct contact with the appropriate DOE Radiological Assistance Coordinating Office.

(6) The Department of Agriculture (USDA) has scientific and technical capability to measure, evaluate, and monitor, either on the ground or by use of aircraft, situations where natural resources including soil, water, wildlife, and vegetation have been impacted by fire, insects and diseases, floods, hazardous substances, and other natural or man-caused emergencies. The USDA may be contacted through Forest Service emergency staff officers who are the designated members of the RRT. Agencies within USDA have relevant capabilities and expertise as follows:

(i) The Forest Service has responsibility for protection and management of national forests and national grasslands. The Forest Service has personnel, laboratory, and field capability to measure, evaluate, monitor, and control as needed, releases of pesticides and other hazardous substances on lands under its jurisdiction.

(ii) The Agriculture Research Service (ARS) administers an applied and developmental research program in animal and plant protection and production; the use and improvement of soil, water, and air; the processing, storage, and distribution of farm products; and human nutrition. The ARS has the capabilities to provide regulation of, and evaluation and training for, employees exposed to biological, chemical, radiological, and industrial hazards. In emergency situations, the ARS can identify, control, and abate pollution in the areas of air, soil, wastes, pesticides, radiation, and toxic substances for ARS facilities.

(iii) The Soil Conservation Service (SCS) has personnel in nearly every county in the nation who are knowledgeable in soil, agronomy, engineering, and biology. These personnel can help to predict the effects of pollut-

ants on soil and their movements over and through soils. Technical specialists can assist in identifying potential hazardous waste sites and provide review and advice on plans for remedial measures.

(iv) The Animal and Plant Health Inspection Service (APHIS) can respond in an emergency to regulate movement of diseased or infected organisms to prevent the spread and contamination of nonaffected areas.

(v) The Food Safety and Inspection Service (FSIS) has responsibility to prevent meat and poultry products contaminated with harmful substances from entering human food channels. In emergencies, the FSIS works with other federal and state agencies to establish acceptability for slaughter of exposed or potentially exposed animals and their products. In addition they are charged with managing the Federal Radiological Emergency Response Program for the USDA.

(7) The Department of Commerce (DOC), through NOAA, provides scientific support for response and contingency planning in coastal and marine areas, including assessments of the hazards that may be involved, predictions of movement and dispersion of oil and hazardous substances through trajectory modeling, and information on the sensitivity of coastal environments to oil and hazardous substances; provides expertise on living marine resources and their habitats, including endangered species, marine mammals and National Marine Sanctuary ecosystems; provides information on actual and predicted meteorological, hydrological, ice, and oceanographic conditions for marine, coastal, and inland waters, and tide and circulation data for coastal and territorial waters and for the Great Lakes.

(8) The Department of Health and Human Services (HHS) is responsible for providing assistance on matters related to the assessment of health hazards at a response, and protection of both response workers and the public's health. HHS is delegated authorities under section 104(b) of CERCLA relating to a determination that illness, disease, or complaints thereof may be attributable to exposure to a hazardous substance, pollutant, or contaminant. HHS programs and services may be carried out through grants, contracts, or cooperative agreements. The basic research programs shall be coordinated with the Superfund research, demonstration, and development program conducted by EPA and DOD through the mechanisms provided for in CERCLA. Agencies within HHS have relevant responsibilities, capabilities, and expertise as follows:

(i) The Agency for Toxic Substances and Disease Registry (ATSDR), under section 104(i) of CERCLA, is required to: Establish appropriate disease/exposure registries; provide medical care and testing of exposed individuals in cases of public health emergencies; develop, maintain, and provide information on health effects of toxic substances; maintain a list of areas restricted or closed because of toxic substances contamination; conduct research to determine relationships between exposure to toxic substances and illness; conduct health assessments at all NPL sites; conduct a health assessment in response to a petition or provide a written explanation why an assessment will not be conducted; together with EPA, identify the most hazardous substances related to CERCLA sites; together with EPA, develop guidelines for toxicological profiles for hazardous substances; develop a toxicological profile for all such substances; and develop educational materials related to health effects of toxic substances for health professionals.

(ii) The National Institutes for Environmental Health Sciences (NIEHS) has been given the responsibilities under section 311(a) of CERCLA, to conduct and support programs of basic research, development, and demonstration; and to establish short course and continuing education programs, and graduate or advanced training. In addition, section 126(g) of SARA authorizes NIEHS to administer grants for training and education of workers who are or may be engaged in activities related to hazardous waste removal, containment, or emergency responses.

(9) The Department of the Interior (DOI) may be contacted through Re-

gional Environmental Officers (REOs), who are the designated members of RRTs. Department land managers have jurisdiction over the national park system, national wildlife refuges and fish hatcheries, the public lands, and certain water projects in western states. In addition, bureaus and offices have relevant expertise as follows:

(i) Fish and Wildlife Service: Anadromous and certain other fishes and wildlife, including endangered and threatened species, migratory birds, and certain marine mammals; waters and wetlands; contaminants affecting habitat resources; and laboratory research facilities.

(ii) Geological Survey: Geology, hydrology (ground water and surface water), and natural hazards.

(iii) Bureau of Land Management: Minerals, soils, vegetation, wildlife, habitat, archaeology, and wilderness; and hazardous materials.

(iv) Minerals Management Service: Manned facilities for Outer Continental Shelf (OCS) oversight.

(v) Bureau of Mines: Analysis and identification of inorganic hazardous substances and technical expertise in metals and metallurgy relevant to site cleanup.

(vi) Office of Surface Mining: Coal mine wastes and land reclamation.

(vii) National Park Service: Biological and general natural resources expert personnel at park units.

(viii) Bureau of Reclamation: Operation and maintenance of water projects in the West; engineering and hydrology; and reservoirs.

(ix) Bureau of Indian Affairs: Coordination of activities affecting Indian lands; assistance in identifying Indian tribal government officials.

(x) Office of Territorial Affairs: Assistance in implementing the NCP in American Samoa, Guam, the Pacific Island Governments, the Northern Mariana Islands, and the Virgin Islands.

(10) The Department of Justice (DOJ) can provide expert advice on complicated legal questions arising from discharges or releases, and federal agency responses. In addition, the DOJ represents the federal government, including its agencies, in litigation relating to such discharges or releases.

(11) The Department of Labor (DOL), through the Occupational Safety and Health Administration (OSHA) and the states operating plans approved under section 18 of the Occupational Safety and Health Act of 1970 (OSH Act), has authority to conduct safety and health inspections of hazardous waste sites to assure that employees are being protected and to determine if the site is in compliance with:

(i) Safety and health standards and regulations promulgated by OSHA (or the states) in accordance with section 126 of SARA and all other applicable standards; and

(ii) Regulations promulgated under the OSH Act and its general duty clause. OSHA inspections may be self-generated, consistent with its program operations and objectives, or may be conducted in response to requests from EPA or another lead agency. OSHA may also conduct inspections in response to accidents or employee complaints. OSHA may also conduct inspections at hazardous waste sites in those states with approved plans that choose not to exercise their jurisdiction to inspect such sites. On request, OSHA will provide advice and assistance to EPA and other NRT/RRT agencies as well as to the OSC/RPM regarding hazards to persons engaged in response activities. Technical assistance may include review of site safety plans and work practices, assistance with exposure monitoring, and help with other compliance questions. OSHA may also take any other action necessary to assure that employees are properly protected at such response activities. Any questions about occupational safety and health at these sites should be referred to the OSHA Regional Office.

(12) The Department of Transportation (DOT) provides response expertise pertaining to transportation of oil or hazardous substances by all modes of transportation. Through the Research and Special Programs Administration (RSPA), DOT offers expertise in the requirements for packaging, handling, and transporting regulated hazardous materials.

(13) The Department of State (DOS) will lead in the development of international joint contingency plans. It will also help to coordinate an international response when discharges or releases cross international boundaries or involve foreign flag vessels. Additionally, DOS will coordinate requests for assistance from foreign governments and U.S. proposals for conducting research at incidents that occur in waters of other countries.

(14) The Nuclear Regulatory Commission will respond, as appropriate, to releases of radioactive materials by its licensees, in accordance with the NRC Incident Response Plan (NUREG-0728) to monitor the actions of those licensees and assure that the public health and environment are protected and adequate recovery operations are instituted. The Nuclear Regulatory Commission will keep EPA informed of any significant actual or potential releases in accordance with procedural agreements. In addition, the Nuclear Regulatory Commission will provide advice to the OSC/RPM when assistance is required in identifying the source and character of other hazardous substance releases where the Nuclear Regulatory Commission has licensing authority for activities utilizing radioactive materials.

(15) The National Response Center (NRC), located at USCG Headquarters, is the national communications center, continuously manned for handling activities related to response actions. The NRC acts as the single federal point of contact for all pollution incident reporting and as the NRT communications center. These response actions include: Oil and hazardous substances, radiological, biological, etiological, surety materials, munitions, and fuels. Notice of discharges must be made telephonically through a toll free number or a special local number (Telecommunication Device for the Deaf (TDD) and collect calls accepted.) The telephone report is distributed to any interested NRT member agency or federal entity that has established a written agreement or understanding with the NRC. Each telephone notice is magnetically voice recorded and manually entered into an on-line computer data base. The NRC tracks medium, major, and potential, major spills and provides incident summaries to all NRT members and other interested parties. The NRC evaluates incoming information and immediately advises FEMA of a potential major disaster or evacuations situation. The NRC provides facilities for the NRT to use in coordinating a national response action, when required; assists in arrangements for regular as well as special NRT meetings and maintains information on the time and place of such meetings; and sends representatives to RRT meetings as appropriate. The NRC is available to assist all NRT agencies as needed.

§ 300.180 State and local participation in response.

(a) Each state governor is requested to designate one state office/representative to represent the state on the appropriate RRT. The state's office/representative may participate fully in all activities of the appropriate RRT. Each state governor is also requested to designate a lead state agency that will direct state-lead response operations. This agency is responsible for designating the OSC/RPM for state-lead response actions, designating SACs for federal-lead response actions, and coordinating/communicating with any other state agencies, as appropriate. Local governments are invited to participate in activities on the appropriate RRT as may be provided by state law or arranged by the state's representative. Indian tribes wishing to participate should assign one person or office to represent the tribal government on the appropriate RRT.

(b) In addition to meeting the requirements for local emergency plans under SARA section 303, state and local government agencies are encouraged to include contingency planning for responses, consistent with the NCP and the RCP, in all emergency and disaster planning.

(c) For facilities not addressed under CERCLA, states are encouraged to undertake response actions themselves or to use their authorities to compel potentially responsible parties to undertake response actions.

(d) States are encouraged to enter into cooperative agreements pursuant to section 104(c)(3) and (d) of CERCLA to enable them to undertake actions authorized under subparts D and E of the NCP. Requirements for entering into these agreements are included in subpart F of the NCP. A state agency that acts pursuant to such agreements is referred to as the lead agency. In the event there is no cooperative agreement, the lead agency can be designated in a SMOA or other agreement.

(e) Because state and local public safety organizations would normally be the first government representatives at the scene of a discharge or release, they are expected to initiate public safety measures that are necessary to protect public health and welfare and that are consistent with containment and cleanup requirements in the NCP, and are responsible for directing evacuations pursuant to existing state or local procedures.

§ 300.185 Nongovernmental participation.

(a) Industry groups, academic organizations, and others are encouraged to commit resources for response operations. Specific commitments should be listed in the RCP and OSC contingency plans.

(b) The technical and scientific information generated by the local community, along with information from federal, state, and local governments, should be used to assist the OSC/RPM in devising response strategies where effective standard techniques are unavailable. The SSC may act as liaison between the OSC/RPM and such interested organizations.

(c) OSC contingency plans shall establish procedures to allow for well organized, worthwhile, and safe use of volunteers, including compliance with § 300.150 regarding worker health and safety. OSC contingency plans should provide for the direction of volunteers by the OSC/RPM or by other federal, state, or local officials knowledgeable in contingency operations and capable of providing leadership. OSC contingency plans also should identify specific areas in which volunteers can be used, such as beach surveillance, logistical support, and bird and wildlife treatment. Unless specifically requested by the OSC/RPM, volunteers generally should not be used for physical removal or remedial activities. If, in the judgment of the OSC/RPM, dangerous conditions exist, volunteers shall be restricted from on-scene operations.

(d) Nongovernmental participation must be in compliance with the requirements of subpart H of this part if any recovery of costs will be sought.

Subpart C—Planning and Preparedness

SOURCE: 55 FR 8835, Mar. 8, 1990, unless otherwise noted.

§ 300.200 General.

This subpart summarizes emergency preparedness activities relating to discharges of oil and releases of hazardous substances, pollutants, or contaminants; describes the federal, state, and local planning structure; provides for three levels of federal contingency plans; and cross-references state and local emergency preparedness activities under SARA Title III, also known as the "Emergency Planning and Community Right-to-Know Act of 1986" but referred to herein as "Title III." Regulations implementing Title III are codified at 40 CFR subchapter J.

§ 300.205 Planning and coordination structure.

(a) *National.* As described in § 300.110, the NRT is responsible for national planning and coordination.

(b) *Regional.* As described in § 300.115, the RRTs are responsible for regional planning and coordination.

(c) *State.* As provided by sections 301 and 303 of SARA, the state emergency response commission (SERC) of each state, appointed by the Governor, is to designate emergency planning districts, appoint local emergency planning committees (LEPCs), supervise and coordinate their activities, and review local emergency response plans, which are described in § 300.215. The SERC also is to establish procedures for receiving and processing requests from the public for information gener-

ated by Title III reporting requirements and to designate an official to serve as coordinator for information.

(d) *Local.* As provided by sections 301 and 303 of SARA, emergency planning districts are designated by the SERC in order to facilitate the preparation and implementation of emergency plans. Each LEPC is to prepare a local emergency response plan for the emergency planning district and establish procedures for receiving and processing requests from the public for information generated by Title III reporting requirements. The LEPC is to appoint a chair and establish rules for the LEPC. The LEPC is to designate an official to serve as coordinator for information.

§ 300.210 Federal contingency plans.

There are three levels of federal contingency plans: The National Contingency Plan, regional contingency plans (RCPs), and OSC contingency plans. These plans are available for inspection at EPA regional offices or USCG district offices. Addresses and telephone numbers for these offices may be found in the United States Government Manual, issued annually, or in local telephone directories.

(a) *The National Contingency Plan.* The purpose and objectives, authority, and scope of the NCP are described in §§ 300.1 through 300.3.

(b) *Regional contingency plans.* The RRTs, working with the states, shall develop federal RCPs for each standard federal region, Alaska, Oceania in the Pacific, and the Caribbean to coordinate timely, effective response by various federal agencies and other organizations to discharges of oil or releases of hazardous substances, pollutants, or contaminants. RCPs shall, as appropriate, include information on all useful facilities and resources in the region, from government, commercial, academic, and other sources. To the greatest extent possible, RCPs shall follow the format of the NCP and coordinate with state emergency response plans, OSC contingency plans, which are described in § 300.210(c), and Title III local emergency response plans, which are described in § 300.215. Such coordination should be accomplished by working with the SERCs in the region covered by the RCP. RCPs shall contain lines of demarcation between the inland and coastal zones, as mutually agreed upon by USCG and EPA.

(c)(1) *OSC contingency plans.* In order to provide for a coordinated, effective federal, state, and local response, each OSC, in consultation with the RRT, may develop an OSC contingency plan for response in the OSC area of responsibility. OSC contingency plans shall be developed in all areas in the coastal zone, because OSCs in the coastal zone have responsibility for discharges and releases offshore, which often exceed the jurisdiction and capabilities of other responders. Boundaries for OSC contingency plans shall coincide with those agreed upon among EPA, USCG, DOE, and DOD, subject to functions and authorities delegated in Executive Order 12580, to determine OSC areas of responsibility and should be clearly indicated in the RCP. Jurisdictional boundaries of local emergency planning districts established by states, described in § 300.205(c), shall, as appropriate, be considered in determining OSC areas of responsibility. OSC areas of responsibility may include several such local emergency planning districts, or parts of such districts. In developing the OSC contingency plan, OSCs shall coordinate with SERCs and LEPCs affected by the OSC area of responsibility.

(2) The OSC contingency plan shall provide for a well-coordinated response that is integrated and compatible with all appropriate response plans of state, local, and other nonfederal entities, and especially with Title III local emergency response plans, described in § 300.215, or in the OSC area of responsibility. The OSC contingency plan shall, as appropriate, identify the probable locations of discharges or releases; the available resources to respond to multi-media incidents; where such resources can be obtained; waste disposal methods and facilities consistent with local and state plans developed under the Solid Waste Disposal Act, 42 U.S.C. 6901 et seq.; and a local structure for responding to discharges or releases.

§ 300.215 Title III local emergency response plans.

This section describes and cross-references the regulations that implement Title III of SARA. These regulations are codified at 40 CFR part 355.

(a) Each LEPC is to prepare an emergency response plan in accordance with section 303 of SARA Title III and review the plan once a year, or more frequently as changed circumstances in the community or at any subject facility may require. Such Title III local emergency response plans should be closely coordinated with applicable federal OSC contingency plans and state emergency response plans.

(b) A facility, as defined in 40 CFR part 355, is subject to emergency planning requirements if an extremely hazardous substance, as defined in 40 CFR part 355, is present at the facility in an amount equal to or in excess of the threshold planning quantity established for such substance. In addition, for the purposes of emergency planning, a Governor or SERC may designate additional facilities that shall be subject to planning requirements, if such designation is made after public notice and opportunity for comment. EPA may revise the list of extremely hazardous substances and threshold planning quantities, taking into account the toxicity, reactivity, volatility, dispersability, combustibility, or flammability of a substance. Facility owners or operators are to name a facility representative who will participate in the planning process as a facility emergency coordinator.

(c) In accordance with section 303 of SARA, each local emergency response plan is to include, but is not limited to, the following:

(1) Identification of facilities subject to Title III emergency planning requirements that are within the emergency planning district; routes likely to be used for the transportation of substances on the list of extremely hazardous substances; and any additional facilities, such as hospitals or natural gas facilities, contributing or subjected to additional risk due to their proximity to facilities subject to Title III emergency planning requirements;

(2) Methods and procedures to be followed by facility owners and operators and local emergency and medical personnel to respond to any release, as defined in 40 CFR part 355, of extremely hazardous substances;

(3) Designation of a community emergency coordinator and a facility emergency coordinator for each facility subject to Title III emergency planning requirements, who will make determinations necessary to implement the emergency response plan;

(4) Procedures providing reliable, effective, and timely notification by the facility emergency coordinators and the community emergency coordinator to persons designated in the emergency response plan, and to the public, that a release has occurred;

(5) Methods for determining the occurrence of a release and the area or population likely to be affected by such a release;

(6) A description of emergency equipment and facilities in the community and at each facility in the community subject to Title III emergency planning requirements, including an identification of the persons responsible for such equipment and facilities;

(7) Evacuation plans, including provisions for precautionary evacuation and alternative traffic routes;

(8) Training programs, including schedules for training of local emergency response and medical personnel; and

(9) Methods and schedules for exercising the emergency response plan.

(d) In accordance with section 303 of SARA, the SERC of each state is to review the emergency response plan developed by the LEPC of each emergency planning district and make recommendations to the LEPC on revisions that may be necessary to ensure coordination of the plan with emergency response plans of other emergency planning districts. RRTs may review a local emergency response plan at the request of the LEPC. This request should be made by the LEPC, through the SERC and the state representative on the RRT.

(e) Title III establishes reporting requirements that provide useful information in developing emergency plans.

(1) Upon request from the LEPC, facility owners or operators shall provide promptly to such LEPC information necessary for developing and implementing the emergency response plan.

(2) Facilities required to prepare or have available a material safety data sheet (MSDS) for a hazardous chemical, as defined in 40 CFR part 370, under the Occupational Safety and Health Act of 1970, 29 U.S.C. 651 et seq., and regulations promulgated under that Act, shall submit a MSDS for each hazardous chemical or a list of hazardous chemicals to the appropriate SERC, LEPC, and local fire department in accordance with 40 CFR part 370.

(3) Facilities subject to the requirements of paragraph (e)(2) of this section shall also submit an inventory form to the SERC, LEPC, and the local fire department, which contains an estimate of the maximum amount of hazardous chemicals present at the facility during the preceding year, an estimate of the average daily amount of hazardous chemicals at the facility, and the location of these hazardous chemicals at the facility, in accordance with 40 CFR part 370.

(4) Certain facilities with 10 or more employees and which manufacture, process, or use a toxic chemical, as defined in 40 CFR part 372, in excess of a statutorily prescribed quantity, shall submit annual information on the chemical and releases of the chemical into the environment to EPA and the state in accordance with 40 CFR part 372.

(f) Immediately after a release of an extremely hazardous substance, or a hazardous substance subject to the notification requirements of CERCLA section 103(a), the owner or operator of a facility, as defined in 40 CFR part 355, shall notify the community emergency coordinator for the appropriate LEPC and the appropriate SERC in accordance with 40 CFR part 355. As soon as practicable after such a release has occurred, the facility owner or operator shall provide a written follow-up emergency notice, or notices, if more information becomes available, setting forth and updating the information contained in the initial release notification and including additional information with respect to response actions taken, health risks associated with the release, and, where appropriate, advice regarding medical attention necessary for exposed individuals. For releases of hazardous substances subject to the notification requirements of CERCLA section 103(a), immediate notification must also be made to the NRC, as provided in § 300.405(b).

(g) Title III requires public access to information submitted pursuant to its reporting requirements. Each emergency response plan, MSDS, inventory form, toxic chemical release form, and follow-up emergency release notification is to be made available to the general public during normal working hours at the location(s) designated by the EPA Administrator, Governor, SERC, or LEPC, as appropriate.

§ 300.220 Related Title III issues.

Other related Title III requirements are found in 40 CFR part 355.

Subpart D—Operational Response Phases for Oil Removal

SOURCE: 55 FR 8837, Mar. 8, 1990, unless otherwise noted

§ 300.300 Phase I—Discovery or notification.

(a) A discharge of oil may be discovered through:

(1) A report submitted by the person in charge of a vessel or facility, in accordance with statutory requirements;

(2) Deliberate search by patrols;

(3) Random or incidental observation by government agencies or the public; or

(4) Other sources.

(b) Any person in charge of a vessel or a facility shall, as soon as he or she has knowledge of any discharge from such vessel or facility in violation of section 311(b)(3) of the Clean Water Act, immediately notify the NRC. If direct reporting to the NRC is not practicable, reports may be made to the USCG or EPA predesignated OSC for the geographic area where the discharge occurs. The EPA predesignated OSC may also be contacted through the regional 24-hour emergency re-

sponse telephone number. All such reports shall be promptly relayed to the NRC. If it is not possible to notify the NRC or predesignated OSC immediately, reports may be made immediately to the nearest Coast Guard unit. In any event such person in charge of the vessel or facility shall notify the NRC as soon as possible.

(c) Any other person shall, as appropriate, notify the NRC of a discharge of oil.

(d) Upon receipt of a notification of discharge, the NRC shall promptly notify the OSC. The OSC shall proceed with the following phases as outlined in the RCP and OSC contingency plan.

§ 300.305 Phase II—Preliminary assessment and initiation of action.

(a) The OSC is responsible for promptly initiating a preliminary assessment.

(b) The preliminary assessment shall be conducted using available information, supplemented where necessary and possible by an on-scene inspection. The OSC shall undertake actions to:

(1) Evaluate the magnitude and severity of the discharge or threat to public health or welfare or the environment;

(2) Assess the feasibility of removal;

(3) To the extent practicable, identify potentially responsible parties; and

(4) Ensure that authority exists for undertaking additional response actions.

(c) The OSC, in consultation with legal authorities when appropriate, shall make a reasonable effort to have the discharger voluntarily and promptly perform removal actions. The OSC shall ensure adequate surveillance over whatever actions are initiated. If effective actions are not being taken to eliminate the threat, or if removal is not being properly done, the OSC shall, to the extent practicable under the circumstances, so advise the responsible party. If the responsible party does not take proper removal actions, or is unknown, or is otherwise unavailable, the OSC shall, pursuant to section 311(c)(1) of the CWA, determine whether authority for a federal response exists, and, if so, take appropriate response actions. Where practicable, continuing efforts should be made to encourage response by responsible parties.

(d) If natural resources are or may be injured by the discharge, the OSC shall ensure that state and federal trustees of affected natural resources are promptly notified in order that the trustees may initiate appropriate actions, including those identified in subpart G. The OSC shall seek to coordinate assessments, evaluations, investigations, and planning with state and federal trustees.

§ 300.310 Phase III—Containment, countermeasures, cleanup, and disposal.

(a) Defensive actions shall begin as soon as possible to prevent, minimize, or mitigate threat(s) to public health or welfare or the environment. Actions may include but are not limited to: Analyzing water samples to determine the source and spread of the oil; controlling the source of discharge; measuring and sampling; source and spread control or salvage operations; placement of physical barriers to deter the spread of the oil and to protect natural resources; control of the water discharged from upstream impoundment; and the use of chemicals and other materials in accordance with subpart J of this part to restrain the spread of the oil and mitigate its effects.

(b) As appropriate, actions shall be taken to recover the oil or mitigate its effects. Of the numerous chemical or physical methods that may be used, the chosen methods shall be the most consistent with protecting public health and welfare and the environment. Sinking agents shall not be used.

(c) Oil and contaminated materials recovered in cleanup operations shall be disposed of in accordance with the RCP and OSC contingency plan and any applicable laws, regulations, or requirements.

§ 300.315 Phase IV—Documentation and cost recovery.

(a) Documentation shall be collected and maintained to support all actions taken under the CWA and to form the basis for cost recovery. Whenever practicable, documentation shall be

sufficient to prove the source and circumstances of the incident, the responsible party or parties, and impact and potential impacts to public health and welfare and the environment. When appropriate, documentation shall also be collected for scientific understanding of the environment and for the research and development of improved response methods and technology. Damages to private citizens, including loss of earnings, are not addressed by the NCP. Evidentiary and cost documentation procedures are specified in the USCG Marine Safety Manual (Commandant Instruction M16000.11) and further provisions are contained in 33 CFR part 153.

(b) OSCs shall submit OSC reports to the RRT as required by § 300.165.

(c) OSCs shall ensure the necessary collection and safeguarding of information, samples, and reports. Samples and information shall be gathered expeditiously during the response to ensure an accurate record of the impacts incurred. Documentation materials shall be made available to the trustees of affected natural resources. The OSC shall make available to trustees of the affected natural resources information and documentation that can assist the trustees in the determination of actual or potential natural resource injuries.

(d) Information and reports obtained by the EPA or USCG OSC shall be transmitted to the appropriate offices responsible for follow-up actions.

§ 300.320 General pattern of response.

(a) When the OSC receives a report of a discharge, actions normally should be taken in the following sequence:

(1) When the reported discharge is an actual or potential major discharge, immediately notify the RRT, including the affected state, if appropriate, and the NRC.

(2) Investigate the report to determine pertinent information such as the threat posed to public health or welfare or the environment, the type and quantity of polluting material, and the source of the discharge.

(3) Officially classify the size of the discharge and determine the course of action to be followed.

(4) Determine whether a discharger or other person is properly carrying out removal. Removal is being done properly when:

(i) The cleanup is fully sufficient to minimize or mitigate threat(s) to public health and welfare and the environment. Removal efforts are improper to the extent that federal efforts are necessary to minimize further or mitigate those threats; and

(ii) The removal efforts are in accordance with applicable regulations, including the NCP.

(5) Determine whether a state or political subdivision thereof has the capability to carry out response actions and whether a contract or cooperative agreement has been established with the appropriate fund administrator for this purpose.

(6) Notify the trustees of affected natural resources in accordance with the applicable RCP.

(b) The preliminary inquiry will probably show that the situation falls into one of four categories. These categories and the appropriate response to each are outlined below:

(1) If the investigation shows that no discharge occurred, or it shows a minor discharge with no removal action required, the case may be closed for response purposes.

(2) If the investigation shows a minor discharge with the responsible party taking proper removal action, contact shall be established with the party. The removal action shall, whenever possible, be monitored to ensure continued proper action.

(3) If the investigation shows a minor discharge with improper removal action being taken, the following measures shall be taken:

(i) An immediate effort shall, as appropriate, be made to stop further pollution and remove past and ongoing contamination.

(ii) The responsible party shall be advised of what action will be considered appropriate.

(iii) If the responsible party does not properly respond, the party shall be notified of potential liability for federal response performed under the CWA. This liability includes all costs of removal and may include the costs of assessing and restoring, rehabilitat-

ing, replacing, or acquiring the equivalent of damaged natural resources, and other actual or necessary costs of a federal response.

(iv) The OSC shall notify appropriate state and local officials, keep the RRT advised, and initiate Phase III operations, as described in § 300.310, as conditions warrant.

(v) Information shall be collected for possible recovery of response costs in accordance with § 300.315.

(4) When the investigation shows that an actual or potential medium or major oil discharge exists, the OSC shall follow the same general procedures as for a minor discharge. If appropriate, the OSC shall recommend activation of the RRT.

§ 300.330 Wildlife conservation.

The Department of the Interior, Department of Commerce, and state representatives to the RRT shall arrange for the coordination of professional and volunteer groups permitted and trained to participate in wildlife dispersal, collection, cleaning, rehabilitation, and recovery activities, consistent with 16 U.S.C. 703-712 and applicable state laws. The RCP and OSC contingency plans shall, to the extent practicable, identify organizations or institutions that are permitted to participate in such activities and operate such facilities. Wildlife conservation activities will normally be included in Phase III response actions, described in § 300.310.

§ 300.335 Funding.

(a) If the person responsible for the discharge does not act promptly or take proper removal actions, or if the person responsible for the discharge is unknown, federal discharge removal actions may begin under section 311(c)(1) of the CWA. The discharger, if known, is liable for costs of federal removal in accordance with section 311(f) of the CWA and other federal laws.

(b) Actions undertaken by the participating agencies in response to pollution shall be carried out under existing programs and authorities when available. Federal agencies will make resources available, expend funds, or participate in response to oil discharges under their existing authority. Authority to expend resources will be in accordance with agencies' basic statutes and, if required, through interagency agreements. Where the OSC requests assistance from a federal agency, that agency may be reimbursed in accordance with the provisions of 33 CFR 153.407. Specific interagency reimbursement agreements may be signed when necessary to ensure that the federal resources will be available for a timely response to a discharge of oil. The ultimate decisions as to the appropriateness of expending funds rest with the agency that is held accountable for such expenditures.

(c) The OSC shall exercise sufficient control over removal operations to be able to certify that reimbursement from the following funds is appropriate:

(1) The oil pollution fund, administered by the Commandant, USCG, that has been established pursuant to section 311(k) of the CWA or any other spill response fund established by Congress. Regulations governing the administration and use of the section 311(k) fund are contained in 33 CFR part 153.

(2) The fund authorized by the Deepwater Port Act is administered by the Commandant, USCG. Governing regulations are contained in 33 CFR part 137.

(3) The fund authorized by the Outer Continental Shelf Lands Act, as amended, is administered by the Commandant, USCG. Governing regulations are contained in 33 CFR parts 135 and 136.

(4) The fund authorized by the Trans-Alaska Pipeline Authorization Act is administered by a Board of Trustees under the purview of the Secretary of the Interior. Governing regulations are contained in 43 CFR part 29.

(d) Response actions other than removal, such as scientific investigations not in support of removal actions or law enforcement, shall be provided by the agency with legal responsibility for those specific actions.

(e) The funding of a response to a discharge from a federally operated or supervised facility or vessel is the re-

sponsibility of the operating or supervising agency.

(f) The following agencies have funds available for certain discharge removal actions:

(1) EPA may provide funds to begin timely discharge removal actions when the OSC is an EPA representative.

(2) The USCG pollution control efforts are funded under "operating expenses." These funds are used in accordance with agency directives.

(3) The Department of Defense has two specific sources of funds that may be applicable to an oil discharge under appropriate circumstances. This does not consider military resources that might be made available under specific conditions.

(i) Funds required for removal of a sunken vessel or similar obstruction of navigation are available to the Corps of Engineers through Civil Works Appropriations, Operations and Maintenance, General.

(ii) The U.S. Navy may conduct salvage operations contingent on defense operational commitments, when funded by the requesting agency. Such funding may be requested on a direct cite basis.

(4) Pursuant to section 311(c)(2)(H) of the CWA, the state or states affected by a discharge of oil may act where necessary to remove such discharge and may, pursuant to 33 CFR part 153, be reimbursed from the oil pollution fund for the reasonable costs incurred in such a removal.

(i) Removal by a state is necessary within the meaning of section 311(c)(2)(H) of the CWA when the OSC determines that the owner or operator of the vessel, onshore facility, or offshore facility from which the discharge occurs does not effect removal properly, or is unknown, and that:

(A) State action is required to minimize or mitigate significant threat(s) to the public health or welfare or the environment that federal action cannot minimize or mitigate; or

(B) Removal or partial removal can be done by the state at a cost that is less than or not significantly greater than the cost that would be incurred by the federal agencies.

(ii) State removal actions must be in compliance with the NCP in order to qualify for reimbursement.

(iii) State removal actions are considered to be Phase III actions, described in § 300.310, under the same definitions applicable to federal agencies.

(iv) Actions taken by local governments in support of federal discharge removal operations are considered to be actions of the state for purposes of this section. The RCP and OSC contingency plan shall show what funds and resources are available from participating agencies under various conditions and cost arrangements. Interagency agreements may be necessary to specify when reimbursement is required.

Subpart E—Hazardous Substance Response

SOURCE: 55 FR 8839, Mar. 8, 1990, unless otherwise noted.

§ 300.400 General.

(a) This subpart establishes methods and criteria for determining the appropriate extent of response authorized by CERCLA:

(1) When there is a release of a hazardous substance into the environment; or

(2) When there is a release into the environment of any pollutant or contaminant that may present an imminent and substantial danger to the public health or welfare.

(b) *Limitations on response.* Unless the lead agency determines that a release constitutes a public health or environmental emergency and no other person with the authority and capability to respond will do so in a timely manner, a removal or remedial action under section 104 of CERCLA shall not be undertaken in response to a release:

(1) Of a naturally occurring substance in its unaltered form, or altered solely through naturally occurring processes or phenomena, from a location where it is naturally found;

(2) From products that are part of the structure of, and result in expo-

sure within, residential buildings or business or community structures; or

(3) Into public or private drinking water supplies due to deterioration of the system through ordinary use.

(c) *Fund-financed action.* In determining the need for and in planning or undertaking Fund-financed action, the lead agency shall, to the extent practicable:

(1) Engage in prompt response;

(2) Provide for state participation in response actions, as described in subpart F of this part;

(3) Conserve Fund monies by encouraging private party response;

(4) Be sensitive to local community concerns;

(5) Consider using treatment technologies;

(6) Involve the Regional Response Team (RRT) in both removal and remedial response actions at appropriate decision-making stages;

(7) Encourage the involvement and sharing of technology by industry and other experts; and

(8) Encourage the involvement of organizations to coordinate responsible party actions, foster site response, and provide technical advice to the public, federal and state governments, and industry.

(d) *Entry and access.* (1) For purposes of determining the need for response, or choosing or taking a response action, or otherwise enforcing the provisions of CERCLA, EPA, or the appropriate federal agency, and a state or political subdivision operating pursuant to a contract or cooperative agreement under CERCLA section 104(d)(1), has the authority to enter any vessel, facility, establishment or other place, property, or location described in paragraph (d)(2) of this section and conduct, complete, operate, and maintain any response actions authorized by CERCLA or these regulations.

(2)(i) Under the authorities described in paragraph (d)(1) of this section, EPA, or the appropriate federal agency, and a state or political subdivision operating pursuant to a contract or cooperative agreement under CERCLA section 104(d)(1), may enter:

(A) Any vessel, facility, establishment, or other place or property where any hazardous substance or pollutant or contaminant may be or has been generated, stored, treated, disposed of, or transported from;

(B) Any vessel, facility, establishment, or other place or property from which, or to which, a hazardous substance or pollutant or contaminant has been, or may have been, released or where such release is or may be threatened;

(C) Any vessel, facility, establishment, or other place or property where entry is necessary to determine the need for response or the appropriate response or to effectuate a response action; or

(D) Any vessel, facility, establishment, or other place, property, or location adjacent to those vessels, facilities, establishments, places, or properties described in paragraphs (d)(2)(i)(A), (B), or (C) of this section.

(ii) Once a determination has been made that there is a reasonable basis to believe that there has been or may be a release, EPA, or the appropriate federal agency, and a state or political subdivision operating pursuant to a contract or cooperative agreement under CERCLA section 104(d)(1), is authorized to enter all vessels, facilities, establishments, places, properties, or locations specified in paragraph (d)(2)(i) of this section, at which the release is believed to be, and all other vessels, facilities, establishments, places, properties, or locations identified in paragraph (d)(2)(i) of this section that are related to the response or are necessary to enter in responding to that release.

(3) The lead agency may designate as its representative solely for the purpose of access, among others, one or more potentially responsible parties, including representatives, employees, agents, and contractors of such parties. EPA, or the appropriate federal agency, may exercise the authority contained in section 104(e) of CERCLA to obtain access for its designated representative. A potentially responsible party may only be designated as a representative of the lead agency where that potentially responsible party has agreed to conduct response activities pursuant to an administrative order or consent decree.

(4)(i) If consent is not granted under the authorities described in paragraph (d)(1) of this section, or if consent is conditioned in any manner, EPA, or the appropriate federal agency, may issue an order pursuant to section 104(e)(5) of CERCLA directing compliance with the request for access made under § 300.400(d)(1). EPA or the appropriate federal agency may ask the Attorney General to commence a civil action to compel compliance with either a request for access or an order directing compliance.

(ii) EPA reserves the right to proceed, where appropriate, under applicable authority other than CERCLA section 104(e).

(iii) The administrative order may direct compliance with a request to enter or inspect any vessel, facility, establishment, place, property, or location described in paragraph (d)(2) of this section.

(iv) Each order shall contain:

(A) A determination by EPA, or the appropriate federal agency, that it is reasonable to believe that there may be or has been a release or threat of a release of a hazardous substance or pollutant or contaminant and a statement of the facts upon which the determination is based;

(B) A description, in light of CERCLA response authorities, of the purpose and estimated scope and duration of the entry, including a description of the specific anticipated activities to be conducted pursuant to the order;

(C) A provision advising the person who failed to consent that an officer or employee of the agency that issued the order will be available to confer with respondent prior to effective date of the order; and

(D) A provision advising the person who failed to consent that a court may impose a penalty of up to $25,000 per day for unreasonable failure to comply with the order.

(v) Orders shall be served upon the person or responsible party who failed to consent prior to their effective date. Force shall not be used to compel compliance with an order.

(vi) Orders may not be issued for any criminal investigations.

(e) *Permit requirements.* (1) No federal, state, or local permits are required for on-site response actions conducted pursuant to CERCLA sections 104, 106, 120, 121, or 122. The term *on-site* means the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action.

(2) Permits, if required, shall be obtained for all response activities conducted off-site.

(f) *Health assessments.* Health assessments shall be performed by ATSDR at facilities on or proposed to be listed on the NPL and may be performed at other releases or facilities in response to petitions made to ATSDR. Where available, these health assessments may be used by the lead agency to assist in determining whether response actions should be taken and/or to identify the need for additional studies to assist in the assessment of potential human health effects associated with releases or potential releases of hazardous substances.

(g) *Identification of applicable or relevant and appropriate requirements.* (1) The lead and support agencies shall identify requirements applicable to the release or remedial action contemplated based upon an objective determination of whether the requirement specifically addresses a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site.

(2) If, based upon paragraph (g)(1) of this section, it is determined that a requirement is not applicable to a specific release, the requirement may still be relevant and appropriate to the circumstances of the release. In evaluating relevance and appropriateness, the factors in paragraphs (g)(2)(i) through (viii) of this section shall be examined, where pertinent, to determine whether a requirement addresses problems or situations sufficiently similar to the circumstances of the release or remedial action contemplated, and whether the requirement is well-suited to the site, and therefore is both relevant and appropriate. The pertinence of each of the following factors will depend, in part, on whether a requirement addresses a chemical, location, or

action. The following comparisons shall be made, where pertinent, to determine relevance and appropriateness:

(i) The purpose of the requirement and the purpose of the CERCLA action;

(ii) The medium regulated or affected by the requirement and the medium contaminated or affected at the CERCLA site;

(iii) The substances regulated by the requirement and the substances found at the CERCLA site;

(iv) The actions or activities regulated by the requirement and the remedial action contemplated at the CERCLA site;

(v) Any variances, waivers, or exemptions of the requirement and their availability for the circumstances at the CERCLA site;

(vi) The type of place regulated and the type of place affected by the release or CERCLA action;

(vii) The type and size of structure or facility regulated and the type and size of structure or facility affected by the release or contemplated by the CERCLA action;

(viii) Any consideration of use or potential use of affected resources in the requirement and the use or potential use of the affected resource at the CERCLA site.

(3) In addition to applicable or relevant and appropriate requirements, the lead and support agencies may, as appropriate, identify other advisories, criteria, or guidance to be considered for a particular release. The "to be considered" (TBC) category consists of advisories, criteria, or guidance that were developed by EPA, other federal agencies, or states that may be useful in developing CERCLA remedies.

(4) Only those state standards that are promulgated, are identified by the state in a timely manner, and are more stringent than federal requirements may be applicable or relevant and appropriate. For purposes of identification and notification of promulgated state standards, the term *promulgated* means that the standards are of general applicability and are legally enforceable.

(5) The lead agency and support agency shall identify their specific requirements that are applicable or relevant and appropriate for a particular site. These agencies shall notify each other, in a timely manner as described in § 300.515(d), of the requirements they have determined to be applicable or relevant and appropriate. When identifying a requirement as an ARAR, the lead agency and support agency shall include a citation to the statute or regulation from which the requirement is derived.

(6) Notification of ARARs shall be according to procedures and timeframes specified in § 300.515 (d)(2) and (h)(2).

(h) *Oversight.* The lead agency may provide oversight for actions taken by potentially responsible parties to ensure that a response is conducted consistent with this part. The lead agency may also monitor the actions of third parties preauthorized under subpart H of this part. EPA will provide oversight when the response is pursuant to an EPA order or federal consent decree.

(i) *Other.* (1) This subpart does not establish any preconditions to enforcement action by either the federal or state governments to compel response actions by potentially responsible parties.

(2) While much of this subpart is oriented toward federally funded response actions, this subpart may be used as guidance concerning methods and criteria for response actions by other parties under other funding mechanisms. Except as provided in subpart H of this part, nothing in this part is intended to limit the rights of any person to seek recovery of response costs from responsible parties pursuant to CERCLA section 107.

(3) Activities by the federal and state governments in implementing this subpart are discretionary governmental functions. This subpart does not create in any private party a right to federal response or enforcement action. This subpart does not create any duty of the federal government to take any response action at any particular time.

§ 300.405 Discovery or notification.

(a) A release may be discovered through:

(1) A report submitted in accordance with section 103(a) of CERCLA, i.e., reportable quantities codified at 40 CFR part 302;

(2) A report submitted to EPA in accordance with section 103(c) of CERCLA;

(3) Investigation by government authorities conducted in accordance with section 104(e) of CERCLA or other statutory authority;

(4) Notification of a release by a federal or state permit holder when required by its permit;

(5) Inventory or survey efforts or random or incidental observation reported by government agencies or the public;

(6) Submission of a citizen petition to EPA or the appropriate federal facility requesting a preliminary assessment, in accordance with section 105(d) of CERCLA; and

(7) Other sources.

(b) Any person in charge of a vessel or a facility shall report releases as described in paragraph (a)(1) of this section to the National Response Center (NRC). If direct reporting to the NRC is not practicable, reports may be made to the United States Coast Guard (USCG) on-scene coordinator (OSC) for the geographic area where the release occurs. The EPA predesignated OSC may also be contacted through the regional 24-hour emergency response telephone number. All such reports shall be promptly relayed to the NRC. If it is not possible to notify the NRC or predesignated OSC immediately, reports may be made immediately to the nearest USCG unit. In any event, such person in charge of the vessel or facility shall notify the NRC as soon as possible.

(c) All other reports of releases described under paragraph (a) of this section, except releases reported under paragraphs (a) (2) and (6) of this section, shall, as appropriate, be made to the NRC.

(d) The NRC will generally need information that will help to characterize the release. This will include, but not be limited to: Location of the release; type(s) of material(s) released; an estimate of the quantity of material released; possible source of the release; and date and time of the release. Reporting under paragraphs (b) and (c) of this section shall not be delayed due to incomplete notification information.

(e) Upon receipt of a notification of a release, the NRC shall promptly notify the appropriate OSC. The OSC shall notify the Governor, or designee, of the state affected by the release.

(f)(1) When the OSC is notified of a release that may require response pursuant to § 300.415(b), a removal site evaluation shall, as appropriate, be promptly undertaken pursuant to § 300.410.

(2) When notification indicates that removal action pursuant to § 300.415(b) is not required, a remedial site evaluation shall, if appropriate, be undertaken by the lead agency pursuant to § 300.420, if one has not already been performed.

(3) If radioactive substances are present in a release, the EPA Radiological Response Coordinator should be notified for evaluation and assistance, consistent with §§ 300.130(f) and 300.145(f).

(g) Release notification made to the NRC under this section does not relieve the owner/operator of a facility from any obligations to which it is subject under SARA Title III or state law. In particular, it does not relieve the owner/operator from the requirements of section 304 of SARA Title III and 40 CFR part 355 and § 300.215(f) of this part for notifying the community emergency coordinator for the appropriate local emergency planning committee of all affected areas and the state emergency response commission of any state affected that there has been a release. Federal agencies are not legally obligated to comply with the requirements of Title III of SARA.

§ 300.410 Removal site evaluation.

(a) A removal site evaluation includes a removal preliminary assessment and, if warranted, a removal site inspection.

(b) A removal site evaluation of a release identified for possible CERCLA

response pursuant to § 300.415 shall, as appropriate, be undertaken by the lead agency as promptly as possible. The lead agency may perform a removal preliminary assessment in response to petitions submitted by a person who is, or may be, affected by a release of a hazardous substance, pollutant, or contaminant pursuant to § 300.420(b)(5).

(c)(1) The lead agency shall, as appropriate, base the removal preliminary assessment on readily available information. A removal preliminary assessment may include, but is not limited to:

(i) Identification of the source and nature of the release or threat of release;

(ii) Evaluation by ATSDR or by other sources, for example, state public health agencies, of the threat to public health;

(iii) Evaluation of the magnitude of the threat;

(iv) Evaluation of factors necessary to make the determination of whether a removal is necessary; and

(v) Determination of whether a non-federal party is undertaking proper response.

(2) A removal preliminary assessment of releases from hazardous waste management facilities may include collection or review of data such as site management practices, information from generators, photographs, analysis of historical photographs, literature searches, and personal interviews conducted, as appropriate.

(d) A removal site inspection may be performed if more information is needed. Such inspection may include a perimeter (i.e., off-site) or on-site inspection, taking into consideration whether such inspection can be performed safely.

(e) A removal site evaluation shall be terminated when the OSC or lead agency determines:

(1) There is no release;

(2) The source is neither a vessel nor a facility as defined in § 300.5 of the NCP;

(3) The release involves neither a hazardous substance, nor a pollutant or contaminant that may present an imminent and substantial danger to public health or welfare;

(4) The release consists of a situation specified in § 300.400(b)(1) through (3) subject to limitations on response;

(5) The amount, quantity, or concentration released does not warrant federal response;

(6) A party responsible for the release, or any other person, is providing appropriate response, and on-scene monitoring by the government is not required; or

(7) The removal site evaluation is completed.

(f) The results of the removal site evaluation shall be documented.

(g) If natural resources are or may be injured by the release, the OSC or lead agency shall ensure that state and federal trustees of the affected natural resources are promptly notified in order that the trustees may initiate appropriate actions, including those identified in subpart G of this part. The OSC or lead agency shall seek to coordinate necessary assessments, evaluations, investigations, and planning with such state and federal trustees.

(h) If the removal site evaluation indicates that removal action under § 300.415 is not required, but that remedial action under § 300.430 may be necessary, the lead agency shall, as appropriate, initiate a remedial site evaluation pursuant to § 300.420.

§ 300.415 Removal action.

(a)(1) In determining the appropriate extent of action to be taken in response to a given release, the lead agency shall first review the removal site evaluation, any information produced through a remedial site evaluation, if any has been done previously, and the current site conditions, to determine if removal action is appropriate.

(2) Where the responsible parties are known, an effort initially shall be made, to the extent practicable, to determine whether they can and will perform the necessary removal action promptly and properly.

(3) This section does not apply to removal actions taken pursuant to section 104(b) of CERCLA. The criteria

for such actions are set forth in section 104(b) of CERCLA.

(b)(1) At any release, regardless of whether the site is included on the National Priorities List, where the lead agency makes the determination, based on the factors in paragraph (b)(2) of this section, that there is a threat to public health or welfare or the environment, the lead agency may take any appropriate removal action to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or the threat of release.

(2) The following factors shall be considered in determining the appropriateness of a removal action pursuant to this section:

(i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;

(ii) Actual or potential contamination of drinking water supplies or sensitive ecosystems;

(iii) Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release;

(iv) High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;

(v) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;

(vi) Threat of fire or explosion;

(vii) The availability of other appropriate federal or state response mechanisms to respond to the release; and

(viii) Other situations or factors that may pose threats to public health or welfare or the environment.

(3) If the lead agency determines that a removal action is appropriate, actions shall, as appropriate, begin as soon as possible to abate, prevent, minimize, stabilize, mitigate, or eliminate the threat to public health or welfare or the environment. The lead agency shall, at the earliest possible time, also make any necessary determinations pursuant to paragraph (b)(4) of this section.

(4) Whenever a planning period of at least six months exists before on-site activities must be initiated, and the lead agency determines, based on a site evaluation, that a removal action is appropriate:

(i) The lead agency shall conduct an engineering evaluation/cost analysis (EE/CA) or its equivalent. The EE/CA is an analysis of removal alternatives for a site.

(ii) If environmental samples are to be collected, the lead agency shall develop sampling and analysis plans that shall provide a process for obtaining data of sufficient quality and quantity to satisfy data needs. Sampling and analysis plans shall be reviewed and approved by EPA. The sampling and analysis plans shall consist of two parts:

(A) The field sampling plan, which describes the number, type, and location of samples and the type of analyses; and

(B) The quality assurance project plan, which describes policy, organization, and functional activities and the data quality objectives and measures necessary to achieve adequate data for use in planning and documenting the removal action.

(5) Fund-financed removal actions, other than those authorized under section 104(b) of CERCLA, shall be terminated after $2 million has been obligated for the action or 12 months have elapsed from the date that removal activities begin on-site, unless the lead agency determines that:

(i) There is an immediate risk to public health or welfare or the environment; continued response actions are immediately required to prevent, limit, or mitigate an emergency; and such assistance will not otherwise be provided on a timely basis; or

(ii) Continued response action is otherwise appropriate and consistent with the remedial action to be taken.

(c) Removal actions shall, to the extent practicable, contribute to the efficient performance of any anticipated long-term remedial action with respect to the release concerned.

(d) The following removal actions are, as a general rule, appropriate in the types of situations shown; however, this list is not exhaustive and is not intended to prevent the lead agency from taking any other actions deemed necessary under CERCLA or other ap-

propriate federal or state enforcement or response authorities, and the list does not create a duty on the lead agency to take action at any particular time:

(1) Fences, warning signs, or other security or site control precautions—where humans or animals have access to the release;

(2) Drainage controls, for example, run-off or run-on diversion—where needed to reduce migration of hazardous substances or pollutants or contaminants off-site or to prevent precipitation or run-off from other sources, for example, flooding, from entering the release area from other areas;

(3) Stabilization of berms, dikes, or impoundments or drainage or closing of lagoons—where needed to maintain the integrity of the structures;

(4) Capping of contaminated soils or sludges—where needed to reduce migration of hazardous substances or pollutants or contaminants into soil, ground or surface water, or air;

(5) Using chemicals and other materials to retard the spread of the release or to mitigate its effects—where the use of such chemicals will reduce the spread of the release;

(6) Excavation, consolidation, or removal of highly contaminated soils from drainage or other areas—where such actions will reduce the spread of, or direct contact with, the contamination;

(7) Removal of drums, barrels, tanks, or other bulk containers that contain or may contain hazardous substances or pollutants or contaminants—where it will reduce the likelihood of spillage; leakage; exposure to humans, animals, or food chain; or fire or explosion;

(8) Containment, treatment, disposal, or incineration of hazardous materials—where needed to reduce the likelihood of human, animal, or food chain exposure; or

(9) Provision of alternative water supply—where necessary immediately to reduce exposure to contaminated household water and continuing until such time as local authorities can satisfy the need for a permanent remedy.

(e) Where necessary to protect public health or welfare, the lead agency shall request that FEMA conduct a temporary relocation or that state/local officials conduct an evacuation.

(f) If the lead agency determines that the removal action will not fully address the threat posed by the release and the release may require remedial action, the lead agency shall ensure an orderly transition from removal to remedial response activities.

(g) Removal actions conducted by states under cooperative agreements, described in subpart F of this part, shall comply with all requirements of this section.

(h) Facilities operated by a state or political subdivision at the time of disposal require a state cost share of at least 50 percent of Fund-financed response costs if a Fund-financed remedial action is conducted.

(i) Fund-financed removal actions under CERCLA section 104 and removal actions pursuant to CERCLA section 106 shall, to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws. Waivers described in § 300.430(f)(1)(ii)(C) may be used for removal actions. Other federal and state advisories, criteria, or guidance may, as appropriate, be considered in formulating the removal action (see § 300.400(g)(3)). In determining whether compliance with ARARs is practicable, the lead agency may consider appropriate factors, including:

(1) The urgency of the situation; and

(2) The scope of the removal action to be conducted.

(j) Removal actions pursuant to section 106 or 122 of CERCLA are not subject to the following requirements of this section:

(1) Section 300.415(a)(2) requirement to locate responsible parties and have them undertake the response;

(2) Section 300.415(b)(2)(vii) requirement to consider the availability of other appropriate federal or state response and enforcement mechanisms to respond to the release;

(3) Section 300.415(b)(5) requirement to terminate response after $2 million has been obligated or 12

months have elapsed from the date of the initial response; and

(4) Section 300.415(f) requirement to assure an orderly transition from removal to remedial action.

(k) To the extent practicable, provision for post-removal site control following a Fund-financed removal action at both NPL and non-NPL sites is encouraged to be made prior to the initiation of the removal action. Such post-removal site control includes actions necessary to ensure the effectiveness and integrity of the removal action after the completion of the on-site removal action or after the $2 million or 12-month statutory limits are reached for sites that do not meet the exemption criteria in paragraph (b)(5) of this section. Post-removal site control may be conducted by:

(1) The affected state or political subdivision thereof or local units of government for any removal;

(2) Potentially responsible parties; or

(3) EPA's remedial program for some federal-lead Fund-financed responses at NPL sites.

(l) OSCs/RPMs conducting removal actions shall submit OSC reports to the RRT as required by § 300.165.

(m) *Community relations in removal actions.* (1) In the case of all removal actions taken pursuant to § 300.415 or CERCLA enforcement actions to compel removal response, a spokesperson shall be designated by the lead agency. The spokesperson shall inform the community of actions taken, respond to inquiries, and provide information concerning the release. All news releases or statements made by participating agencies shall be coordinated with the OSC/RPM. The spokesperson shall notify, at a minimum, immediately affected citizens, state and local officials, and, when appropriate, civil defense or emergency management agencies.

(2) For actions where, based on the site evaluation, the lead agency determines that a removal is appropriate, and that less than six months exists before on-site removal activity must begin, the lead agency shall:

(i) Publish a notice of availability of the administrative record file established pursuant to § 300.820 in a major local newspaper of general circulation within 60 days of initiation of on-site removal activity;

(ii) Provide a public comment period, as appropriate, of not less than 30 days from the time the administrative record file is made available for public inspection, pursuant to § 300.820(b)(2); and

(iii) Prepare a written response to significant comments pursuant to § 300.820(b)(3).

(3) For removal actions where on-site action is expected to extend beyond 120 days from the initiation of on-site removal activities, the lead agency shall by the end of the 120-day period:

(i) Conduct interviews with local officials, community residents, public interest groups, or other interested or affected parties, as appropriate, to solicit their concerns, information needs, and how or when citizens would like to be involved in the Superfund process;

(ii) Prepare a formal community relations plan (CRP) based on the community interviews and other relevant information, specifying the community relations activities that the lead agency expects to undertake during the response; and

(iii) Establish at least one local information repository at or near the location of the response action. The information repository should contain items made available for public information. Further, an administrative record file established pursuant to subpart I for all removal actions shall be available for public inspection in at least one of the repositories. The lead agency shall inform the public of the establishment of the information repository and provide notice of availability of the administrative record file for public review. All items in the repository shall be available for public inspection and copying.

(4) Where, based on the site evaluation, the lead agency determines that a removal action is appropriate and that a planning period of at least six months exists prior to initiation of the on-site removal activities, the lead agency shall at a minimum:

(i) Comply with the requirements set forth in paragraphs (m)(3)(i), (ii), and (iii) of this section, prior to the com-

pletion of the engineering evaluation/cost analysis (EE/CA), or its equivalent, except that the information repository and the administrative record file will be established no later than when the EE/CA approval memorandum is signed;

(ii) Publish a notice of availability and brief description of the EE/CA in a major local newspaper of general circulation pursuant to § 300.820;

(iii) Provide a reasonable opportunity, not less than 30 calendar days, for submission of written and oral comments after completion of the EE/CA pursuant to § 300.820(a). Upon timely request, the lead agency will extend the public comment period by a minimum of 15 days; and

(iv) Prepare a written response to significant comments pursuant to § 300.820(a).

§ 300.420 Remedial site evaluation.

(a) *General.* The purpose of this section is to describe the methods, procedures, and criteria the lead agency shall use to collect data, as required, and evaluate releases of hazardous substances, pollutants, or contaminants. The evaluation may consist of two steps: a remedial preliminary assessment (PA) and a remedial site inspection (SI).

(b) *Remedial preliminary assessment.* (1) The lead agency shall perform a remedial PA on all sites in CERCLIS as defined in § 300.5 to:

(i) Eliminate from further consideration those sites that pose no threat to public health or the environment;

(ii) Determine if there is any potential need for removal action;

(iii) Set priorities for site inspections; and

(iv) Gather existing data to facilitate later evaluation of the release pursuant to the Hazard Ranking System (HRS) if warranted.

(2) A remedial PA shall consist of a review of existing information about a release such as information on the pathways of exposure, exposure targets, and source and nature of release. A remedial PA shall also include an off-site reconnaissance as appropriate. A remedial PA may include an on-site reconnaissance where appropriate.

(3) If the remedial PA indicates that a removal action may be warranted, the lead agency shall initiate removal evaluation pursuant to § 300.410.

(4) In performing a remedial PA, the lead agency may complete the EPA Preliminary Assessment form, available from EPA regional offices, or its equivalent, and shall prepare a PA report, which shall include:

(i) A description of the release;

(ii) A description of the probable nature of the release; and

(iii) A recommendation on whether further action is warranted, which lead agency should conduct further action, and whether an SI or removal action or both should be undertaken.

(5) Any person may petition the lead federal agency (EPA or the appropriate federal agency in the case of a release or suspected release from a federal facility), to perform a PA of a release when such person is, or may be, affected by a release of a hazardous substance, pollutant, or contaminant. Such petitions shall be addressed to the EPA Regional Administrator for the region in which the release is located, except that petitions for PAs involving federal facilities should be addressed to the head of the appropriate federal agency.

(i) Petitions shall be signed by the petitioner and shall contain the following:

(A) The full name, address, and phone number of petitioner;

(B) A description, as precisely as possible, of the location of the release; and

(C) How the petitioner is or may be affected by the release.

(ii) Petitions should also contain the following information to the extent available:

(A) What type of substances were or may be released;

(B) The nature of activities that have occurred where the release is located; and

(C) Whether local and state authorities have been contacted about the release.

(iii) The lead federal agency shall complete a remedial or removal PA within one year of the date of receipt of a complete petition pursuant to paragraph (b)(5) of this section, if one

has not been performed previously, unless the lead federal agency determines that a PA is not appropriate. Where such a determination is made, the lead federal agency shall notify the petitioner and will provide a reason for the determination.

(iv) When determining if performance of a PA is appropriate, the lead federal agency shall take into consideration:

(A) Whether there is information indicating that a release has occurred or there is a threat of a release of a hazardous substance, pollutant, or contaminant; and

(B) Whether the release is eligible for response under CERCLA.

(c) *Remedial site inspection.* (1) The lead agency shall perform a remedial SI as appropriate to:

(i) Eliminate from further consideration those releases that pose no significant threat to public health or the environment;

(ii) Determine the potential need for removal action;

(iii) Collect or develop additional data, as appropriate, to evaluate the release pursuant to the HRS; and

(iv) Collect data in addition to that required to score the release pursuant to the HRS, as appropriate, to better characterize the release for more effective and rapid initiation of the RI/FS or response under other authorities.

(2) The remedial SI shall build upon the information collected in the remedial PA. The remedial SI shall involve, as appropriate, both on- and off-site field investigatory efforts, and sampling.

(3) If the remedial SI indicates that removal action may be appropriate, the lead agency shall initiate removal site evaluation pursuant to § 300.410.

(4) Prior to conducting field sampling as part of site inspections, the lead agency shall develop sampling and analysis plans that shall provide a process for obtaining data of sufficient quality and quantity to satisfy data needs. The sampling and analysis plans shall consist of two parts:

(i) The field sampling plan, which describes the number, type, and location of samples, and the type of analyses, and

(ii) The quality assurance project plan (QAPP), which describes policy, organization, and functional activities, and the data quality objectives and measures necessary to achieve adequate data for use in site evaluation and hazard ranking system activities.

(5) Upon completion of a remedial SI, the lead agency shall prepare a report that includes the following:

(i) A description/history/nature of waste handling;

(ii) A description of known contaminants;

(iii) A description of pathways of migration of contaminants;

(iv) An identification and description of human and environmental targets; and

(v) A recommendation on whether further action is warranted.

§ 300.425 Establishing remedial priorities.

(a) *General.* The purpose of this section is to identify the criteria as well as the methods and procedures EPA uses to establish its priorities for remedial actions.

(b) *National Priorities List.* The NPL is the list of priority releases for long-term remedial evaluation and response.

(1) Only those releases included on the NPL shall be considered eligible for Fund-financed remedial action. Removal actions (including remedial planning activities, RI/FSs, and other actions taken pursuant to CERCLA section 104(b)) are not limited to NPL sites.

(2) Inclusion of a release on the NPL does not imply that monies will be expended, nor does the rank of a release on the NPL establish the precise priorities for the allocation of Fund resources. EPA may also pursue other appropriate authorities to remedy the release, including enforcement actions under CERCLA and other laws. A site's rank on the NPL serves, along with other factors, including enforcement actions, as a basis to guide the allocation of Fund resources among releases.

(3) Federal facilities that meet the criteria identified in paragraph (c) of this section are eligible for inclusion on the NPL. Except as provided by

CERCLA sections 111(e)(3) and 111(c), federal facilities are not eligible for Fund-financed remedial actions.

(4) Inclusion on the NPL is not a precondition to action by the lead agency under CERCLA sections 106 or 122 or to action under CERCLA section 107 for recovery of non-Fund-financed costs or Fund-financed costs other than Fund-financed remedial construction costs.

(c) *Methods for determining eligibility for NPL.* A release may be included on the NPL if the release meets one of the following criteria:

(1) The release scores sufficiently high pursuant to the Hazard Ranking System described in Appendix A to this part.

(2) A state (not including Indian tribes) has designated a release as its highest priority. States may make only one such designation; or

(3) The release satisfies all of the following criteria:

(i) The Agency for Toxic Substances and Disease Registry has issued a health advisory that recommends dissociation of individuals from the release;

(ii) EPA determines that the release poses a significant threat to public health; and

(iii) EPA anticipates that it will be more cost-effective to use its remedial authority than to use removal authority to respond to the release.

(d) *Procedures for placing sites on the NPL.* Lead agencies may submit candidates to EPA by scoring the release using the HRS and providing the appropriate backup documentation.

(1) Lead agencies may submit HRS scoring packages to EPA anytime throughout the year.

(2) EPA shall review lead agencies' HRS scoring packages and revise them as appropriate. EPA shall develop any additional HRS scoring packages on releases known to EPA.

(3) EPA shall compile the NPL based on the methods identified in paragraph (c) of this section.

(4) EPA shall update the NPL at least once a year.

(5) To ensure public involvement during the proposal to add a release to the NPL, EPA shall:

(i) Publish the proposed rule in the FEDERAL REGISTER and solicit comments through a public comment period; and

(ii) Publish the final rule in the FEDERAL REGISTER, and make available a response to each significant comment and any significant new data submitted during the comment period.

(6) Releases may be categorized on the NPL when deemed appropriate by EPA.

(e) *Deletion from the NPL.* Releases may be deleted from or recategorized on the NPL where no further response is appropriate.

(1) EPA shall consult with the state on proposed deletions from the NPL prior to developing the notice of intent to delete. In making a determination to delete a release from the NPL, EPA shall consider, in consultation with the state, whether any of the following criteria has been met:

(i) Responsible parties or other persons have implemented all appropriate response actions required;

(ii) All appropriate Fund-financed response under CERCLA has been implemented, and no further response action by responsible parties is appropriate; or

(iii) The remedial investigation has shown that the release poses no significant threat to public health or the environment and, therefore, taking of remedial measures is not appropriate.

(2) Releases shall not be deleted from the NPL until the state in which the release was located has concurred on the proposed deletion. EPA shall provide the state 30 working days for review of the deletion notice prior to its publication in the FEDERAL REGISTER.

(3) All releases deleted from the NPL are eligible for further Fund-financed remedial actions should future conditions warrant such action. Whenever there is a significant release from a site deleted from the NPL, the site shall be restored to the NPL without application of the HRS.

(4) To ensure public involvement during the proposal to delete a release from the NPL, EPA shall:

(i) Publish a notice of intent to delete in the FEDERAL REGISTER and solicit comment through a public com-

ment period of a minimum of 30 calendar days;

(ii) In a major local newspaper of general circulation at or near the release that is proposed for deletion, publish a notice of availability of the notice of intent to delete;

(iii) Place copies of information supporting the proposed deletion in the information repository, described in § 300.430(c)(2)(iii), at or near the release proposed for deletion. These items shall be available for public inspection and copying; and

(iv) Respond to each significant comment and any significant new data submitted during the comment period and include this response document in the final deletion package.

(5) EPA shall place the final deletion package in the local information repository once the notice of final deletion has been published in the FEDERAL REGISTER.

§ 300.430 Remedial investigation/feasibility study and selection of remedy.

(a) *General*—(1) *Introduction.* The purpose of the remedy selection process is to implement remedies that eliminate, reduce, or control risks to human health and the environment. Remedial actions are to be implemented as soon as site data and information make it possible to do so. Accordingly, EPA has established the following program goal, expectations, and program management principles to assist in the identification and implementation of appropriate remedial actions.

(i) *Program goal.* The national goal of the remedy selection process is to select remedies that are protective of human health and the environment, that maintain protection over time, and that minimize untreated waste.

(ii) *Program management principles.* EPA generally shall consider the following general principles of program management during the remedial process:

(A) Sites should generally be remediated in operable units when early actions are necessary or appropriate to achieve significant risk reduction quickly, when phased analysis and response is necessary or appropriate given the size or complexity of the site, or to expedite the completion of total site cleanup.

(B) Operable units, including interim action operable units, should not be inconsistent with nor preclude implementation of the expected final remedy.

(C) Site-specific data needs, the evaluation of alternatives, and the documentation of the selected remedy should reflect the scope and complexity of the site problems being addressed.

(iii) *Expectations.* EPA generally shall consider the following expectations in developing appropriate remedial alternatives:

(A) EPA expects to use treatment to address the principal threats posed by a site, wherever practicable. Principal threats for which treatment is most likely to be appropriate include liquids, areas contaminated with high concentrations of toxic compounds, and highly mobile materials.

(B) EPA expects to use engineering controls, such as containment, for waste that poses a relatively low long-term threat or where treatment is impracticable.

(C) EPA expects to use a combination of methods, as appropriate, to achieve protection of human health and the environment. In appropriate site situations, treatment of the principal threats posed by a site, with priority placed on treating waste that is liquid, highly toxic or highly mobile, will be combined with engineering controls (such as containment) and institutional controls, as appropriate, for treatment residuals and untreated waste.

(D) EPA expects to use institutional controls such as water use and deed restrictions to supplement engineering controls as appropriate for short- and long-term management to prevent or limit exposure to hazardous substances, pollutants, or contaminants. Institutional controls may be used during the conduct of the remedial investigation/feasibility study (RI/FS) and implementation of the remedial action and, where necessary, as a component of the completed remedy. The use of institutional controls shall not substitute for active response measures (e.g., treatment and/or contain-

ment of source material, restoration of ground waters to their beneficial uses) as the sole remedy unless such active measures are determined not to be practicable, based on the balancing of trade-offs among alternatives that is conducted during the selection of remedy.

(E) EPA expects to consider using innovative technology when such technology offers the potential for comparable or superior treatment performance or implementability, fewer or lesser adverse impacts than other available approaches, or lower costs for similar levels of performance than demonstrated technologies.

(F) EPA expects to return usable ground waters to their beneficial uses wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site. When restoration of ground water to beneficial uses is not practicable, EPA expects to prevent further migration of the plume, prevent exposure to the contaminated ground water, and evaluate further risk reduction.

(2) *Remedial investigation/feasibility study.* The purpose of the remedial investigation/feasibility study (RI/FS) is to assess site conditions and evaluate alternatives to the extent necessary to select a remedy. Developing and conducting an RI/FS generally includes the following activities: project scoping, data collection, risk assessment, treatability studies, and analysis of alternatives. The scope and timing of these activities should be tailored to the nature and complexity of the problem and the response alternatives being considered.

(b) *Scoping.* In implementing this section, the lead agency should consider the program goal, program management principles, and expectations contained in this rule. The investigative and analytical studies should be tailored to site circumstances so that the scope and detail of the analysis is appropriate to the complexity of site problems being addressed. During scoping, the lead and support agencies shall confer to identify the optimal set and sequence of actions necessary to address site problems. Specifically, the lead agency shall:

(1) Assemble and evaluate existing data on the site, including the results of any removal actions, remedial preliminary assessment and site inspections, and the NPL listing process.

(2) Develop a conceptual understanding of the site based on the evaluation of existing data described in paragraph (b)(1) of this section.

(3) Identify likely response scenarios and potentially applicable technologies and operable units that may address site problems.

(4) Undertake limited data collection efforts or studies where this information will assist in scoping the RI/FS or accelerate response actions, and begin to identify the need for treatability studies, as appropriate.

(5) Identify the type, quality, and quantity of the data that will be collected during the RI/FS to support decisions regarding remedial response activities.

(6) Prepare site-specific health and safety plans that shall specify, at a minimum, employee training and protective equipment, medical surveillance requirements, standard operating procedures, and a contingency plan that conforms with 29 CFR 1910.120 (l)(1) and (l)(2).

(7) If natural resources are or may be injured by the release, ensure that state and federal trustees of the affected natural resources have been notified in order that the trustees may initiate appropriate actions, including those identified in subpart G of this part. The lead agency shall seek to coordinate necessary assessments, evaluations, investigations, and planning with such state and federal trustees.

(8) Develop sampling and analysis plans that shall provide a process for obtaining data of sufficient quality and quantity to satisfy data needs. Sampling and analysis plans shall be reviewed and approved by EPA. The sampling and analysis plans shall consist of two parts:

(i) The field sampling plan, which describes the number, type, and location of samples and the type of analyses; and

(ii) The quality assurance project plan, which describes policy, organization, and functional activities and the data quality objectives and measures

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necessary to achieve adequate data for use in selecting the appropriate remedy.

(9) Initiate the identification of potential federal and state ARARs and, as appropriate, other criteria, advisories, or guidance to be considered.

(c) *Community relations.* (1) The community relations requirements described in this section apply to all remedial activities undertaken pursuant to CERCLA section 104 and to section 106 or section 122 consent orders or decrees, or section 106 administrative orders.

(2) The lead agency shall provide for the conduct of the following community relations activities, to the extent practicable, prior to commencing field work for the remedial investigation:

(i) Conducting interviews with local officials, community residents, public interest groups, or other interested or affected parties, as appropriate, to solicit their concerns and information needs, and to learn how and when citizens would like to be involved in the Superfund process.

(ii) Preparing a formal community relations plan (CRP), based on the community interviews and other relevant information, specifying the community relations activities that the lead agency expects to undertake during the remedial response. The purpose of the CRP is to:

(A) Ensure the public appropriate opportunities for involvement in a wide variety of site-related decisions, including site analysis and characterization, alternatives analysis, and selection of remedy;

(B) Determine, based on community interviews, appropriate activities to ensure such public involvement, and

(C) Provide appropriate opportunities for the community to learn about the site.

(iii) Establishing at least one local information repository at or near the location of the response action. Each information repository should contain a copy of items made available to the public, including information that describes the technical assistance grants application process. The lead agency shall inform interested parties of the establishment of the information repository.

(iv) Informing the community of the availability of technical assistance grants.

(3) For PRP actions, the lead agency shall plan and implement the community relations program at a site. PRPs may participate in aspects of the community relations program at the discretion of and with oversight by the lead agency.

(4) The lead agency may conduct technical discussions involving PRPs and the public. These technical discussions may be held separately from, but contemporaneously with, the negotiations/settlement discussions.

(5) In addition, the following provisions specifically apply to enforcement actions:

(i) Lead agencies entering into an enforcement agreement with de minimis parties under CERCLA section 122(g) or cost recovery settlements under section 122(h) shall publish a notice of the proposed agreement in the FEDERAL REGISTER at least 30 days before the agreement becomes final, as required by section 122(i). The notice must identify the name of the facility and the parties to the proposed agreement and must allow an opportunity for comment and consideration of comments; and

(ii) Where the enforcement agreement is embodied in a consent decree, public notice and opportunity for public comment shall be provided in accordance with 28 CFR 50.7.

(d) *Remedial investigation.* (1) The purpose of the remedial investigation (RI) is to collect data necessary to adequately characterize the site for the purpose of developing and evaluating effective remedial alternatives. To characterize the site, the lead agency shall, as appropriate, conduct field investigations, including treatability studies, and conduct a baseline risk assessment. The RI provides information to assess the risks to human health and the environment and to support the development, evaluation, and selection of appropriate response alternatives. Site characterization may be conducted in one or more phases to focus sampling efforts and increase the efficiency of the investigation. Because estimates of actual or potential exposures and associated impacts on

human and environmental receptors may be refined throughout the phases of the RI as new information is obtained, site characterization activities should be fully integrated with the development and evaluation of alternatives in the feasibility study. Bench- or pilot-scale treatability studies shall be conducted, when appropriate and practicable, to provide additional data for the detailed analysis and to support engineering design of remedial alternatives.

(2) The lead agency shall characterize the nature of and threat posed by the hazardous substances and hazardous materials and gather data necessary to assess the extent to which the release poses a threat to human health or the environment or to support the analysis and design of potential response actions by conducting, as appropriate, field investigations to assess the following factors:

(i) Physical characteristics of the site, including important surface features, soils, geology, hydrogeology, meteorology, and ecology;

(ii) Characteristics or classifications of air, surface water, and ground water;

(iii) The general characteristics of the waste, including quantities, state, concentration, toxicity, propensity to bioaccumulate, persistence, and mobility;

(iv) The extent to which the source can be adequately identified and characterized;

(v) Actual and potential exposure pathways through environmental media;

(vi) Actual and potential exposure routes, for example, inhalation and ingestion; and

(vii) Other factors, such as sensitive populations, that pertain to the characterization of the site or support the analysis of potential remedial action alternatives.

(3) The lead and support agency shall identify their respective potential ARARs related to the location of and contaminants at the site in a timely manner. The lead and support agencies may also, as appropriate, identify other pertinent advisories, criteria, or guidance in a timely manner (see § 300.400(g)(3)).

(4) Using the data developed under paragraphs (d) (1) and (2) of this section, the lead agency shall conduct a site-specific baseline risk assessment to characterize the current and potential threats to human health and the environment that may be posed by contaminants migrating to ground water or surface water, releasing to air, leaching through soil, remaining in the soil, and bioaccumulating in the food chain. The results of the baseline risk assessment will help establish acceptable exposure levels for use in developing remedial alternatives in the FS, as described in paragraph (e) of this section.

(e) *Feasibility study.* (1) The primary objective of the feasibility study (FS) is to ensure that appropriate remedial alternatives are developed and evaluated such that relevant information concerning the remedial action options can be presented to a decision-maker and an appropriate remedy selected. The lead agency may develop a feasibility study to address a specific site problem or the entire site. The development and evaluation of alternatives shall reflect the scope and complexity of the remedial action under consideration and the site problems being addressed. Development of alternatives shall be fully integrated with the site characterization activities of the remedial investigation described in paragraph (d) of this section. The lead agency shall include an alternatives screening step, when needed, to select a reasonable number of alternatives for detailed analysis.

(2) Alternatives shall be developed that protect human health and the environment by recycling waste or by eliminating, reducing, and/or controlling risks posed through each pathway by a site. The number and type of alternatives to be analyzed shall be determined at each site, taking into account the scope, characteristics, and complexity of the site problem that is being addressed. In developing and, as appropriate, screening the alternatives, the lead agency shall:

(i) Establish remedial action objectives specifying contaminants and media of concern, potential exposure pathways, and remediation goals. Initially, preliminary remediation goals

are developed based on readily available information, such as chemical-specific ARARs or other reliable information. Preliminary remediation goals should be modified, as necessary, as more information becomes available during the RI/FS. Final remediation goals will be determined when the remedy is selected. Remediation goals shall establish acceptable exposure levels that are protective of human health and the environment and shall be developed by considering the following:

(A) Applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws, if available, and the following factors:

(*1*) For systemic toxicants, acceptable exposure levels shall represent concentration levels to which the human population, including sensitive subgroups, may be exposed without adverse effect during a lifetime or part of a lifetime, incorporating an adequate margin of safety;

(*2*) For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6} using information on the relationship between dose and response. The 10^{-6} risk level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure;

(*3*) Factors related to technical limitations such as detection/quantification limits for contaminants;

(*4*) Factors related to uncertainty; and

(*5*) Other pertinent information.

(B) Maximum contaminant level goals (MCLGs), established under the Safe Drinking Water Act, that are set at levels above zero, shall be attained by remedial actions for ground or surface waters that are current or potential sources of drinking water, where the MCLGs are relevant and appropriate under the circumstances of the release based on the factors in § 300.400(g)(2). If an MCLG is determined not to be relevant and appropriate, the corresponding maximum contaminant level (MCL) shall be attained where relevant and appropriate to the circumstances of the release.

(C) Where the MCLG for a contaminant has been set at a level of zero, the MCL promulgated for that contaminant under the Safe Drinking Water Act shall be attained by remedial actions for ground or surface waters that are current or potential sources of drinking water, where the MCL is relevant and appropriate under the circumstances of the release based on the factors in § 300.400(g)(2).

(D) In cases involving multiple contaminants or pathways where attainment of chemical-specific ARARs will result in cumulative risk in excess of 10^{-4}, criteria in paragraph (e)(2)(i)(A) of this section may also be considered when determining the cleanup level to be attained.

(E) Water quality criteria established under sections 303 or 304 of the Clean Water Act shall be attained where relevant and appropriate under the circumstances of the release.

(F) An alternate concentration limit (ACL) may be established in accordance with CERCLA section 121(d)(2)(B)(ii).

(G) Environmental evaluations shall be performed to assess threats to the environment, especially sensitive habitats and critical habitats of species protected under the Endangered Species Act.

(ii) Identify and evaluate potentially suitable technologies, including innovative technologies;

(iii) Assemble suitable technologies into alternative remedial actions.

(3) For source control actions, the lead agency shall develop, as appropriate:

(i) A range of alternatives in which treatment that reduces the toxicity, mobility, or volume of the hazardous substances, pollutants, or contaminants is a principal element. As appropriate, this range shall include an alternative that removes or destroys hazardous substances, pollutants, or contaminants to the maximum extent feasible, eliminating or minimizing, to the degree possible, the need for long-term management. The lead agency

also shall develop, as appropriate, other alternatives which, at a minimum, treat the principal threats posed by the site but vary in the degree of treatment employed and the quantities and characteristics of the treatment residuals and untreated waste that must be managed; and

(ii) One or more alternatives that involve little or no treatment, but provide protection of human health and the environment primarily by preventing or controlling exposure to hazardous substances, pollutants, or contaminants, through engineering controls, for example, containment, and, as necessary, institutional controls to protect human health and the environment and to assure continued effectiveness of the response action.

(4) For ground-water response actions, the lead agency shall develop a limited number of remedial alternatives that attain site-specific remediation levels within different restoration time periods utilizing one or more different technologies.

(5) The lead agency shall develop one or more innovative treatment technologies for further consideration if those technologies offer the potential for comparable or superior performance or implementability; fewer or lesser adverse impacts than other available approaches; or lower costs for similar levels of performance than demonstrated treatment technologies.

(6) The no-action alternative, which may be no further action if some removal or remedial action has already occurred at the site, shall be developed.

(7) As appropriate, and to the extent sufficient information is available, the short- and long-term aspects of the following three criteria shall be used to guide the development and screening of remedial alternatives:

(i) *Effectiveness.* This criterion focuses on the degree to which an alternative reduces toxicity, mobility, or volume through treatment, minimizes residual risks and affords long-term protection, complies with ARARs, minimizes short-term impacts, and how quickly it achieves protection. Alternatives providing significantly less effectiveness than other, more promising alternatives may be eliminated. Alternatives that do not provide adequate protection of human health and the environment shall be eliminated from further consideration.

(ii) *Implementability.* This criterion focuses on the technical feasibility and availability of the technologies each alternative would employ and the administrative feasibility of implementing the alternative. Alternatives that are technically or administratively infeasible or that would require equipment, specialists, or facilities that are not available within a reasonable period of time may be eliminated from further consideration.

(iii) *Cost.* The costs of construction and any long-term costs to operate and maintain the alternatives shall be considered. Costs that are grossly excessive compared to the overall effectiveness of alternatives may be considered as one of several factors used to eliminate alternatives. Alternatives providing effectiveness and implementability similar to that of another alternative by employing a similar method of treatment or engineering control, but at greater cost, may be eliminated.

(8) The lead agency shall notify the support agency of the alternatives that will be evaluated in detail to facilitate the identification of ARARs and, as appropriate, pertinent advisories, criteria, or guidance to be considered.

(9) *Detailed analysis of alternatives.* (i) A detailed analysis shall be conducted on the limited number of alternatives that represent viable approaches to remedial action after evaluation in the screening stage. The lead and support agencies must identify their ARARs related to specific actions in a timely manner and no later than the early stages of the comparative analysis. The lead and support agencies may also, as appropriate, identify other pertinent advisories, criteria, or guidance in a timely manner.

(ii) The detailed analysis consists of an assessment of individual alternatives against each of nine evaluation criteria and a comparative analysis that focuses upon the relative performance of each alternative against those criteria.

(iii) *Nine criteria for evaluation.* The analysis of alternatives under review shall reflect the scope and complexity of site problems and alternatives being evaluated and consider the relative significance of the factors within each criteria. The nine evaluation criteria are as follows:

(A) *Overall protection of human health and the environment.* Alternatives shall be assessed to determine whether they can adequately protect human health and the environment, in both the short- and long-term, from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site by eliminating, reducing, or controlling exposures to levels established during development of remediation goals consistent with § 300.430(e)(2)(i). Overall protection of human health and the environment draws on the assessments of other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs.

(B) *Compliance with ARARs.* The alternatives shall be assessed to determine whether they attain applicable or relevant and appropriate requirements under federal environmental laws and state environmental or facility siting laws or provide grounds for invoking one of the waivers under paragraph (f)(1)(ii)(C) of this section.

(C) *Long-term effectiveness and permanence.* Alternatives shall be assessed for the long-term effectiveness and permanence they afford, along with the degree of certainty that the alternative will prove successful. Factors that shall be considered, as appropriate, include the following:

(*1*) Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities. The characteristics of the residuals should be considered to the degree that they remain hazardous, taking into account their volume, toxicity, mobility, and propensity to bioaccumulate.

(*2*) Adequacy and reliability of controls such as containment systems and institutional controls that are necessary to manage treatment residuals and untreated waste. This factor addresses in particular the uncertainties associated with land disposal for providing long-term protection from residuals; the assessment of the potential need to replace technical components of the alternative, such as a cap, a slurry wall, or a treatment system; and the potential exposure pathways and risks posed should the remedial action need replacement.

(D) *Reduction of toxicity, mobility, or volume through treatment.* The degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume shall be assessed, including how treatment is used to address the principal threats posed by the site. Factors that shall be considered, as appropriate, include the following:

(*1*) The treatment or recycling processes the alternatives employ and materials they will treat;

(*2*) The amount of hazardous substances, pollutants, or contaminants that will be destroyed, treated, or recycled;

(*3*) The degree of expected reduction in toxicity, mobility, or volume of the waste due to treatment or recycling and the specification of which reduction(s) are occurring;

(*4*) The degree to which the treatment is irreversible;

(*5*) The type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate of such hazardous substances and their constituents; and

(*6*) The degree to which treatment reduces the inherent hazards posed by principal threats at the site.

(E) *Short-term effectiveness.* The short-term impacts of alternatives shall be assessed considering the following:

(*1*) Short-term risks that might be posed to the community during implementation of an alternative;

(*2*) Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures;

(*3*) Potential environmental impacts of the remedial action and the effectiveness and reliability of mitigative measures during implementation; and

(*4*) Time until protection is achieved.

(F) *Implementability.* The ease or difficulty of implementing the alternatives shall be assessed by considering the following types of factors as appropriate:

(*1*) Technical feasibility, including technical difficulties and unknowns associated with the construction and operation of a technology, the reliability of the technology, ease of undertaking additional remedial actions, and the ability to monitor the effectiveness of the remedy.

(*2*) Administrative feasibility, including activities needed to coordinate with other offices and agencies and the ability and time required to obtain any necessary approvals and permits from other agencies (for off-site actions);

(*3*) Availability of services and materials, including the availability of adequate off-site treatment, storage capacity, and disposal capacity and services; the availability of necessary equipment and specialists, and provisions to ensure any necessary additional resources; the availability of services and materials; and availability of prospective technologies.

(G) *Cost.* The types of costs that shall be assessed include the following:

(*1*) Capital costs, including both direct and indirect costs;

(*2*) Annual operation and maintenance costs; and

(*3*) Net present value of capital and O&M costs.

(H) *State acceptance.* Assessment of state concerns may not be completed until comments on the RI/FS are received but may be discussed, to the extent possible, in the proposed plan issued for public comment. The state concerns that shall be assessed include the following:

(*1*) The state's position and key concerns related to the preferred alternative and other alternatives; and

(*2*) State comments on ARARs or the proposed use of waivers.

(I) *Community acceptance.* This assessment includes determining which components of the alternatives interested persons in the community support, have reservations about, or oppose. This assessment may not be completed until comments on the proposed plan are received.

(f) *Selection of remedy*—(1) Remedies selected shall reflect the scope and purpose of the actions being undertaken and how the action relates to long-term, comprehensive response at the site.

(i) The criteria noted in paragraph (e)(9)(iii) of this section are used to select a remedy. These criteria are categorized into three groups.

(A) *Threshold criteria.* Overall protection of human health and the environment and compliance with ARARs (unless a specific ARAR is waived) are threshold requirements that each alternative must meet in order to be eligible for selection.

(B) *Primary balancing criteria.* The five primary balancing criteria are long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost.

(C) *Modifying criteria.* State and community acceptance are modifying criteria that shall be considered in remedy selection.

(ii) The selection of a remedial action is a two-step process and shall proceed in accordance with § 300.515(e). First, the lead agency, in conjunction with the support agency, identifies a preferred alternative and presents it to the public in a proposed plan, for review and comment. Second, the lead agency shall review the public comments and consult with the state (or support agency) in order to determine if the alternative remains the most appropriate remedial action for the site or site problem. The lead agency, as specified in § 300.515(e), makes the final remedy selection decision, which shall be documented in the ROD. Each remedial alternative selected as a Superfund remedy will employ the criteria as indicated in paragraph (f)(1)(i) of this section to make the following determination:

(A) Each remedial action selected shall be protective of human health and the environment.

(B) On-site remedial actions selected in a ROD must attain those ARARs that are identified at the time of ROD signature or provide grounds for invoking a waiver under § 300.430(f)(1)(ii)(C).

(*1*) Requirements that are promulgated or modified after ROD signature must be attained (or waived) only when determined to be applicable or relevant and appropriate and necessary to ensure that the remedy is protective of human health and the environment.

(*2*) Components of the remedy not described in the ROD must attain (or waive) requirements that are identified as applicable or relevant and appropriate at the time the amendment to the ROD or the explanation of significant difference describing the component is signed.

(C) An alternative that does not meet an ARAR under federal environmental or state environmental or facility siting laws may be selected under the following circumstances:

(*1*) The alternative is an interim measure and will become part of a total remedial action that will attain the applicable or relevant and appropriate federal or state requirement;

(*2*) Compliance with the requirement will result in greater risk to human health and the environment than other alternatives;

(*3*) Compliance with the requirement is technically impracticable from an engineering perspective;

(*4*) The alternative will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, or limitation through use of another method or approach;

(*5*) With respect to a state requirement, the state has not consistently applied, or demonstrated the intention to consistently apply, the promulgated requirement in similar circumstances at other remedial actions within the state; or

(*6*) For Fund-financed response actions only, an alternative that attains the ARAR will not provide a balance between the need for protection of human health and the environment at the site and the availability of Fund monies to respond to other sites that may present a threat to human health and the environment.

(D) Each remedial action selected shall be cost-effective, provided that it first satisfies the threshold criteria set forth in § 300.430(f)(1)(ii) (A) and (B). Cost-effectiveness is determined by evaluating the following three of the five balancing criteria noted in § 300.430(f)(1)(i)(B) to determine overall effectiveness: long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, and short-term effectiveness. Overall effectiveness is then compared to cost to ensure that the remedy is cost-effective. A remedy shall be cost-effective if its costs are proportional to its overall effectiveness.

(E) Each remedial action shall utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. This requirement shall be fulfilled by selecting the alternative that satisfies paragraph (f)(1)(ii) (A) and (B) of this section and provides the best balance of trade-offs among alternatives in terms of the five primary balancing criteria noted in paragraph (f)(1)(i)(B) of this section. The balancing shall emphasize long-term effectiveness and reduction of toxicity, mobility, or volume through treatment. The balancing shall also consider the preference for treatment as a principal element and the bias against off-site land disposal of untreated waste. In making the determination under this paragraph, the modifying criteria of state acceptance and community acceptance described in paragraph (f)(1)(i)(C) of this section shall also be considered.

(2) *The proposed plan.* In the first step in the remedy selection process, the lead agency shall identify the alternative that best meets the requirements in § 300.430(f)(1), above, and shall present that alternative to the public in a proposed plan. The lead agency, in conjunction with the support agency and consistent with § 300.515(e), shall prepare a proposed plan that briefly describes the remedial alternatives analyzed by the lead agency, proposes a preferred remedial action alternative, and summarizes the information relied upon to select the preferred alternative. The selection of remedy process for an operable unit may be initiated at any time during the remedial action process. The purpose of the proposed plan is to supple-

ment the RI/FS and provide the public with a reasonable opportunity to comment on the preferred alternative for remedial action, as well as alternative plans under consideration, and to participate in the selection of remedial action at a site. At a minimum, the proposed plan shall:

(i) Provide a brief summary description of the remedial alternatives evaluated in the detailed analysis established under paragraph (e)(9) of this section;

(ii) Identify and provide a discussion of the rationale that supports the preferred alternative;

(iii) Provide a summary of any formal comments received from the support agency; and

(iv) Provide a summary explanation of any proposed waiver identified under paragraph (f)(1)(ii)(C) of this section from an ARAR.

(3) *Community relations to support the selection of remedy.* (i) The lead agency, after preparation of the proposed plan and review by the support agency, shall conduct the following activities:

(A) Publish a notice of availability and brief analysis of the proposed plan in a major local newspaper of general circulation;

(B) Make the proposed plan and supporting analysis and information available in the administrative record required under subpart I of this part;

(C) Provide a reasonable opportunity, not less than 30 calendar days, for submission of written and oral comments on the proposed plan and the supporting analysis and information located in the information repository, including the RI/FS. Upon timely request, the lead agency will extend the public comment period by a minimum of 30 additional days;

(D) Provide the opportunity for a public meeting to be held during the public comment period at or near the site at issue regarding the proposed plan and the supporting analysis and information;

(E) Keep a transcript of the public meeting held during the public comment period pursuant to CERCLA section 117(a) and make such transcript available to the public; and

(F) Prepare a written summary of significant comments, criticisms, and new relevant information submitted during the public comment period and the lead agency response to each issue. This responsiveness summary shall be made available with the record of decision.

(ii) After publication of the proposed plan and prior to adoption of the selected remedy in the record of decision, if new information is made available that significantly changes the basic features of the remedy with respect to scope, performance, or cost, such that the remedy significantly differs from the original proposal in the proposed plan and the supporting analysis and information, the lead agency shall:

(A) Include a discussion in the record of decision of the significant changes and reasons for such changes, if the lead agency determines such changes could be reasonably anticipated by the public based on the alternatives and other information available in the proposed plan or the supporting analysis and information in the administrative record; or

(B) Seek additional public comment on a revised proposed plan, when the lead agency determines the change could not have been reasonably anticipated by the public based on the information available in the proposed plan or the supporting analysis and information in the administrative record. The lead agency shall, prior to adoption of the selected remedy in the ROD, issue a revised proposed plan, which shall include a discussion of the significant changes and the reasons for such changes, in accordance with the public participation requirements described in paragraph (f)(3)(i) of this section.

(4) *Final remedy selection.* (i) In the second and final step in the remedy selection process, the lead agency shall reassess its initial determination that the preferred alternative provides the best balance of trade-offs, now factoring in any new information or points of view expressed by the state (or support agency) and community during the public comment period. The lead agency shall consider state (or support agency) and community comments re-

garding the lead agency's evaluation of alternatives with respect to the other criteria. These comments may prompt the lead agency to modify aspects of the preferred alternative or decide that another alternative provides a more appropriate balance. The lead agency, as specified in § 300.515(e), shall make the final remedy selection decision and document that decision in the ROD.

(ii) If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after initiation of the selected remedial action.

(iii) The process for selection of a remedial action at a federal facility on the NPL, pursuant to CERCLA section 120, shall entail:

(A) Joint selection of remedial action by the head of the relevant department, agency, or instrumentality and EPA; or

(B) If mutual agreement on the remedy is not reached, selection of the remedy is made by EPA.

(5) *Documenting the decision.* (i) To support the selection of a remedial action, all facts, analyses of facts, and site-specific policy determinations considered in the course of carrying out activities in this section shall be documented, as appropriate, in a record of decision, in a level of detail appropriate to the site situation, for inclusion in the administrative record required under subpart I of this part. Documentation shall explain how the evaluation criteria in paragraph (e)(9)(iii) of this section were used to select the remedy.

(ii) The ROD shall describe the following statutory requirements as they relate to the scope and objectives of the action:

(A) How the selected remedy is protective of human health and the environment, explaining how the remedy eliminates, reduces, or controls exposures to human and environmental receptors;

(B) The federal and state requirements that are applicable or relevant and appropriate to the site that the remedy will attain;

(C) The applicable or relevant and appropriate requirements of other federal and state laws that the remedy will not meet, the waiver invoked, and the justification for invoking the waiver;

(D) How the remedy is cost-effective, i.e., explaining how the remedy provides overall effectiveness proportional to its costs;

(E) How the remedy utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and

(F) Whether the preference for remedies employing treatment which permanently and significantly reduces the toxicity, mobility, or volume of the hazardous substances, pollutants, or contaminants as a principal element is or is not satisfied by the selected remedy. If this preference is not satisfied, the record of decision must explain why a remedial action involving such reductions in toxicity, mobility, or volume was not selected.

(iii) The ROD also shall:

(A) Indicate, as appropriate, the remediation goals, discussed in paragraph (e)(2)(i) of this section, that the remedy is expected to achieve. Performance shall be measured at appropriate locations in the ground water, surface water, soils, air, and other affected environmental media. Measurement relating to the performance of the treatment processes and the engineering controls may also be identified, as appropriate;

(B) Discuss significant changes and the response to comments described in paragraph (f)(3)(i)(F) of this section;

(C) Describe whether hazardous substances, pollutants, or contaminants will remain at the site such that a review of the remedial action under paragraph (f)(4)(ii) of this section no less often than every five years shall be required; and

(D) When appropriate, provide a commitment for further analysis and selection of long-term response measures within an appropriate timeframe.

(6) *Community relations when the record of decision is signed.* After the ROD is signed, the lead agency shall:

(i) Publish a notice of the availability of the ROD in a major local newspaper of general circulation; and

(ii) Make the record of decision available for public inspection and copying at or near the facility at issue prior to the commencement of any remedial action.

§ 300.435 Remedial design/remedial action, operation and maintenance.

(a) *General.* The remedial design/remedial action (RD/RA) stage includes the development of the actual design of the selected remedy and implementation of the remedy through construction. A period of operation and maintenance may follow the RA activities.

(b) *RD/RA activities.* (1) All RD/RA activities shall be in conformance with the remedy selected and set forth in the ROD or other decision document for that site. Those portions of RD/RA sampling and analysis plans describing the QA/QC requirements for chemical and analytical testing and sampling procedures of samples taken for the purpose of determining whether cleanup action levels specified in the ROD are achieved, generally will be consistent with the requirements of § 300.430(b)(8).

(2) During the course of the RD/RA, the lead agency shall be responsible for ensuring that all federal and state requirements that are identified in the ROD as applicable or relevant and appropriate requirements for the action are met. If waivers from any ARARs are involved, the lead agency shall be responsible for ensuring that the conditions of the waivers are met.

(c) *Community relations.* (1) Prior to the initiation of RD, the lead agency shall review the CRP to determine whether it should be revised to describe further public involvement activities during RD/RA that are not already addressed or provided for in the CRP.

(2) After the adoption of the ROD, if the remedial action or enforcement action taken, or the settlement or consent decree entered into, differs significantly from the remedy selected in the ROD with respect to scope, performance, or cost, the lead agency shall consult with the support agency, as appropriate, and shall either:

(i) Publish an explanation of significant differences when the differences in the remedial or enforcement action, settlement, or consent decree significantly change but do not fundamentally alter the remedy selected in the ROD with respect to scope, performance, or cost. To issue an explanation of significant differences, the lead agency shall:

(A) Make the explanation of significant differences and supporting information available to the public in the administrative record established under § 300.815 and the information repository; and

(B) Publish a notice that briefly summarizes the explanation of significant differences, including the reasons for such differences, in a major local newspaper of general circulation; or

(ii) Propose an amendment to the ROD if the differences in the remedial or enforcement action, settlement, or consent decree fundamentally alter the basic features of the selected remedy with respect to scope, performance, or cost. To amend the ROD, the lead agency, in conjunction with the support agency, as provided in § 300.515(e), shall:

(A) Issue a notice of availability and brief description of the proposed amendment to the ROD in a major local newspaper of general circulation;

(B) Make the proposed amendment to the ROD and information supporting the decision available for public comment;

(C) Provide a reasonable opportunity, not less than 30 calendar days, for submission of written or oral comments on the amendment to the ROD. Upon timely request, the lead agency will extend the public comment period by a minimum of 30 additional days;

(D) Provide the opportunity for a public meeting to be held during the public comment period at or near the facility at issue;

(E) Keep a transcript of comments received at the public meeting held during the public comment period;

(F) Include in the amended ROD a brief explanation of the amendment

and the response to each of the significant comments, criticisms, and new relevant information submitted during the public comment period;

(G) Publish a notice of the availability of the amended ROD in a major local newspaper of general circulation; and

(H) Make the amended ROD and supporting information available to the public in the administrative record and information repository prior to the commencement of the remedial action affected by the amendment.

(3) After the completion of the final engineering design, the lead agency shall issue a fact sheet and provide, as appropriate, a public briefing prior to the initiation of the remedial action.

(d) *Contractor conflict of interest.* (1) For Fund-financed RD/RA and O&M activities, the lead agency shall:

(i) Include appropriate language in the solicitation requiring potential prime contractors to submit information on their status, as well as the status of their subcontractors, parent companies, and affiliates, as potentially responsible parties at the site.

(ii) Require potential prime contractors to certify that, to the best of their knowledge, they and their potential subcontractors, parent companies, and affiliates have disclosed all information described in § 300.435(d)(1)(i) or that no such information exists, and that any such information discovered after submission of their bid or proposal or contract award will be disclosed immediately.

(2) Prior to contract award, the lead agency shall evaluate the information provided by the potential prime contractors and:

(i) Determine whether they have conflicts of interest that could significantly impact the performance of the contract or the liability of potential prime contractors or subcontractors.

(ii) If a potential prime contractor or subcontractor has a conflict of interest that cannot be avoided or otherwise resolved, and using that potential prime contractor or subcontractor to conduct RD/RA or O&M work under a Fund-financed action would not be in the best interests of the state or federal government, an offeror or bidder contemplating use of that prime contractor or subcontractor may be declared nonresponsible or ineligible for award in accordance with appropriate acquisition regulations, and the contract may be awarded to the next eligible offeror or bidder.

(e) *Recontracting.* (1) If a Fund-financed contract must be terminated because additional work outside the scope of the contract is needed, EPA is authorized to take appropriate steps to continue interim RAs as necessary to reduce risks to public health and the environment. Appropriate steps may include extending an existing contract for a federal-lead RA or amending a cooperative agreement for a state-lead RA. Until the lead agency can reopen the bidding process and recontract to complete the RA, EPA may take such appropriate steps as described above to cover interim work to reduce such risks, where:

(i) Additional work is found to be needed as a result of such unforeseen situations as newly discovered sources, types, or quantities of hazardous substances at a facility; and

(ii) Performance of the complete RA requires the lead agency to rebid the contract because the existing contract does not encompass this newly discovered work.

(2) The cost of such interim actions shall not exceed $2 million.

(f) *Operation and maintenance.* (1) Operation and maintenance (O&M) measures are initiated after the remedy has achieved the remedial action objectives and remediation goals in the ROD, and is determined to be operational and functional, except for ground- or surface-water restoration actions covered under § 300.435(f)(4). A state must provide its assurance to assume responsibility for O&M, including, where appropriate, requirements for maintaining institutional controls, under § 300.510(c).

(2) A remedy becomes "operational and functional" either one year after construction is complete, or when the remedy is determined concurrently by EPA and the state to be functioning properly and is performing as designed, whichever is earlier. EPA may grant extensions to the one-year period, as appropriate.

(3) For Fund-financed remedial actions involving treatment or other measures to restore ground- or surface-water quality to a level that assures protection of human health and the environment, the operation of such treatment or other measures for a period of up to 10 years after the remedy becomes operational and functional will be considered part of the remedial action. Activities required to maintain the effectiveness of such treatment or measures following the 10-year period, or after remedial action is complete, whichever is earlier, shall be considered O&M. For the purposes of federal funding provided under CERCLA section 104(c)(6), a restoration activity will be considered administratively "complete" when:

(i) Measures restore ground- or surface-water quality to a level that assures protection of human health and the environment;

(ii) Measures restore ground or surface water to such a point that reductions in contaminant concentrations are no longer significant; or

(iii) Ten years have elapsed, whichever is earliest.

(4) The following shall not be deemed to constitute treatment or other measures to restore contaminated ground or surface water under § 300.435(f)(3):

(i) Source control maintenance measures; and

(ii) Ground- or surface-water measures initiated for the primary purpose of providing a drinking-water supply, not for the purpose of restoring ground water.

§ 300.440 Procedures for planning and implementing off-site response actions [Reserved].

Subpart F—State Involvement in Hazardous Substance Response

SOURCE: 55 FR 8853, Mar. 8, 1990, unless otherwise noted.

§ 300.500 General.

(a) EPA shall ensure meaningful and substantial state involvement in hazardous substance response as specified in this subpart. EPA shall provide an opportunity for state participation in removal, pre-remedial, remedial, and enforcement response activities. EPA shall encourage states to enter into an EPA/state Superfund Memorandum of Agreement (SMOA) under § 300.505 to increase state involvement and strengthen the EPA/state partnership.

(b) EPA shall encourage states to participate in Fund-financed response in two ways. Pursuant to § 300.515(a), states may either assume the lead through a cooperative agreement for the response action or may be the support agency in EPA-lead remedial response. Section 300.515 sets forth requirements for state involvement in EPA-lead remedial and enforcement response and also addresses comparable requirements for EPA involvement in state-lead remedial and enforcement response. Section 300.520 specifies requirements for state involvement in EPA-lead enforcement negotiations. Section 300.525 specifies requirements for state involvement in removal actions. In addition to the requirements set forth in this subpart, 40 CFR part 35, subpart O, "Cooperative Agreements and Superfund State Contracts for Superfund Response Actions," contains further requirements for state participation during response.

§ 300.505 EPA/State Superfund Memorandum of Agreement (SMOA).

(a) The SMOA may establish the nature and extent of EPA and state interaction during EPA-lead and state-lead response (Indian tribes meeting the requirements of § 300.515(b) may be treated as states for purposes of this section). EPA shall enter into SMOA discussions if requested by a state. The following may be addressed in a SMOA:

(1) The EPA/state or Indian tribe relationship for removal, pre-remedial, remedial, and enforcement response, including a description of the roles and the responsibilities of each.

(2) The general requirements for EPA oversight. Oversight requirements may be more specifically defined in cooperative agreements.

(3) The general nature of lead and support agency interaction regarding

the review of key documents and/or decision points in removal, pre-remedial, remedial, and enforcement response. The requirements for EPA and state review of each other's key documents when each is serving as the support agency shall be equivalent to the extent practicable. Review times agreed to in the SMOA must also be documented in site-specific cooperative agreements or Superfund state contracts in order to be binding.

(4) Procedures for modification of the SMOA (e.g., if EPA and a state agree that the lead and support agency roles and responsibilities have changed, or if modifications are required to achieve desired goals).

(b) The SMOA and any modifications thereto shall be executed by the EPA Regional Administrator and the head of the state agency designated as lead agency for state implementation of CERCLA.

(c) Site-specific agreements entered into pursuant to section 104(d)(1) of CERCLA shall be developed in accordance with 40 CFR part 35, subpart O. The SMOA shall not supersede such agreements.

(d)(1) EPA and the state shall consult annually to determine priorities and make lead and support agency designations for removal, pre-remedial, remedial, and enforcement response to be conducted during the next fiscal year and to discuss future priorities and long-term requirements for response. These consultations shall include the exchange of information on both Fund- and non-Fund-financed response activities. The SMOA may describe the timeframe and process for the EPA/state consultation.

(2) The following activities shall be discussed in the EPA/state consultations established in the SMOA, or otherwise initiated and documented in writing in the absence of a SMOA, on a site-specific basis with EPA and the state identifying the lead agency for each response action discussed:

(i) Pre-remedial response actions, including preliminary assessments and site inspections;

(ii) Hazard Ranking System scoring and NPL listing and deletion activities;

(iii) Remedial phase activities, including remedial investigation/feasibility study, identification of potential applicable or relevant and appropriate requirements (ARARs) under federal and state environmental laws and, as appropriate, other advisories, criteria, or guidance to be considered (TBCs), proposed plan, ROD, remedial design, remedial action, and operation and maintenance;

(iv) Potentially responsible party (PRP) searches, notices to PRPs, response to information requests, PRP negotiations, oversight of PRPs, other enforcement actions pursuant to state law, and activities where the state provides support to EPA;

(v) Compilation and maintenance of the administrative record for selection of a response action as required by subpart I of this part;

(vi) Related site support activities;

(vii) State ability to share in the cost and timing of payments; and

(viii) General CERCLA implementation activities.

(3) If a state is designated as the lead agency for a non-Fund-financed action at an NPL site, the SMOA shall be supplemented by site-specific enforcement agreements between EPA and the state which specify schedules and EPA involvement.

(4) In the absence of a SMOA, EPA and the state shall comply with the requirements in § 300.515(h). If the SMOA does not address all of the requirements specified in § 300.515(h), EPA and the state shall comply with any unaddressed requirements in that section.

§ 300.510 State assurances.

(a) A Fund-financed remedial action undertaken pursuant to CERCLA section 104(a) cannot proceed unless a state provides its applicable required assurances. The assurances must be provided by the state prior to the initiation of remedial action pursuant to a Superfund state contract for EPA-lead (or political subdivision-lead) remedial action or pursuant to a cooperative agreement for a state-lead remedial action. The SMOA may not be used for this purpose. Federally recognized Indian tribes are not required to provide CERCLA section 104(c)(3) assurances for Fund-financed response ac-

tions. Further requirements pertaining to state, political subdivision, and federally recognized Indian tribe involvement in CERCLA response are found in 40 CFR part 35, subpart O.

(b)(1) The state is not required to share in the cost of state- or EPA-lead Fund-financed removal actions (including remedial planning activities associated with remedial actions) conducted pursuant to CERCLA section 104 unless the facility was operated by the state or a political subdivision thereof at the time of disposal of hazardous substances therein and a remedial action is ultimately undertaken at the site. Such remedial planning activities include, but are not limited to, remedial investigations (RIs), feasibility studies (FSs), and remedial design (RD). States shall be required to share 50 percent, or greater, in the cost of all Fund-financed response actions if the facility was publicly operated at the time of the disposal of hazardous substances. For other facilities, except federal facilities, the state shall be required to share 10 percent of the cost of the remedial action.

(2) CERCLA section 104(c)(5) provides that EPA shall grant a state credit for reasonable, documented, direct, out-of-pocket, non-federal expenditures subject to the limitations specified in CERCLA section 104(c)(5). For a state to apply credit toward its cost share, it must enter into a cooperative agreement or Superfund state contract. The state must submit as soon as possible, but no later than at the time CERCLA section 104 assurances are provided for a remedial action, its accounting of eligible credit expenditures for EPA verification. Additional credit requirements are contained in 40 CFR part 35, subpart O.

(3) Credit may be applied to a state's future cost share requirements at NPL sites for response expenditures or obligations incurred by the state or a political subdivision from January 1, 1978 to December 11, 1980, and for the remedial action expenditures incurred only by the state after October 17, 1986.

(4) Credit that exceeds the required cost share at the site for which the credit is granted may be transferred to another site to offset a state's required remedial action cost share.

(c)(1) Prior to a Fund-financed remedial action, the state must also provide its assurance in accordance with CERCLA section 104(c)(3)(A) to assume responsibility for operation and maintenance of implemented remedial actions for the expected life of such actions. In addition, when appropriate, as part of the O&M assurance, the state must assure that any institutional controls implemented as part of the remedial action at a site are in place, reliable, and will remain in place after the initiation of O&M. The state and EPA shall consult on a plan for operation and maintenance prior to the initiation of a remedial action.

(2) After a joint EPA/state inspection of the implemented Fund-financed remedial action under § 300.515(g), EPA may share, for a period of up to one year, in the cost of the operation of the remedial action to ensure that the remedy is operational and functional. In the case of the restoration of ground or surface water, EPA shall share in the cost of the state's operation of ground- or surface-water restoration remedial actions as specified in § 300.435(f)(3).

(d) In accordance with CERCLA sections 104 (c)(3)(B) and 121(d)(3), if the remedial action requires off-site storage, destruction, treatment, or disposal, the state must provide its assurance before the remedial action begins on the availability of a hazardous waste disposal facility that is in compliance with CERCLA section 121(d)(3) and is acceptable to EPA.

(e)(1) In accordance with CERCLA section 104(c)(9), EPA shall not provide any remedial action pursuant to CERCLA section 104 until the state in which the release occurs enters into a cooperative agreement or Superfund state contract with EPA providing assurances deemed adequate by EPA that the state will assure the availability of hazardous waste treatment or disposal facilities which:

(i) Have adequate capacity for the destruction, treatment, or secure disposition of all hazardous wastes that are reasonably expected to be generated within the state during the 20-year period following the date of such coop-

erative agreement or Superfund state contract and to be destroyed, treated, or disposed;

(ii) Are within the state, or outside the state in accordance with an interstate agreement or regional agreement or authority;

(iii) Are acceptable to EPA; and

(iv) Are in compliance with the requirements of Subtitle C of the Solid Waste Disposal Act.

(2) This rule does not address whether or not Indian tribes are states for purposes of this paragraph (e).

(f) EPA may determine that an interest in real property must be acquired in order to conduct a response action. As a general rule, the state in which the property is located must agree to acquire and hold the necessary property interest, including any interest in acquired property that is needed to ensure the reliability of institutional controls restricting the use of that property. If it is necessary for the United States government to acquire the interest in property to permit implementation of the response, the state must accept transfer of the acquired interest on or before the completion of the response action.

§ 300.515 Requirements for state involvement in remedial and enforcement response.

(a) *General.* (1) States are encouraged to undertake actions authorized under subpart E. Section 104(d)(1) of CERCLA authorizes EPA to enter into cooperative agreements or contracts with a state, political subdivision, or a federally recognized Indian tribe to carry out Fund-financed response actions authorized under CERCLA, when EPA determines that the state, the political subdivision, or federally recognized Indian tribe has the capability to undertake such actions. EPA will use a cooperative agreement to transfer funds to those entities to undertake Fund-financed response activities. The requirements for states, political subdivisions, or Indian tribes to receive funds as a lead or support agency for response are addressed at 40 CFR part 35, subpart O.

(2) For EPA-lead Fund-financed remedial planning activities, including, but not limited to, remedial investigations, feasibility studies, and remedial designs, the state agency acceptance of the support agency role during an EPA-lead response shall be documented in a letter, SMOA, or cooperative agreement. Superfund state contracts are unnecessary for this purpose.

(3) Cooperative agreements and Superfund state contracts are only appropriate for non-Fund-financed response actions if a state intends to seek credit for remedial action expenses under § 300.510.

(b) *Indian tribe involvement during response.* To be afforded substantially the same treatment as states under section 104 of CERCLA, the governing body of the Indian tribe must:

(1) Be federally recognized; and

(2) Have a tribal governing body that is currently performing governmental functions to promote the health, safety, and welfare of the affected population or to protect the environment within a defined geographic area; and

(3) Have jurisdiction over a site at which Fund-financed response, including pre-remedial activities, is contemplated.

(c) *State involvement in PA/SI and National Priorities List process.* EPA shall ensure state involvement in the listing and deletion process by providing states opportunities for review, consultation, or concurrence specified in this section.

(1) EPA shall consult with states as appropriate on the information to be used in developing HRS scores for releases.

(2) EPA shall, to the extent feasible, provide the state 30 working days to review releases which were scored by EPA and which will be considered for placement on the National Priorities List (NPL).

(3) EPA shall provide the state 30 working days to review and concur on the Notice of Intent to Delete a release from the NPL. Section 300.425 describes the EPA/state consultation and concurrence process for deleting releases from the NPL.

(d) *State involvement in RI/FS process.* A key component of the EPA/state partnership shall be the communication of potential federal and state ARARs and, as appropriate, other per-

tinent advisories, criteria, or guidance to be considered (TBCs).

(1) In accordance with §§ 300.400(g) and 300.430, the lead and support agencies shall identify their respective potential ARARs and communicate them to each other in a timely manner, i.e., no later than the early stages of the comparative analysis described in § 300.430(e)(9), such that sufficient time is available for the lead agency to consider and incorporate all potential ARARs without inordinate delays and duplication of effort. The lead and support agencies may also identify TBCs and communicate them in a timely manner.

(2) When a state and EPA have entered into a SMOA, the SMOA may specify a consultation process which requires the lead agency to solicit potential ARARs at specified points in the remedial planning and remedy selection processes. At a minimum, the SMOA shall include the points specified in § 300.515(h)(2). The SMOA shall specify timeframes for support agency response to lead agency requests to ensure that potential ARARs are identified and communicated in a timely manner. Such timeframes must also be documented in site-specific agreements. The SMOA may also discuss identification and communication of TBCs.

(3) If EPA in its statement of a proposed plan intends to waive any state-identified ARARs, or does not agree with the state that a certain state standard is an ARAR, it shall formally notify the state when it submits the RI/FS report for state review or responds to the state's submission of the RI/FS report.

(4) EPA shall respond to state comments on waivers from or disagreements about state ARARs, as well as the preferred alternative when making the RI/FS report and proposed plan available for public comment.

(e) *State involvement in selection of remedy.* (1) Both EPA and the state shall be involved in preliminary discussions of the alternatives addressed in the FS prior to preparation of the proposed plan and ROD. At the conclusion of the RI/FS, the lead agency, in conjunction with the support agency, shall develop a proposed plan. The support agency shall have an opportunity to comment on the plan. The lead agency shall publish a notice of availability of the RI/FS report and a brief analysis of the proposed plan pursuant to § 300.430(e) and (f). Included in the proposed plan shall be a statement that the lead and support agencies have reached agreement or, where this is not the case, a statement explaining the concerns of the support agency with the lead agency's proposed plan. The state may not publish a proposed plan that EPA has not approved. EPA may assume the lead from the state if agreement cannot be reached.

(2)(i) EPA and the state shall identify, at least annually, sites for which RODs will be prepared during the next fiscal year, in accordance with § 300.515(h)(1). For all EPA-lead sites, EPA shall prepare the ROD and provide the state an opportunity to concur with the recommended remedy. For Fund-financed state-lead sites, EPA and the state shall designate sites, in a site-specific agreement, for which the state shall prepare the ROD and seek EPA's concurrence and adoption of the remedy specified therein, and sites for which EPA shall prepare the ROD and seek the state's concurrence. EPA and the state may designate sites for which the state shall prepare the ROD for non-Fund-financed state-lead enforcement response actions (i.e., actions taken under state law) at an NPL site. The state may seek EPA's concurrence in the remedy specified therein. Either EPA or the state may choose not to designate a site as state-lead.

(ii) State concurrence on a ROD is not a prerequisite to EPA's selecting a remedy, i.e., signing a ROD, nor is EPA's concurrence a prerequisite to a state's selecting a remedy at a non-Fund-financed state-lead enforcement site under state law. Unless EPA's Assistant Administrator for Solid Waste and Emergency Response or Regional Administrator concurs in writing with a state-prepared ROD, EPA shall not be deemed to have approved the state decision. A state may not proceed with a Fund-financed response action unless EPA has first concurred in and adopted the ROD. Section 300.510(a) specifies limitations on EPA's proceed-

ing with a remedial action without state assurances.

(iii) The lead agency shall provide the support agency with a copy of the signed ROD for remedial actions to be conducted pursuant to CERCLA.

(iv) On state-lead sites identified for EPA concurrence, the state generally shall be expected to maintain its lead agency status through the completion of the remedial action.

(f) *Enhancement of remedy.* (1) A state may ask EPA to make changes in or expansions of a remedial action selected under subpart E.

(i) If EPA finds that the proposed change or expansion is necessary and appropriate to the EPA-selected remedial action, the remedy may be modified (consistent with § 300.435(c)(2)) and any additional costs paid as part of the remedial action.

(ii) If EPA finds that the proposed change or expansion is not necessary to the selected remedial action, but would not conflict or be inconsistent with the EPA-selected remedy, EPA may agree to integrate the proposed change or expansion into the planned CERCLA remedial work if:

(A) The state agrees to fund the entire additional cost associated with the change or expansion; and

(B) The state agrees to assume the lead for supervising the state-funded component of the remedy or, if EPA determines that the state-funded component cannot be conducted as a separate phase or activity, for supervising the remedial design and construction of the entire remedy.

(2) Where a state does not concur in a remedial action secured by EPA under CERCLA section 106, and the state desires to have the remedial action conform to an ARAR that has been waived under § 300.430(f)(1)(ii)(C), a state may seek to have that remedial action so conform, in accordance with the procedures set out in CERCLA section 121(f)(2).

(g) *State involvement in remedial design/remedial action.* The extent and nature of state involvement during remedial design and remedial action shall be specified in site-specific cooperative agreements or Superfund state contracts, consistent with 40 CFR part 35, subpart O. For Fund-financed remedial actions, the lead and support agencies shall conduct a joint inspection at the conclusion of construction of the remedial action to determine that the remedy has been constructed in accordance with the ROD and with the remedial design.

(h) *Requirements for state involvement in absence of SMOA.* In the absence of a SMOA, EPA and the state shall comply with the requirements in § 300.515(h). If the SMOA does not address all of the requirements specified in § 300.515(h), EPA and the state shall comply with any unaddressed requirements in that section.

(1) *Annual consultations.* EPA shall conduct consultations with states at least annually to establish priorities and identify and document in writing the lead for remedial and enforcement response for each NPL site within the state for the upcoming fiscal year. States shall be given the opportunity to participate in long-term planning efforts for remedial and enforcement response during these annual consultations.

(2) *Identification of ARARs and TBCs.* The lead and support agencies shall discuss potential ARARs during the scoping of the RI/FS. The lead agency shall request potential ARARs from the support agency no later than the time that the site characterization data are available. The support agency shall communicate in writing those potential ARARs to the lead agency within 30 working days of receipt of the lead agency request for these ARARs. The lead and support agencies may also discuss and communicate other pertinent advisories, criteria, or guidance to be considered (TBCs). After the initial screening of alternatives has been completed but prior to initiation of the comparative analysis conducted during the detailed analysis phase of the FS, the lead agency shall request that the support agency communicate any additional requirements that are applicable or relevant and appropriate to the alternatives contemplated within 30 working days of receipt of this request. The lead agency shall thereafter consult the support agency to ensure that identified

ARARs and TBCs are updated as appropriate.

(3) *Support agency review of lead agency documents.* The lead agency shall provide the support agency an opportunity to review and comment on the RI/FS, proposed plan, ROD, and remedial design, and any proposed determinations on potential ARARs and TBCs. The support agency shall have a minimum of 10 working days and a maximum of 15 working days to provide comments to the lead agency on the RI/FS, ROD, ARAR/TBC determinations, and remedial design. The support agency shall have a minimum of five working days and a maximum of 10 working days to comment on the proposed plan.

(i) *Administrative record requirements.* The state, where it is the lead agency for a Fund-financed site, shall compile and maintain the administrative record for selection of a response action under subpart I of this part, unless specified otherwise in the SMOA.

§ 300.520 State involvement in EPA-lead enforcement negotiations.

(a) EPA shall notify states of response action negotiations to be conducted by EPA with potentially responsible parties during each fiscal year.

(b) The state must notify EPA of such negotiations in which it intends to participate.

(c) The state is not foreclosed from signing a consent decree if it does not participate substantially in the negotiations.

§ 300.525 State involvement in removal actions.

(a) States may undertake Fund-financed removal actions pursuant to a cooperative agreement with EPA. State-lead removal actions taken pursuant to cooperative agreements must be conducted in accordance with § 300.415 on removal actions, and 40 CFR part 35, subpart O.

(b) States are not required under section 104(c)(3) of CERCLA to share in the cost of a Fund-financed removal action, unless the removal is conducted at an NPL site that was operated by a state or political subdivision at the time of disposal of hazardous substances therein and a Fund-financed remedial action is ultimately undertaken at the site. In this situation, states are required to share, 50 percent or greater, in the cost of all removal (including remedial planning) and remedial action costs at the time of the remedial action.

(c) States are encouraged to provide for post-removal site control as discussed in § 300.415(k) for all Fund-financed removal actions.

(d) States shall be responsible for identifying potential state ARARs for all Fund-financed removal actions and for providing such ARARs to EPA in a timely manner for all EPA-lead removal actions.

(e) EPA shall consult with a state on all removal actions to be conducted in that state.

Subpart G—Trustees for Natural Resources

SOURCE: 55 FR 8857, Mar. 8, 1990, unless otherwise noted.

§ 300.600 Designation of federal trustees.

(a) The President is required to designate in the National Contingency Plan those federal officials who are to act on behalf of the public as trustees for natural resources. Federal officials so designated will act pursuant to section 107(f) of CERCLA and section 311(f)(5) of the Clean Water Act. Natural resources include:

(1) Natural resources over which the United States has sovereign rights; and

(2) Natural resources within the territorial sea, contiguous zone, exclusive economic zone, and outer continental shelf belonging to, managed by, held in trust by, appertaining to, or otherwise controlled (hereinafter referred to as "managed or protected") by the United States.

(b) The following individuals shall be the designated trustee(s) for general categories of natural resources. They are authorized to act pursuant to section 107(f) of CERCLA or section 311(f)(5) of the Clean Water Act when there is injury to, destruction of, loss of, or threat to natural resources

as a result of a release of a hazardous substance or a discharge of oil. Notwithstanding the other designations in this section, the Secretaries of Commerce and the Interior shall act as trustees of those resources subject to their respective management or protection.

(1) *Secretary of Commerce.* The Secretary of Commerce shall act as trustee for natural resources managed or protected by the Department of Commerce or by other federal agencies and that are found in or under waters navigable by deep draft vessels, in or under tidally influenced waters, or waters of the contiguous zone, the exclusive economic zone, and the outer continental shelf, and in upland areas serving as habitat for marine mammals and other protected species. However, before the Secretary takes an action with respect to an affected resource under the management or protection of another federal agency, he shall, whenever practicable, seek to obtain the concurrence of that other federal agency. Examples of the Secretary's trusteeship include marine fishery resources and their supporting ecosystems; anadromous fish; certain endangered species and marine mammals; and National Marine Sanctuaries and Estuarine Research Reserves.

(2) *Secretary of the Interior.* The Secretary of the Interior shall act as trustee for natural resources managed or protected by the Department of the Interior. Examples of the Secretary's trusteeship include migratory birds; certain anadromous fish, endangered species, and marine mammals; federally owned minerals; and certain federally managed water resources. The Secretary of the Interior shall also be trustee for those natural resources for which an Indian tribe would otherwise act as trustee in those cases where the United States acts on behalf of the Indian tribe.

(3) *Secretary for the land managing agency.* For natural resources located on, over, or under land administered by the United States, the trustee shall be the head of the Department in which the land managing agency is found. The trustees for the principal federal land managing agencies are the Secretaries of the Department of the Interior, the Department of Agriculture, the Department of Defense, and the Department of Energy.

(4) *Head of authorized agencies.* For natural resources located in the United States but not otherwise described in this section, the trustee shall be the head of the federal agency or agencies authorized to manage or protect those resources.

§ 300.605 State trustees.

State trustees shall act on behalf of the public as trustees for natural resources within the boundary of a state or belonging to, managed by, controlled by, or appertaining to such state. For the purposes of subpart G of this part, the definition of the term *state* does not include Indian tribes.

§ 300.610 Indian tribes.

The tribal chairmen (or heads of the governing bodies) of Indian tribes, as defined in § 300.5, or a person designated by the tribal officials, shall act on behalf of the Indian tribes as trustees for the natural resources belonging to, managed by, controlled by, or appertaining to such Indian tribe, or held in trust for the benefit of such Indian tribe, or belonging to a member of such Indian tribe, if such resources are subject to a trust restriction on alienation. When the tribal chairman or head of the tribal governing body designates another person as trustee, the tribal chairman or head of the tribal governing body shall notify the President of such designation. Such officials are authorized to act when there is injury to, destruction of, loss of, or threat to natural resources as a result of a release of a hazardous substance.

§ 300.615 Responsibilities of trustees.

(a) Where there are multiple trustees, because of coexisting or contiguous natural resources or concurrent jurisdictions, they should coordinate and cooperate in carrying out these responsibilities.

(b) Trustees are responsible for designating to the RRTs, for inclusion in the Regional Contingency Plan, appropriate contacts to receive notifica-

tions from the OSCs/RPMs of potential injuries to natural resources.

(c) *Upon notification or discovery of* injury to, destruction of, loss of, or threat to natural resources, trustees may, pursuant to section 107(f) of CERCLA or section 311(f)(5) of the Clean Water Act, take the following or other actions as appropriate:

(1) Conduct a preliminary survey of the area affected by the discharge or release to determine if trust resources under their jurisdiction are, or potentially may be, affected;

(2) Cooperate with the OSC/RPM in coordinating assessments, investigations, and planning;

(3) Carry out damage assessments; or

(4) Devise and carry out a plan for restoration, rehabilitation, replacement, or acquisition of equivalent natural resources. In assessing damages to natural resources, the federal, state, and Indian tribe trustees have the option of following the procedures for natural resource damage assessments located at 43 CFR part 11.

(d) The authority of federal trustees includes, but is not limited to the following actions:

(1) Requesting that the Attorney General seek compensation from the responsible parties for the damages assessed and for the costs of an assessment and of restoration planning; and

(2) Participating in negotiations between the United States and potentially responsible parties (PRPs) to obtain PRP-financed or PRP-conducted assessments and restorations for injured resources or protection for threatened resources and to agree to covenants not to sue, where appropriate.

(3) Requiring, in consultation with the lead agency, any person to comply with the requirements of CERCLA section 104(e) regarding information gathering and access.

(e) Actions which may be taken by any trustee pursuant to section 107(f) of CERCLA or section 311(f)(5) of the Clean Water Act include, but are not limited to, any of the following:

(1) Requesting that an authorized agency issue an administrative order or pursue injunctive relief against the parties responsible for the discharge or release; or

(2) Requesting that the lead agency remove, or arrange for the removal of, or provide for remedial action with respect to, any hazardous substances from a contaminated medium pursuant to section 104 of CERCLA.

Subpart H—Participation by Other Persons

SOURCE: 55 FR 8858, Mar. 8, 1990, unless otherwise noted.

§ 300.700 Activities by other persons.

(a) *General.* Any person may undertake a response action to reduce or eliminate a release of a hazardous substance, pollutant, or contaminant.

(b) *Summary of CERCLA authorities.* The mechanisms available to recover the costs of response actions under CERCLA are, in summary:

(1) Section 107(a), wherein any person may receive a court award of his or her response costs, plus interest, from the party or parties found to be liable;

(2) Section 111(a)(2), wherein a private party, a potentially responsible party pursuant to a settlement agreement, or certain foreign entities may file a claim against the Fund for reimbursement of response costs;

(3) Section 106(b), wherein any person who has complied with a section 106(a) order may petition the Fund for reimbursement of reasonable costs, plus interest; and

(4) Section 123, wherein a general purpose unit of local government may apply to the Fund under 40 CFR part 310 for reimbursement of the costs of temporary emergency measures that are necessary to prevent or mitigate injury to human health or the environment associated with a release.

(c) *Section 107(a) cost recovery actions.* (1) Responsible parties shall be liable for all response costs incurred by the United States government or a State or an Indian tribe not inconsistent with the NCP.

(2) Responsible parties shall be liable for necessary costs of response actions to releases of hazardous substances incurred by any other person consistent with the NCP.

(3) For the purpose of cost recovery under section 107(a)(4)(B) of CERCLA:

(i) A private party response action will be considered "consistent with the NCP" if the action, when evaluated as a whole, is in substantial compliance with the applicable requirements in paragraphs (c)(5) and (6) of this section, and results in a CERCLA-quality cleanup;

(ii) Any response action carried out in compliance with the terms of an order issued by EPA pursuant to section 106 of CERCLA, or a consent decree entered into pursuant to section 122 of CERCLA, will be considered "consistent with the NCP."

(4) Actions under § 300.700(c)(1) will not be considered "inconsistent with the NCP," and actions under § 300.700(c)(2) will not be considered not "consistent with the NCP," based on immaterial or insubstantial deviations from the provisions of 40 CFR part 300.

(5) The following provisions of this part are potentially applicable to private party response actions:

(i) Section 300.150 (on worker health and safety);

(ii) Section 300.160 (on documentation and cost recovery);

(iii) Section 300.400(c)(1), (4), (5), and (7) (on determining the need for a Fund-financed action); (e) (on permit requirements) except that the permit waiver does not apply to private party response actions; and (g) (on identification of ARARs) except that applicable requirements of federal or state law may not be waived by a private party;

(iv) Section 300.405(b), (c), and (d) (on reports of releases to the NRC);

(v) Section 300.410 (on removal site evaluation) except paragraphs (e)(5) and (6);

(vi) Section 300.415 (on removal actions) except paragraphs (a)(2), (b)(2)(vii), (b)(5), and (f); and including § 300.415(i) with regard to meeting ARARs where practicable except that private party removal actions must always comply with the requirements of applicable law;

(vii) Section 300.420 (on remedial site evaluation);

(viii) Section 300.430 (on RI/FS and selection of remedy) except paragraph (f)(1)(ii)(C)(6) and that applicable requirements of federal or state law may not be waived by a private party; and

(ix) Section 300.435 (on RD/RA and operation and maintenance).

(6) Private parties undertaking response actions should provide an opportunity for public comment concerning the selection of the response action based on the provisions set out below, or based on substantially equivalent state and local requirements. The following provisions of this part regarding public participation are potentially applicable to private party response actions, with the exception of administrative record and information repository requirements stated therein:

(i) Section 300.155 (on public information and community relations);

(ii) Section 300.415(m) (on community relations during removal actions);

(iii) Section 300.430(c) (on community relations during RI/FS) except paragraph (c)(5);

(iv) Section 300.430(f)(2), (3), and (6) (on community relations during selection of remedy); and

(v) Section 300.435(c) (on community relations during RD/RA and operation and maintenance).

(7) When selecting the appropriate remedial action, the methods of remedying releases listed in Appendix D of this part may also be appropriate to a private party response action.

(8) Except for actions taken pursuant to CERCLA sections 104 or 106 or response actions for which reimbursement from the Fund will be sought, any action to be taken by the lead agency listed in paragraphs (c)(5) through (c)(7) may be taken by the person carrying out the response action.

(d) *Section 111(a)(2) claims.* (1) Persons, other than those listed in paragraphs (d)(1)(i) through (iii) of this section, may be able to receive reimbursement of response costs by means of a claim against the Fund. The categories of persons excluded from pursuing this claims authority are:

(i) Federal government;

(ii) State governments, and their political subdivisions, unless they are po-

tentially responsible parties covered by an order or consent decree pursuant to section 122 of CERCLA; and

(iii) Persons operating under a procurement contract or an assistance agreement with the United States with respect to matters covered by that contract or assistance agreement, unless specifically provided therein.

(2) In order to be reimbursed by the Fund, an eligible person must notify the Administrator of EPA or designee prior to taking a response action and receive prior approval, i.e., "preauthorization," for such action.

(3) Preauthorization is EPA's prior approval to submit a claim against the Fund for necessary response costs incurred as a result of carrying out the NCP. All applications for preauthorization will be reviewed to determine whether the request should receive priority for funding. EPA, in its discretion, may grant preauthorization of a claim. Preauthorization will be considered only for:

(i) Removal actions pursuant to § 300.415;

(ii) CERCLA section 104(b) activities; and

(iii) Remedial actions at National Priorities List sites pursuant to § 300.435.

(4) To receive EPA's prior approval, the eligible person must:

(i) Demonstrate technical and other capabilities to respond safely and effectively to releases of hazardous substances, pollutants, or contaminants; and

(ii) Establish that the action will be consistent with the NCP in accordance with the elements set forth in paragraphs (c)(5) through (8) of this section.

(5) EPA will grant preauthorization to a claim by a party it determines to be potentially liable under section 107 of CERCLA only in accordance with an order issued pursuant to section 106 of CERCLA, or a settlement with the federal government in accordance with section 122 of CERCLA.

(6) Preauthorization does not establish an enforceable contractual relationship between EPA and the claimant.

(7) Preauthorization represents EPA's commitment that if funds are appropriated for response actions, the response action is conducted in accordance with the preauthorization decision document, and costs are reasonable and necessary, reimbursement will be made from the Superfund, up to the maximum amount provided in the preauthorization decision document.

(8) For a claim to be awarded under section 111 of CERCLA, EPA must certify that the costs were necessary and consistent with the preauthorization decision document.

(e) *Section 106(b) petition.* Subject to conditions specified in CERCLA section 106(b), any person who has complied with an order issued after October 16, 1986 pursuant to section 106(a) of CERCLA, may seek reimbursement for response costs incurred in complying with that order unless the person has waived that right.

(f) *Section 123 reimbursement to local governments.* Any general purpose unit of local government for a political subdivision that is affected by a release may receive reimbursement for the costs of temporary emergency measures necessary to prevent or mitigate injury to human health or the environment subject to the conditions set forth in 40 CFR part 310. Such reimbursement may not exceed $25,000 for a single response.

(g) *Release from liability.* Implementation of response measures by potentially responsible parties or by any other person does not release those parties from liability under section 107(a) of CERCLA, except as provided in a settlement under section 122 of CERCLA or a federal court judgment.

Subpart I—Administrative Record for Selection of Response Action

SOURCE: 55 FR 8859, Mar. 8, 1990, unless otherwise noted.

§ 300.800 Establishment of an administrative record.

(a) *General requirement.* The lead agency shall establish an administrative record that contains the documents that form the basis for the selection of a response action. The lead agency shall compile and maintain the

administrative record in accordance with this subpart.

(b) *Administrative records for federal facilities.* (1) If a federal agency other than EPA is the lead agency for a federal facility, the federal agency shall compile and maintain the administrative record for the selection of the response action for that facility in accordance with this subpart. EPA may furnish documents which the federal agency shall place in the administrative record file to ensure that the administrative record includes all documents that form the basis for the selection of the response action.

(2) EPA or the U.S. Coast Guard shall compile and maintain the administrative record when it is the lead agency for a federal facility.

(3) If EPA is involved in the selection of the response action at a federal facility on the NPL, the federal agency acting as the lead agency shall provide EPA with a copy of the index of documents included in the administrative record file, the RI/FS workplan, the RI/FS released for public comment, the proposed plan, any public comments received on the RI/FS and proposed plan, and any other documents EPA may request on a case-by-case basis.

(c) *Administrative record for state-lead sites.* If a state is the lead agency for a site, the state shall compile and maintain the administrative record for the selection of the response action for that site in accordance with this subpart. EPA may require the state to place additional documents in the administrative record file to ensure that the administrative record includes all documents which form the basis for the selection of the response action. The state shall provide EPA with a copy of the index of documents included in the administrative record file, the RI/FS workplan, the RI/FS released for public comment, the proposed plan, any public comments received on the RI/FS and proposed plan, and any other documents EPA may request on a case-by-case basis.

(d) *Applicability.* This subpart applies to all response actions taken under section 104 of CERCLA or sought, secured, or ordered administratively or judicially under section 106 of CERCLA, as follows:

(1) Remedial actions where the remedial investigation commenced after the promulgation of these regulations; and

(2) Removal actions where the action memorandum is signed after the promulgation of these regulations.

(e) For those response actions not included in paragraph (d) of this section, the lead agency shall comply with this subpart to the extent practicable.

§ 300.805 Location of the administrative record file.

(a) The lead agency shall establish a docket at an office of the lead agency or other central location at which documents included in the administrative record file shall be located and a copy of the documents included in the administrative record file shall also be made available for public inspection at or near the site at issue, except as provided below:

(1) Sampling and testing data, quality control and quality assurance documentation, and chain of custody forms, need not be located at or near the site at issue or at the central location, provided that the index to the administrative record file indicates the location and availability of this information.

(2) Guidance documents not generated specifically for the site at issue need not be located at or near the site at issue, provided that they are maintained at the central location and the index to the administrative record file indicates the location and availability of these guidance documents.

(3) Publicly available technical literature not generated for the site at issue, such as engineering textbooks, articles from technical journals, and toxicological profiles, need not be located at or near the site at issue or at the central location, provided that the literature is listed in the index to the administrative record file or the literature is cited in a document in the record.

(4) Documents included in the confidential portion of the administrative record file shall be located only in the central location.

(5) The administrative record for a removal action where the release or threat of release requires that on-site removal activities be initiated within hours of the lead agency's determination that a removal is appropriate and on-site removal activities cease within 30 days of initiation, need be available for public inspection only at the central location.

(b) Where documents are placed in the central location but not in the file located at or near the site, such documents shall be added to the file located at or near the site upon request, except for documents included in paragraph (a)(4) of this section.

(c) The lead agency may make the administrative record file available to the public in microform.

§ 300.810 Contents of the administrative record file.

(a) *Contents.* The administrative record file for selection of a response action typically, but not in all cases, will contain the following types of documents:

(1) Documents containing factual information, data and analysis of the factual information, and data that may form a basis for the selection of a response action. Such documents may include verified sampling data, quality control and quality assurance documentation, chain of custody forms, site inspection reports, preliminary assessment and site evaluation reports, ATSDR health assessments, documents supporting the lead agency's determination of imminent and substantial endangerment, public health evaluations, and technical and engineering evaluations. In addition, for remedial actions, such documents may include approved workplans for the remedial investigation/feasibility study, state documentation of applicable or relevant and appropriate requirements, and the RI/FS;

(2) Guidance documents, technical literature, and site-specific policy memoranda that may form a basis for the selection of the response action. Such documents may include guidance on conducting remedial investigations and feasibility studies, guidance on determining applicable or relevant and appropriate requirements, guidance on risk/exposure assessments, engineering handbooks, articles from technical journals, memoranda on the application of a specific regulation to a site, and memoranda on off-site disposal capacity;

(3) Documents received, published, or made available to the public under § 300.815 for remedial actions, or § 300.820 for removal actions. Such documents may include notice of availability of the administrative record file, community relations plan, proposed plan for remedial action, notices of public comment periods, public comments and information received by the lead agency, and responses to significant comments;

(4) Decision documents. Such documents may include action memoranda and records of decision;

(5) Enforcement orders. Such documents may include administrative orders and consent decrees; and

(6) An index of the documents included in the administrative record file. If documents are customarily grouped together, as with sampling data chain of custody documents, they may be listed as a group in the index to the administrative record file.

(b) *Documents not included in the administrative record file.* The lead agency is not required to include documents in the administrative record file which do not form a basis for the selection of the response action. Such documents include but are not limited to draft documents, internal memoranda, and day-to-day notes of staff unless such documents contain information that forms the basis of selection of the response action and the information is not included in any other document in the administrative record file.

(c) *Privileged documents.* Privileged documents shall not be included in the record file except as provided in paragraph (d) of this section or where such privilege is waived. Privileged documents include but are not limited to documents subject to the attorney-client, attorney work product, deliberative process, or other applicable privilege.

(d) *Confidential file.* If information which forms the basis for the selection of a response action is included only in

a document containing confidential or privileged information and is not otherwise available to the public, the information, to the extent feasible, shall be summarized in such a way as to make it disclosable and the summary shall be placed in the publicly available portion of the administrative record file. The confidential or privileged document itself shall be placed in the confidential portion of the administrative record file. If information, such as confidential business information, cannot be summarized in a disclosable manner, the information shall be placed only in the confidential portion of the administrative record file. All documents contained in the confidential portion of the administrative record file shall be listed in the index to the file.

§ 300.815 Administrative record file for a remedial action.

(a) The administrative record file for the selection of a remedial action shall be made available for public inspection at the commencement of the remedial investigation phase. At such time, the lead agency shall publish in a major local newspaper of general circulation a notice of the availability of the administrative record file.

(b) The lead agency shall provide a public comment period as specified in § 300.430(f)(3) so that interested persons may submit comments on the selection of the remedial action for inclusion in the administrative record file. The lead agency is encouraged to consider and respond as appropriate to significant comments that were submitted prior to the public comment period. A written response to significant comments submitted during the public comment period shall be included in the administrative record file.

(c) The lead agency shall comply with the public participation procedures required in § 300.430(f)(3) and shall document such compliance in the administrative record.

(d) Documents generated or received after the record of decision is signed shall be added to the administrative record file only as provided in § 300.825.

§ 300.820 Administrative record file for a removal action.

(a) If, based on the site evaluation, the lead agency determines that a removal action is appropriate and that a planning period of at least six months exists before on-site removal activities must be initiated:

(1) The administrative record file shall be made available for public inspection when the engineering evaluation/cost analysis (EE/CA) is made available for public comment. At such time, the lead agency shall publish in a major local newspaper of general circulation a notice of the availability of the administrative record file.

(2) The lead agency shall provide a public comment period as specified in § 300.415 so that interested persons may submit comments on the selection of the removal action for inclusion in the administrative record file. The lead agency is encouraged to consider and respond, as appropriate, to significant comments that were submitted prior to the public comment period. A written response to significant comments submitted during the public comment period shall be included in the administrative record file.

(3) The lead agency shall comply with the public participation procedures of § 300.415(m) and shall document compliance with § 300.415(m)(3)(i) through (iii) in the administrative record file.

(4) Documents generated or received after the decision document is signed shall be added to the administrative record file only as provided in § 300.825.

(b) For all removal actions not included in paragraph (a) of this section:

(1) Documents included in the administrative record file shall be made available for public inspection no later than 60 days after initiation of on-site removal activity. At such time, the lead agency shall publish in a major local newspaper of general circulation a notice of availability of the administrative record file.

(2) The lead agency shall, as appropriate, provide a public comment period of not less than 30 days beginning at the time the administrative record file is made available to the

public. The lead agency is encouraged to consider and respond, as appropriate, to significant comments that were submitted prior to the public comment period. A written response to significant comments submitted during the public comment period shall be included in the administrative record file.

(3) Documents generated or received after the decision document is signed shall be added to the administrative record file only as provided in § 300.825.

§ 300.825 Record requirements after the decision document is signed.

(a) The lead agency may add documents to the administrative record file after the decision document selecting the response action has been signed if:

(1) The documents concern a portion of a response action decision that the decision document does not address or reserves to be decided at a later date; or

(2) An explanation of significant differences required by § 300.435(c), or an amended decision document is issued, in which case, the explanation of significant differences or amended decision document and all documents that form the basis for the decision to modify the response action shall be added to the administrative record file.

(b) The lead agency may hold additional public comment periods or extend the time for the submission of public comment after a decision document has been signed on any issues concerning selection of the response action. Such comment shall be limited to the issues for which the lead agency has requested additional comment. All additional comments submitted during such comment periods that are responsive to the request, and any response to these comments, along with documents supporting the request and any final decision with respect to the issue, shall be placed in the administrative record file.

(c) The lead agency is required to consider comments submitted by interested persons after the close of the public comment period only to the extent that the comments contain significant information not contained elsewhere in the administrative record file which could not have been submitted during the public comment period and which substantially support the need to significantly alter the response action. All such comments and any responses thereto shall be placed in the administrative record file.

Subpart J—Use of Dispersants and Other Chemicals

SOURCE: 55 FR 8861, Mar. 8, 1990, unless otherwise noted.

§ 300.900 General.

(a) Section 311(c)(2)(G) of the Clean Water Act requires that EPA prepare a schedule of dispersants and other chemicals, if any, that may be used in carrying out the NCP. This subpart makes provisions for such a schedule.

(b) This subpart applies to the navigable waters of the United States and adjoining shorelines, the waters of the contiguous zone, and the high seas beyond the contiguous zone in connection with activities under the Outer Continental Shelf Lands Act, activities under the Deepwater Port Act of 1974, or activities that may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States, including resources under the Magnuson Fishery Conservation and Management Act of 1976.

(c) This subpart applies to the use of any chemical agents or other additives as defined in subpart A of this part that may be used to remove or control oil discharges.

§ 300.905 NCP Product Schedule.

(a) *Oil Discharges.* (1) EPA shall maintain a schedule of dispersants and other chemical or biological products that may be authorized for use on oil discharges in accordance with the procedures set forth in § 300.910. This schedule, called the NCP Product Schedule, may be obtained from the Emergency Response Division (OS-210), U.S. Environmental Protection Agency, Washington, DC 20460. The telephone number is 1-202-382-2190.

(2) Products may be added to the NCP Product Schedule by the process specified in § 300.920.

(b) *Hazardous Substance Releases* [Reserved].

§ 300.910 Authorization of use.

(a) The OSC, with the concurrence of the EPA representative to the RRT and, as appropriate, the concurrence of the RRT representatives from the states with jurisdiction over the navigable waters threatened by the release or discharge, and in consultation with the DOC and DOI natural resource trustees, when practicable, may authorize the use of dispersants, surface collecting agents, biological additives, or miscellaneous oil spill control agents on the oil discharge, provided that the dispersants, surface collecting agents, biological additives, or miscellaneous oil spill control agents are listed on the NCP Product Schedule.

(b) The OSC, with the concurrence of the EPA representative to the RRT and, as appropriate, the concurrence of the RRT representatives from the states with jurisdiction over the navigable waters threatened by the release or discharge, and in consultation with the DOC and DOI natural resource trustees, when practicable, may authorize the use of burning agents on a case-by-case basis.

(c) The OSC may authorize the use of any dispersant, surface collecting agent, other chemical agent, burning agent, biological additive, or miscellaneous oil spill control agent, including products not listed on the NCP Product Schedule, without obtaining the concurrence of the EPA representative to the RRT, the RRT representatives from the states with jurisdiction over the navigable waters threatened by the release or discharge, when, in the judgment of the OSC, the use of the product is necessary to prevent or substantially reduce a hazard to human life. The OSC is to inform the EPA RRT representative and, as appropriate, the RRT representatives from the affected states and, when practicable, the DOC/DOI natural resource trustees of the use of a product not on the Schedule as soon as possible and, pursuant to the provisions in paragraph (a) of this section, obtain their concurrence or their comments on its continued use once the threat to human life has subsided.

(d) Sinking agents shall not be authorized for application to oil discharges.

(e) RRTs shall, as appropriate, consider, as part of their planning activities, the appropriateness of using the dispersants, surface collecting agents, biological additives, or miscellaneous oil spill control agents listed on the NCP Product Schedule, and the appropriateness of using burning agents. Regional Contingency Plans (RCPs) shall, as appropriate, address the use of such products in specific contexts. If the RRT representatives from the states with jurisdiction over the waters of the area to which an RCP applies and the DOC and DOI natural resource trustees approve in advance the use of certain products under specified circumstances as described in the RCP, the OSC may authorize the use of the products without obtaining the specific concurrences described in paragraphs (a) and (b) of this section.

§ 300.915 Data requirements.

(a) *Dispersants.* (1) Name, brand, or trademark, if any, under which the dispersant is sold.

(2) Name, address, and telephone number of the manufacturer, importer, or vendor.

(3) Name, address, and telephone number of primary distributors or sales outlets.

(4) Special handling and worker precautions for storage and field application. Maximum and minimum storage temperatures, to include optimum ranges as well as temperatures that will cause phase separations, chemical changes, or other alterations to the effectiveness of the product.

(5) Shelf life.

(6) Recommended application procedures, concentrations, and conditions for use depending upon water salinity, water temperature, types and ages of the pollutants, and any other application restrictions.

(7) Dispersant Toxicity. Use standard toxicity test methods described in Appendix C to part 300.

(8) Effectiveness. Use standard effectiveness test methods described in Appendix C to part 300. Manufacturers are also encouraged to provide data on

product performance under conditions other than those captured by these tests.

(9) The following data requirements incorporate by reference standards from the 1988 Annual Book of ASTM Standards. American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.[1]

(i) Flash Point—Select appropriate method from the following:

(A) ASTM—D 56-87, "Standard Test Method for Flash Point by Tag Closed Tester";

(B) ASTM—D 92-85, "Standard Test Method for Flash and Fire Points by Cleveland Open Cup";

(C) ASTM—D 93-85, "Standard Test Methods for Flash Point by Pensky-Martens Closed Tester";

(D) ASTM—D 1310-86, "Standard Test Method for Flash Point and Fire Point of Liquids by Tag Open-Cup Apparatus"; or

(E) ASTM—D 3278-82, "Standard Test Methods for Flash Point of Liquids by Setaflash Closed-Cup Apparatus."

(ii) Pour Point—Use ASTM—D 97-87, "Standard Test Method for Pour Point of Petroleum Oils."

(iii) Viscosity—Use ASTM—D 445-86, "Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)."

(iv) Specific Gravity—Use ASTM—D 1298-85, "Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method."

(v) pH—Use ASTM—D 1293-84, "Standard Test Methods for pH of Water."

(10) Dispersing Agent Components. Itemize by chemical name and percentage by weight each component of the total formulation. The percentages will include maximum, minimum, and average weights in order to reflect quality control variations in manufacture or formulation. In addition to the chemical information provided in response to the first two sentences, identify the major components in at least the following categories: surface active agents, solvents, and additives.

(11) Heavy Metals, Cyanide, and Chlorinated Hydrocarbons. Using standard test procedures, state the concentrations or upper limits of the following materials:

(i) Arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc, plus any other metals that may be reasonably expected to be in the sample. Atomic absorption methods should be used and the detailed analytical methods and sample preparation shall be fully described.

(ii) Cyanide. Standard calorimetric procedures should be used.

(iii) Chlorinated hydrocarbons. Gas chromatography should be used and the detailed analytical methods and sample preparation shall be fully described.

(12) The technical product data submission shall include the identity of the laboratory that performed the required tests, the qualifications of the laboratory staff, including professional biographical information for individuals responsible for any tests, and laboratory experience with similar tests. Laboratories performing toxicity tests for dispersant toxicity must demonstrate previous toxicity test experience in order for their results to be accepted. It is the responsibility of the submitter to select competent analytical laboratories based on the guidelines contained herein. EPA reserves the right to refuse to accept a submission of technical product data because of lack of qualification of the analytical laboratory, significant variance between submitted data and any laboratory confirmation performed by EPA, or other circumstances that would result in inadequate or inaccurate information on the dispersing agent.

(b) *Surface collecting agents.* (1) Name, brand, or trademark, if any, under which the product is sold.

[1] Copies of these standards may be obtained from the publisher. Copies may be inspected at the U.S. Environmental Protection Agency, 401 M St., SW., Room LG, Washington, DC, or at the Office of the Federal Register, 1100 L Street, NW., Room 8401, Washington, DC.

(2) Name, address, and telephone number of the manufacturer, importer, or vendor.

(3) Name, address, and telephone number of primary distributors or sales outlets.

(4) Special handling and worker precautions for storage and field application. Maximum and minimum storage temperatures, to include optimum ranges as well as temperatures that will cause phase separations, chemical changes, or other alterations to the effectiveness of the product.

(5) Shelf life.

(6) Recommended application procedures, concentrations, and conditions for use depending upon water salinity, water temperature, types and ages of the pollutants, and any other application restrictions.

(7) Toxicity. Use standard toxicity test methods described in Appendix C to Part 300.

(8) The following data requirements incorporate by reference standards from the 1988 Annual Book of ASTM Standards. American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.[2]

(i) Flash Point—Select appropriate method from the following:

(A) ASTM—D 56-87, "Standard Test Method for Flash Point by Tag Closed Tester";

(B) ASTM—D 92-85, "Standard Test Method for Flash and Fire Points by Cleveland Open Cup";

(C) ASTM—D 93-85, "Standard Test Methods for Flash Point by Pensky-Martens Closed Tester";

(D) ASTM—D 1310-86, "Standard Test Method for Flash Point and Fire Point of Liquids by Tag Open-Cup Apparatus"; or

(E) ASTM—D 3278-82, "Standard Test Methods for Flash Point of Liquids by Setaflash Closed-Cup Apparatus."

(ii) Pour Point—Use ASTM—D 97-87, "Standard Test Method for Pour Point of Petroleum Oils."

(iii) Viscosity—Use ASTM—D 445-86, "Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)."

(iv) Specific Gravity—Use ASTM—D 1298-85, "Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method."

(v) pH—Use ASTM—D 1293-84, "Standard Test Methods for pH of Water."

(9) Test to Distinguish Between Surface Collecting Agents and Other Chemical Agents.

(i) Method Summary—Five milliliters of the chemical under test are mixed with 95 milliliters of distilled water and allowed to stand undisturbed for one hour. Then the volume of the upper phase is determined to the nearest one milliliter.

(ii) Apparatus.

(A) Mixing Cylinder: 100 milliliter subdivisions and fitted with a glass stopper.

(B) Pipettes: Volumetric pipette, 5.0 milliliter.

(C) Timers.

(iii) Procedure—Add 95 milliliters of distilled water at 22 °C, plus or minus 3 °C, to a 100 milliliter mixing cylinder. To the surface of the water in the mixing cylinder, add 5.0 milliliters of the chemical under test. Insert the stopper and invert the cylinder five times in ten seconds. Set upright for one hour at 22 °C, plus or minus 3 °C, and then measure the chemical layer at the surface of the water. If the major portion of the chemical added (75 percent) is at the water surface as a separate and easily distinguished layer, the product is a surface collecting agent.

(10) Surface Collecting Agent Components. Itemize by chemical name and percentage by weight each component of the total formulation. The percentages should include maximum, minimum, and average weights in order to reflect quality control vari-

[2] Copies of these standards may be obtained from the publisher. Copies may be inspected at the U.S. Environmental Protection Agency, 401 M St., SW., Room LG, Washington, DC, or at the Office of the Federal Register, 1100 L Street, NW., Room 8401, Washington, DC.

ations in manufacture or formulation. In addition to the chemical information provided in response to the first two sentences, identify the major components in at least the following categories: surface action agents, solvents, and additives.

(11) Heavy Metals, Cyanide, and Chlorinated Hydrocarbons. Follow specifications in paragraph (a)(15) of this section.

(12) Analytical Laboratory Requirements for Technical Product Data. Follow specifications in paragraph (a)(16) of this section.

(c) *Biological Additives.* (1) Name, brand, or trademark, if any, under which the additive is sold.

(2) Name, address, and telephone number of the manufacturer, importer, or vendor.

(3) Name, address, and telephone number of primary distributors or sales outlets.

(4) Special handling and worker precautions for storage and field application. Maximum and minimum storage temperatures.

(5) Shelf life.

(6) Recommended application procedures, concentrations, and conditions for use, depending upon water salinity, water temperature, types and ages of the pollutants, and any other application restrictions.

(7) Statements and supporting data on the effectiveness of the additive, including degradation rates, and on the test conditions under which the effectiveness data were obtained.

(8) For microbiological cultures, furnish the following information:

(i) Listing of all microorganisms by species.

(ii) Percentage of each species in the composition of the additive.

(iii) Optimum pH, temperature, and salinity ranges for use of the additive, and maximum and minimum pH, temperature, and salinity levels above or below which the effectiveness of the additive is reduced to half its optimum capacity.

(iv) Special nutrient requirements, if any.

(v) Separate listing of the following, and test methods for such determinations: Salmonella, fecal coliform, Shigella, Staphylococcus Coagulase positive, and Beta Hemolytic Streptococci.

(9) For enzyme additives furnish the following information:

(i) Enzyme name(s).

(ii) International Union of Biochemistry (I.U.B.) number(s).

(iii) Source of the enzyme.

(iv) Units.

(v) Specific Activity.

(vi) Optimum pH, temperature, and salinity ranges for use of the additive, and maximum and minimum pH, temperature, and salinity levels above or below which the effectiveness of the additive is reduced to half its optimum capacity.

(vii) Enzyme shelf life.

(viii) Enzyme optimum storage conditions.

(10) Laboratory Requirements for Technical Product Data. Follow specifications in paragraph (a)(16) of this section.

(d) *Burning Agents.* EPA does not require technical product data submissions for burning agents and does not include burning agents on the NCP Product Schedule.

(e) *Miscellaneous Oil Spill Control Agents.* (1) Name, brand, or trademark, if any, under which the miscellaneous oil spill control agent is sold.

(2) Name, address, and telephone number of the manufacturer, importer, or vendor.

(3) Name, address, and telephone number of primary distributors or sales outlets.

(4) Special handling and worker precautions for storage and field application. Maximum and minimum storage temperatures, to include optimum ranges as well as temperatures that will cause phase separations, chemical changes, or other alternatives to the effectiveness of the product.

(5) Shelf life.

(6) Recommended application procedures, concentrations, and conditions for use depending upon water salinity, water temperature, types and ages of the pollutants, and any other application restrictions.

(7) Toxicity. Use standard toxicity test methods described in Appendix C to part 300.

(8) The following data requirements incorporate by reference standards

from the 1988 Annual Book of ASTM Standards. American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.[3]

(i) Flash Point—Select appropriate method from the following:

(A) ASTM—D 56-87, "Standard Test Method for Flash Point by Tag Closed Tester";

(B) ASTM—D 92-85, "Standard Test Method for Flash and Fire Points by Cleveland Open Cup";

(C) ASTM—D 93-85, "Standard Test Methods for Flash Point by Pensky-Martens Closed Tester";

(D) ASTM—D 1310-86, "Standard Test Method for Flash Point and Fire Point of Liquids by Tag Open-Cup Apparatus"; or

(E) ASTM—D 3278-82, "Standard Test Methods for Flash Point of Liquids by Setaflash Closed-Cup Apparatus."

(ii) Pour Point—Use ASTM—D 97-87, "Standard Test Method for Pour Point of Petroleum Oils."

(iii) Viscosity—Use ASTM—D 445-86, "Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)."

(iv) Specific Gravity—Use ASTM—D 1298-85, "Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method."

(v) pH—Use ASTM—D 1293-84, "Standard Test Methods for pH of Water."

(9) Miscellaneous Oil Spill Control Agent Components. Itemize by chemical name and percentage by weight each component of the total formulation. The percentages should include maximum, minimum, and average weights in order to reflect quality control variations in manufacture or formulation. In addition to the chemical information provided in response to the first two sentences, identify the major components in at least the following categories: surface active agents, solvents, and additives.

(10) Heavy Metals, Cyanide, and Chlorinated Hydrocarbons. Follow specifications in paragraph (a)(15) of this section.

(11) For any miscellaneous oil spill control agent that contains microbiological cultures or enzyme additives, furnish the information specified in paragraphs (c)(8) and (c)(9) of this section, as appropriate.

(12) Analytical Laboratory Requirements for Technical Product Data. Follow specifications in paragraph (a)(16) of this section.

§ 300.920 Addition of products to schedule.

(a) To add a dispersant, surface collecting agent, biological additive, or miscellaneous oil spill control agent to the NCP Product Schedule, the technical product data specified in § 300.915 must be submitted to the Emergency Response Division (OS-210), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460. If EPA determines that the required data were submitted, EPA will add the product to the schedule.

(b) EPA will inform the submitter in writing, within 60 days of the receipt of technical product data, of its decision on adding the product to the schedule.

(c) The submitter may assert that certain information in the technical product data submissions is confidential business information. EPA will handle such claims pursuant to the provisions in 40 CFR part 2, subpart B. Such information must be submitted separately from non-confidential information, clearly identified, and clearly marked "Confidential Business Information." If the submitter fails to make such a claim at the time of submittal, EPA may make the information available to the public without further notice.

(d) The submitter must notify EPA of any changes in the composition,

[3] Copies of these standards may be obtained from the publisher. Copies may be inspected at the U.S. Environmental Protection Agency, 401 M St., SW., Room LG, Washington, DC, or at the Office of the Federal Register, 1100 L Street, NW., Room 8401, Washington, DC.

formulation, or application of the dispersant, surface collecting agent, biological additive, or miscellaneous oil spill control agent. On the basis of this data, EPA may require retesting of the product if the change is likely to affect the effectiveness or toxicity of the product.

(e) The listing of a product on the NCP Product Schedule does not constitute approval of the product. To avoid possible misinterpretation or misrepresentation, any label, advertisement, or technical literature that refers to the placement of the product on the ~~NCP Schedule must either re~~produce in its entirety EPA's written statement that it will add the product to the NCP Product Schedule under § 300.920(b), or include the disclaimer shown below. If the disclaimer is used, it must be conspicuous and must be fully reproduced. Failure to comply with these restrictions or any other improper attempt to demonstrate the approval of the product by any NRT or other U.S. Government agency shall constitute grounds for removing the product from the NCP Product Schedule.

DISCLAIMER

[PRODUCT NAME] is on the U.S. Environmental Protection Agency's NCP Product Schedule. This listing does NOT mean that EPA approves, recommends, licenses, certifies, or authorizes the use of [product name] on an oil discharge. This listing means only that data have been submitted to EPA as required by subpart J of the National Contingency Plan, § 300.915.

SECTION 2

PART III

RULES AND REGULATIONS

40 CFR 112

OIL POLLUTION PREVENTION

EPA predesignated On-Scene Coordinator (OSC) for the geographic area where the discharge occurs. All such reports shall be promptly relayed to the NRC. If it is not possible to notify the NRC or the predesignated OCS immediately, reports may be made immediately to the nearest Coast Guard unit, provided that the person in charge of the vessel or onshore or offshore facility notifies the NRC as soon as possible. The reports shall be made in accordance with such procedures as the Secretary of Transportation may prescribe. The procedures for such notice are set forth in U.S. Coast Guard regulations, 33 CFR part 153, subpart B and in the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR part 300, subpart E. (Approved by the Office of Management and Budget under the control number 2050-0046)

§ 110.11 Discharge at deepwater ports.

(a) Except as provided in paragraph (b) below, for purposes of section 18(m)(3) of the Deepwater Port Act of 1974, the term "discharge" shall include but not be limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping into the marine environment of quantities of oil that:

(1) Violate applicable water quality standards, or

(2) Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.

(b) For purposes of section 18(m)(3) of the Deepwater Port Act of 1974, the term "discharge" excludes:

(1) Discharges of oil from a properly functioning vessel engine, (including an engine on a public vessel), but not discharges of such oil accumulated in a vessel's bilges (unless in compliance with MARPOL 73/78, Annex I); and

(2) Discharges of oil permitted under MARPOL 73/78, Annex I.

PART 112—OIL POLLUTION PREVENTION

Sec.

112.1 General applicability.
112.2 Definitions.
112.3 Requirements for preparation and implementation of Spill Prevention Control and Countermeasure Plans.
112.4 Amendment of SPCC Plans by Regional Administrator.
112.5 Amendment of Spill Prevention Control and Countermeasure Plans by owners or operators.
112.6 Civil penalties for violation of oil pollution prevention regulations.
112.7 Guidelines for the preparation and implementation of a Spill Prevention Control and Countermeasure Plan.

APPENDIX—MEMORANDUM OF UNDERSTANDING BETWEEN THE SECRETARY OF TRANSPORTATION AND THE ADMINISTRATOR OF THE ENVIRONMENTAL PROTECTION AGENCY

AUTHORITY: Secs. 311(j)(1)(C), 311(j)(2), 501(a), Federal Water Pollution Control Act (sec. 2, Pub. L. 92-500, 86 Stat. 816 et seq. (33 U.S.C. 1251 et seq.)); sec. 4(b), Pub. L. 92-500, 86 Stat. 897; 5 U.S.C. Reorg. Plan of 1970 No. 3 (1970), 35 FR 15623, 3 CFR 1966-1970 Comp.; E.O. 11735, 38 FR 21243, 3 CFR.

SOURCE: 38 FR 34165, Dec. 11, 1973, unless otherwise noted.

§ 112.1 General applicability.

(a) This part establishes procedures, methods and equipment and other requirements for equipment to prevent the discharge of oil from non-transportation-related onshore and offshore facilities into or upon the navigable waters of the United States or adjoining shorelines.

(b) Except as provided in paragraph (d) of this section, this part applies to owners or operators of non-transportation-related onshore and offshore facilities engaged in drilling, producing, gathering, storing, processing, refining, transferring, distributing or consuming oil and oil products, and which, due to their location, could reasonably be expected to discharge oil in harmful quantities, as defined in part 110 of this chapter, into or upon the navigable waters of the United States or adjoining shorelines.

(c) As provided in section 313 (86 Stat. 875) departments, agencies, and instrumentalities of the Federal gov-

ernment are subject to these regulations to the same extent as any person, except for the provisions of § 112.6.

(d) This part does not apply to:

(1) Facilities, equipment or operations which are not subject to the jurisdiction of the Environmental Protection Agency, as follows:

(i) Onshore and offshore facilities, which, due to their location, could not reasonably be expected to discharge oil into or upon the navigable waters of the United States or adjoining shorelines. This determination shall be based solely upon a consideration of the geographical, locational aspects of the facility (such as proximity to navigable waters or adjoining shorelines, land contour, drainage, etc.) and shall exclude consideration of manmade features such as dikes, equipment or other structures which may serve to restrain, hinder, contain, or otherwise prevent a discharge of oil from reaching navigable waters of the United States or adjoining shorelines; and

(ii) Equipment or operations of vessels or transportation-related onshore and offshore facilities which are subject to authority and control of the Department of Transportation, as defined in the Memorandum of Understanding between the Secretary of Transportation and the Administrator of the Environmental Protection Agency, dated November 24, 1971, 36 FR 24000.

(2) Those facilities which, although otherwise subject to the jurisdiction of the Environmental Protection Agency, meet both of the following requirements:

(i) The underground buried storage capacity of the facility is 42,000 gallons or less of oil, and

(ii) The storage capacity, which is not buried, of the facility is 1,320 gallons or less of oil, provided no single container has a capacity in excess of 660 gallons.

(e) This part provides for the preparation and implementation of Spill Prevention Control and Countermeasure Plans prepared in accordance with § 112.7, designed to complement existing laws, regulations, rules, standards, policies and procedures pertaining to safety standards, fire prevention and pollution prevention rules, so as to form a comprehensive balanced Federal/State spill prevention program to minimize the potential for oil discharges. Compliance with this part does not in any way relieve the owner or operator of an onshore or an offshore facility from compliance with other Federal, State or local laws.

[38 FR 34165, Dec. 11, 1973, as amended at 41 FR 12657, Mar. 26, 1976]

§ 112.2 Definitions.

For the purposes of this part:

(a) *Oil* means oil of any kind or in any form, including, but not limited to petroleum, fuel oil, sludge, oil refuse and oil mixed with wastes other than dredged spoil.

(b) *Discharge* includes but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying or dumping. For purposes of this part, the term *discharge* shall not include any discharge of oil which is authorized by a permit issued pursuant to section 13 of the River and Harbor Act of 1899 (30 Stat. 1121, 33 U.S.C. 407), or sections 402 or 405 of the FWPCA Amendments of 1972 (86 Stat. 816 et seq., 33 U.S.C. 1251 et seq.).

(c) *Onshore facility* means any facility of any kind located in, on, or under any land within the United States, other than submerged lands, which is not a transportation-related facility.

(d) *Offshore facility* means any facility of any kind located in, on, or under any of the navigable waters of the United States, which is not a transportation-related facility.

(e) *Owner or operator* means any person owning or operating an onshore facility or an offshore facility, and in the case of any abandoned offshore facility, the person who owned or operated such facility immediately prior to such abandonment.

(f) *Person* includes an individual, firm, corporation, association, and a partnership.

(g) *Regional Administrator*, means the Regional Administrator of the Environmental Protection Agency, or his designee, in and for the Region in which the facility is located.

(h) *Transportation-related* and *non-transportation-related* as applied to an onshore or offshore facility, are defined in the Memorandum of Understanding between the Secretary of Transportation and the Administrator of the Environmental Protection Agency, dated November 24, 1971, 36 FR 24080.

(i) *Spill event* means a discharge of oil into or upon the navigable waters of the United States or adjoining shorelines in harmful quantities, as defined at 40 CFR part 110.

(j) *United States* means the States, the District of Columbia, the Commonwealth of Puerto Rico, the Canal Zone, Guam, American Samoa, the Virgin Islands, and the Trust Territory of the Pacific Islands.

(k) The term *navigable waters* of the United States means *navigable waters* as defined in section 502(7) of the FWPCA, and includes:

(1) All navigable waters of the United States, as defined in judicial decisions prior to passage of the 1972 Amendments to the FWPCA (Pub. L. 92-500), and tributaries of such waters;

(2) Interstate waters;

(3) Intrastate lakes, rivers, and streams which are utilized by interstate travelers for recreational or other purposes; and

(4) Intrastate lakes, rivers, and streams from which fish or shellfish are taken and sold in interstate commerce.

(l) *Vessel* means every description of watercraft or other artificial contrivance used, or capable of being used as a means of transportation on water, other than a public vessel.

§ 112.3 Requirements for preparation and implementation of Spill Prevention Control and Countermeasure Plans.

(a) Owners or operators of onshore and offshore facilities in operation on or before the effective date of this part that have discharged or, due to their location, could reasonably be expected to discharge oil in harmful quantities, as defined in 40 CFR part 110, into or upon the navigable waters of the United States or adjoining shorelines, shall prepare a Spill Prevention Control and Countermeasure Plan (hereinafter "SPCC Plan"), in writing and in accordance with § 112.7. Except as provided for in paragraph (f) of this section, such SPCC Plan shall be prepared within six months after the effective date of this part and shall be fully implemented as soon as possible, but not later than one year after the effective date of this part.

(b) Owners or operators of onshore and offshore facilities that become operational after the effective date of this part, and that have discharged or could reasonably be expected to discharge oil in harmful quantities, as defined in 40 CFR part 110, into or upon the navigable waters of the United States or adjoining shorelines, shall prepare an SPCC Plan in accordance with § 112.7. Except as provided for in paragraph (f) of this section, such SPCC Plan shall be prepared within six months after the date such facility begins operations and shall be fully implemented as soon as possible, but not later than one year after such facility begins operations.

(c) Owners or operators of onshore and offshore mobile or portable facilities, such as onshore drilling or workover rigs, barge mounted offshore drilling or workover rigs, and portable fueling facilities shall prepare and implement an SPCC Plan as required by paragraphs (a), (b) and (d) of this section. The owners or operators of such facility need not prepare a new SPCC Plan each time the facility is moved to a new site. The SPCC Plan may be a general plan, prepared in accordance with § 112.7, using good engineering practice. When the mobile or portable facility is moved, it must be located and installed using the spill prevention practices outlined in the SPCC Plan for the facility. No mobile or portable facility subject to this regulation shall operate unless the SPCC Plan has been implemented. The SPCC Plan shall only apply while the facility is in a fixed (non-transportation) operating mode.

(d) No SPCC Plan shall be effective to satisfy the requirements of this part unless it has been reviewed by a Registered Professional Engineer and certified to by such Professional Engineer. By means of this certification

the engineer, having examined the facility and being familiar with the provisions of this part, shall attest that the SPCC Plan has been prepared in accordance with good engineering practices. Such certification shall in no way relieve the owner or operator of an onshore or offshore facility of his duty to prepare and fully implement such Plan in accordance with § 112.7, as required by paragraphs (a), (b) and (c) of this section.

(e) Owners or operators of a facility for which an SPCC Plan is required pursuant to paragraph (a), (b) or (c) of this section shall maintain a complete copy of the Plan at such facility if the facility is normally attended at least 8 hours per day, or at the nearest field office if the facility is not so attended, and shall make such Plan available to the Regional Administrator for on-site review during normal working hours.

(f) Extensions of time.

(1) The Regional Administrator may authorize an extension of time for the preparation and full implementation of an SPCC Plan beyond the time permitted for the preparation and implementation of an SPCC Plan pursuant to paragraph (a), (b) or (c) of this section where he finds that the owner or operator of a facility subject to paragraphs (a), (b) or (c) of this section cannot fully comply with the requirements of this part as a result of either nonavailability of qualified personnel, or delays in construction or equipment delivery beyond the control and without the fault of such owner or operator or their respective agents or employees.

(2) Any owner or operator seeking an extension of time pursuant to paragraph (f)(1) of this section may submit a letter of request to the Regional Administrator. Such letter shall include:

(i) A complete copy of the SPCC Plan, if completed;

(ii) A full explanation of the cause for any such delay and the specific aspects of the SPCC Plan affected by the delay;

(iii) A full discussion of actions being taken or contemplated to minimize or mitigate such delay;

(iv) A proposed time schedule for the implementation of any corrective actions being taken or contemplated, including interim dates for completion of tests or studies, installation and operation of any necessary equipment or other preventive measures.

In addition, such owner or operator may present additional oral or written statements in support of his letter of request.

(3) The submission of a letter of request for extension of time pursuant to paragraph (f)(2) of this section shall in no way relieve the owner or operator from his obligation to comply with the requirements of § 112.3 (a), (b) or (c). Where an extension of time is authorized by the Regional Administrator for particular equipment or other specific aspects of the SPCC Plan, such extension shall in no way affect the owner's or operator's obligation to comply with the requirements of § 112.3 (a), (b) or (c) with respect to other equipment or other specific aspects of the SPCC Plan for which an extension of time has not been expressly authorized.

[38 FR 34165, Dec. 11, 1973, as amended at 41 FR 12657, Mar. 26, 1976]

§ 112.4 Amendment of SPCC Plans by Regional Administrator.

(a) Notwithstanding compliance with § 112.3, whenever a facility subject to § 112.3 (a), (b) or (c) has: Discharged more than 1,000 U.S. gallons of oil into or upon the navigable waters of the United States or adjoining shorelines in a single spill event, or discharged oil in harmful quantities, as defined in 40 CFR part 110, into or upon the navigable waters of the United States or adjoining shorelines in two spill events, reportable under section 311(b)(5) of the FWPCA, occurring within any twelve month period, the owner or operator of such facility shall submit to the Regional Administrator, within 60 days from the time such facility becomes subject to this section, the following:

(1) Name of the facility;

(2) Name(s) of the owner or operator of the facility;

(3) Location of the facility;

(4) Date and year of initial facility operation;

(5) Maximum storage or handling capacity of the facility and normal daily throughput;

(6) Description of the facility, including maps, flow diagrams, and topographical maps;

(7) A complete copy of the SPCC Plan with any amendments;

(8) The cause(s) of such spill, including a failure analysis of system or subsystem in which the failure occurred;

(9) The corrective actions and/or countermeasures taken, including an adequate description of equipment repairs and/or replacements;

(10) Additional preventive measures taken or contemplated to minimize the possibility of recurrence;

(11) Such other information as the Regional Administrator may reasonably require pertinent to the Plan or spill event.

(b) Section 112.4 shall not apply until the expiration of the time permitted for the preparation and implementation of an SPCC Plan pursuant to § 112.3 (a), (b), (c) and (f).

(c) A complete copy of all information provided to the Regional Administrator pursuant to paragraph (a) of this section shall be sent at the same time to the State agency in charge of water pollution control activities in and for the State in which the facility is located. Upon receipt of such information such State agency may conduct a review and make recommendations to the Regional Administrator as to further procedures, methods, equipment and other requirements for equipment necessary to prevent and to contain discharges of oil from such facility.

(d) After review of the SPCC Plan for a facility subject to paragraph (a) of this section, together with all other information submitted by the owner or operator of such facility, and by the State agency under paragraph (c) of this section, the Regional Administrator may require the owner or operator of such facility to amend the SPCC Plan if he finds that the Plan does not meet the requirements of this part or that the amendment of the Plan is necessary to prevent and to contain discharges of oil from such facility.

(e) When the Regional Administrator proposes to require an amendment to the SPCC Plan, he shall notify the facility operator by certified mail addressed to, or by personal delivery to, the facility owner or operator, that he proposes to require an amendment to the Plan, and shall specify the terms of such amendment. If the facility owner or operator is a corporation, a copy of such notice shall also be mailed to the registered agent, if any, of such corporation in the State where such facility is located. Within 30 days from receipt of such notice, the facility owner or operator may submit written information, views, and arguments on the amendment. After considering all relevant material presented, the Regional Administrator shall notify the facility owner or operator of any amendment required or shall rescind the notice. The amendment required by the Regional Administrator shall become part of the Plan 30 days after such notice, unless the Regional Administrator, for good cause, shall specify another effective date. The owner or operator of the facility shall implement the amendment of the Plan as soon as possible, but not later than six months after the amendment becomes part of the Plan, unless the Regional Administrator specifies another date.

(f) An owner or operator may appeal a decision made by the Regional Administrator requiring an amendment to an SPCC Plan. The appeal shall be made to the Administrator of the United States Environmental Protection Agency and must be made in writing within 30 days of receipt of the notice from the Regional Administrator requiring the amendment. A complete copy of the appeal must be sent to the Regional Administrator at the time the appeal is made. The appeal shall contain a clear and concise statement of the issues and points of fact in the case. It may also contain additional information from the owner or operator, or from any other person. The Administrator or his designee may request additional information from the owner or operator, or from any other person. The Administrator or his designee shall render a decision within 60 days of receiving the appeal and shall notify the owner or operator of his decision.

[38 FR 34165, Dec. 11, 1973, as amended at 41 FR 12658, Mar. 26, 1976]

§ 112.5 Amendment of Spill Prevention Control and Countermeasure Plans by owners or operators.

(a) Owners or operators of facilities subject to § 112.3 (a), (b) or (c) shall amend the SPCC Plan for such facility in accordance with § 112.7 whenever there is a change in facility design, construction, operation or maintenance which materially affects the facility's potential for the discharge of oil into or upon the navigable waters of the United States or adjoining shore lines. Such amendments shall be fully implemented as soon as possible, but not later than six months after such change occurs.

(b) Notwithstanding compliance with paragraph (a) of this section, owners and operators of facilities subject to § 112.3 (a), (b) or (c) shall complete a review and evaluation of the SPCC Plan at least once every three years from the date such facility becomes subject to this part. As a result of this review and evaluation, the owner or operator shall amend the SPCC Plan within six months of the review to include more effective prevention and control technology if: (1) Such technology will significantly reduce the likelihood of a spill event from the facility, and (2) if such technology has been field-proven at the time of the review.

(c) No amendment to an SPCC Plan shall be effective to satisfy the requirements of this section unless it has been certified by a Professional Engineer in accordance with § 112.3(d).

§ 112.6 Civil penalties for violation of oil pollution prevention regulations.

Owners or operators of facilities subject to § 112.3 (a), (b) or (c) who violate the requirements of this part 112 by failing or refusing to comply with any of the provisions of § 112.3, § 112.4 or § 112.5 shall be liable for a civil penalty of not more than $5,000 for each day such violation continues. Civil penalties shall be imposed in accordance with procedures set out in part 114 of this subchapter D.

(Secs. 311(j), 501(a), Pub. L. 92-500, 86 Stat. 868, 885 (33 U.S.C. 1321(j), 1361(a)))

[39 FR 31602, Aug. 29, 1974]

§ 112.7 Guidelines for the preparation and implementation of a Spill Prevention Control and Countermeasure Plan.

The SPCC Plan shall be a carefully thought-out plan, prepared in accordance with good engineering practices, and which has the full approval of management at a level with authority to commit the necessary resources. If the plan calls for additional facilities or procedures, methods, or equipment not yet fully operational, these items should be discussed in separate paragraphs, and the details of installation and operational start-up should be explained separately. The complete SPCC Plan shall follow the sequence outlined below, and include a discussion of the facility's conformance with the appropriate guidelines listed:

(a) A facility which has experienced one or more spill events within twelve months prior to the effective date of this part should include a written description of each such spill, corrective action taken and plans for preventing recurrence.

(b) Where experience indicates a reasonable potential for equipment failure (such as tank overflow, rupture, or leakage), the plan should include a prediction of the direction, rate of flow, and total quantity of oil which could be discharged from the facility as a result of each major type of failure.

(c) Appropriate containment and/or diversionary structures or equipment to prevent discharged oil from reaching a navigable water course should be provided. One of the following preventive systems or its equivalent should be used as a minimum:

(1) Onshore facilities:

(i) Dikes, berms or retaining walls sufficiently impervious to contain spilled oil;

(ii) Curbing;

(iii) Culverting, gutters or other drainage systems;

(iv) Weirs, booms or other barriers;

(v) Spill diversion ponds;

(vi) Retention ponds;

(vii) Sorbent materials.

(2) Offshore facilities:

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(i) Curbing, drip pans;

(ii) Sumps and collection systems.

(d) When it is determined that the installation of structures or equipment listed in § 112.7(c) to prevent discharged oil from reaching the navigable waters is not practicable from any onshore or offshore facility, the owner or operator should clearly demonstrate such impracticability and provide the following:

(1) A strong oil spill contingency plan following the provision of 40 CFR part 109.

(2) A written commitment of manpower, equipment and materials required to expeditiously control and remove any harmful quantity of oil discharged.

(e) In addition to the minimal prevention standards listed under § 112.7(c), sections of the Plan should include a complete discussion of conformance with the following applicable guidelines, other effective spill prevention and containment procedures (or, if more stringent, with State rules, regulations and guidelines):

(1) *Facility drainage (onshore); (excluding production facilities).* (i) Drainage from diked storage areas should be restrained by valves or other positive means to prevent a spill or other excessive leakage of oil into the drainage system or inplant effluent treatment system, except where plan systems are designed to handle such leakage. Diked areas may be emptied by pumps or ejectors; however, these should be manually activated and the condition of the accumulation should be examined before starting to be sure no oil will be discharged into the water.

(ii) Flapper-type drain valves should not be used to drain diked areas. Valves used for the drainage of diked areas should, as far as practical, be of manual, open-and-closed design. When plant drainage drains directly into water courses and not into wastewater treatment plants, retained storm water should be inspected as provided in paragraphs (e)(2)(iii) (B), (C) and (D) of this section before drainage.

(iii) Plant drainage systems from undiked areas should, if possible, flow into ponds, lagoons or catchment basins, designed to retain oil or return it to the facility. Catchment basins should not be located in areas subject to periodic flooding.

(iv) If plant drainage is not engineered as above, the final discharge of all in-plant ditches should be equipped with a diversion system that could, in the event of an uncontrolled spill, return the oil to the plant.

(v) Where drainage waters are treated in more than one treatment unit, natural hydraulic flow should be used. If pump transfer is needed, two "lift" pumps should be provided, and at least one of the pumps should be permanently installed when such treatment is continuous. In any event, whatever techniques are used facility drainage systems should be adequately engineered to prevent oil from reaching navigable waters in the event of equipment failure or human error at the facility.

(2) *Bulk storage tanks (onshore); (excluding production facilities).* (i) No tank should be used for the storage of oil unless its material and construction are compatible with the material stored and conditions of storage such as pressure and temperature, etc.

(ii) All bulk storage tank installations should be constructed so that a secondary means of containment is provided for the entire contents of the largest single tank plus sufficient freeboard to allow for precipitation. Diked areas should be sufficiently impervious to contain spilled oil. Dikes, containment curbs, and pits are commonly employed for this purpose, but they may not always be appropriate. An alternative system could consist of a complete drainage trench enclosure arranged so that a spill could terminate and be safely confined in an inplant catchment basin or holding pond.

(iii) Drainage of rainwater from the diked area into a storm drain or an effluent discharge that empties into an open water course, lake, or pond, and bypassing the in-plant treatment system may be acceptable if:

(A) The bypass valve is normally sealed closed.

(B) Inspection of the run-off rain water ensures compliance with applicable water quality standards and will

not cause a harmful discharge as defined in 40 CFR part 110.

(C) The bypass valve is opened, and resealed following drainage under responsible supervision.

(D) Adequate records are kept of such events.

(iv) Buried metallic storage tanks represent a potential for undetected spills. A new buried installation should be protected from corrosion by coatings, cathodic protection or other effective methods compatible with local soil conditions. Such buried tanks should at least be subjected to regular pressure testing.

(v) Partially buried metallic tanks for the storage of oil should be avoided, unless the buried section of the shell is adequately coated, since partial burial in damp earth can cause rapid corrosion of metallic surfaces, especially at the earth/air interface.

(vi) Aboveground tanks should be subject to periodic integrity testing, taking into account tank design (floating roof, etc.) and using such techniques as hydrostatic testing, visual inspection or a system of non-destructive shell thickness testing. Comparison records should be kept where appropriate, and tank supports and foundations should be included in these inspections. In addition, the outside of the tank should frequently be observed by operating personnel for signs of deterioration, leaks which might cause a spill, or accumulation of oil inside diked areas.

(vii) To control leakage through defective internal heating coils, the following factors should be considered and applied, as appropriate.

(A) The steam return or exhaust lines from internal heating coils which discharge into an open water course should be monitored for contamination, or passed through a settling tank, skimmer, or other separation or retention system.

(B) The feasibility of installing an external heating system should also be considered.

(viii) New and old tank installations should, as far as practical, be fail-safe engineered or updated into a fail-safe engineered installation to avoid spills. Consideration should be given to providing one or more of the following devices:

(A) High liquid level alarms with an audible or visual signal at a constantly manned operation or surveillance station; in smaller plants an audible air vent may suffice.

(B) Considering size and complexity of the facility, high liquid level pump cutoff devices set to stop flow at a predetermined tank content level.

(C) Direct audible or code signal communication between the tank gauger and the pumping station.

(D) A fast response system for determining the liquid level of each bulk storage tank such as digital computers, telepulse, or direct vision gauges or their equivalent.

(E) Liquid level sensing devices should be regularly tested to insure proper operation.

(ix) Plant effluents which are discharged into navigable waters should have disposal facilities observed frequently enough to detect possible system upsets that could cause an oil spill event.

(x) Visible oil leaks which result in a loss of oil from tank seams, gaskets, rivets and bolts sufficiently large to cause the accumulation of oil in diked areas should be promptly corrected.

(xi) Mobile or portable oil storage tanks (onshore) should be positioned or located so as to prevent spilled oil from reaching navigable waters. A secondary means of containment, such as dikes or catchment basins, should be furnished for the largest single compartment or tank. These facilities should be located where they will not be subject to periodic flooding or washout.

(3) *Facility transfer operations, pumping, and in-plant process (onshore); (excluding production facilities).* (i) Buried piping installations should have a protective wrapping and coating and should be cathodically protected if soil conditions warrant. If a section of buried line is exposed for any reason, it should be carefully examined for deterioration. If corrosion damage is found, additional examination and corrective action should be taken as indicated by the magnitude of the damage. An alternative would

be the more frequent use of exposed pipe corridors or galleries.

(ii) When a pipeline is not in service, or in standby service for an extended time the terminal connection at the transfer point should be capped or blank-flanged, and marked as to origin.

(iii) Pipe supports should be properly designed to minimize abrasion and corrosion and allow for expansion and contraction.

(iv) All aboveground valves and pipelines should be subjected to regular examinations by operating personnel at which time the general condition of items, such as flange joints, expansion joints, valve glands and bodies, catch pans, pipeline supports, locking of valves, and metal surfaces should be assessed. In addition, periodic pressure testing may be warranted for piping in areas where facility drainage is such that a failure might lead to a spill event.

(v) Vehicular traffic granted entry into the facility should be warned verbally or by appropriate signs to be sure that the vehicle, because of its size, will not endanger above ground piping.

(4) *Facility tank car and tank truck loading/unloading rack (onshore).* (i) Tank car and tank truck loading/unloading procedures should meet the minimum requirements and regulation established by the Department of Transportation.

(ii) Where rack area drainage does not flow into a catchment basin or treatment facility designed to handle spills, a quick drainage system should be used for tank truck loading and unloading areas. The containment system should be designed to hold at least maximum capacity of any single compartment of a tank car or tank truck loaded or unloaded in the plant.

(iii) An interlocked warning light or physical barrier system, or warning signs, should be provided in loading/unloading areas to prevent vehicular departure before complete disconnect of flexible or fixed transfer lines.

(iv) Prior to filling and departure of any tank car or tank truck, the lowermost drain and all outlets of such vehicles should be closely examined for leakage, and if necessary, tightened, adjusted, or replaced to prevent liquid leakage while in transit.

(5) *Oil production facilities (onshore)*—(i) *Definition.* An onshore production facility may include all wells, flowlines, separation equipment, storage facilities, gathering lines, and auxiliary non-transportation-related equipment and facilities in a single geographical oil or gas field operated by a single operator.

(ii) *Oil production facility (onshore) drainage.* (A) At tank batteries and central treating stations where an accidental discharge of oil would have a reasonable possibility of reaching navigable waters, the dikes or equivalent required under § 112.7(c)(1) should have drains closed and sealed at all times except when rainwater is being drained. Prior to drainage, the diked area should be inspected as provided in paragraphs (e)(2)(iii) (B), (C), and (D) of this section. Accumulated oil on the rainwater should be picked up and returned to storage or disposed of in accordance with approved methods.

(B) Field drainage ditches, road ditches, and oil traps, sumps or skimmers, if such exist, should be inspected at regularly scheduled intervals for accumulation of oil that may have escaped from small leaks. Any such accumulations should be removed.

(iii) *Oil production facility (onshore) bulk storage tanks.* (A) No tank should be used for the storage of oil unless its material and construction are compatible with the material stored and the conditions of storage.

(B) All tank battery and central treating plant installations should be provided with a secondary means of containment for the entire contents of the largest single tank if feasible, or alternate systems such as those outlined in § 112.7(c)(1). Drainage from undiked areas should be safely confined in a catchment basin or holding pond.

(C) All tanks containing oil should be visually examined by a competent person for condition and need for maintenance on a scheduled periodic basis. Such examination should include the foundation and supports of tanks that are above the surface of the ground.

(D) New and old tank battery installations should, as far as practical, be fail-safe engineered or updated into a fail-safe engineered installation to prevent spills. Consideration should be given to one or more of the following:

(*1*) Adequate tank capacity to assure that a tank will not overfill should a pumper/gauger be delayed in making his regular rounds.

(*2*) Overflow equalizing lines between tanks so that a full tank can overflow to an adjacent tank.

(*3*) Adequate vacuum protection to prevent tank collapse during a pipeline run.

(*4*) High level sensors to generate and transmit an alarm signal to the computer where facilities are a part of a computer production control system.

(iv) *Facility transfer operations, oil production facility (onshore).* (A) All above ground valves and pipelines should be examined periodically on a scheduled basis for general condition of items such as flange joints, valve glands and bodies, drip pans, pipeline supports, pumping well polish rod stuffing boxes, bleeder and gauge valves.

(B) Salt water (oil field brine) disposal facilities should be exained often, particularly following a sudden change in atmospheric temperature to detect possible system upsets that could cause an oil discharge.

(C) Production facilities should have a program of flowline maintenance to prevent spills from this source. The program should include periodic examinations, corrosion protection, flowline replacement, and adequate records, as appropriate, for the individual facility.

(6) *Oil drilling and workover facilities (onshore).* (i) Mobile drilling or workover equipment should be positioned or located so as to prevent spilled oil from reaching navigable waters.

(ii) Depending on the location, catchment basins or diversion structures may be necessary to intercept and contain spills of fuel, crude oil, or oily drilling fluids.

(iii) Before drilling below any casing string or during workover operations, a blowout prevention (BOP) assembly and well control system should be installed that is capable of controlling any well head pressure that is expected to be encountered while that BOP assembly is on the well. Casing and BOP installations should be in accordance with State regulatory agency requirements.

(7) *Oil drilling, production, or workover facilities (offshore).* (i) Definition: "An oil drilling, production or workover facility (offshore)" may include all drilling or workover equipment, wells, flowlines, gathering lines, platforms, and auxiliary nontransportation-related equipment and facilities in a single geographical oil or gas field operated by a single operator.

(ii) Oil drainage collection equipment should be used to prevent and control small oil spillage around pumps, glands, valves, flanges, expansion joints, hoses, drain lines, separators, treaters, tanks, and allied equipment. Drains on the facility should be controlled and directed toward a central collection sump or equivalent collection system sufficient to prevent discharges of oil into the navigable waters of the United States. Where drains and sumps are not practicable oil contained in collection equipment should be removed as often as necessary to prevent overflow.

(iii) For facilities employing a sump system, sump and drains should be adequately sized and a spare pump or equivalent method should be available to remove liquid from the sump and assure that oil does not escape. A regular scheduled preventive maintenance inspection and testing program should be employed to assure reliable operation of the liquid removal system and pump start-up device. Redundant automatic sump pumps and control devices may be required on some installations.

(iv) In areas where separators and treaters are equipped with dump valves whose predominant mode of failure is in the closed position and pollution risk is high, the facility should be specially equipped to prevent the escape of oil. This could be accomplished by extending the flare line to a diked area if the separator is near shore, equipping it with a high liquid level sensor that will automatically shut-in wells producing to the

separator, parallel redundant dump valves, or other feasible alternatives to prevent oil discharges.

(v) Atmospheric storage or surge tanks should be equipped with high liquid level sensing devices or other acceptable alternatives to prevent oil discharges.

(vi) Pressure tanks should be equipped with high and low pressure sensing devices to activate an alarm and/or control the flow or other acceptable alternatives to prevent oil discharges.

(vii) Tanks should be equipped with suitable corrosion protection.

(viii) A written procedure for inspecting and testing pollution prevention equipment and systems should be prepared and maintained at the facility. Such procedures should be included as part of the SPCC Plan.

(ix) Testing and inspection of the pollution prevention equipment and systems at the facility should be conducted by the owner or operator on a scheduled periodic basis commensurate with the complexity, conditions and circumstances of the facility or other appropriate regulations.

(x) Surface and subsurface well shut-in valves and devices in use at the facility should be sufficiently described to determine method of activation or control, e.g., pressure differential, change in fluid or flow conditions, combination of pressure and flow, manual or remote control mechanisms. Detailed records for each well, while not necessarily part of the plan should be kept by the owner or operator.

(xi) Before drilling below any casing string, and during workover operations a blowout preventer (BOP) assembly and well control system should be installed that is capable of controlling any well-head pressure that is expected to be encountered while that BOP assembly is on the well. Casing and BOP installations should be in accordance with State regulatory agency requirements.

(xii) Extraordinary well control measures should be provided should emergency conditions, including fire, loss of control and other abnormal conditions, occur. The degree of control system redundancy should vary with hazard exposure and probable consequences of failure. It is recommended that surface shut-in systems have redundant or "fail close" valving. Subsurface safety valves may not be needed in producing wells that will not flow but should be installed as required by applicable State regulations.

(xiii) In order that there will be no misunderstanding of joint and separate duties and obligations to perform work in a safe and pollution free manner, written instructions should be prepared by the owner or operator for contractors and subcontractors to follow whenever contract activities include servicing a well or systems appurtenant to a well or pressure vessel. Such instructions and procedures should be maintained at the offshore production facility. Under certain circumstances and conditions such contractor activities may require the presence at the facility of an authorized representative of the owner or operator who would intervene when necessary to prevent a spill event.

(xiv) All manifolds (headers) should be equipped with check valves on individual flowlines.

(xv) If the shut-in well pressure is greater than the working pressure of the flowline and manifold valves up to and including the header valves associated with that individual flowline, the flowline should be equipped with a high pressure sensing device and shut-in valve at the wellhead unless provided with a pressure relief system to prevent over pressuring.

(xvi) All pipelines appurtenant to the facility should be protected from corrosion. Methods used, such as protective coatings or cathodic protection, should be discussed.

(xvii) Sub-marine pipelines appurtenant to the facility should be adequately protected against environmental stresses and other activities such as fishing operations.

(xviii) Sub-marine pipelines appurtenant to the facility should be in good operating condition at all times and inspected on a scheduled periodic basis for failures. Such inspections should be documented and maintained at the facility.

(8) *Inspections and records.* Inspections required by this part should be

in accordance with written procedures developed for the facility by the owner or operator. These written procedures and a record of the inspections, signed by the appropriate supervisor or inspector, should be made part of the SPCC Plan and maintained for a period of three years.

(9) *Security (excluding oil production facilities).* (i) All plants handling, processing, and storing oil should be fully fenced, and entrance gates should be locked and/or guarded when the plant is not in production or is unattended.

(ii) The master flow and drain valves and any other valves that will permit direct outward flow of the tank's content to the surface should be securely locked in the closed position when in non-operating or non-standby status.

(iii) The starter control on all oil pumps should be locked in the "off" position or located at a site accessible only to authorized personnel when the pumps are in a non-operating or non-standby status.

(iv) The loading/unloading connections of oil pipelines should be securely capped or blank-flanged when not in service or standby service for an extended time. This security practice should also apply to pipelines that are emptied of liquid content either by draining or by inert gas pressure.

(v) Facility lighting should be commensurate with the type and location of the facility. Consideration should be given to: (A) Discovery of spills occurring during hours of darkness, both by operating personnel, if present, and by non-operating personnel (the general public, local police, etc.) and (B) prevention of spills occurring through acts of vandalism.

(10) *Personnel, training and spill prevention procedures.* (i) Owners or operators are responsible for properly instructing their personnel in the operation and maintenance of equipment to prevent the discharges of oil and applicable pollution control laws, rules and regulations.

(ii) Each applicable facility should have a designated person who is accountable for oil spill prevention and who reports to line management.

(iii) Owners or operators should schedule and conduct spill prevention briefings for their operating personnel at intervals frequent enough to assure adequate understanding of the SPCC Plan for that facility. Such briefings should highlight and describe known spill events or failures, malfunctioning components, and recently developed precautionary measures.

APPENDIX—MEMORANDUM OF UNDERSTANDING BETWEEN THE SECRETARY OF TRANSPORTATION AND THE ADMINISTRATOR OF THE ENVIRONMENTAL PROTECTION AGENCY

SECTION II—DEFINITIONS

The Environmental Protection Agency and the Department of Transportation agree that for the purposes of Executive Order 11548, the term:

(1) "Non-transportation-related onshore and offshore facilities" means:

(A) Fixed onshore and offshore oil well drilling facilities including all equipment and appurtenances related thereto used in drilling operations for exploratory or development wells, but excluding any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

(B) Mobile onshore and offshore oil well drilling platforms, barges, trucks, or other mobile facilities including all equipment and appurtenances related thereto when such mobile facilities are fixed in position for the purpose of drilling operations for exploratory or development wells, but excluding any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

(C) Fixed onshore and offshore oil production structures, platforms, derricks, and rigs including all equipment and appurtenances related thereto, as well as completed wells and the wellhead separators, oil separators, and storage facilities used in the production of oil, but excluding any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

(D) Mobile onshore and offshore oil production facilities including all equipment and appurtenances related thereto as well as completed wells and wellhead equipment, piping from wellheads to oil separators, oil separators, and storage facilities used in the production of oil when such mobile facilities are fixed in position for the purpose of oil production operations, but excluding any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

(E) Oil refining facilities including all equipment and appurtenances related thereto as well as in-plant processing units, storage units, piping, drainage systems and waste treatment units used in the refining of oil, but excluding any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

(F) Oil storage facilities including all equipment and appurtenances related thereto as well as fixed bulk plant storage, terminal oil storage facilities, consumer storage, pumps and drainage systems used in the storage of oil, but excluding inline or breakout storage tanks needed for the continuous operation of a pipeline system and any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

(G) Industrial, commercial, agricultural or public facilities which use and store oil, but excluding any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

(H) Waste treatment facilities including in-plant pipelines, effluent discharge lines, and storage tanks, but excluding waste treatment facilities located on vessels and terminal storage tanks and appurtenances for the reception of oily ballast water or tank washings from vessels and associated systems used for off-loading vessels.

(I) Loading racks, transfer hoses, loading arms and other equipment which are appurtenant to a nontransportation-related facility or terminal facility and which are used to transfer oil in bulk to or from highway vehicles or railroad cars.

(J) Highway vehicles and railroad cars which are used for the transport of oil exclusively within the confines of a nontransportation-related facility and which are not intended to transport oil in interstate or intrastate commerce.

(K) Pipeline systems which are used for the transport of oil exclusively within the confines of a nontransportation-related facility or terminal facility and which are not intended to transport oil in interstate or intrastate commerce, but excluding pipeline systems used to transfer oil in bulk to or from a vessel.

(2) "Transportation-related onshore and offshore facilities" means:

(A) Onshore and offshore terminal facilities including transfer hoses, loading arms and other equipment and appurtenances used for the purpose of handling or transferring oil in bulk to or from a vessel as well as storage tanks and appurtenances for the reception of oily ballast water or tank washings from vessels, but excluding terminal waste treatment facilities and terminal oil storage facilities.

(B) Transfer hoses, loading arms and other equipment appurtenant to a nontransportation-related facility which is used to transfer oil in bulk to or from a vessel.

(C) Interstate and intrastate onshore and offshore pipeline systems including pumps and appurtenances related thereto as well as in-line or breakout storage tanks needed for the continuous operation of a pipeline system, and pipelines from onshore and offshore oil production facilities, but excluding onshore and offshore piping from wellheads to oil separators and pipelines which are used for the transport of oil exclusively within the confines of a nontransportation-related facility or terminal facility and which are not intended to transport oil in interstate or intrastate commerce or to transfer oil in bulk to or from a vessel.

(D) Highway vehicles and railroad cars which are used for the transport of oil in interstate or intrastate commerce and the equipment and appurtenances related thereto, and equipment used for the fueling of locomotive units, as well as the rights-of-way on which they operate. Excluded are highway vehicles and railroad cars and motive power used exclusively within the confines of a nontransportation-related facility or terminal facility and which are not intended for use in interstate or intrastate commerce.

PART 113—LIABILITY LIMITS FOR SMALL ONSHORE STORAGE FACILITIES

Subpart A—Oil Storage Facilities

Sec.

113.1 Purpose.
113.2 Applicability.
113.3 Definitions.
113.4 Size classes and associated liability limits for fixed onshore oil storage facilities, 1,000 barrels or less capacity.
113.5 Exclusions.
113.6 Effect on other laws.

AUTHORITY: Sec. 311(f)(2), 86 Stat. 867 (33 U.S.C. 1251 (1972)).

SOURCE: 38 FR 25440, Sept. 13, 1973, unless otherwise noted.

Subpart A—Oil Storage Facilities

§ 113.1 Purpose.

This subpart establishes size classifications and associated liability limits for small onshore oil storage facilities with fixed capacity of 1,000 barrels or less.

SECTION 3

PART I

DOCUMENTING AN OIL SPILL

The OSC and the cleanup supervisor are responsible for ensuring the accurate documentation of an oil spill cleanup operation. This documentation is necessary for protection in the event of lawsuits. It is also a valuable tool to improve the management of cleanup operations and thus reduce expenses. The study of well documented histories of past oil spills can also be used to improve a facilities oil spill prevention program.

THE DAILY LOG

Regardless of who responds, documentation has to be completed. A log of daily events should be kept from the time a spill is first noticed until cleanup operations are complete. One person should be delegated the responsibility of recording all data pertaining to the spill on a daily basis. For legal purposes, bound volumes with consecutively numbered pages should be used rather than looseleaf notebooks. Records kept in looseleaf notebooks could be subject to claims that information was purposefully removed or added. Each entry should record the date, time, place, action and signature(s) of the witness(es). Because of its value particularly as potential legal evidence, the log must be kept in a secure place.

Any information that could be of importance should be recorded while the clean-up is in progress. Small, portable tape recorders allow a supervisor to verbally document operations as he views them from the air, water or land. Tapes should be transcribed daily. Large spills may necessitate each supervisor to keep a personal log. Entries from such logs should be consolidated and recorded into the headquarters log. Information should be as complete as possible.

Some of the more important points to document include:

1. The limits of the spill. (Did the oil reach a certain intake, marina, beach or marsh?)

2. Damages resulting from the spill. (Were warnings issued?)
   a. Property
      1) boats - names and registration numbers
      2) other
   b. Life
      1) human injury or death - names, addresses, extent of injuries
      2) livestock - number of owner(s), address(es)
      3) wildlife - number of oiled birds collected, numbered cleaned, number surviving

3. Prior condition of the area and property if known.

4. Cleanup operations.
   a. Equipment and manpower available (cooperatives, contractors)
   b. Actions taken (equipment and techniques employed, chemicals used, etc.)
   c. Assessment of effectiveness/recommendations

5. Orders, directions on decision-making events.
   a. The OSC shall keep a log of the decision-making events during the spill cleanup. This is particularly important when the OSC approves the cleanup area. This procedure will ensure that the orders from the OSC are very clear.
   b. The spiller shall record all orders and directions from the on-scene coordinator in a log because the spiller is officially responsible to the federal on-scene coordinator.

6. Record of manpower, equipment and materials used.
   a. Contractors on a federal cleanup, shall submit to the OSC, daily time sheets listing manpower, equipment and materials used.
   b. These documents shall be signed by the OSC representative and the contractor supervisor at the close of each work day.
   c. Contractors must understand that only charges so verified and authorized by the OSC will be accepted for payment. This action will avoid disagreement upon completion of the cleanup.

PHOTOGRAPHS

Color photographs should be taken to record the source and the extent of the spill and the cleanup effort. A 35 mm camera is recommended for documentation. The following information should be recorded at the time each picture is taken:

1. name and location of the vessel, facility or site,

2. date and time the photograph was taken,

3. names of photographer and witnesses,

4. description of what is being photographed, and

5. reference to outstanding landmarks.

In addition, lawyers often want information on shutter speed, f-stop, type of film used and details of film processing. A Polaroid camera can be useful by providing the photographer with an immediate visual record, allowing a scene to be reshot if needed to obtain an acceptable photograph. For large spills, a professional photographer should be hired to handle photographic documentation. The professional photographer will require information regarding what is to be photographed. The photographer's name and number should be in the contingency plan.

OIL SAMPLING

Oil sampling is an important part of documentation during the spill and the cleanup. The federal OSC may split the sampling with the responsible parties to verify the analysis. An oil spill can result in a lawsuit, so all the facts of a spill should be available from the beginning of the spill to its cleanup completion.

Methods of identifying particular oils essentially match samples based on the assumption that no two oils have identical compositions unless they have identical histories. This relationship has been termed the "fingerprint principle" because, in theory, every oil is unique. It should be emphasized that this is a theory since weathering will tend to alter the composition of an oil, making it more difficult to trace. Co-mingling with other products and contamination are also significant problems in fingerprinting.

SAMPLING PROCEDURES FOR OIL SPILLS ON WATER

At the present time, there is no standard procedure for oil sampling although the EPA, U.S. Coast Guard and ASTM are expected to publish methods soon. Until then, the following procedures should be considered.

The objectives of oil sampling are to:

1. Determine the quantity of oil that makes identification possible after consultation with the lab,

2. obtain a true representation of the oil;

3. handle the sample properly so that it is not contaminated or altered in any way; and

4. protect the legal validity of the sample identity and subsequent analyses.

As a part of the planning procedure, a sampling kit should be assembled which includes the following items:

1. spatula,

2. note pad,

3. pens with indelible ink,

4. sample bottles, glass or Teflon, with lids (pint, wide-mouth bottle and Teflon-lined lid),

5. labels to identify location,

6. packing material or appropriate case to prevent breakage of sample bottles during shipping,

7. pads for some type of sorbent material to pick up rainbows, and

8. rags for cleanup of personnel.

The recommended sample size varies, but generally one pint is sufficient. Many of the procedures used for identification require only a small amount of material, so a sample should be taken even if a full pint cannot be obtained. Duplicate samples should be taken from each area so that one bottle can be sent to the laboratory for analysis and the other retained for reference. Glass and Teflon are the only two types of containers recommended for oil spill sampling. Glass containers are most frequently used because they are less expensive and more available. Care should be taken in packing glass containers in dry ice. For this duty it is better to use Teflon containers. A Teflon-lined top should be used, but any non-metallic closure is acceptable. Unused containers are preferred, although previously used containers that have been cleaned with a strong detergent and thoroughly rinsed are acceptable.

Sampling a slick is a simple procedure, but care must be taken to get a true representation of the spill. When the oil is several inches thick the person taking the sample can skim a sufficient amount from the top. However, when the oil is thin this is not possible. Plenty of samples should be taken when there is enough available and the excess should be stored as duplicates. It is best to keep the samples cold to prevent biological and chemical degradation.

To obtain a large enough sample from a thin layer of oil, first skim as much oil into a jar as possible. Then turn the bottle upside down (with the cap screwed on) and slowly unscrew the cap. Let the water run from the jar but tighten the cap before the oil escapes. Repeat this procedure several times until a reasonable oil sample size is obtained.

When oil layers are so thin (rainbows) that a sample cannot be obtained using the upside-down method, absorbent pads may be used. Several types are available and may be cut to size. Glass fiber insulation material is used by some Coast Guard offices to take samples. This material has a special coating that does not contaminate the sample. Pads used in gun cleaning also work well. The pad should be placed in an appropriately sized bottle after it is well oiled. Several pads should be oiled to obtain enough oil for analysis and placed in a sample bottle. The bottle should be labeled as to the type of pads used. Other acceptable pads are sheets of Teflon, polypropylene fiber, rayon waste and polyurethane foam. Another sampling device that is used fairly frequently is aluminum foil. A sheet of heavy-duty foil is skimmed along the surface of the spill and placed into a jar.

SAMPLING OILED BEACHES

Oil spill samples on beaches can be collected by picking up oil-coated sand and transferring it to containers. Oil on rocks or debris can be scraped into containers with a spatula.

SOIL SAMPLING

Oil spill samples on dry land can be collected by picking up oil-coated soil and transferring it to containers. Oil on rocks or debris can be scraped into containers with a spatula.

REFERENCE SAMPLES

Reference samples are taken to determine the source of the spill. Reference samples are important because oil identification is basically accomplished by matching the oil sample with the reference to determine the oil's origin. Reference samples should be taken from every possible spill source in the area even though some may not appear to be involved with the spill. The references should be properly labeled and described in a log as to location, nature and why they were selected. All facts pertaining to the reference samples must be in writing and witnessed to be legally valid.

Underground leaks from service station tanks present some different sampling problems. Gasoline may seep through the ground and float on the water table, traveling several miles underground. For this reason, it is important to obtain reference gasolines from all possible seepage sources, even though they may not be in the immediate vicinity of the spot where the leak was discovered. This would include service station underground tanks, surface storage tanks and pipelines.

SAMPLE ANALYSIS

As part of the oil spill cleanup preparation, arrangements should be made with an analytical laboratory to analyze oil samples. After samples are collected and witnessed, the person handling the sampling should oversee the packaging and shipping. The person in charge should state in a letter that he observed the samples being packaged and that he took the package to the carrier, who received it and marked it in some distinctive way (i.e., adhering a numbered form to it). He should also state that he requested the carrier to return to him evidence that the package was delivered to the addressee. He should attach to the letter the carrier's receipt for the package and follow up to see that the package was delivered.

When samples reach the laboratory, chemists have several analytical methods at their disposal to identify the sample. The most commonly accepted methods are gas chromatography, atomic absorption spectrophotometry and infrared analysis. These methods utilize various characteristics of the oil to identify it.

Gas chromatography is used to characterize the organic components such as isooctane and propane. A small quantity of the sample is injected into a carrier gas and enters a small diameter column, usually several feet long, filled with a chemical packing material. The column is heated to control the rate the sample fractions move through the column. The small molecules travel at a faster rate than the long chain molecules and are detected at the end through a flame measuring technique or by other methods. Standard pure organic samples are also injected in the column. The readout oil sample is compared to the readouts for standards. The device can determine quality and quantity of different fractions of oil.

Atomic absorption spectroscopy is used in oil identification to determine the nickel/vanadium ration of oils. This procedure is based on the premise that the nickel/vanadium ratio is unique to a particular oil and does not change significantly during weathering. In atomic absorption spectrophotometry, a light beam is directed through a flame that is burning the sample, then the light from the flame passes through very small grids and onto a detector that measures the amount of light. The wavelength of the light beam is characteristic of the metal being determined, and the amount of light energy absorbed by the flame is a measure of the concentration of that metal in the sample.

Infrared analysis is useful in oil analysis because nearly all chemical compounds show marked selective absorption in the infrared regions. It has been found that infrared spectra are very complex, making it improbable that any two compounds will have identical curves. The instrument is capable of generating light over a range of wavelengths in the infrared region. The sample is placed in a glass vial and infrared light passed through. Absorption of the infrared radiation displaces the atoms from their normal positions and causes them to oscillate. The remaining light passes on to a photocell and results in a reading on a graph.

SUMMARY

One of the most important tasks of the cleanup operation is to accurately record the history of the oil spill. The purpose of documentation is to protect the company, minimize expenses and use the log as a basis for critiquing the spill prevention and cleanup programs. It is important to record the extent of the spill, orders that were received from the government on-scene coordinator, major orders given to others and an assessment of the cleanup activities each day. Because one does not know what may be important at the time, it is necessary to take more pictures, and samples and to record the written information than one may believe necessary.

The spilled oil should be documented by taking samples of unspilled oil for reference and spilled oil for comparison. The sampling program and arrangements for sample shipping and chemical analyses should be preplanned.

FURTHER READING

Haubold, S.A. 1981. Contingency planning for oil spill litigation. In: Proceedings, 1981 Oil Spill Conference. pp. 691-694. American Petroleum Institute, Washington, D.C.

Lawler, G.C. and J.L. Laseter. 1979. Analytical documentation of spills of oil and hazardous substances into the marine development. In: 1979 U.S. Fish and Wildlife Service Pollution Response Workshop. pp. 172-198. U.S. Fish and Wildlife Service, Washington, D.C.

APPENDIX I

OIL SPILL DOCUMENTATION

A COMPLETE WRITTEN OR TAPED RECORD SHOULD BE MADE OF ALL ACTIONS TAKEN DURING A RESPONSE ACTIVITY. TO THE DEGREE POSSIBLE, THE RECORD SHOULD BE MADE AS EVENTS OCCUR.

THE RECORD SHOULD INCLUDE AS A MINIMUM:

NOTIFICATION INFORMATION.

A TIME RECORD FROM THE SPILL INCIDENT TO COMPLETION OF CLEAN-UP.

AMOUNT AND TYPE OF MATERIAL SPILLED, EXTENT OF THE SPILL, AND ANY OTHER VISUAL OBSERVATIONS.

AN ANALYSIS OF THE SPILLED MATERIAL, COMPARING UNSPILLED AND SPILLED.

THE RESPONSE TAKEN.

PARTY IDENTIFIED AS LIABLE FOR SPILL RESPONSE AND CLEAN-UP COSTS.

ALL CONVERSATIONS WITH NON-COMPANY PERSONS.

A LISTING OF ALL PERSONS AT THE SCENE.

ALL COSTS INCURRED.

A DETERMINATION OF MATERIAL RECOVERED.

AN ASSESSMENT OF DAMAGES.

WHENEVER POSSIBLE, PHOTOGRAPHS SHOULD BE TAKEN TO ESTABLISH A VISUAL RECORD.

by: CAPTAIN TIM PLUMMER
Marine Superintendent
The Standard Oil Co. (Ohio)
200 Public Square
Cleveland, OH 44144-02375

NOTIFICATION INFORMATION

Date and Time of notification of spill.
Person reporting the spill.
Telephone number to reach person reporting the spill.
Vessel name.
Location of spill (detailed).
Date and time of the spill. Occurred or discovered.
Type of material spilled.
Quantity of material spilled.
Source of the spill:
- Tank Overflow
- Pipeline Failure
- Hose Failure
- Tank Rupture
- Overboard Seasuction
- Other
- Unknown

Is spill stopped or continuing.
If continuing what is the flow rate and quantity remaining that could be spilled.
Actions underway and planned to stop the spill.
River and weather conditions (i.e., river stage, wind speed and direction, visibility, forecast).
Summary of vessel damage.
Notification information:
- Who was notified of the spill and when.

WRITTEN RECORD

All information should be as complete as possible. Assign a historian to keep THE written record of what is happening.

His/her only job is to keep the record.

For legal purposes, bound volumes with consecutively numbered pages should be used rather than loose leaf notebooks.

Each entry should include date, time, place, action, and signature of witnesses.

Small, portable tape recorders are very handy to use, but tapes should be transcribed daily into THE written record.

There should be ONE record telling the whole story of the spill and cleanup efforts describing everything that took place.

AMOUNT AND TYPE OF MATERIAL SPILLED/EXTENT OF THE SPILL/OTHER VISUAL OBSERVATIONS

The limits of the spill. Where has the oil reached and where is it likely to reach.

AN ANALYSIS OF THE SPILLED MATERIAL - SAMPLES

The objectives of oil sampling are:

1. To obtain a quantity of oil that makes identification possible.

2. To obtain a true representation of the oil spilled.

3. To handle the sample properly so that it is not contaminated or altered in any way.

4. To protect the legal validity of the sample identity and subsequent analyses. Proper labeling: date, time, location sample was taken, sampler.

The spilled oil should be documented by taking samples of unspilled oil for reference and spilled oil for comparison. The sampling program and arrangements for sample handling and analyses should be preplanned.

THE RESPONSE TAKEN

Equipment and manpower available from refinery, cooperative and contractors.

Actions taken, equipments used, techniques employed, chemicals used, etc.

Assessment of the effectiveness of the cleanup efforts each day.

PARTY IDENTIFIED AS LIABLE FOR SPILL RESPONSE AND CLEAN-UP COSTS.

If a vessel causes a spill, they would be responsible for the clean-up and costs.

We may have to or want to assume the responsibility for clean-up.

Our reputation and image are very important to us. If this is done we will pass the costs back to the vessel.

ALL CONVERSATIONS WITH NON-COMPANY PERSONS.

Coast Guard, EPA, Police, Fire, etc.

Media or other private sector should be referred to Public Affairs.

The government On-Scene Coordinator is overall in charge, so be sure to record all orders and directions from him/her. Then have him/her sign to acknowledge.

A LISTING OF ALL PERSONS AT THE SCENE

Officials:	U.S. Coast Guard EPA Police Fire Others
Contractors:	Persons in charge. Total number of workers. Shifts and hours worked.

ALL COSTS INCURRED

Contractors should be required to submit time sheets daily listing manpower, equipment, and materials used.

These should be verified daily by a Sohio designated representative and contractor's representative and stipulated as a requirement with the contractor for eventual payment.

DETERMINATION OF MATERIAL RECOVERED

This illustrates the effectiveness of the clean-up and helps to determine the amount of oil not recovered.

AN ASSESSMENT OF DAMAGES

Property

1. Boats: names and registration numbers.
2. Docks: location.
3. Other.

Life

1. Human injury or death - names, address, extent of injuries.
2. Livestock - numbers, owners, addresses.
3. Wildlife - number of oiled birds collected, number cleaned, number surviving.

Include prior condition of the area if known.

PHOTOGRAPHS

Color photographs to help document the extent of the spill and clean-up effort. A 35 mm camera is recommended.

The following information should be recorded for each photo.

1. Name and location of vessel, facility or site.
2. Date and time.
3. Names of photographer and witness.
4. Description of what's being photographed.
5. Reference to outstanding landmarks.

A polaroid is helpful for immediate use. A professional photographer should be used for large spills.

Use of a video camera is also very helpful to illustrate a perspective not possible with photographs.

NEED FOR GOOD DOCUMENTATION

Potential for legal scrutiny.
Insurance support.
A reference if lawsuits occur.
Substantiate or disprove clean-up costs.
Illustrate to officials the efforts made.
Minimize expenses.
Improve contingency plans and future responses.

SUMMARY

Because one does not know what may be important at the time, it is necessary to take many more pictures, take more samples and record much more written information than one may believe necessary. In other words, you can't record too much information.

SECTION 3

PART II

OIL CLEANUP CONTRACTORS

Numerous contracting companies have been formed in recent years to assist in oil spill cleanup operations. These companies range in size from the very small organization with limited equipment to large well-staffed and well-equipped companies capable of handling major spills. The services of general contractors not necessarily in the oil spill cleanup business are also important during cleanup operations. In all cases, the function of a third party contractor is to assist a company in cleaning up a spill.

CONTRACTING SERVICES AVAILABLE

Oil spill contractor services can range from furnishing equipment items, such as vacuum trucks or pumps, to providing complete cleanup of a spill on a turn-key basis. The more limited assistance of providing equipment can usually be arranged through heavy equipment contractors in most parts of the country. Contractors that offer the service of turn-key oil spill cleanup are usually located near major petroleum production, manufacturing and distribution centers.

A company may find its needs served best by prearranging for the services of a number of contractors in their area. For example, a company may have an agreement to rent heavy equipment with operators from a highway contractor, small equipment such as pumps, chain saws and portable lights from a contractor supply firm; helicopters from an aircraft company; boats from a barge company; and cleanup services from several oil cleanup contractors.

Some specific services that can be obtained from an oil cleanup contractor include:

1. spill-response units on call 24 hours a day that include well equipped trucks and trained personnel to combat a spill in the initial stages;

2. backup manpower and equipment for large spills;

3. large, offshore or bay-type self-propelled skimmers;

4. warehouses stocked with sorbents and booms;

5. rental agreements with other contractors to bring in additional vacuum trucks and other equipment;

6. experienced personnel to assist in supervising cleanup operations;

7. commercial disposal sites for oily debris; and

8. oil reclamation facilities for recovered oil.

MANPOWER SUPPLY

One of the most important contract services is to provide a nucleus of trained supervisory personnel. It is essential that enough trained supervisors be available to prevent individuals from becoming overextended and unable to direct the work properly.

No one would expect a contractor to keep more than a skeleton crew available at any time for a spill, so provisions must be made to greatly expand the contractor's force as required. The contractor should have files on potential workers and may make public appeals for labor. These people will be inexperienced and must have careful supervision. One contractor in New York believes that this is best solved by operating a union company and hiring workers from the union hall. This can have its disadvantages by raising the price for unskilled as well as skilled workers.

A large contractor in the Houston area built his business from a waste oil hauling and disposal operation. He is capable of expanding to a 100-person oil spill labor force because of drivers available for his trucking operation. This method of expanding his labor force has proven valuable.

THE CLEAN CHANNEL INC. CONTRACTOR

The second company described above acts as the contractor for Clean Channel Inc. of Houston. In this arrangement the contractor is called by member companies to handle the entire cleanup operation. Some members have personnel on call to contain the spill by deploying booms for quick containment but leave the cleanup operation to the contractor. This contractor works the Texas City area as well as Houston and therefore keeps equipment and personnel at each location. A warehouse is located at the Houston site to store equipment, boom and sorbent. Facilities have been installed to clean boom equipment using steam and solvent. Access to the warehouse is by boat off the Houston Ship Channel, by highway and by helicopter. A helicopter pad has been constructed from an old building slab.

THE CLEAN GULF CONTRACTOR

Halliburton Services of Harvey, Louisiana, is the prime contractor for Clean Gulf Associates. This arrangement calls for the contractor to own and maintain the cooperative's equipment and to supply special services. Halliburton does not supply manpower to operate the equipment and does not supply boats. These are furnished by the member companies involved in the cleanup, but the contractor does provide three marine supervisors in an advisory capacity.

Halliburton has agreed to make available other personnel such as mechanics and foremen to assist the supervisory personnel from member companies of the Halliburton Marine Supervisors. The additional labor is paid at the contractor's normal rates. With regard to manual labor, Halliburton assists a company in securing personnel through Brown and Root or tidelands Marine.

THE CONTRACTOR AS AN OIL SPILL EQUIPMENT SALES OUTLET

Many contractors double as oil spill cleanup sales outlets. This gives them an opportunity to diversify and to obtain equipment at discount prices. Because these companies also use their products under actual spill conditions, they are in a good position to evaluate the equipment. A number of contractor-sales operations sell booms stamped with their own name. The boom is made by a manufacturing company, but often to a particular contractor's specifications. Some of their changes may be extra handholds, anchor points, or additional reinforcement.

PREVENTING CONFLICTS WITH CONTRACTORS

Some conflicts between agencies and cleanup contractors in the past have originated from disagreement over charges for equipment and manpower. To prevent problems, a cleanup supervisor should be assigned to each contractor to carefully follow the operation. The supervisor should keep a daily log of all contractor operations and have a meeting each afternoon with the contractor superintendent to discuss what was accomplished, what needs to be done the next day, what equipment will be charged to the job and the number and classification of labor hours that will be charged for the day. If charges for each day's operation are agreed to by the agency and the contractor, fewer problems should arise when invoices are received.

Some specific points to discuss with the contractor include:

1. What equipment at the job site is being charged to the project but is no longer required?

2. What is the procedure for charging overtime for personnel?

3. At what rates are overtime charges made?

4. Are living expenses charged to the job?

5. Are protective clothing and hand tools charged to the job?

Contractor rates should be agreed on before a spill occurs, not during a spill. Participants in this course should determine if their company and its contractors have mutually approved a rate schedule that can be employed for oil spill cleanup. Because of inflation the contractor will probably specify an expiration date on the rate sheet. If this is the case, a new rate sheet should be obtained as prices expire.

WHO DOES THE CONTRACTOR WORK FOR?

Depending on the spill, the contractor may work for the company responsible for the spill or for the EPA or Coast Guard. If the contractor works for the responsible party, the OSC can direct the clean-up through the responsible party representative. Usually, contractors employed by the Coast Guard have been called in to handle mystery spills or spills that the spiller will not or cannot clean up. In some cases a contractor may initially be hired by the spiller, but if cleanup costs become prohibitive, the Coast Guard may assume cleanup responsibility and directly supervise the contractor. Contractors working for the U.S. Coast Guard or EPA are paid from the Oil Spill Liability Trust Fund established by the Oil Pollution Act of 1990. Although in such cases the U.S. Government assumes cleanup responsibility, the spiller is still liable to the U.S. Government for cleanup costs up to his limit of liability regardless of what costs the spiller encumbered prior to having turned the spill over to the Coast Guard or EPA.

CONTRACTOR'S PROBLEMS

Contractors often encounter difficulties collecting payment for their services. Many ship company spills are paid through insurance claims and the insurance companies tend to pay only a portion of the contractor's cost. The contractor is expected to keep hundreds of thousands of dollars worth of specialized equipment ready to go at all times backed by an army of well-trained laborers. This is not economically practical and companies should not expect this type of service without paying for it. A company that wants to continue to have the services of a competent contractor will see that all bills are verified and paid as expeditiously as possible.

PREPLANNING CLEANUP OPERATION WITH THE CONTRACTOR

If a company expects to rely on a cleanup contractor for a significant portion of the operation, the facility response plans will identify a contractor. Since oil will often move great distances after a spill occurs, the expected response time of the contractor is an important consideration for pre-planning cleanup operations. The company developing the contingency plan must know how the contractor will respond when called, i.e., how long it takes, what equipment will be moved in on initial call up and what manpower will respond to the spill. Arrangements must be made for early communication between the company and the contractor.

Contractors can assist in determining recovery locations that will be adequate for their equipment in obtaining disposal sites for debris and waste oil. The contingency plan should be developed as a team effort between the contractor and company, and the plan must be updated as required.

SUMMARY

Becoming acquainted with area contractors, their capabilities and services can result in an improved contingency plan. Information regarding what equipment contractors have available to them, where

they obtain their labor and what their limitations are as far as numbers and experience should be obtained. The company should determine if a contractor has something special to offer, such as an oily water disposal system or a solid waste landfill. Rates and responsibilities should be agreed on before a spill occurs. A company representative should be assigned to follow the contractor's work, and charges for the amount of manpower and equipment used each day should be determined during a meeting with the contractor at the end of the day.

TYPICAL CONTRACTUAL AGREEMENT OUTLINE

All segments should be written by company personnel who are experienced with writing contracts. A typical contractual agreement between an oil cleanup contractor and a company should contain the following:

1. name, address and telephone number of contractor to perform services;
2. name of company to receive services;
3. purpose of agreement;
4. where the services will be performed;
5. details of services to be performed and unit cost of each service;
6. statement on the liability of all services provided by the contractor;
7. what the company will provide;
8. statement on the liability of the company;
9. how work will be supervised by the company;
10. when and how payments will be made to the contractor;
11. dates the agreement will be in effect;
12. statements on dissolving the contract and/or obtaining compensation upon failure by the contractor to act or, in the event he acts, in some manner not in the interest of the company;
13. signatures of each party; and
14. date signed.

SECTION 3

PART III

OIL SPILL CLEANUP COOPERATIVES

Oil spill cleanup cooperatives have been formed by companies to help provide a more effective and economical capability for oil spill cleanup than that which can be provided by a single company. Although there are many cooperatives in existence, they differ in organization and management. The size of a cooperative can range from a two-company gentleman's agreement to loan equipment to a fully staffed organization such as Clean Bay Inc. of the San Francisco area that owns over two million dollars worth of specialized equipment and is capable of handling almost any oil spill situation.

SMALL EQUIPMENT COOPERATIVES

A small equipment cooperative can be formed between two or more companies for their mutual benefit. A simple agreement outlining the purpose and operating procedures of the proposed cooperative is drawn up and submitted to each party for written approval. The agreement can commit all or part of available equipment for other members' use. Booms, sorbents and skimmers are usually the items shared. Each member facility should have a reasonable supply of all items in-house for initial containment and cleanup of any potential spill, relying on equipment owned by other members as backup for larger spills.

THE CLEAN BAY INC. COOPERATIVE

Advantages of larger cooperatives such as Clean Bay Inc. become apparent during large-scale spills. Because of the size of the 1973 Oakland Estuary spill (about 4,000 barrels) Clean Bay Inc., a well-organized, competent cleanup cooperative, was designated by the Coast Guard on-scene coordinator as principal cleanup contractor. Within two hours after activating Clean Bay's contingency plan, a mobil communications headquarters was established at the spill site and cooperative supervisors were on-scene arranging for additional materials, contract laborers, trucks and marine equipment. Two 12-hour shifts manned the operation around the clock. Cooperative manpower included 122 supervisors augmented by 462 contract personnel. Major equipment included 8 large skimmers, 20 other major marine vessels, 30 small boats, 40 tank, dump and vacuum trucks, 3 helicopters and stockpiles of equipment and supplies such as pumps, hoses, hand tools, floodlights and sorbents.

The Clean Bay oil spill response team managed the cleanup, directing the activities of personnel and equipment supplied by 48 contractors. The cooperative provided a full complement of business functions including supervision, purchasing, accounting, engineering, public relations and legal counsel.

Cooperative management was supplied by member company installations in the area. When the contingency plan was activated, foremen, engineers, superintendents and supervisors that had been predesignated and pretrained left their regular duties at local refineries, terminals and offices to take their places in the Clean Bay organization, serving as area foremen, communications operators, Coast Guard liaison coordinators or in a number of other positions.

It is obvious that a tremendous amount of planning is necessary to successfully operate a major cooperative such as Clean Bay Inc. The effectiveness of the cooperative effort relies heavily on an up-to-date comprehensive contingency plan which reflects changes in the personnel and equipment inventories of its participants. Each man called for duty must know where to go and what to do, and because of shift work, sickness and vacation schedules, each person must have additional alternates ready to take his place.

THE CLEAN GULF COOPERATIVE

Clean Gulf Associates (CGA), a large equipment cooperative based in New Orleans, Louisiana, obtains all equipment and some manpower on a contract lease basis from Oil Field Service Corporation has three basic goals:

1. to provide oil spill containment and cleanup capability for use by member companies;

2. to maintain equipment at strategic locations in a state of 24-hour readiness; and

3. to evaluate technological advances for possible use by Clean Gulf.

Current membership includes 37 companies whose operations cover 98 percent of the total production area along the Gulf Coast. Membership is open to new companies at any time.

Five basic points that help explain the relationship between the contractor, Halliburton Services and Clean Gulf Associates are as follows.

1. The contractor purchases equipment authorized by the Cooperative Executive Committee made up of members from each industry.

2. The contractor stockpiles equipment at different locations to provide optimum coverage of the area.

3. The contractor leases the equipment exclusively to Clean Gulf.

4. The contractor furnishes three full-time marine supervisors to maintain equipment in good working condition, to train member company personnel and to give on-scene operational assistance.

5. The contractor provides one full-time engineer to work on new equipment design and evaluation.

An operations manual is distributed to all member companies. The manual contains detailed procedures for obtaining equipment, daily rental fees, equipment descriptions including limitations and operating instructions and manpower requirements for each item. It also includes an inventory of the oil spill containment, cleanup and auxiliary equipment stockpiled by companies along the Gulf Coast. The manual, in conjunction with training aids developed by the cooperative, provides a good base for training personnel who will be responsible for supervision of oil spill cleanup.

The cooperative maintains a mobile response unit ready to be dispatched to any member company's spill. The unit comes to the job with sufficient manpower and equipment to handle small spills and will initiate containment of larger spills until more help arrives.

Some of the special equipment in the Clean Gulf inventory are as follows:

1. a barge-mounted high volume open sea skimmer system,
2. helicopter spray systems,
3. bird scare equipment,
4. a waterfowl rehabilitation unit and
5. shallow water skimmers.

ADVANTAGES AND DISADVANTAGES OF COOPERATIVES

Cooperatives offer the advantages of expanded cleanup capabilities without the burden of total cost for such services. These features are particularly attractive for small, remote facilities, although the disadvantages of cooperative endeavors must also be considered. Possible disadvantages include:

1. inconvenience of location of member equipment,
2. additional response time needed to enter, locate contact personnel, load equipment and return to spill site,
3. incompatibility of equipment (particularly booms),
4. decreased capacity to respond in the event member spills occur concurrently and
5. failure to return equipment in proper condition or at all.

Preplanning, tight organization, written agreements which clearly delineate responsibilities of members and a sincere cooperative spirit can go a long way in eliminating most of the above and at least minimizing others.

HOW TO TAKE FULL ADVANTAGE OF A COOPERATIVE

Participants can take full advantage of a cooperative by:

1. learning the operation of the cooperative and taking an active part by meeting other members and attending meetings;

2. visiting member facilities, examining their equipment and checking to see that the inventory sheet for their facility is current;

3. verifying the procedure to obtain member equipment and having current telephone numbers and names;

4. learning how to use any specialized equipment available from other members and training company personnel in its use;

5. visiting larger, more organized cooperatives to see how their methods could be incorporated into the local cooperative;

6. updating information on equipment for other members; and

7. seeing that cooperative members hold regular drills to simulate oil spill conditions.

HOW TO FORM A COOPERATIVE

After checking the company contingency plan, it should be determined if additional manpower and equipment from an outside source would be beneficial. If a cooperative can be of help, the company should consider joining. If there are one or more companies nearby that could benefit by a cooperative and none have been formed in the area, it might be worthwhile to consider forming a cooperative. To aid in forming cooperatives, the API Committee on Environmental Law developed an agreement form published in 1971. The purpose of the standard form is to include the major provisions necessary to start such an organization and to avoid some of the problems that have occurred in the past.

Essentially, the form explains the purpose of the cooperative, area of operation, membership, detailed procedures and bylaws. A copy of the agreement form is reproduced at the end of this section as a reference. A second agreement from the west coast is also included as a guide.

SUMMARY

Cooperatives are entities formed by two or more companies for the purpose of providing a standby pool of equipment and/or manpower available to combat oil spills. Cooperatives are not always chartered, staffed or operated the same way throughout the country. Rather, their organization is adapted to fit the needs of their members. To serve its own needs best, a company must take an

active part in the operations of the cooperative. This includes keeping equipment current and changing the cooperative as necessary to ensure that it operates in the interest of the members it serves. Periodic drills are necessary to assure that the cooperative can be activated effectively.

Much can be learned from the major cooperatives such as Clean Bay of San Francisco and Clean Gulf of New Orleans. It will be worth while to study their operations and apply what they have learned to one's own situation.

The API has developed a suggested agreement form to aid in forming a cooperative. If a cooperative can be of help, a meeting of company neighbors should be arranged for the purpose of forming one.

AGREEMENT FOR OIL SPILL COOPERATIVE

This agreement shall constitute the rules and procedures of the _____

_____

_____

(hereinafter "Committee") (NAME OF OIL CONTROL COORDINATING COMMITTEE)

I. Purpose of the Committee

The purpose of the Committee is to develop, maintain and improve a procedure among the member companies of the Committee for mutual assistance and cooperation in the control of oil spill emergencies occurring within the following described area:

The procedure will involve the making available by the Committee or one or more member companies of materials, equipment or personnel, in accordance with the conditions specified below, to the member company affected by such emergency or to designated government agencies or third parties. The procedure shall not result in any monetary profit to the Committee or its member companies.

II. Membership in the Committee

The Committee shall consist of those companies operating refineries, terminals, pipelines or other facilities for handling, storing, transporting, manufacturing, producing or drilling for petroleum or petroleum products or related hydrocarbons in or about the area described above, who shall from time to time agree to participate on the Committee. A list of the initial member companies is attached hereto as Exhibit A. A member company of the Committee may at any time on 30 days' written notice to the Chairman, with copies to all member companies of the Committee, withdraw from the Committee. Exhibit A shall be amended to reflect the admission to or withdrawal from the Committee of any company. All member companies shall sign acceptances of the provisions of these Rules and Procedures.

III. Procedures

A. Materials and Equipment - To implement the above stated purpose, it will be the responsibility of the Chairman of the Committee, with the assistance of the Committee members, to collect and maintain the following information:

1. Equipment Lists: There shall be furnished by each member company a list of the equipment (pickup devices, skimmers, vacuum trucks, oil booms, etc.) which it would be willing to make available for use by a member company affected by an oil emergency or by the Committee, as the case may be. All listed equipment shall be released on authority of the contact personnel of the respective member company unless that company clearly designates on the list that certain of the equipment can be released only on higher authority and provides the name and job title of such higher authority.

2. Materials Lists: There shall be furnished by each member company a list of the materials (approved chemicals, straw, etc.) which it would be willing to make available for use by a member company affected by an oil emergency, or by the Committee, as the case may be. All listed materials shall be released on authority of the contact personnel of the respective member company unless the company clearly designates on the list that certain of the material can be released only on higher authority and provides the name and job title of such higher authority.

   Each member company may, at its sole discretion, permit the use of its listed equipment and materials outside the above described area in accordance with the terms of this agreement, or otherwise remove or permit the removal of any such equipment and materials from said area.

3. Personnel: It is not anticipated that personnel will be supplied, except in the case of specialized equipment, in which case each member company should indicate on its equipment list which items will require trained personnel. Such personnel would be furnished on a voluntary basis only, as hereinafter provided.

4. Authorized Contact Lists: Each member company shall supply the names or titles and plant telephone numbers of responsible personnel in its plant who are authorized to release material and equipment for said company. This list should be in the order to be called. The first item on the list, if possible, should be the title of personnel who are on duty at all times. Except for the normal work week (Monday to Friday, excluding holidays), this person should be called to request material or equipment. The second name on the list should be the company's representative on the Committee who would normally be called during regular office hours. This should be followed by his alternate on the Committee and other officials such as Plant Manager, General Superintendent, etc. The home telephone numbers for the names individuals should also be supplied.

5. Other Sources of Materials and Equipment: The Committee shall prepare and maintain names, addresses and telephone numbers of other sources of materials and equipment, including the various suppliers of approved chemicals. In addition, the Committee may, in accordance with this agreement, acquire additional equipment or materials, which shall be sorted at member company facilities or other locations mutually satisfactory to the member companies and released on the Authority of the Chairman or (in his absence) the Vice Chairman, or on request of a member company when that company is affected by an oil spill emergency. Equipment and materials as acquired by the Committee shall be owned as tenants in common by all member companies and shall be held by the Committee as agent of said members; provided, however, that any member company withdrawal from the Committee shall as of the effective date of said withdrawal be deemed to have waived and assigned to the remaining member companies as tenants in common all its rights, title and interest in said equipment and materials and shall execute such waiver and assignment, unless other arrangements are approved by majority action of the remaining member companies. The committee shall prepare and maintain a list describing the nature and location of such equipment and materials. It shall be the responsibility of each company to keep current the company's respective lists. The Committee shall arrange for distribution of the various lists to all member companies.

B. Emergency Procedures - The procedures to be followed in the event of an oil emergency shall be as respectively indicated below.

1. Assistance to Members: Any member company affected by an oil spill emergency may, if assistance is desired, call on the Committee and other member companies for materials and equipment listed as available. The nearest member companies at which the required items are located should be called first.

The member company affected by the emergency and requesting assistance shall be solely responsible for taking steps necessary to meet it. Said member company shall repair and return, or replace in kind, any materials or equipment supplied at its request by the Committee or other member companies and prior thereto shall, as necessary, provide and pay for temporary replacement. Said member company shall also reimburse the Committee and other member companies for any out-of-pocket costs incurred by them in furnishing such assistance, including without limitation any premium pay for personnel and the costs of consumable materials incurred or expended as a result of furnishing such assistance. In no event shall any reimbursement result in monetary profit to the Committee, it being the intent of the Committee not to operate for profit. Any personnel voluntarily supplied by the Committee or other member companies shall be completely under the supervision and control of the member company requesting assistance, and said company shall hold the other member companies harmless from any claims and actions (whether or not based upon negligent acts or omissions) for injuries to or the death of such personnel or any other

persons or damage to property of member companies or third parties arising out of the emergency or the actions taken to meet the emergency, including, but not limited to, any liability arising out of or caused by the use of any materials, equipment, or personnel furnished by any member company; provided, however, that if the oil spill emergency was caused or contributed to by a member company other than the member company requesting such assistance, nothing herein shall relieve the responsible member company (or other party) of any liability otherwise present (including liability to the affected member company) for causing or contributing to the oil spill emergency.

The member company affected by the emergency shall be responsible for reporting the emergency to any governmental authority concerned. Said member company shall also be responsible for all information releases concerning the emergency provided, however, that any references therein to Committee activities shall be coordinated through the Committee's public relations spokesman hereinafter referred to.

2. Assistance to Others: With respect to oil spill emergencies other than those affecting member companies, it is the intent that assistance from the Committee and its member companies be made available to the U.S. Coast Guard or other government agencies having jurisdiction, upon request, in accordance with the conditions set forth below. To this end, it shall be the duty of the Chairman to inform the above agencies of the existence of the Committee and to supply them with the names, telephone numbers and addresses of the Chairman and one or more alternates. Any member company receiving notice of such an oil emergency shall instruct the source of such information to contact the appropriate government agencies immediately. At the same time, such member company shall also inform the Chairman or, in his absence, the Vice Chairman. Only if said government agencies fail to contact the Chairman or Vice Chairman promptly shall they contact said agencies and ask if assistance from the Committee is desired.

In the event of an oil spill emergency affecting persons or companies other than member companies, if so requested by the U.S. Coast Guard or other appropriate government agency, the use of listed equipment and materials by or under the direction and supervision of said agency or other agencies or parties not members of the Committee may be authorized by the Chairman or, in his absence, the Vice Chairman or, if they are both unavailable, the contact personnel of the member companies at which the needed equipment and materials are located, at their sole discretion; on the condition, however, that the person or company affected by the emergency grant to the member companies providing such assistance the above described repair, replacement, reimbursement and indemnification rights that are granted to said companies by any member company requesting assistance under this agreement. participation of personnel on a voluntary basis for the operation of listed specialized equipment may similarly be authorized.

In the event of an oil spill emergency the source of which is unknown, at the request and cost and under the direction and supervision of the U.S. Coast Guard or EPA, the Committee shall take action to contain and clean up such spills.

C. Sharing of Nonreimbursed Costs and Expenses - Any costs and expenses incurred by the Committee and member companies in connection with rendering such assistance which are not otherwise reimbursed, including the repair or replacement cost of expended, damaged, or destroyed materials or equipment and any liabilities to third parties arising out of the use or misuse of such equipment or materials or any deficiency thereof, shall be shared by all member companies on the basis of the Participation Formula hereinafter referred to or equally in the event that no such Participation Formula is agreed upon.

D. Inability to Furnish Assistance - Any member company which is unable to supply assistance in any given emergency shall be bound by all the provisions of these Rules and Procedures, but shall incur no additional liability solely by reason of such inability to participate in such emergency.

IV. Liability

Notwithstanding anything herein to the contrary, no member company shall be liable for any claims or penalties arising out of or resulting from the gross or wanton negligence or willful misconduct of another member company while rendering assistance under this agreement.

V. Bylaws

A. The Committee shall have a Council composed of one representative appointed by each member company. Each member company may also designate an alternate to serve in place of that company's representative. A list of the present representatives and alternates is attached hereto as Exhibit B. Member companies may change representatives or alternates by notice in writing to the other member companies from time to time, and Exhibit B shall be amended accordingly.

B. The Committee and its Council shall be headed by a Chairman and Vice Chairman who shall be the representatives of member companies elected by vote of a majority of the representatives of all member companies. After the initial election the Council shall elect each year a new Vice Chairman, with the present Vice Chairman to succeed to the Chairman's post. In the absence of the Chairman, the Vice Chairman shall serve as Chairman.

C. The Chairman may, if he deems it necessary in the conduct of Council business, designate a Secretary of the Council. The Secretary shall have no vote except as he may serve as a representative or alternate.

D. The Committee Council shall hold at least four meetings per year. The chairman shall schedule and give at least ten days written notice of each such meeting. Emergency meetings may, however, be called by the Chairman or, in his absence, by the Vice Chairman by telephone or telegraph and a poll of the members may likewise be taken when there is an emergency requiring immediate action.

E. The Committee Council will obtain information regarding different types of equipment and materials and oil containment and recovery techniques and may, as necessary, recommend to the Committee the purchase of certain equipment or materials.

F. The Committee Council will develop and recommend to the Committee appropriate methods of transporting, handling, storing and maintaining the available equipment and materials.

G. The Committee Council will develop and recommend to the Committee appropriate equipment and methods for disposing of recovered oil.

H. The Committee Council will determine the availability of third party cleanup services adequately manned and equipped to provide all necessary services to effect containment, cleanup and disposal of oil spills occurring at or from member company facilities or vessels located in the area covered by this agreement and to obtain from such third parties the proposed terms under which such services would be made available to member companies on an independent contractor basis.

I. The Committee Council will consider and adopt a public relations contingency plan which shall set forth the procedures to be followed and shall name a spokesman to act for the Committee as necessary and desirable before the press and other news media during an oil spill emergency.

J. The Committee Council shall develop such other information, procedures or recommendations as it considers necessary for the Committee to function effectively. Should the Council consider it necessary to obtain funds for the acquisition of equipment or materials or other authorized Committee activities, the Chairman may call upon member companies to meet such a need on the basis of a Participation Formula mutually satisfactory to them.

K. Decisions on the day-to-day operations of the Committee shall be by majority vote at its meeting of a majority of the representatives of all member companies. Decisions involving policy or concerning the possible purchase by the Committee of materials or equipment shall be adopted in the same manner.

L. These Rules and Regulations may be amended from time to time by majority action of the member companies.

M. No amendment of these Rules and Procedures or decision to purchase materials or equipment shall be binding upon any non-approving member until 35 days after such member has received actual notice of the action taken.

This agreement may be executed in counterpart and will be binding on any party signing a copy of same.

ACCEPTANCE

NAME OF COMPANY_____

ADDRESS_____

APPROVAL SIGNATURE_____

TITLE_____

DATE OF APPROVAL_____

PORT SAN LUIS AND ESTERO BAY OIL

Spill Cooperative Agreement

Pacific Gas and Electric Company, Standard Oil Company of California, Texaco Inc. and Union Oil Company of California (hereinafter collectively referred to as the "Participants"), agree on_____ _____, (date), as follows:

Purpose

1. The Participants shall cooperate with and assist each other and appropriate governmental agencies and private organizations in the control and removal of oil spills affecting public and private property, beaches, harbors and waters along the coast of the State of California between the Point Estero and Point Sal (hereinafter referred to as the "Area of Interest"). The Participants may also from time to time cooperate with and assist or obtain the assistance of agencies and organizations concerned with the control and removal of oil spills outside the Area of Interest.

Participants

2. The Participants are operators of facilities in the Area of Interest for the handling, storing or transporting of petroleum products and related hydrocarbons. Others who operate similar facilities may from time to time become Participants and parties to this Agreement under terms to be established at such times by the Participants.

3. A Participant may withdraw from this Agreement at any time by written notice to each of the other Participants. The withdrawal shall be effective thirty days after such notice is sent. The withdrawal shall be effective thirty days after such notice is sent. The withdrawing Participant shall remain liable for its share of any liability incurred prior to the effective date of withdrawal. The withdrawing Participant shall receive the value of its share in any jointly owned assets of the Participants as of the

effective date of withdrawal. Such value shall be determined on the basis of original cost depreciated at a rate of twenty percent per annum.

The Committee

4. The Participants shall each appoint one representative and an alternate to a committee which shall carry out and effectuate this agreement. Participants may change representatives and alternates from time to time upon written notice to the other Participants.

5. The Committee members shall elect a Chairman and Vice Chairman who shall each serve for one year. The Vice Chairman shall each year be elected to the Chairman's position. The Chairman, and in his absence the Vice Chairman, shall preside at all meetings of the committee and shall perform such other duties specified in this agreement or delegated by the committee.

6. The committee shall meet at least once each calendar quarter. The Chairman shall schedule and give at least ten days notice of each such quarterly meeting. The Chairman shall call such other meetings as may from time to time be requested by a member of the Committee.

7. All decisions by the committee except those requiring the expenditure of money shall be made by a simple majority of the votes cast with each Participant having one vote. Decisions requiring the expenditure of money shall be made by a vote of a majority of at least seventy-five percent of the votes eligible to be cast; each Participant having a vote weighted in accordance with the participation formula set forth in Exhibit A. A quorum shall consist of three Participants.

Assistance and Cooperations

8. Each Participant shall provide the other Participants with a list of personnel and oil spill control and cleanup equipment and materials (including, but not limited to, pickup devices, skimmers, vacuum trucks, oil booms, absorbents and chemicals) which it may be willing to make available in the event of an oil spill. The list shall also specify those items which require trained personnel and those items for which a fee must be paid. Each Participant shall also provide the other Participants with a list of persons, together with addresses and office and home telephone numbers, who are authorized to make available personnel and items from the lists. All lists shall be kept current by each Participant who shall inform each of the other Participants of changes.

9. The committee shall prepare, keep current and distribute to the Participants a list of suppliers of personnel, materials and equipment which can be used for oil spill control and removal. The committee may also acquire and maintain equipment and

materials. Such equipment and materials shall be owned by the Participants as tenants in common without the right to partition and in accordance with the participation formula set forth in Exhibit A. The cost of acquiring and maintaining such material and equipment shall be borne by the Participants in accordance with the participation formula set forth in Exhibit A.

10. Any Participant involved with or affected by an oil spill in the Area of Interest may request any and all of the other Participants to make available for the use of the affected Participants the personnel, materials and equipment set forth on the lists distributed by the Participants. The affected Participant shall also have available for its use any jointly owned equipment and materials. The personnel, materials and equipment set forth on the lists distributed by the Participants may also be made available to non-Participants if consented to by the Participant employing such personnel or owning the material and equipment. The Chairman, or in his absence the Vice Chairman, may make available to non-Participants any jointly owned materials and equipment. If more than one Participant is affected by an oil spill, personnel, materials and equipment shall be shared equally.

11. All material and equipment made available pursuant to this agreement shall be returned promptly after use in the condition made available or replaced in kind. Certain material and equipment may be made available on the basis that the user pay a fee to the participant or to the committee allowing the use of the material and equipment. Such fee shall be reasonable and shall take into account the cost of the equipment and material, the cost of maintenance, amortization and cost of money. Any such fee shall be paid upon return of the material and equipment. The personnel made available hereunder shall be under the direction and control of the Participant affected by the oil spill and during such time shall be considered the special employees of such Participant. The Participant making available personnel hereunder shall be reimbursed for all costs of such personnel including, but not limited to, salary, benefits and related overhead.

12. Each Participant shall hold harmless and indemnify each other Participant, the committee, and the agents, servants and employees of the foregoing, against and for all loss and liability and costs incurred, including, but not limited to, attorneys' fees, expenses, claims, fines, damages, or injuries resulting directly or indirectly from the furnishing of personnel, materials and equipment hereunder to the indemnifying party. A like indemnity shall be obtained from a non-Participant before such party can use any personnel, material and equipment. The foregoing indemnity by a Participant or non-Participant shall be applicable whether or not the loss and liability indemnified against were caused or contributed to in whole or in part by the negligence of any other Participant, non-Participant, the committee, or the agents, servants and employees of the foregoing. The party furnishing this indemnity further agrees that the parties to whom this indemnification provision extends shall have the right, but not the obligation, to tender the defense to the indemnifying party of any and all claims arising out of or in any way connected with matters which are the subject of this indemnity, but that failure to tender any such law suit for defense shall not release or relieve the party furnishing this indemnity of his obligations hereunder.

Termination of Agreement

13. This Agreement shall continue in effect until terminated by the affirmative vote of at least seventy-five percent of the Participants. Upon termination of the agreement, all obligations shall be paid or otherwise provided for and remaining assets shall be divided among the Participants in accordance with the participation formula set forth in Exhibit A.

Pacific Gas and Electric Company

by_____

Standard Oil Company of California

by_____

Texaco Inc.

by_____

Union Oil Company of California

by_____

Exhibit "A"

Participation Formula

Each member shall total the gross barrels (at 60°F) of the following commodities handled by it during the preceding calendar year.

a. crude oil or petroleum products transferred from ship to shore facilities and

b. crude oil or petroleum products transferred from shore facilities to ships.

The total barrels handled by each member as described above will be converted to the percentage of the total barrels handled for all members. This percentage will be the member's participation for the current calendar year.

	Company	Bbl. to Vessels	Bbls. to Shore	Total Bbls.	Participation Formula (% of Grand Total)	
	Texaco		229,000	229,000	2.74%	
	P.G. & E.		854,000	854,000	2.75%	
	Union	2,480,000	3,590,000	6,070,000	19.53%	
	Standard	23,719,000	229,000	23,921,000	76.98%	
	Grand Total			31,074,000	100%	

SECTION 4

PART I

PROPERTIES OF OIL THAT AFFECT RECOVERY

Knowledge of how oil reacts after it is spilled is essential for effective oil recovery. Crude oil and refined petroleum products are not made of one type of molecule but are mixtures of different molecules. The types of molecules are similar in structure except for the number and position of carbon and hydrogen atoms in each molecule. During the refining step the molecules are sorted, altered, and reorganized to produce specific blends of molecular types that have been found to work best for the customer (**FIGURES 1 AND 2**).

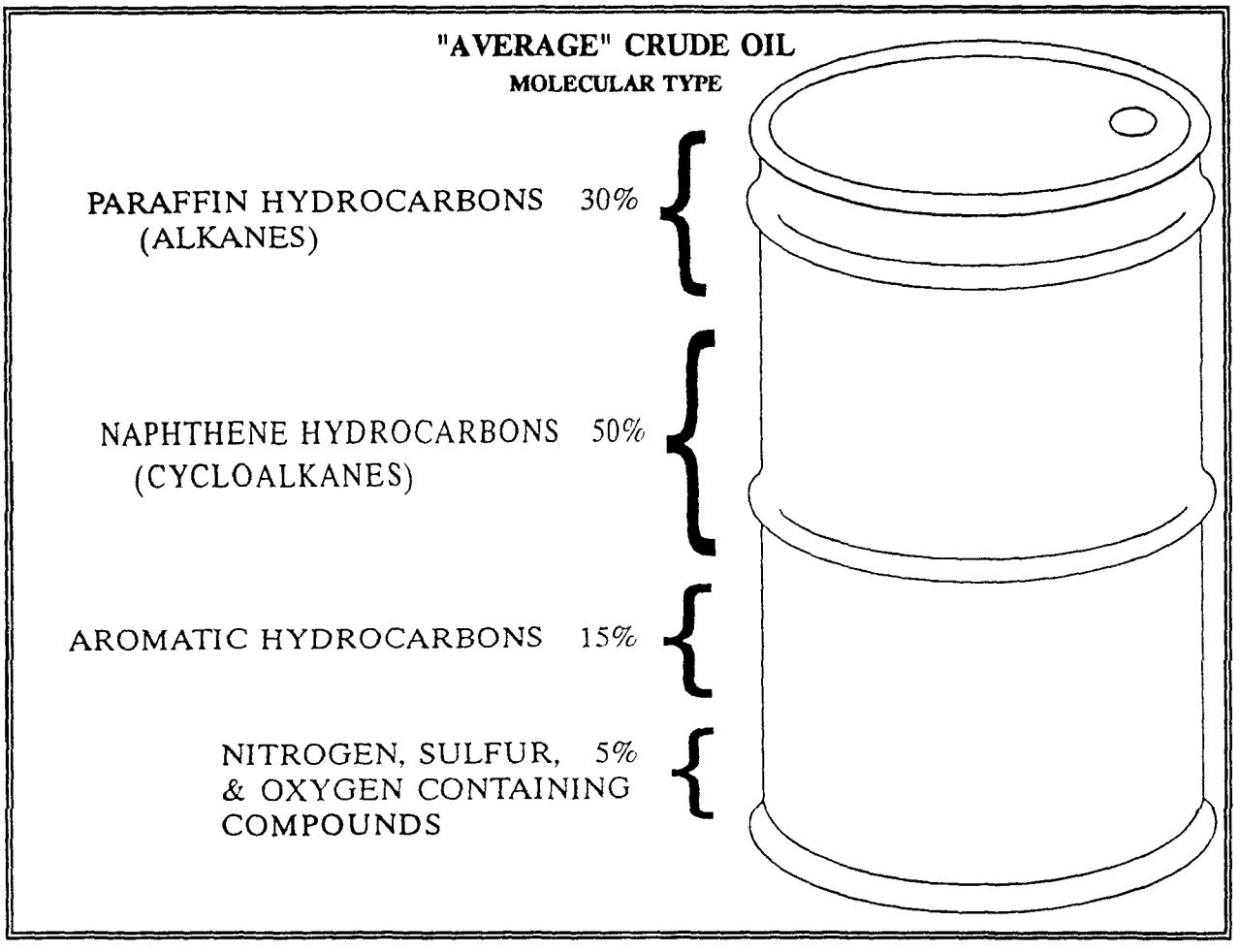

FIGURE 1
"AVERAGE" CRUDE OIL MOLECULAR TYPE

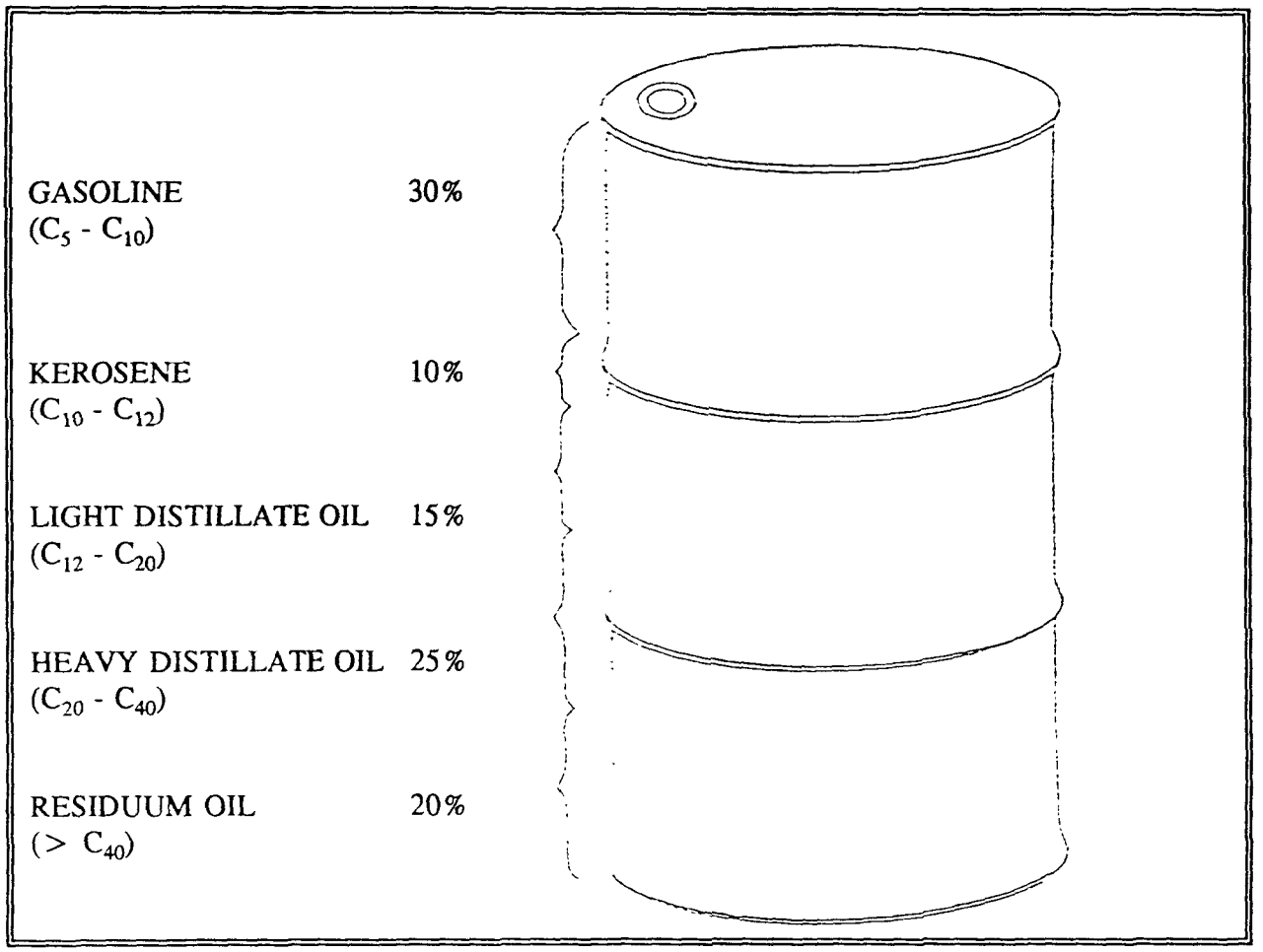

FIGURE 2
"AVERAGE" CRUDE OIL MOLECULAR TYPE

Each blend will act slightly different because the properties of the molecules change as the chemical structures change. As an example, one factor that controls the oil spreading rate is the viscosity of the oil. The less viscous No. 2 oil, with shorter length molecules, will spread faster than the more viscous No. 6 oil which has much longer molecules.

OIL SPREADING

Of the different ways oil may interact with the environment, the rate of spreading is perhaps the most important. As discussed above, spreading rate is a function of the viscosity of the oil. Viscosity is determined by the type of oil molecule and the temperature. In the winter, when the temperature is very low, oil spilled on the ground will not penetrate the soil as quickly or spread over the surface as rapidly as it would in the summer. If the ground is frozen, the oil will not penetrate at all. A second factor affecting spreading rate is the surface tension of the oil. Like viscosity, surface tension is also temperature dependent and tends to restrict spreading at low temperatures. Although the factors that affect spreading are known and spreading rates can be predicted under carefully controlled laboratory conditions, spreading rates for actual spills are very difficult to calculate with

any degree of accuracy. Outdoor test results using two types of oil and two spill sizes are shown in **FIGURE 3.** The data from the figure is not valid for accurately predicting slick areas with time for a particular future spill because spreading rate is a function of temperature and other variables. The graph is useful as a guide to show the relative effects of time, type of oil, and quantity of oil on a slick area. A rule of thumb is that the diameter of an oil slick will double between four and 12 hours after a spill for spills of up to 5000 barrels. It is essential to remember that spreading is a serious problem to the cleanup crew that can best be overcome by acting quickly to contain the spill and remove the oil.

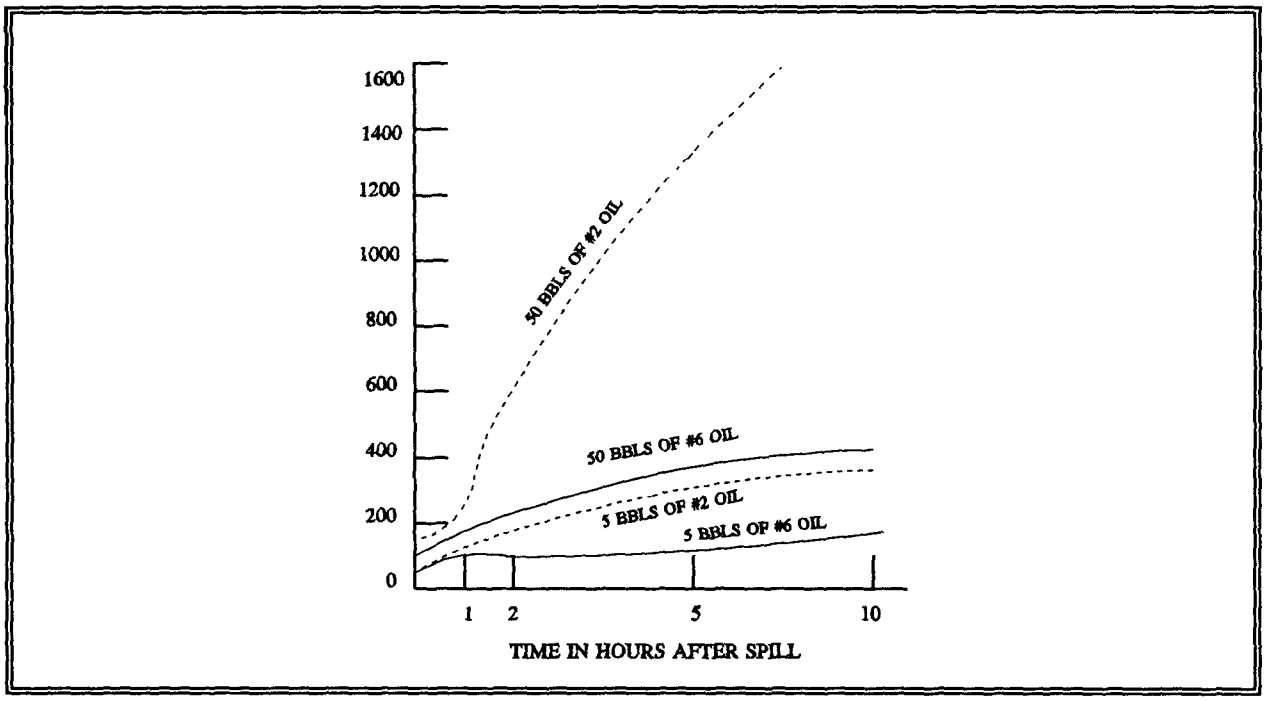

FIGURE 3
RELATIONSHIP OF SPILL AREA,
VOLUME OF SPILL AND TYPE OF OIL WITH TIME

Viscosity affects cleanup efforts with regard to pumping recovered oil. The more viscous the oil, due to oil type and temperature, the more difficult it will be to pump. It is therefore important to match pumps and hoses to the pumping conditions. It is also important to know the oil's pour point, which indicates the temperature at which the oil can no longer be pumped. The pour point temperature will be a function of the makeup of the oil. A waxy crude oil will have a high pour point. Number 2 oil has a pour point of about 20°F. Number 6 oil has a pour point greater than 100°F and therefore must be heated prior to pumping.

OIL EVAPORATION

Volatility is an important characteristic because it governs the rate of evaporation of spilled oil and will determine combustion properties. The flash point and the lower flammable limit are two terms describing volatility. The flash point is the minimum temperature at which sufficient liquid is

vaporized to create a mixture of fuel and air capable of being ignited. For example, the flash point of gasoline is -45°F (-43°C) and that of No. 2 diesel is 125°F (52.7°C). Therefore gasoline is more likely with and ignition source, to ignite in most spill situations. On the other hand, diesel's flash point is above normal temperatures at most spill events. This does not mean that diesel will not ignite. An ignition source can provide the temperature necessary for ignition and the initial combustion can provide the temperature needed for continued combustion.

Combustion is possible when the ratio of fuel to air lies between certain limits. A mixture with not enough fuel (too lean) or not enough air (too rich) will not support combustion. Since it is unlikely that a too rich situation will occur during a spill, the too lean mixture is of primary interest. The minimum volume of fuel (vapor) that will support combustion is called the lower flammable (explosion) limit. For gasoline, this volume can be as low as 1.4 to 1.7% of the air volume. A preferred way to check for combustibility is with a combustible gas detector. Remember that the combustible gas detector test is only good where taken, and this information cannot be generalized for the entire spill area. Furthermore, hydrocarbon products form a layer along the ground which will, in time, mix with the air. The vapors are apt to settle in low places.

Most oils will emit combustible vapors, especially light oils such as gasoline and aviation fuels (**FIGURE 4**). Combustion is likely where oil is concentrated at spill sources, behind booms, or on the shoreline. Since three things are required for combustion to take place (fuel, oxygen [air], and an ignition source), the removal of any one requirement will prevent combustion. Therefore, fuel on land can be covered with a foam blanket or dirt to remove the air. Ignition sources can be removed. Some common sources are: flames (matches, cigarettes), electric sparks (pumps, motors), static sparks, and hot surfaces (mufflers, catalytic converters, pumps).

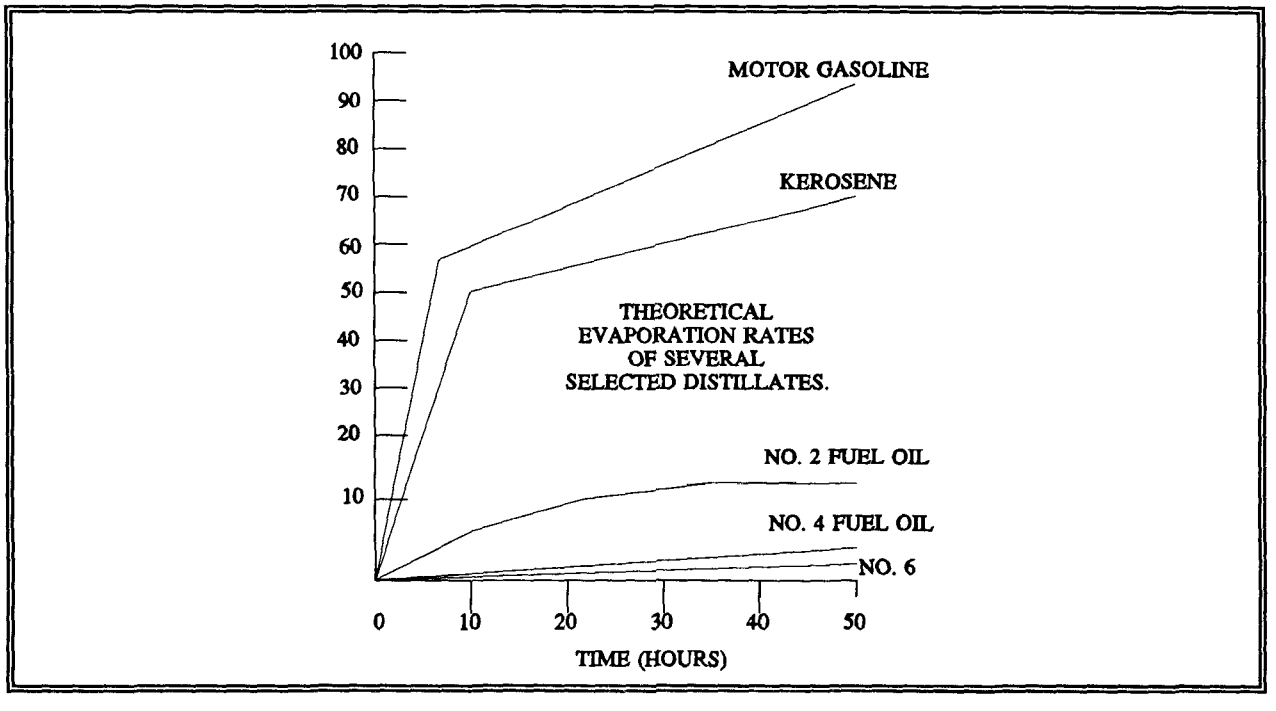

FIGURE 4
RELATIVE EVAPORATION RATES OF HYDROCARBON FUELS SPILLED OIL

A complex mixture such as crude oil will initially lose light fractions by evaporation followed by successively higher boiling fractions (**FIGURE 5**). The evaporation rate will be increased by high winds (**FIGURE 6**). Rough weather conditions also increase evaporation by exposing more surfaces of the oil at wave crests and as sprays. Because evaporation is enhanced by increased surface area, more evaporation will occur as the oil spreads.

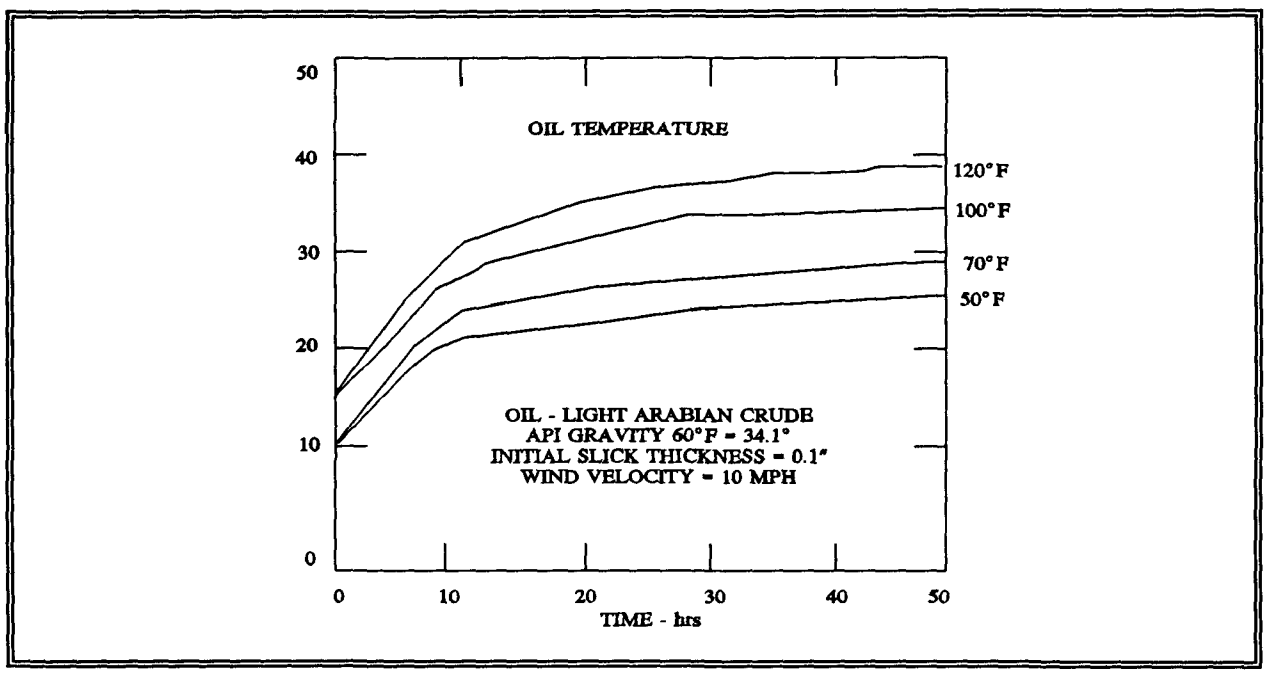

FIGURE 5
OIL EVAPORATION VERSUS TIME AFTER A SPILL

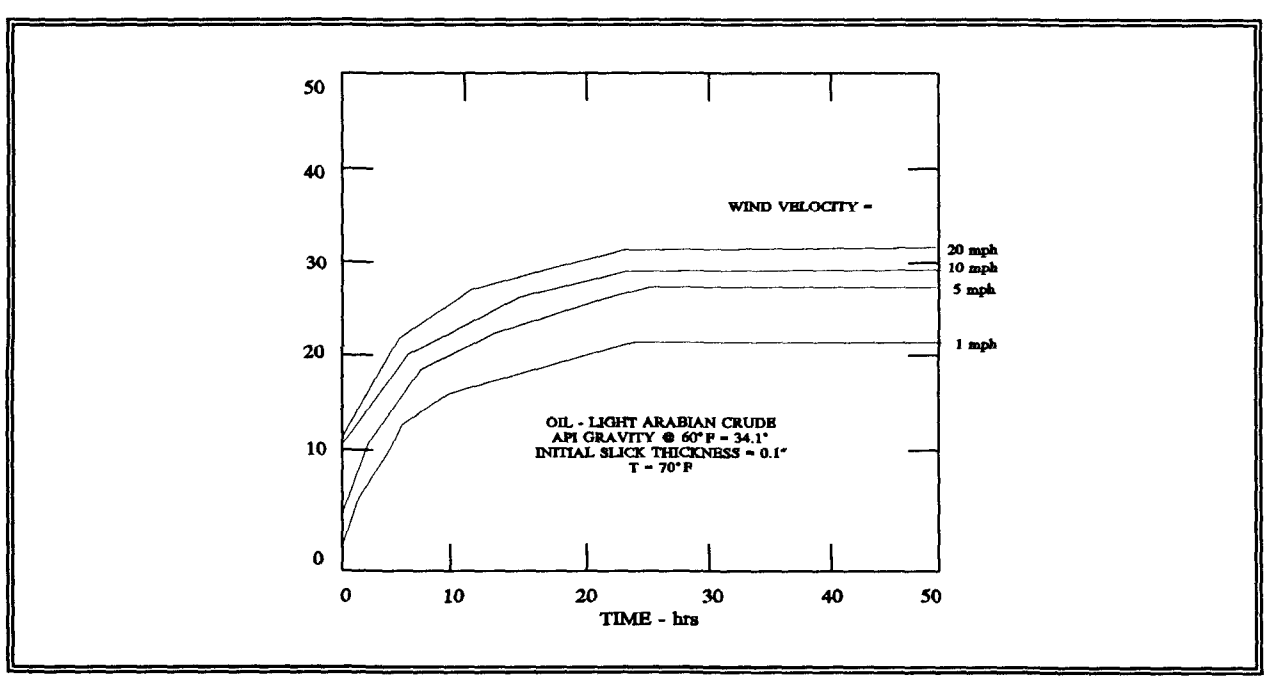

FIGURE 6
EFFECT OF WIND VELOCITY ON SLICK EVAPORATION

Heavier components of crude oil will evaporate slowly and form a residue on the water surface. The residue will have a higher specific gravity, a higher viscosity, and contain greater concentrations of sulphur, metals, and wax than the original crude. Evaporation will result in losing a significant portion of the spilled oil. Experience indicates that as much as 20 percent of the total weight of oil can be lost within a few hours exposure. A much smaller percentage will be lost afterward. This characteristic will assist the cleanup crew because the amount to be removed is decreased. It also makes the remaining oil safer to handle.

BIOLOGICAL DEGRADATION

When oil is spilled in the environment, microorganisms that inhabit the spill area will begin to degrade the oil by using it for food. The rate of degradation will depend on temperature, type of oil, availability of nutrients, and presence of oxygen. It has been suggested that bacteria be added to oil slicks to permit the organisms to degrade the oil at a faster rate. However, the process is more complicated than merely adding organisms because of the requirement of oxygen and nutrients needed for rapid degradation. The relative effect of biological degradation is significant depending on the location of the spill. For example, there would be very little degradation in arctic waters, but considerable oil degradation would occur in tropical waters. Compared to evaporation, however, biological degradation is usually a small factor over a short period of time.

OTHER FACTORS

Most oils can be easily seen on top of the water with the exception of light oils such as No. 2 fuel oil. Although No. 2 fuel oil floats, it is almost transparent and very difficult to see when a worker is viewing the spill a few feet above water. This is why it is helpful to use helicopters to find spills. Spilled oil is usually much lighter than water and will almost without exception float, although some heavy oils have been reported to sink. Kuwait crude residue has a specific gravity of 1.023, and Franion Heavy has a specific gravity of 1.027. However, it is not likely that these residues will sink if spilled in sea water, which has an average specific gravity of 1.025. It is believed that a light emulsion forms under the spill and acts to float the oil.

A small amount of the oil will dissolve and emulsify in the water, depending on the amount of light fractions and degree of mixing caused by currents, waves, and vessel traffic. Light fractions will dissolve in water up to a maximum of about 1000 parts per million. **TABLE 1** lists some hydrocarbon solubilities in distilled water.

Generally, oil density will tend to affect the ease of dispersion of the oil through the water column (**TABLE 1**). Light fractions will dissolve in water up to a minimum of about 10,000 parts per million. The problems with oil dissolving in the water are toxicity to aquatic life, odor in drinking water, flavor change in drinking water, reduced cooling efficiency in cooling waters (power plants), explosion hazard in industrial water supplies, and contamination of food or chemical products from receiving waters. If an emulsion occurs, a thin combination of oil, water, and air (sometimes sand) can develop. Under certain conditions a highly viscous emulsion called "chocolate mousse" can develop which is difficult to recover and persistent in the environment. After the Amoco Cadiz and Metula oil spills, chocolate mousse persisted on the shoreline for years[2,3,4]. The longer oil persists in the water, the more water will combine with the oil to form an emulsion (**FIGURE 7**), and the thicker or more viscous the emulsion will become (**FIGURE 8**). This will affect pumpability. Heavy oils and crude oils are most subject to mousse formation. Although emulsion formation does not significantly slow down the evaporation process, biodegradation is reduced due to the lack of available oxygen inside the mousse.

TABLE 1
DENSITY AND SOLUBILITY OF OIL COMPOUNDS[5]

Compound	Density	Solubility in water
PARAFFINS		
Pentane	.62	360 ppm
Hexane	.66	138 ppm
Heptane	.68	52 ppm
Octane	.70	65 ppm
Nonane	.72	c. 10 ppm
Decane	.73	c. 3 ppm
NAPTHENES		
Cyclopentane	.75	"slight"
Methyl Cyclopentane	.75	
Cyclohexane	.78	
Ethylcyclohexane	.79	
AROMATICS		
Benzene	.88	820 ppm
Toluene	.87	470 ppm
Ethylbenzene	.87	140 ppm
Xylene	.88	c. 80 ppm
Naphthalene	1.15	c. 20 ppm

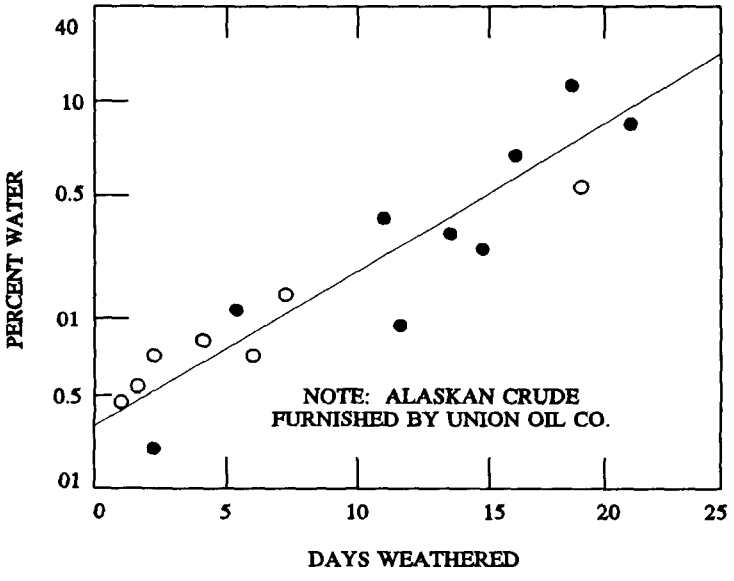

FIGURE 7
WATER INCORPORATION INTO CRUDE WITH TIME[6]

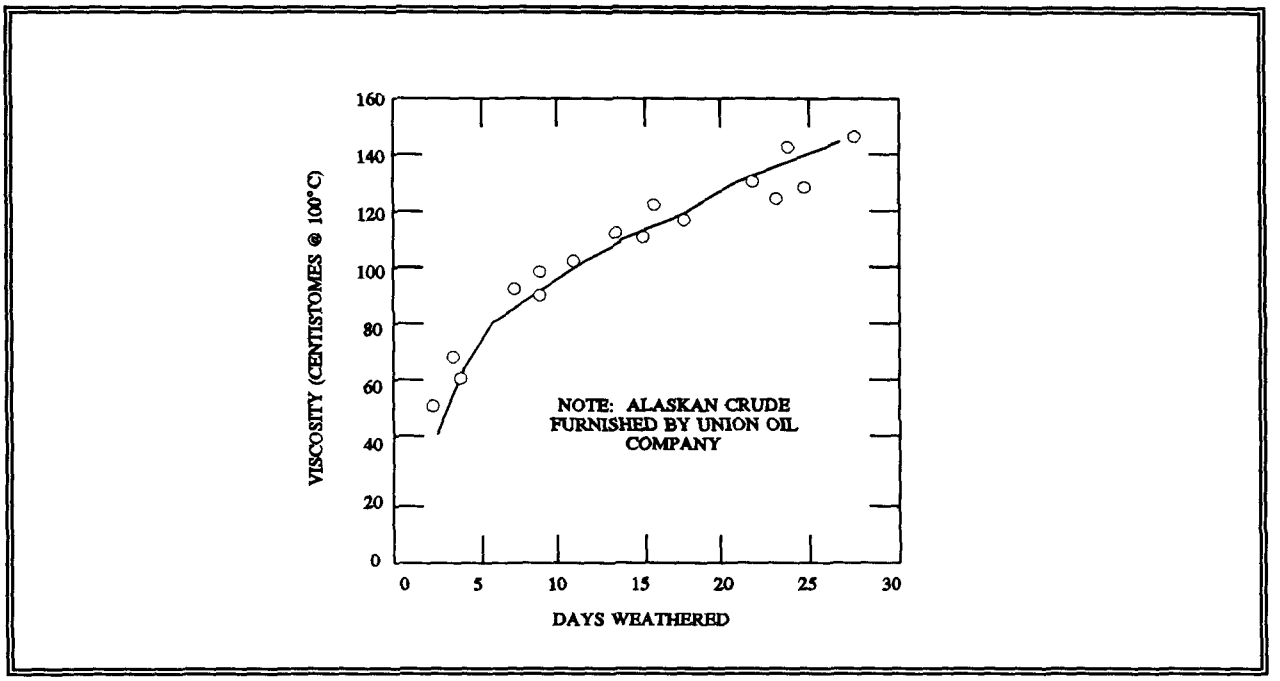

FIGURE 8
VISCOSITY OF CRUDE WITH TIME.

The viscosity of oil also affects the way in which the oil will interact with a beach when driven ashore. Light oil of low viscosity will tend to run off rocky surfaces and to seep into beach sands. A highly viscous oil will more likely remain attached on a surface such as a seawall or boat and will usually stay on top of beach sand (**TABLE 2**).

When samples of spilled oil are taken for analysis to determine legal questions, it is recommended that the samples be taken soon after the spill and prior to significant weathering of the oil. As the oil weathers and loses volatile components, the resulting substance is slightly different than it was originally, causing problems in identification. The Coast Guard has sponsored a considerable research program to more accurately trace weathered oil. Like other detection techniques, the new methods also work better with "fresher" samples, but they are much more likely to determine if a particular weathered sample originated from a particular facility. Sampling procedures will be covered later.

SUMMARY

The two properties that immediately and most importantly affect spills are oil spreading and evaporation of volatile fractions. Spreading will hamper recovery by distributing the oil over a greater area. Evaporation of volatile fractions aids recovery by decreasing the amount of oil to be recovered. Evaporation causes the viscosity and gravity of the remaining oil to increase. Although biological degradation of spilled oil will take place, it is usually an important factor only with long-term spills. Oil dissolution occurs to a relatively small extent, and the emulsification of oil depends on the properties of the oil and mixing energy. As oil weathers it becomes difficult to compare with unweathered oils. Therefore, the sampling program should begin soon after the cleanup program is implemented.

TABLE 2
PROPERTIES OF PETROLEUM PRODUCTS WHICH AFFECT THEIR SPILL BEHAVIOR[1]

Performance Critical Property	Descriptive Property	Gasoline	JP-4	Auto Diesel	Marine Diesel	Fuel Oil - No.2	Fuel Oil No.6	Lube Oil	Relationship of Performance Property to Spill
Viscosity (centistoke at 100°F)	Resistance to flow	LOW	LOW	LOW (≈ 1.4)	LOW (≈ 3.0)	LOW (≈ 2.0)	HIGH (> 75)	MOD-HIGH	Low viscosity materials spread easily over surface
Surface tension	Resistance to spread over another liquid	LOW	LOW	MOD	MOD	MOD	MOD	MOD	Low surface tension materials will spread more readily
Volatility	Tendency to evaporate	HIGH	HIGH	LOW	LOW	LOW	VERY LOW	VERY LOW	High volatility favors evaporation - if combined with low flash point, present explosion hazard
Relative solubility	Tendency for all or portion of spill to dissolve in water	VERY LOW	VERY LOW	VERY LOW	VERY LOW	VERY LOW	VERY LOW	Emulsifies	Soluble components of spill (including additives may be toxic to aquatic organisms)
Density (specific gravity) approx.	Mass per unit volume - tendency to sink in water	LOW (≈ .73)	LOW	LOW (≈ .85)	LOW	LOW (≈ .82)	HIGH (.9 - 1.0)	MOD (.85)	Materials heavier than water (Sp Gr ≈ 1.0) generally will sink - smother bottom organisms - affects shellfish
Emulsibility	Tendency to form stable suspension with water	VERY LOW	VERY LOW	LOW	LOW	LOW	HIGH	HIGH	High emulsibility spreads oil through-out water column, extends possible contamination range. Affects free swimming species (fish)
Pour Point	Lowest temperature at which oil will pour	LOW	LOW	LOW	LOW (20°F)	LOW (20°F)	HIGH (60°F)	LOW (10°F)	As pour point is approached, spill spread decreases
Flash Point (min)	Tendency to ignite	VERY LOW (-40°F)	VERY LOW (-20°F)	LOW (≈ 104°)	MOD (140°F)	LOW (100°F)	MOD (150°F)	VERY HIGH (350°F)	Low flash point combined with high volatility ≈ explosion hazard

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SECTION 4

PART II

CHARACTERISTICS OF OIL MOVEMENT ON WATER

OIL CHARACTERISTICS AND BEHAVIOR

The chemical and physical properties of the oil spilled and ambient conditions will determine how the spilled oil will behave. The basic processes and their time frames are shown in **FIGURE 9**.

General statements on how light, medium and heavy oils will behave on water and their toxicological properties are shown in **TABLE 3**.

PREDICTION OF SPILL MOVEMENT

Predict oil slick movement by vector addition of the two main motive forces that apply; surface currents and winds. Surface currents will dominate spill movement unless the winds are extremely strong. Wind will cause an oil slick to move at about three percent (3%) wind speed, and in the same general direction. **FIGURES 10 - 12** give an example of the vector addition method of oil slick movement prediction. Aerial reconnaissance should be used to monitor spill location and verify predictions.

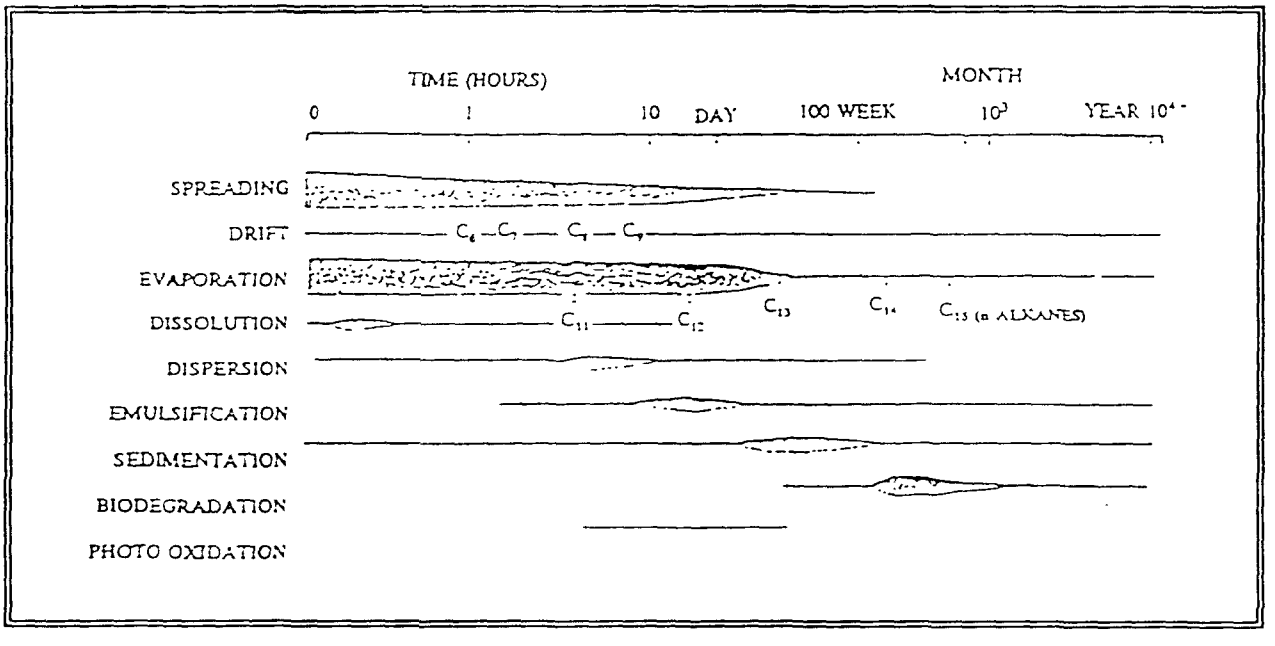

FIGURE 9
PROCESSES VS. TIME ELAPSED SINCE THE SPILL
(Exxon Oil Spill Response Manual pp. 12-13)

TABLE 3
CLASSIFICATION & PROPERTIES OF OIL TYPES WITH RESPECT TO THEIR BEHAVIOR DURING SPILLS

Oil Type	Physical/Chemical Properties	Toxicological Properties
(1) Light, Volatile Oils	- Spread rapidly - High evaporation and solubility rates - Tend to form unstable emulsions - Very toxic to biota when fresh - May penetrate substrate - Can be removed from surfaces by simple agitation and low pressure flushing	- Acute toxicity is related to the content and concentration of the aromatic fractions
(2) Moderate to heavy oils	- Moderate to high viscosity - Toxicity variable depending on light fraction - In tropical climates, rapid evaporation and solution form less toxic weathered residue with toxicity due more to smothering - Light fractions may contaminate interstitial water - Tend to form stable emulsions under high physical energy conditions - Variable penetration, a function of substrate grain size - High potential for sinking after weathering and uptake of sediment - Generally removalble from water surface when fresh - Weather to tar balls and tarry residue	- Acute and chronic toxicity in marine organisms is likely to result from: 1) Mechanical or physical coverage - oil completely smothering organisms causing death 2) Chemical toxicity - results from the exposure of very toxic aromatic fractions of the oil to marine organisms 3) A combination of mechanical or physical coverage and chemical toxicity - Mechanical or physical smothering causes acute toxicity in many marine organisms and chronic toxicity in many marine plants (especially mangroves)
(3) Asphalt, Bunker C, No. 6 fuel oil, waste fuel	- Form tarry lumps at ambient temperatures - Non-spreading - Relatively non-toxic due to substrate - May soften and flow when exposed to the sun - Cannot be recovered from water surface with most cleanup equipment - Easily removed manually from beaches	- Acute and chronic toxicity occurs more from smothering effects than from chemical toxicity, due to the small proportion of toxic aromatic fractions found in heavy, residual oils - Toxicity is more common in marine plants (especially mangroves) and sedentary organisms than in mobile organisms - Acute and chronic toxicity also results from thermal stress, due to the elevation of temperature in oiled habitats

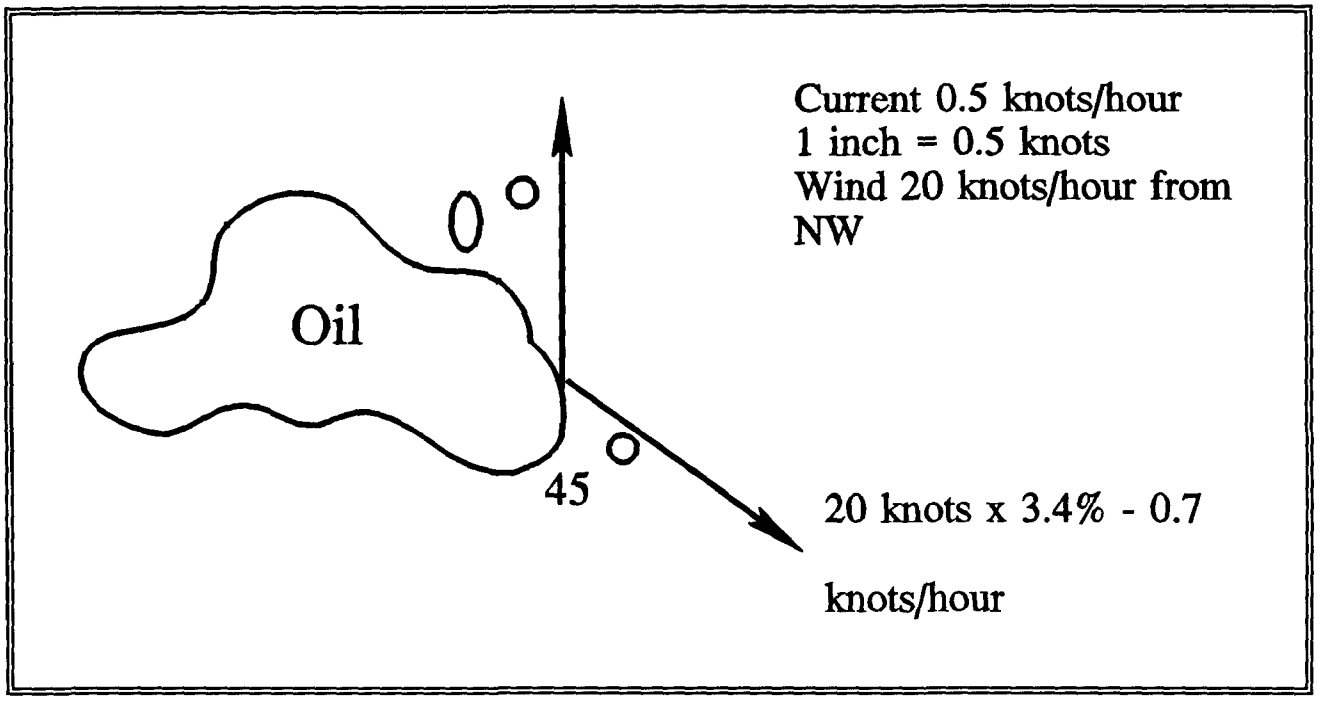

FIGURE 10
CURRENT AND WIND VECTOR

VECTOR ADDITION FOR PREDICTION OF OIL SPILL MOVEMENT

Consistency of oil and ambient and forecasted weather conditions are important in determining the rate and direction of the movement of the spilled oil. As OSC this will help predict where the oil is going and where it may end up. Also knowing these conditions will be essential in preparing for the cleanup to follow.

1. Draw surface water current and wind vectors in their respective directions (**FIGURE 10**). The length of the vectors represent the velocity. Example: 0.5 knots = 1 inch.

2. Draw a line parallel to the wind vector starting from the tip of the current vector and measuring the exact length of the wind vector (**FIGURE 11, Line P**).

3. Draw a line from the present slick position to the tip of Line P. This final line, called the resultant vector, gives the speed and direction of the oil slick movement. The speed is determined by the length of the resultant vector relative to the scale set in Step 1 and used in drawing the components vectors. The direction of predicted oil slick movement can be determined from compass heading (**FIGURE 12**).

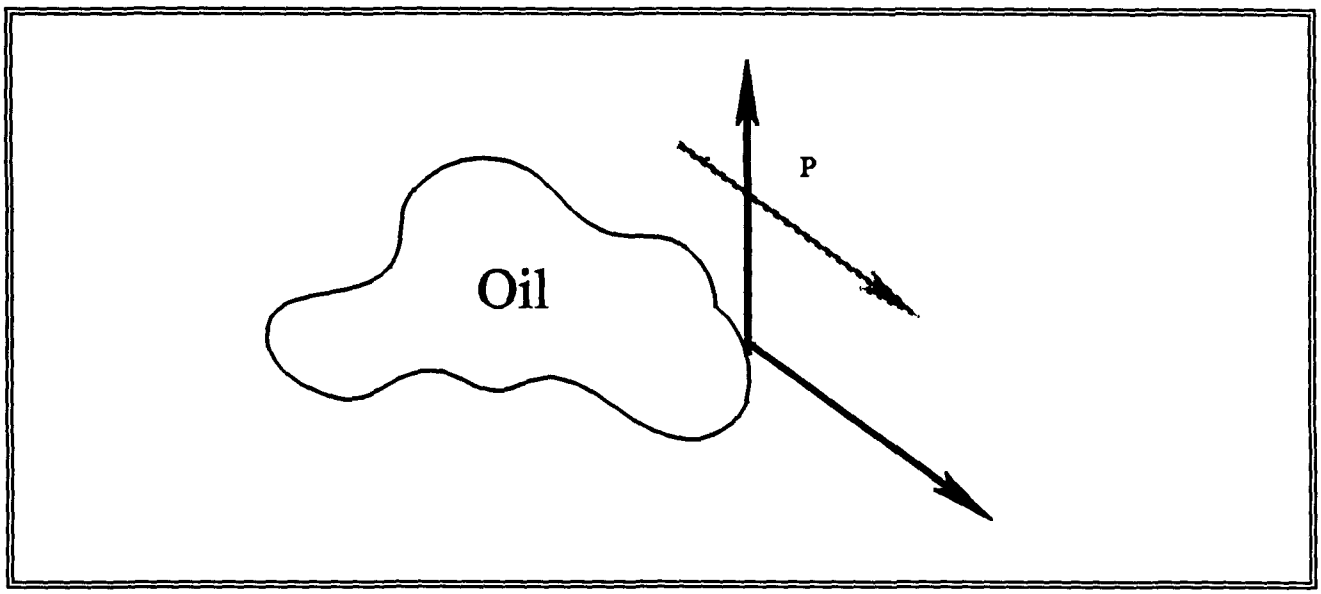

FIGURE 11
PARALLEL LINE TO WIND VECTOR

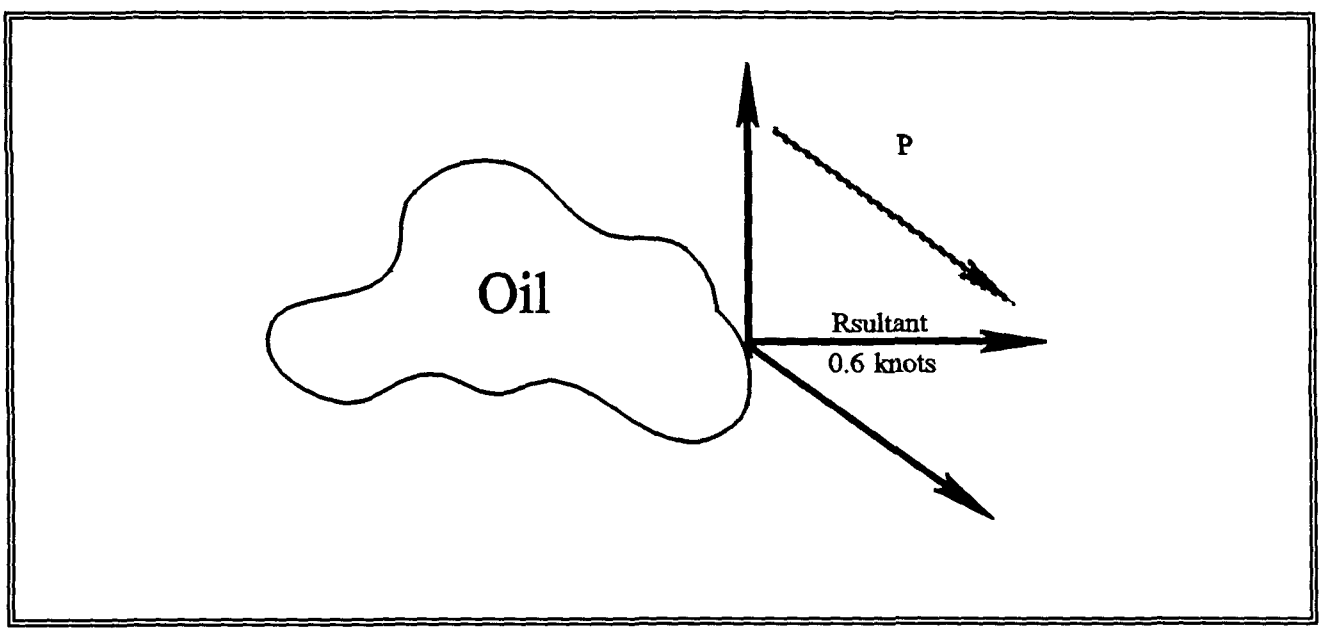

FIGURE 12
RESULTANT VECTOR OF SLICK MOVEMENT

Example 1. Current only; no wind
0.5 knot current = 0.5 knot movement of oil

Example 2. Wind only; no currents
12 knot wind x 3.4% = 0.4 knot wind effect on the movement of the oil

Example 3. Wind and water currents

SECTION 4

PART III

MOVEMENT OF OIL ON WATER

Immediate action is required when oil spills occur on water to prevent the oil from becoming so widely spread that containment and cleanup become enormously expensive. If effective containment and cleanup procedures are initiated within an hour of a spill occurrence, estimated removal costs are $250 per barrel. However, if two hours or more elapse before removing the oil, the cost can be four or more times that amount. To keep response time to a minimum, it is necessary to know how oil will move on water so that time will not be wasted hunting for the oil in the wrong area.

EFFECT OF WIND AND CURRENT

Oil slicks move as a result of wind and water currents. It is commonly assumed that oil slicks move with the wind at approximately 3.4 percent of the wind velocity. The distances a slick can move at different wind velocities and times are shown in **TABLE 4**. For example, within one hour a slick will move a total distance of approximately 0.7 of a mile with a 20 mph wind.

TABLE 4
DISTANCE MOVED IN MILES FOR A GIVEN WIND VELOCITY & TIME

Time after Spill	Wind Velocity, MPH		
	10	20	30
30 minutes	0.17	0.34	0.51
1 hour	0.34	0.68	1.00
2 hours	0.68	1.40	2.10
4 hours	1.40	2.70	4.10
8 hours	2.70	5.40	8.30

There is less agreement, however, concerning the effect of water currents on the movement of oil slicks. If there is no wind, the oil will tend to move at about the same velocity as the water at the surface. When the wind is blowing, the oil will be affected by both water and wind currents, and the movement of the oil will be a function of both forces. If the wind direction is opposite to the normal current, the wind can reduce or reverse the water velocity at the surface. Because of this phenomenon, it is difficult to calculate water surface velocity. Water velocities published by the U.S. Coast Guard and U.S. Geological Survey are useful for some purposes but are average velocities rather than surface velocities. Therefore, a different method must be used to calculate oil slick movements on water.

DETERMINING SLICK VELOCITIES

Since response time is so important, it is necessary that the effect of wind and currents on oil slicks be known at the time a spill occurs. To determine slick movements, drift measurements can be made using shallow styrofoam chips or drift blocks. Chips or drift blocks should lie flat on the water surface with little freeboard or draft. Measurements are especially valuable where the wind is affected by obstacles such as building, trees, ships and other structures.

When the wind velocity is low, the slick tends to move with the water current. These currents should be known in advance of a spill for various weather and tide conditions and again can best be measured by chips or drift blocks. Water velocities area also required whether or not the wind is blowing to predict boom efficiencies and anchoring requirements. **FIGURE 13** indicates how a drift float might be constructed to measure water currents. An empty beverage container can make a fair drift float.

Other devices used to determine current speed are flowmeters, dye markers and tracking buoys.

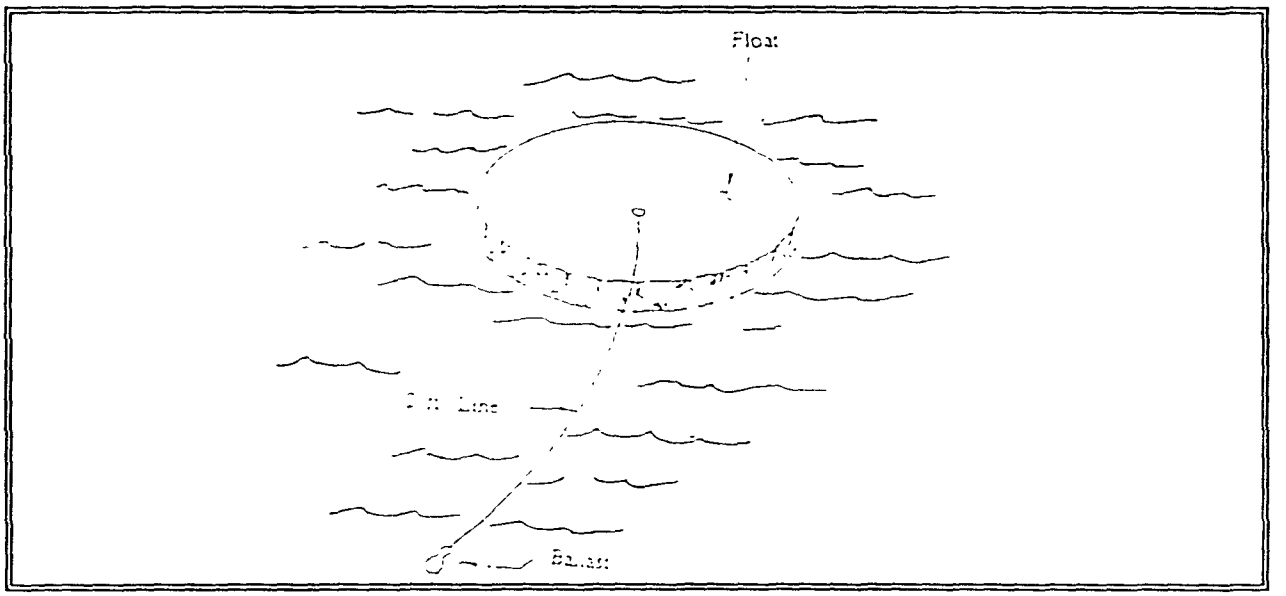

FIGURE 13
DRIFT FLOAT TO MEASURE WATER CURRENTS

If these observations are not made prior to the spill, the spill itself must be observed for speed and direction of drift, but the oil slick makes a very expensive drift test. More information on determining slick movements will be discussed later.

SPILLS IN A CREEK

In this discussion, the difference between a creek and a river will depend on water depth. A boat can travel the full length of a river, while a creek can be waded. Many creeks have little or no flow during normal periods, but can have fast and deep flow during floods. Normally, the surface

velocity in a creek is low and can be greatly affected by the wind. Creek bottoms may be very soft and the bottom may be cluttered with broken glass and metal debris. Banks may be covered with dense vegetation. Crossing creeks can usually be accomplished by short span bridges or culverts. Bridges and culverts are often the best locations to try to stop the flow of an oil slick because of their accessibility by surface transportation and the built-in ability to act as oil-water separators (**FIGURE 14**).

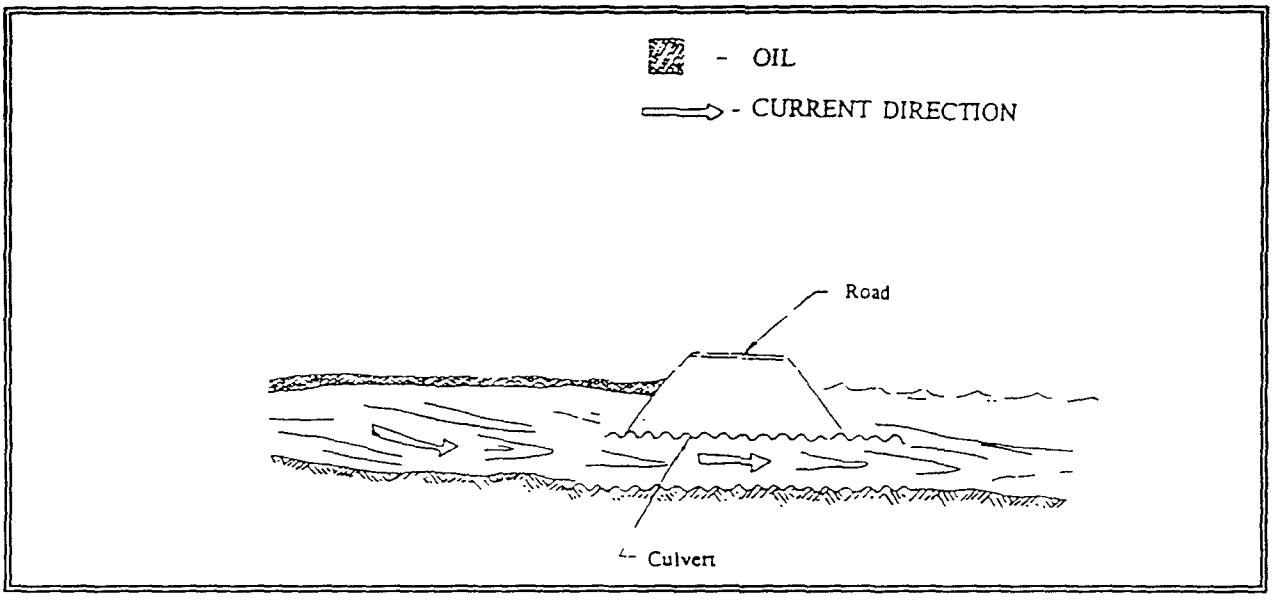

FIGURE 14
CONTAINMENT OF SPILLED OIL BY A CULVERT

SPILLS IN A RIVER

Spills in a river are often difficult to contain because the water is deep and currents may be very swift, requiring most work to be conducted from boats. River banks may be steep and covered with brush. High velocities and turbulence may cause some of the oil to sink temporarily below the surface. Oil slicks moving downstream (or downwind) will eventually move to one side of the channel where oil can usually be contained and removed from the back (**FIGURE 15**).

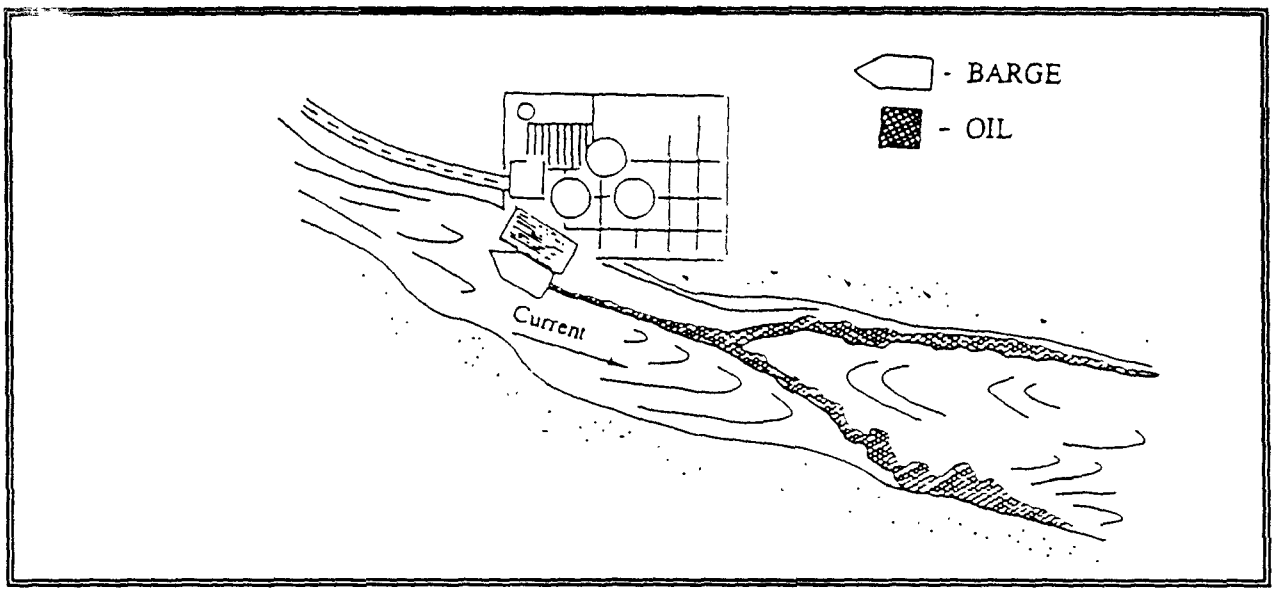

FIGURE 15
MOVEMENT OF AN OIL SLICK AS IT IS CARRIED DOWNSTREAM

Flowing streams meander and flow alternately from pools through riffles. Pools and riffles are usually formed by alternately wide and narrow channel sections (**FIGURE 16**) or by changes in the slope of the channel bottom which produce deep reaches (pools) and shallow reaches (riffles).

River crossings are usually major structures that carry substantial traffic and usually cannot be used as work platforms during cleanup operations. Rivers are also used as water supplies for municipalities, industry and agriculture, so it is necessary to make plans to prevent spilled oil from gaining access to any intake structure along the river. Some rivers also have marinas, parks, beaches and fish camps that require special consideration.

Velocities in a river are never uniform (**FIGURE 16**); as a result, oil will usually drift to the outside bank in a turn (**FIGURE 17**). Maximum surface velocities will normally be near the center of river channels for straight sections of the river and move to the outside of a curve at a bend in the river.

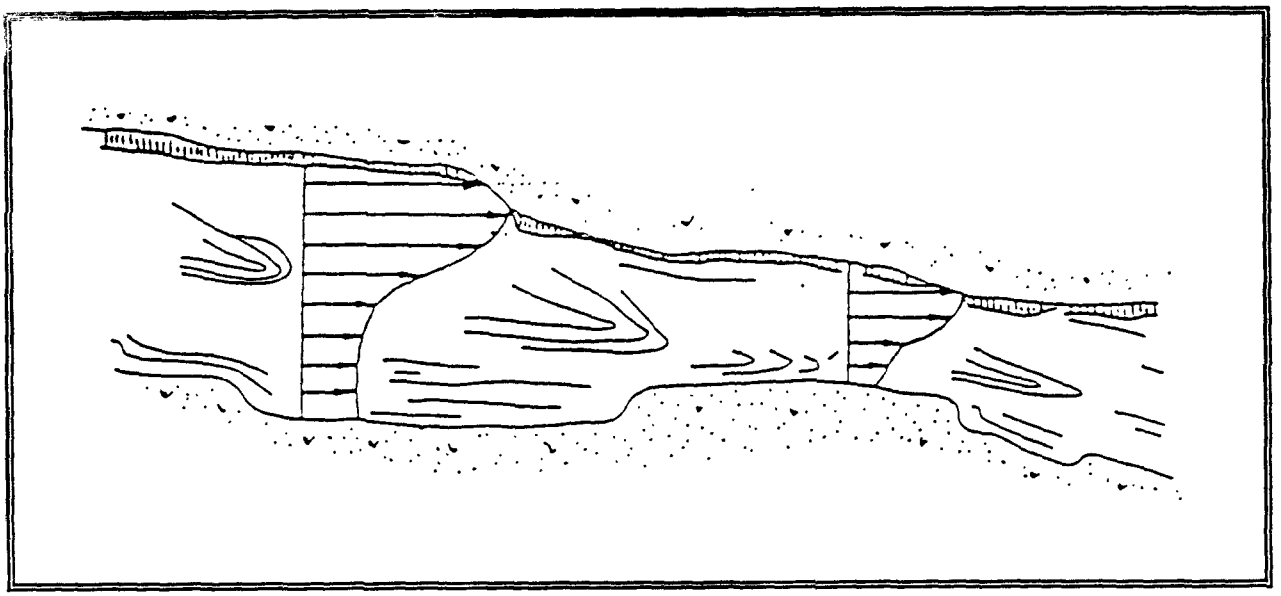

FIGURE 16
NON-UNIFORM VELOCITIES IN A RIVER

FIGURE 17
DRIFT OF OIL TO OUTSIDE BANK IN A TURN

Surface currents in rivers may be caused by gravity and the slope of the channel bottom or may be caused by wind. Some rivers may have such a low surface velocity that a strong wind will cause the water at the surface to flow upstream. The cause of the predominant surface water velocity may vary from season to season. Drift tests should be made during various "typical" conditions prior to a spill. Drift tests should be made to estimate the velocity of the current and to determine locations along the bank where the oil slick is likely to reach shore. Islands in rivers are often strategic sites to contain and remove oil if equipment and personnel can reach these locations in time.

A special problem in rivers is floating debris. Floating debris can destroy booms and can present a hazard to crews working in boats. Boat traffic may also hamper cleanup operations.

SPILLS IN LAKES, ESTUARIES AND BAYS

An estuary is a semi-enclosed part of the coastal ocean where fresh water from the land mixes with seawater. Many estuaries are the drowned lower reaches of rivers meeting the sea. A bay is an inlet into the sea and is considered a part of an ocean that extends into the land. A lake is a large body of water resupplied by surface runoff and/or groundwater.

Lakes, estuaries and bays have hydraulic characteristics of both rivers and oceans. They are often highly developed with industry, recreational beaches, marinas and other highly visible areas that need to be protected from oil spills.

Lakes are often used as water supplies and may have water intakes that must be protected. There may also be sensitive areas in a lake where biological life is concentrated and should be protected. Normally the water surface velocities that will cause the spilled oil to move are wind driven.

Waves are formed in any large body of water and have a significant effect on the movement, containment and removal of oil. **FIGURE 18** demonstrates the various parts of an idealized wave. The crest is the highest part of the wave; the trough is the lowest part. The wave height is the vertical distance from the bottom of the wave through to the top of the wave crest. The wave length is the horizontal distance between successive wave crests or troughs. The wave period is the time for successive wave crests to pass a fixed point. The wave steepness is the ratio of wave height to wave length.

Waves are caused by the forces exerted by wind, tide, earthquake and gravity. Waves in the ocean are normally classified as chop and swell. Chop refers to waves under the influence of the wind that formed them, characterized by short wave lengths and short crests with little rhythmic pattern. Swell pertains to long, smooth crested waves outside the generating area which show a relatively predictable rhythm.

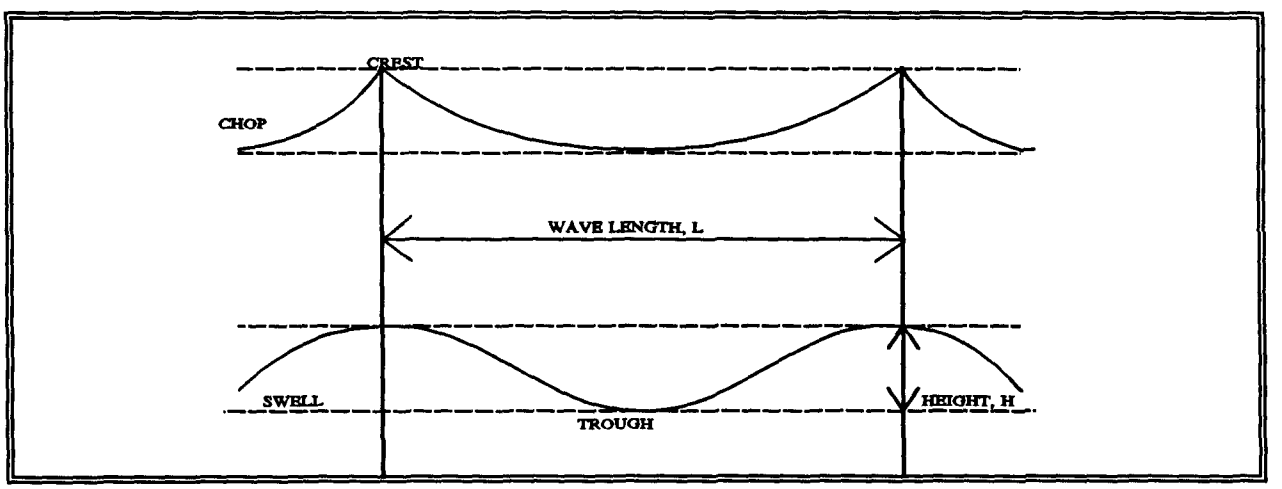

FIGURE 18
PARTS OF AN IDEALIZED WAVE

If the water is deeper than one-half of the wave length, the wave moves through the water with little disturbance from the bottom. In deep water equal to or greater than one-half the wave length, the water moves back and forth as the wave passes (**FIGURE 19**). The waves pass through the water with relatively high velocities, but the water remains relatively stationary. Waves will break when the H/L ratio reaches approximately 1/7.

As waves encounter shallow water, such as a beach, the wave height increases and the wave length decreases. When the wave height becomes approximately 0.8 of the water depth, it forms a breaker. In a breaker, the water moves with the wave exerting tremendous force on everything in its path. Breakers approximately 60 feet high have been reported at the entrance to San Francisco Bay. The height of breakers in a given area is determined by the height and direction of waves offshore. The height of chop is determined by the speed and duration of the wind as well as the area of influence. As waves move ashore, they are generally refracted and turn parallel to the shore.

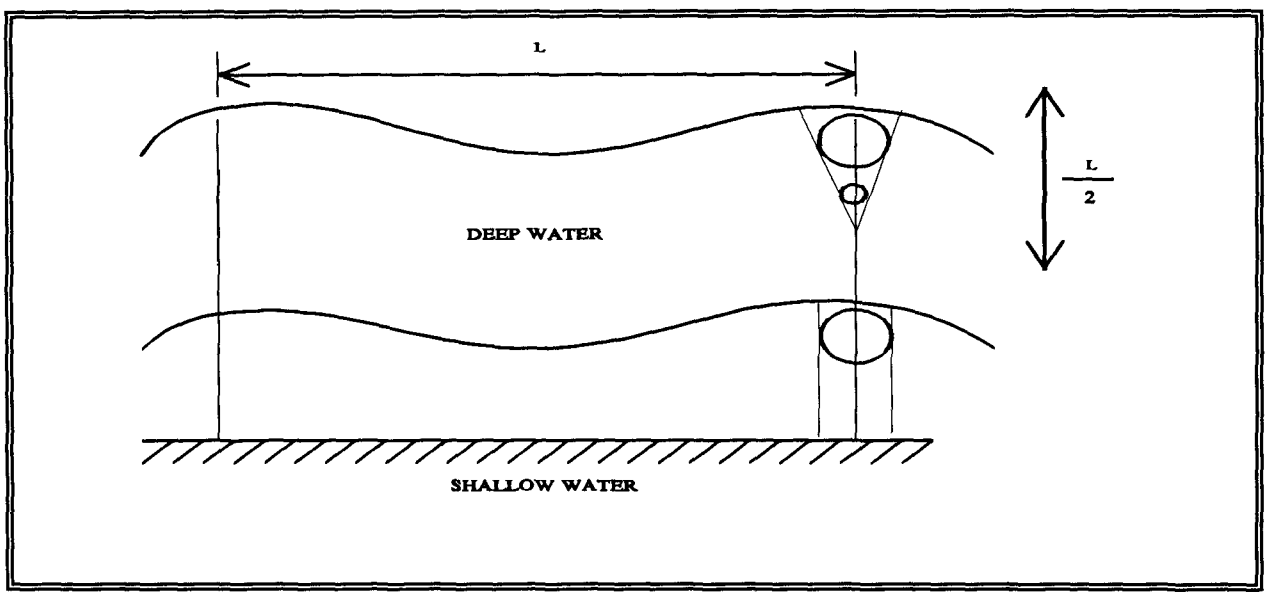

FIGURE 19
SUBSURFACE WATER MOVEMENT CAUSED BY WAVE ACTION

Tides are caused by the periodic rise and fall of the ocean surface. Tidal currents accompanying the rise and fall produce fast surface currents in coastal oceans and estuaries. Most coastal areas have two high tides and two low tides per tidal day of about 24 hours and 50 minutes. The Gulf of Mexico normally has only one high and one low tide during the day. Some areas of the coast will not have an easily predictable tide.

In San Francisco Bay and Chesapeake Bay, the surface water velocities are normally the result of tidal currents. These currents may be affected by wind and flow from rivers, but the direction of the surface water current is largely determined by tidal current. In other areas, such as in Laguna Madre on the southern coast of Texas, the surface water current is determined largely by the wind direction, and tidal currents have little effect. It is necessary to determine the factors that influence water surface velocities in a particular area so that they can be predicted under various conditions.

Estuaries and bays may have beaches and salt marshes. A salt marsh is a tidal flat covered with vegetation. The vegetation is usually submerged only during the highest tides. Oil can move into a salt marsh during flood tide and not be washed away with the ebb tide. Salt marshes are biologically sensitive areas that need special consideration in spill preplanning.

Water flow in an estuary is usually very complex. An estuary will have fresh water flowing from the river out to sea, while salt water from the sea will flow in and out of the estuary. This can result in a wedge of salt water flowing in and out of the estuary with a surface cover of freshwater flowing over the top. It is not unusual in some estuaries for the wind to move the surface fresh water in one direction while the salt water wedge is moving in another direction (**FIGURE 20**).

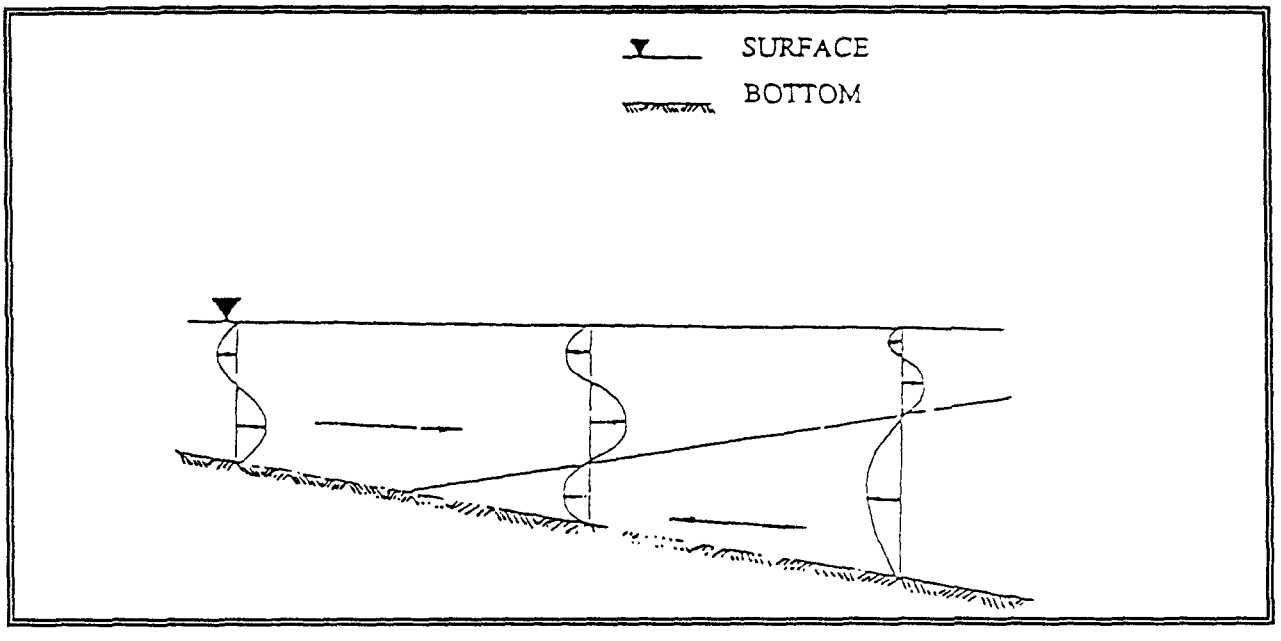

FIGURE 20
THE MOVEMENT OF SALT WATER AND FRESH WATER IN AN ESTUARY

Examples of the effects of tide, wind and freshwater flow on the movement of oil will be demonstrated. **FIGURE 21** shows the direction of movement of oil with no wind during ebb tide in an estuary. In this case, the movement of the freshwater flow from the river and the movement of the tide out to sea combine to cause a high surface velocity out to sea. **FIGURE 22** indicates the same freshwater flow and tide conditions with a wind from the north. A wind from the south during a period of low river flow and high tide is shown in **FIGURE 23**. These conditions result in the oil slick moving across the estuary to the opposite shore. An east wind or an incoming tide might move the slick to the west behind the island.

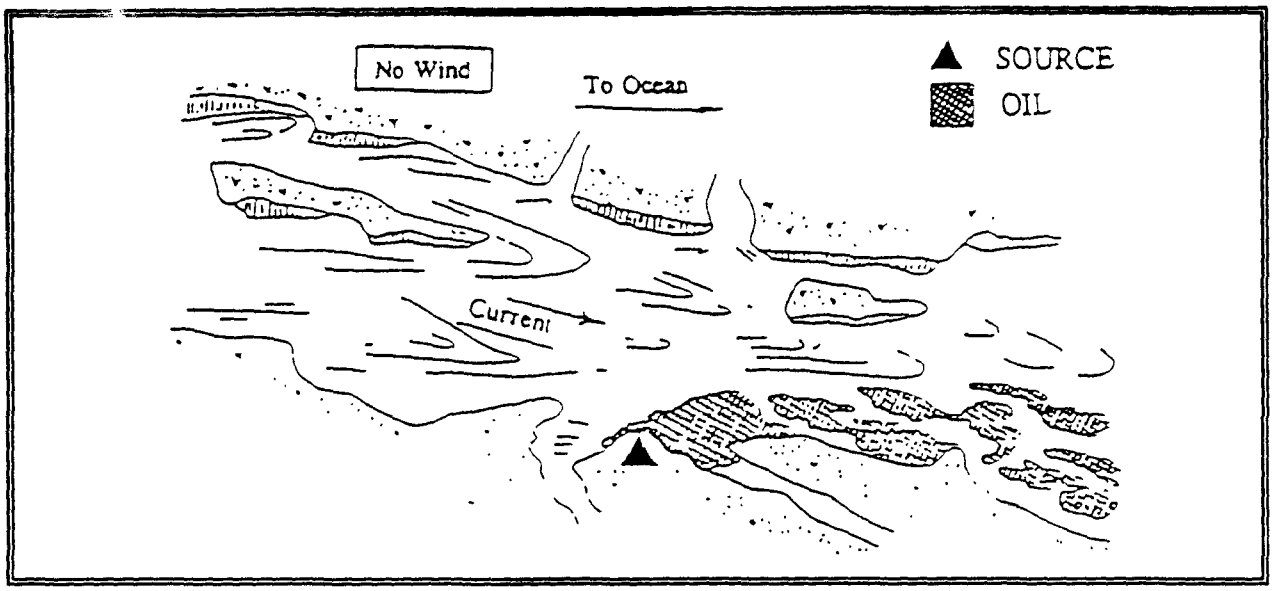

FIGURE 21
MOVEMENT OF OIL GIVEN AN EBB TIDE AND NO WIND

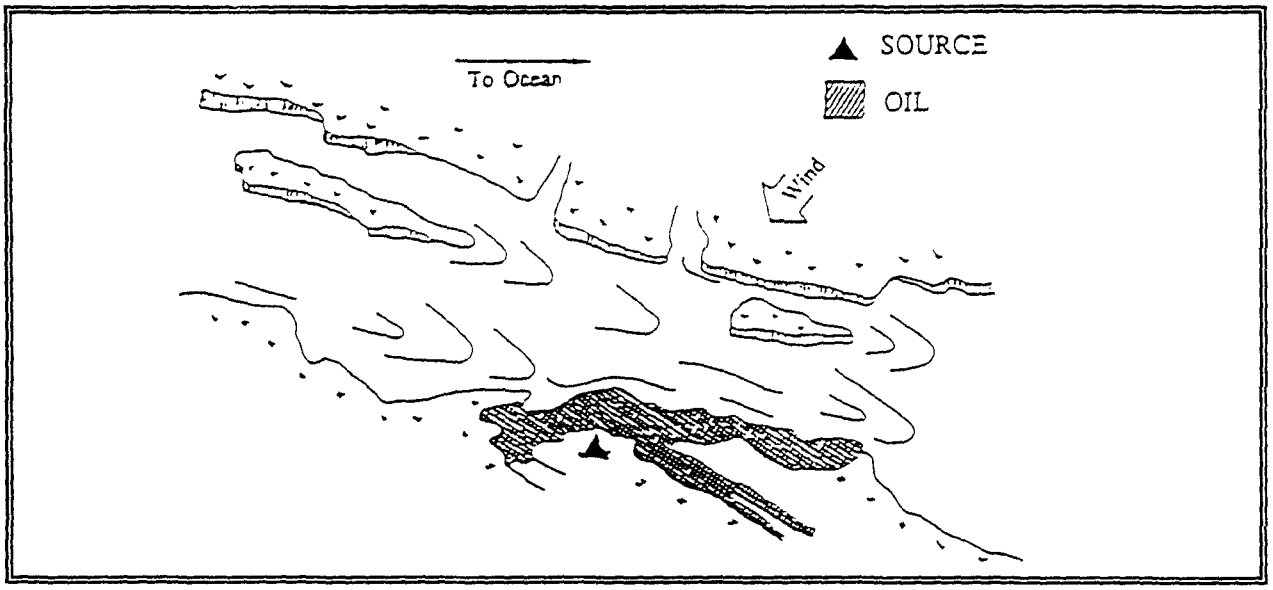

FIGURE 22
MOVEMENT OF OIL GIVEN AN EBB TIDE AND A NORTH WIND

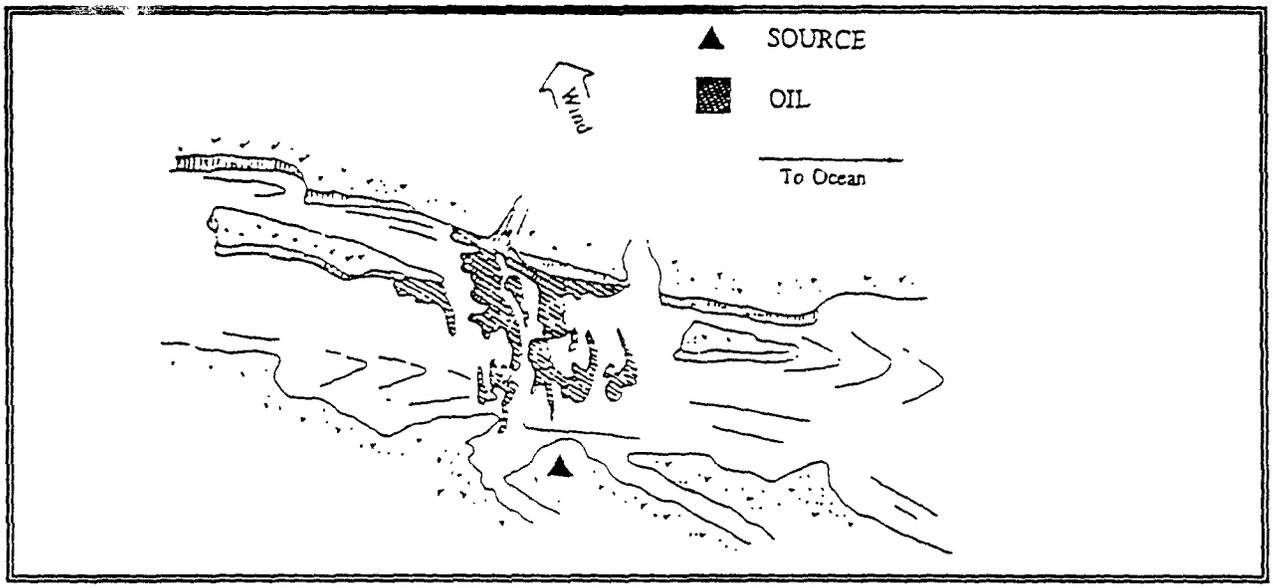

FIGURE 23
MOVEMENT OF OIL GIVEN LOW RIVER FLOW, HIGH TIDE AND A SOUTH WIND

SPILLS IN THE OCEAN

The surface current in the deep sea is determined by winds and unequal heating and cooling of the earth's surface. Deep sea surface currents may be seasonal but are usually predictable. As one moves from the deep sea to the vicinity of a coastline, the surface water currents may become more dependent upon tides, local winds and river flows where currents are usually less predictable. Deep sea currents tend to meander just as flow in a river does, although on a much larger scale. Offshore spills will tend to follow the deep sea surface currents, and their direction of travel should be predictable except during extremely high wind conditions. It is usually more difficult to predict the direction of movement of spills in coastal zones.

In addition to changing the direction of an oil slick, high wind velocities can result in the formation of regularly spaced, staggered parallel rows of oil slicks called windrows or Langmuir cells. The long axis of windrows are generally parallel to the direction of the wind. Windrows will also form at lower wind speed when the surface water is cooled by evaporation or movement of cool air over the water surface. Windrow formation is inhibited when the surface water is heated from warm air flowing over the surface or warm rainfall. They will also be inhibited when the surface water has a lower salinity, such as where a river flows into the sea or after a heavy rainfall. Natural windrow formation is a boon to deep sea oil cleanup because it tends to gather the oil in long narrow bands.

The temperature and salinity of the water in the deep sea are more uniform than near the coast. As the coast is approached, the temperature and salinity may change, and the changes may be seasonal or may be affected by wind speed and direction. Coastal currents are generally parallel to the coastline.

SUMMARY

Immediate action after a spill can save a great deal of money and effort since the spill will usually move with time and result in contamination of a greater area. Oil moves across the surface of water as a result of wind and current. Therefore, it is important to have knowledge of tides, currents, prevailing winds and other factors which will permit the cleanup supervisor to predict how and where a slick will move. It is commonly assumed that oil slicks move with the wind at a velocity of approximately 3.4 percent of the wind velocity.

Slick movement predictions can be made with chips or floats. These measurements are also useful for estimating loads that will be exerted on booms and anchors.

Spills in creeks are normally cleaned up by crews moving about on foot along the bank and in the water. Bridges and culverts are often useful cleanup locations, providing access points for personnel and equipment. Direction of movement of oil is highly influenced by the wind on small creeks.

Spills in rivers are normally cleaned up by crews that must move about by boat. River currents usually alternate from high to low velocities (riffles and pools) and the currents meander from bank to bank. Oil will move to one bank or the other as it flows downstream. Containment and removal of the oil will usually take place at the river bank. Bridges are often not usable as cleanup platforms as in the case of a creek. Rivers will usually contain more sensitive areas that require special consideration during spill recovery. Wind may greatly influence the movement of oil on rivers. Debris in rivers can hamper cleanup operations.

Lakes, estuaries and bays present special problems in containment and cleanup operations. In larger bodies of water, waves become very important. Some estuaries are predominantly controlled by tidal currents, while wind driven currents control the movement of oil in others.

Spills in the ocean are affected by deep sea currents, wind currents and waves. Windrows will tend to cause oil to form long, equally spaced rows of oil drifting with the wind. Deep sea currents are more easily predicted than the surface currents that occur along a coast.

SECTION 5

PART I

CONTAINMENT AND RECOVERY OF OIL ON LAND

DAMAGE DUE TO LAND SPILLS OF OIL

While oil spills occurring on the water are visible and frequently receive much publicity, underground leaks or tank truck accidents that allow the product to penetrate the soil often receive less notoriety. Within the oil industry, however, the problems associated with hydrocarbon contamination of both the soil and groundwater are well known. Statistical data on pipeline spills in 1971 indicate that in 233 reported spill incidents, almost 158,000 barrels of crude oil and gasoline were lost. Underground spills can lie hidden for decades, in some cases surfacing to pose cleanup problems years later.

Even small quantities of hydrocarbons spilled on barren ground may cause difficulties. Attendant problems include polluting water wells, damaging crop lands and causing general damage to the ecosystem. In some instances, surface waters miles away from the original spill site may be contaminated by hydrocarbons transported through underground water systems. Another problem involves volatile petroleum products seeping into basements, sewer lines and telephone conduits.

The varied effects of hydrocarbon spills on land are due in part to the physical and chemical properties of both the spilled product and the soil itself. Since the geology of a region may determine to a large extent how a spill will behave, it should be carefully considered before attempts are made to respond to an oil spill on land. Obviously, most oil spill cleanup on land will involve soils of unknown characteristics. However, in areas where the potential for an oil spill is great, a knowledge of the soil types and oil penetration depths into those soils will allow personnel in charge of cleanup to determine the most economically feasible cleanup methods. Major land spills often require geological experts to assess the situation and suggest cleanup procedures.

Sources of information concerning how oil acts on soil are varied. Actual prespill field studies conducted at high spill risk areas, i.e., a storage facility, yield perhaps the best estimates. In the absence of prespill information, rough estimates of penetration in soil may be made post-spill by referring to county soil maps to determine soil type, followed by calculations based on the type of product spilled.

OIL PENETRATION OF SOIL

Types of Soil

If the soil is relatively homogenous in structure and its texture is known, a reasonable estimate of petroleum penetration rates may be calculated. Texture, for purposes of this discussion, refers to the percent by weight of three mineral fractions: sand, silt and clay.

The sand fraction may be further classified according to particle size. The U.S. Department of Agriculture classification scheme is illustrated in **TABLE 1.**

TABLE 1
SIZE LIMITS OF SOIL SEPARATES[3]

Fraction	Soil Separate	Size (millimeters)
Sand	Very course sand	2-1
	Course sand	1 - 0.5
	Medium sand	0.5 - 0.25
	Fine sand	0.25 - 0.1
	Very fine sand	0.1 - 0.05
Silt	Silt	0.05 - 0.002
Clay	Clay	below 0.002

The percentage of each of the three main fractions is used to name the soil texture (**FIGURE 1**).

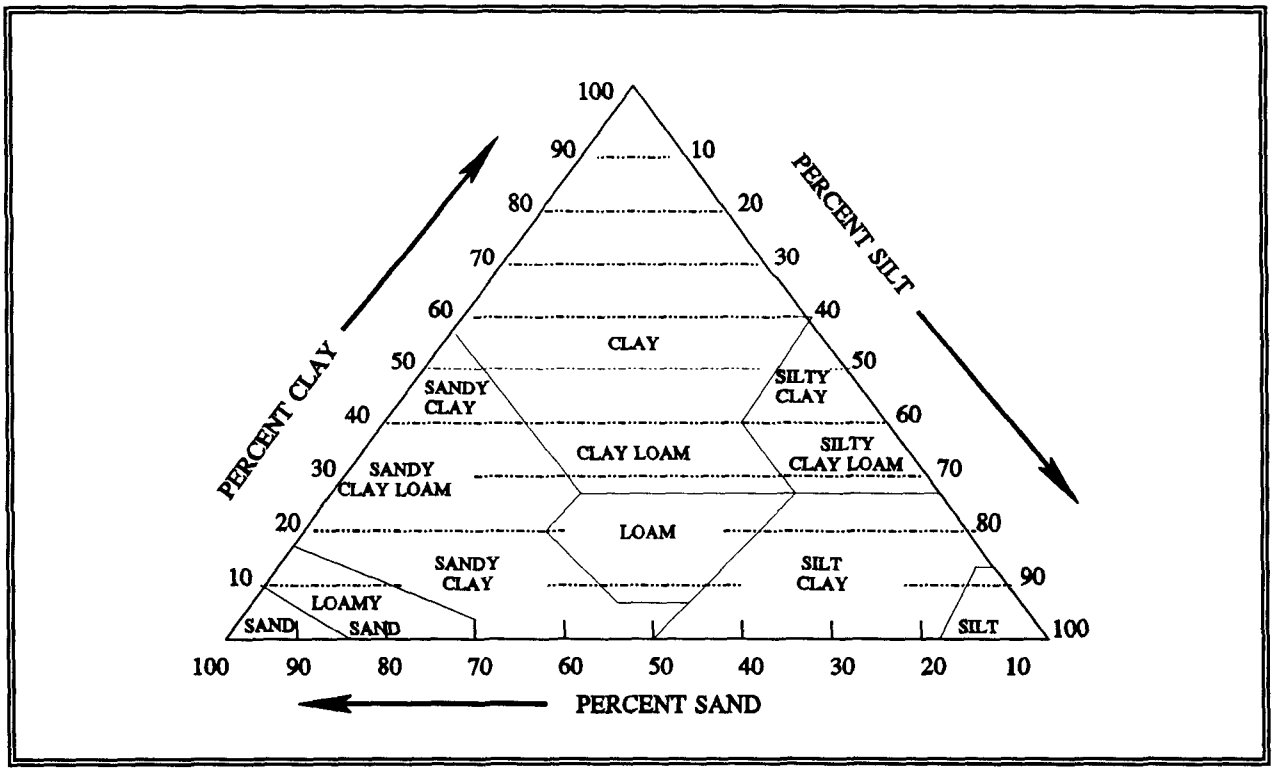

FIGURE 1
SOIL TEXTURE PROFILES

A knowledge of these soil texture types may be used in conjunction with county soil maps in order to approximate how petroleum may penetrate the soil in any particular area. For example, Pelican Island on the Galveston county soil map is shown to have an alkaline and saline clayey and loamy soil, while the southwest end of Galveston Island consists of sandy and loamy soil (**FIGURE 2**). Generally speaking, sandy soils are more easily penetrated by hydrocarbons than the clay-type soils; hence, a hydrocarbon spill on the southwest end of Galveston Island might be expected to penetrate to the groundwater table more quickly than a comparable spill on Pelican Island.

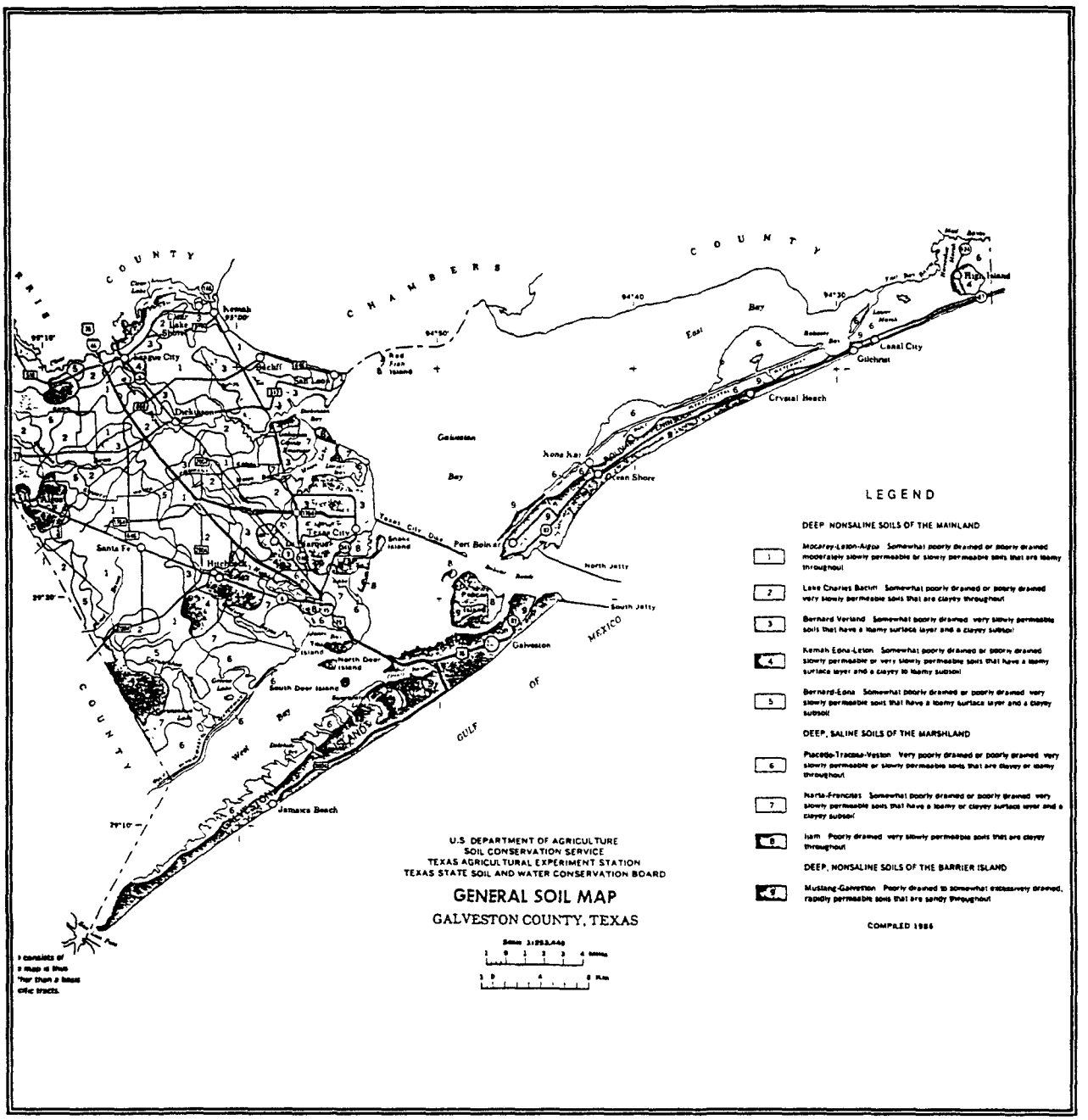

FIGURE 2
GALVESTON COUNTY SOIL MAP

When a large volume of oil is spilled onto the soil, the oil may spread across the soil surface and, depending upon its viscosity and the soil characteristics, may penetrate the soil, eventually reaching the water table. At this point, the oil may depress the water table, forming a thick lens-shaped mass that spreads throughout the funicular zone above the groundwater table and is subject to the influence of the groundwater flow (**FIGURE 3**)[4]. The funicular zone is that region above and approximately equal in thickness to the capillary zone.

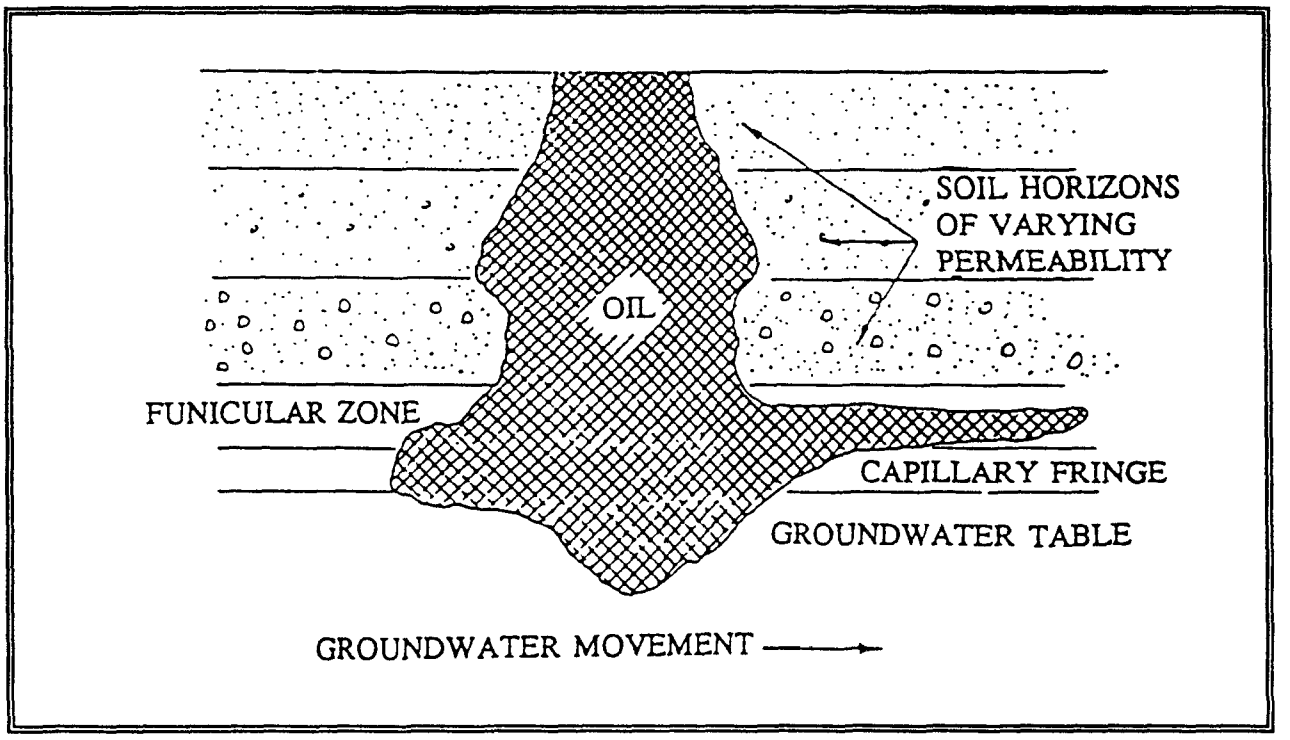

FIGURE 3
OIL CONTAMINATION PROFILE

Penetration Depths of Oil

A calculation of whether or not the oil will reach the groundwater may be made if the soil properties are well known. The following formula has been found to be of value in many cases[5].

Formula 1 $D = (K)(V)/A$

D = maximum depth of penetration in meters (m)
V = volume of infiltrating oil in m^3
A = area of infiltration in m^2
K = a constant, depending upon the retention capacity of the soil and the viscosity of the oil (**TABLE 2**)

The accuracy of the calculations will be limited by the accuracy of the "K" values. Again, the truest K values are those determined by individual prespill field studies. "K" values given in **TABLE 2** are the estimates of one author for dry soil (worst case) conditions. Obviously, values for wet soils would differ greatly from those given. Thus, rainfall as a factor must also be considered.

The maximum spreading of the oil lens on the water table may be calculated, if little groundwater movement occurs, according to Formula 2.

Formula 2 $$S = (1000/F)\ \{V-\{[((A)(d))/K]\}$$

S = maximum spread of oil in m^2
F = thickness of oil layer in the capillary zone
V = volume of oil in m^3
A = area of infiltration in m^2
d = depth of groundwater in m
K = a constant depending on the retention capacity of the soil and viscosity of the oil (**TABLE 2**)

TABLE 2
TYPICAL VALUE FOR K AND F

Soil	K		F(mm)	
	Gasoline	**Kerosene**	**Light Fuel Oil**	
Coarse gravel	400	200	100	5
Gravel to coarse sand	250	125	62	8
Coarse to medium sand	130	66	33	12
Medium to fine sand	80	40	20	20
Fine sand to silt	50	25	12	40

For example, suppose a tank truck spills 14 cubic meters of light fuel oil on a medium to fine sand. The spill diameter is 10 meters.

A = $\pi r^2 = (3.1416)(5m^2) = 78.54m^2$
K = 20 (from **TABLE 2**)
V = $14m^3$
D = $(K)(V)/A = (20)(14m^3)/78.54^2 = 3.6m$

If the groundwater lies at a depth greater than 3.6 meters, then the assumption could be made that the soil would sorb the fuel oil before it could reach the water table.

In another case, suppose that 15 cubic meters of gasoline were spilled on coarse sand. The diameter of the spill is 10 meters, with a water table two meters beneath the soil surface. The maximum spreading of the oil lens on top of the water table is calculated as follows.

F = 8mm
V = $14m^3$
A = πr^2
d = 2m
K = 250 (from **TABLE 2**)
S = (1000/F) {V-[((A)(d))/K]} = (1000mm/m/8mm) {$14m^3$ - [(($78.54m^2$)(2m))/250]} = 1671 m^2
S = 1700 m^2
S = Area = πr^2

Diameter of the gasoline of the water table = 2r = 46m

> Note: The preceding formulas may be converted easily to graph form for those who prefer to work with graphs.

These tables and calculations are practical only for light products. Since the flow rate of an oil is inversely proportional to its viscosity, only those hydrocarbons of relatively low viscosity (high flow rate) are likely to cause substantial migration problems in most soils. Because heavy crudes have a low flow rate, a determination of their penetration rates is usually unnecessary.[6] Much of the information concerning groundwater depth and resulting water table gradient can be obtained inexpensively by consulting a local well driller.

Hydrogeological Investigative Techniques

In order to most accurately predict whether or not a hydrocarbon will penetrate to the groundwater table, prespill evaluation of data concerning the fluctuation of the water table, variation in the soil moisture content, and permeability of the soil in the potential spill area is desirable.

Ideally, investigative procedures should begin with a review of the hydrogeological data of the region within a potential oil spill area. These data should include a study of the geological structures along pipelines, tank farms and major transportation routes. Geological maps are useful in revealing faults, limestone deposits and other geological features that might facilitate the transport of spill products. Similarly, a general assessment of subsurface conditions, including the probable direction of flow of underground water systems, should be made. Finally, it may be useful to delineate the boundaries of various hydrogeological systems.

The usual boundaries are rivers, into which spilled oil is sometimes carried by the groundwater[6].

The second phase of investigative procedures, especially where the ground consists of discrete soil horizons, involves an actual field investigation. Such an investigation may include soil samples taken during percussion drilling. The samples may be examined for grain size in order to accurately define the nature and location of the soil horizons. From core samples one may also determine the porosity of each soil horizon. The boreholes may be used for water permeability measurements. In addition, hydrocarbon percolation tests may be made. The groundwater head distribution may be studied by inserting standpipes (for monitoring the water level) into the complete boreholes.

Pumping tests in selected wells can be made to determine the transport potential (transmissivity) of the aquifer[6]. These combined data offer a working knowledge of:

1. the amount of hydrocarbon that must be spilled in order to reach the groundwater,

2. the direction and rate of migration of the product once the groundwater is contaminated,

3. the geological or hydrogeological boundaries that exist, and

4. the rate at which the product may be extracted from the ground.

This information can be translated into a cross-sectional map showing the probable direction of travel of the oil as it follows the groundwater system (**FIGURE 4**).

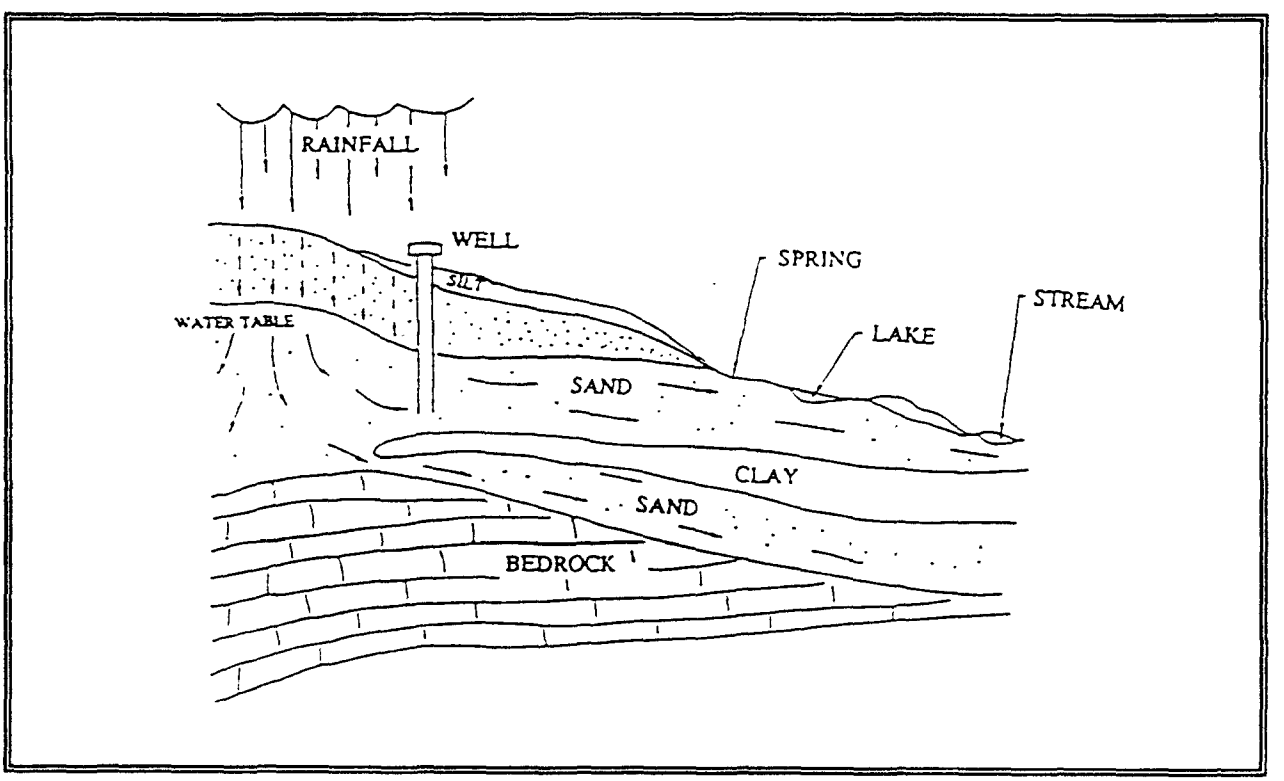

FIGURE 4
SAMPLE GROUNDWATER SYSTEM

SUMMARY

Hydrocarbons move through the soil depending upon the properties of both the soil and the product. A prior knowledge of soil types and permeabilities, as well as the general hydrogeological features of an area can help in preplanning a response to an oil spill on land. This information may be gained from geological maps, county soil maps and actual field studies of an area.

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CLEANUP TECHNIQUES

Methods of cleaning up spills on land are varied to suit the following situations:

1. oil moving horizontally on land, and

2. oil sorbed by the soil above the water table.

In the case of oil moving horizontally on land, the problem can be further divided into three main situations. If oil is spilled on land around a tank farm or loading facility, prior planning should dictate the course of action. According to guidelines for Spill Prevention Control and Countermeasure (SPCC) Plans published in the Federal Register of December 11, 1973, entitled "Oil Pollution Prevention", section 112,7, subsections b and c state:

> (b) where experience indicates a reasonable potential for equipment failure such as tank overflow, rupture or leakage, the plan should include a prediction of the direction, rate of flow and total quantity of oil which could be discharged from the facility as a result of each major type of failure.
>
> (c) appropriate containment and/or diversionary structures or equipment to prevent discharge oil from reaching a navigable water course should be provided. One of the following preventative systems or its equivalent should be used as a minimum:
>
> 1) Onshore facilities
> - i. dikes, berms or retaining walls sufficiently impervious to contain spilled oil
> - ii. curbing
> - iii. gutters or other drainage systems
> - iv. weirs, booms or other barriers
> - v. spill diversion ponds
> - vi. materials

When hydrocation spills occur on city streets as from a tank truck accident, the first agency to respond is usually the fire department. Unfortunately, the first response of many fire departments may be to hose the product into nearby storm sewers or roadside ditches. The fact that the fire department initiates this action does not relieve the company of the liability for damages caused by the spill. In some cases, hosing the spill into a sewer system may actually increase the spill damages. In cities where the potential for a tank truck accident is high, a map of the storm sewer system should be obtained from the city. Prior to knowledge of information such as flow rates and directions, access points and high fire hazard areas in the system will allow a quick and positive response to a spill that enters the sewer. Proper training and equipment for removing a volatile hydrocarbon in such a special situation are essential. Perhaps one of the better general response procedures, especially appropriate if the product is highly toxic or soluble, is to keep the product out of the sewers. This may be done by constructing simple dikes of any readily available material that is impervious to oil. If soil is used, it should be relatively impermeable. Also, several types of

commercially available quick-setting foam may be used to construct dikes. Collapsible storage bladders may be used for emergency containment of spilled product. These sausage-like devices also allow a leaking or damaged tank truck to be unloaded quickly at the scene of the accident. In deciding whether to contain hydrocarbons on land or flush them into sewers, consideration should be given to minimizing fire and explosion hazards. If the product presents no immediate fire or explosion hazard, the best response may be to keep it out of the sewers and remove it from the land surface. Oil on roadways can be pushed to collection sumps, trenches or vacuum devices. Loose sorbents can be worked on top of pavement to remove residual oil.

Land spills in remote areas pose special problems. Leaks from surface pipelines, tank truck accidents in rural areas, and oil field spills are common sources. Planning the response to such spills is difficult, but many workers in the industry have found that topographic maps of the areas along pipelines and around production fields help in figuring the direction of oil moving along the surface.

Before a spill occurs, a list of earthmoving contractors and equipment should be made (for type see Appendices). A telephone call to one of these agents is sometimes the quickest way to get a retaining dike built. Some companies have special spill kits for remote areas which include equipment for confining moving surface oil. Crude oil and heavy fuel oils on the soil can be floated with water in ditches, trenches or behind dikes to limit oil penetration into the soil.

Hydrocarbons that are sorbed by the soil above the water table may be treated in several ways, depending upon the nature of the soil and product. If the spill area is shallow with a clay or water seal along the bottom, flushing with water will, with limited effectiveness, float the oil from the soil. Although rarely employed, natural sorbents, such as sawdust, hay or ground corncobs, mulched into contaminated soil have been used where other cleanup methods have proven ineffective. After having been mixed into the soil, the sorbents are removed by a water stream, collected and disposed of properly (**FIGURE 5**). In frozen soils, high pressure water to dissolve oil or steam cleaning to lower oil viscosity is used to float oil with only minor damage to plants. These tools also work well on roadways, walls and other man-made structures.

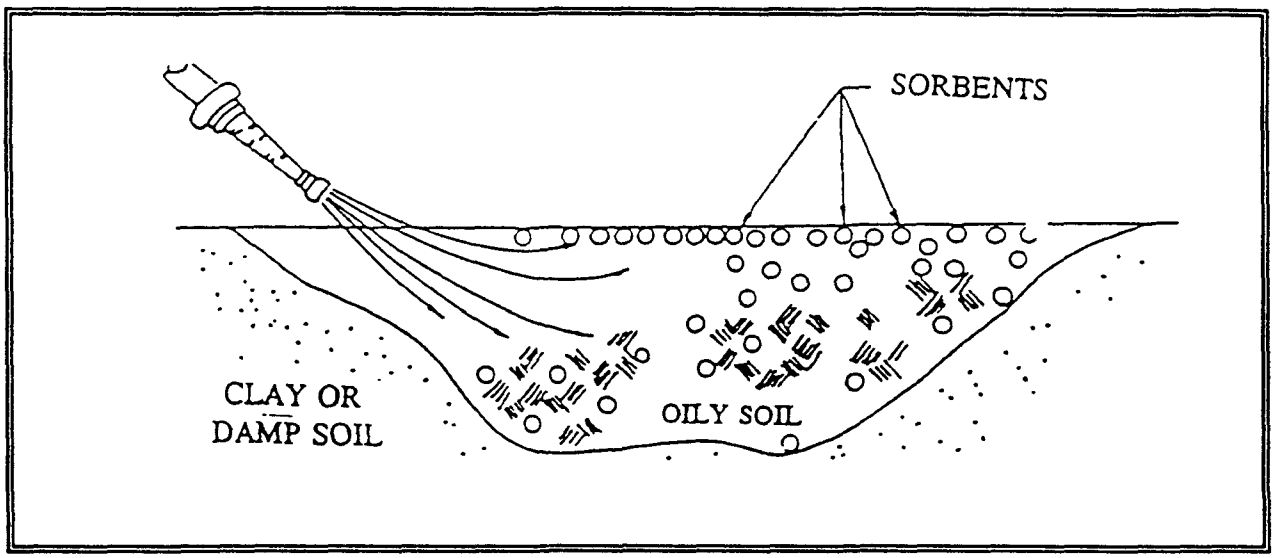

FIGURE 5
SORBENT/HYDRAULIC REMOVAL OF OIL

A common method of treating soil contaminated with hydrocarbons is simply allowing the oil to biodegrade. The success of this method depends on the oil toxicity, available nutrients, available water, ambient temperature and oxygen availability. Biodegradation of alkane hydrocarbons proceeds readily by naturally occurring microorganisms such as yeast, bacteria, mycobacteria and mold fungi. More complex hydrocarbons such as aromatics biodegrade more slowly.

Before initiating any response, volatile hydrocarbons should be allowed to evaporate. Later, various techniques can be used to increase the biodegradation rate. The techniques include:

1. Tilling
2. Adding fertilizer
3. Adding Lime
4. Adding bacteria
5. Temporary drainage
6. Aeration

If the oil depth is shallow, discing and adding fertilizer can add oxygen and nutrients which will cause rapid conversion of soil to carbon dioxide and water by bacteria. Repeated treatments will usually be necessary. Tillage should not be used on dry soils that may be blown away upon disturbance. Some workers have found that plowing organic matter such as sewage treatment plant sludge into the oily soil can increase the biodegradation rate. However, others suggest that it does not. For example, sawdust added to arctic soils has only added more organic matter to the soil which increase the biological oxygen demand.

Other additives such as lime may be considered for corrosive oils on acidic soils to neutralize the added acidity. Special bacteria cultures may be added to inoculate a site. However, it has been debated whether the cultures are more effective than naturally occurring bacteria. They have shown some success on very acidic soils.

To add air into the soil, temporary drainage with tilling and fertilization may help wet forest sites. Entry of air into the soil will facilitate oil volatilization and degradation. However, drainage without soil mixing can do more harm than good. Excessive drainage can cause soil problems such as soil subsidence.

Oil deeper in the ground, below the aerobic bacteria zone, may be degraded by air pumped into the ground. For small spill areas, soil aeration by pumping air through buried perforated pipe or drilled holes can oxidize volatile hydrocarbons and hydrogen sulfide and increase aerobic bacteria degradation. Recent research has experimented with hydrogen peroxide injection into soil layers to oxidize volatiles. However, this technique may sterilize the soil. Other research using surfactants can increase oil leaching, yet surfactants may clog soil. Before applying any land modifying technique, consultation with soil scientists and local government personnel is suggested.

Other cleanup techniques are burning, soil removal and water infiltration. Burning is often thought of as a final cleanup process. However, more work is usually needed. Burning can remove large amounts of oil or the last traces of oil remaining after oil removal operations. It will also oxidize volatile hydrocarbons. Burning can leave an oil film or crust which may prevent seedling shoot penetration, can spread oil further than unburned spill boundaries, can kill plants which may contribute to erosions, and or can produce products more toxic than the original oil product. Therefore, if burning is used, biodegradation techniques should be used to help eliminate oil.

Soil removal is possible for shallow contaminated soils and spills of small area. The amount of oil contaminated can be tremendous even for heavy fuel oils (**FIGURE 6**). Contaminated soil does not mean the soil is sterile. Soil should not be removed in most cases unless absolutely necessary.

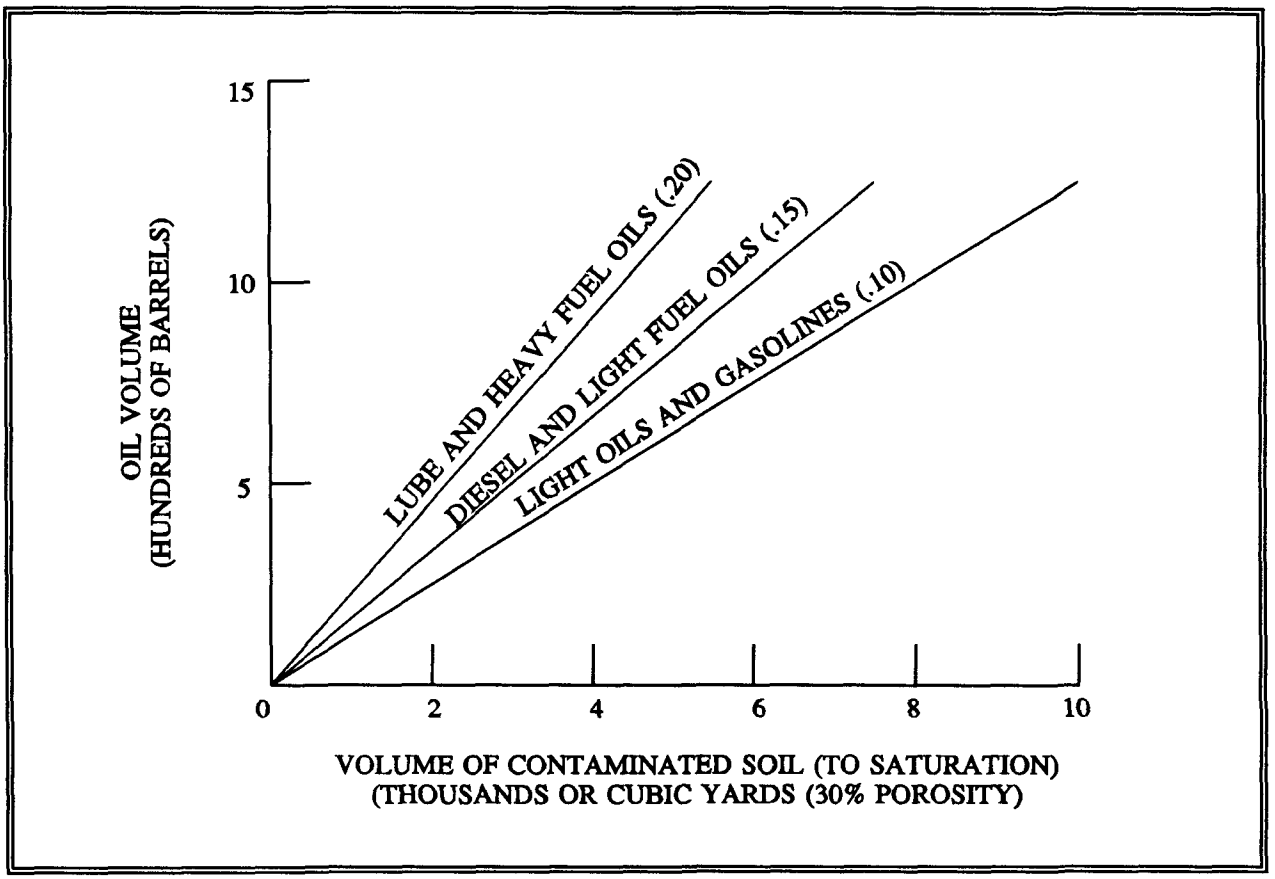

FIGURE 6
RELATION OF SPILL SIZE TO VOLUME OF SOIL CONTAMINATED TO POINT OF SATURATION (soil immobilization)[2]

Problems associated with soil removal are contact with buried structures (pipelines, cables), damage to building foundations, explosion hazard in pits when working with volatile products, and equipment breaking through impermeable layers in the subsoil which would allow greater product penetration.

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Water infiltration has proven to be impractical during most spills to float oil to the surface. In gravel or sandy soils where the groundwater table is less than a foot from the surface, oil can be flooded to the surface and either recovered or burned. However, water flooding can limit oxygen in the soil and contribute to carbon dioxide toxicity, can accelerate nitrate leaching, can decrease aerobic bacteria and cause denitrification. It is impractical in subfreezing weather.

After all cleanup activities are complete, any containment devices such as dikes, trenches, etc., should be removed. The topography should resemble a prespill appearance. Revegetation or restoration can now be considered. Revegetation can increase biodegradation in some cases. Planting leguminous species over the spill site can add nitrogen to the soil which can aid biodegradation. Crops such as alfalfa tend to breakup residual high molecular weight hydrocarbons[8]. Although many legumes are used in site revegetation (**TABLE 3**), some such as alsike clover and white clover are known to tolerate oil while alfalfa has a low tolerance of oil. Grasses may also be used for revegetation (**TABLE 4**). Some such as brome grass and reed canary grass are known to have high oil tolerances. Which species is chosen will depend on the time of year planted, soil characteristics and amount of oil in the soil. Once again, consultation with local soil scientists is advised.

TABLE 3
LEGUMES COMMONLY USED FOR REVEGETATION[9]

Variety	Best Seeding Time	Seed Density* seeds/ft^2	Important Characteristics	Areas/Conditions of Adaption
Alfalfa (many	Late summer	5.2	Good on alkaline	Widely adapted
Birdsfoot trefoil	Spring	9.6	Good on infertile	Moist, temperate, U.S.
Sweet clover	Spring	6.0	Good pioneer on	Widely adapted
Red clover	Early spring	6.3	Not drought	Cool, moist area
Alsike clover	Early spring	16.0	Similar to red clover	Cool, moist areas
Korean Iespedeza	Early spring	5.2	Annual, widely	Southern, U.S.
Servicea Iespedeza	Early spring	8.0	Perennial, tall erect	Southern, U.S.
Hairy Vetch	Fall	0.5	Winter annual,	All of U.S.
White clover	Early fall	18.0	World-wide, many	All of U.S.
Crownvetch	Early fall	2.7	Perennial, creeping	Northern U.S.

* Number of seeds per square foot when applied at 1 lb/acre.

TABLE 4
GRASSES COMMONLY USED FOR REVEGETATION[9]

Variety	Best Seeding Time	Seed Density* seeds/ft^2	Important Characteristics	Areas/Conditions of Adaption
Redtop bentgrass	Fall	14.0	Strong, rhizomatous	Wet, acid soils, warm
Smooth bromegrass	Spring	2.9	Long-lived perennial	Damp, cool summers,
Field bromegrass	Spring	6.4	Annual, fibrous	Cornbelt eastward
Kentucky bluegrass	Fall	50.0	Alkaline soils, rapid	North, humic, U.S.
Tall fescue	Fall	5.5	Slow to establish,	Widely adapted, damp
Meadow fescue	Fall	5.3	Smaller than tall,	Cool to warm regions,
Orchard grass	Spring	12.0	More heat tolerant	Temperate U.S.
Annual ryegrass	Fall	5.6	Hot winter hardy,	Moist southern U.S.
Timothy	Fall	30.0	Shallow roots, bunch	Northern U.S., cool
Reed canarygrass	Late summer	13.0	Tall, coarse, sod	Northern U.S., wet

* Number of seeds per square foot when applied at 1 lb/acre.

SUMMARY

Movement of oil on top and into the soil will depend on topography, soil permeability and structures below the surface. Oil penetration into the soil can be predicted.

Oil on hard surfaces can be pushed into collection devices or sucked into vacuum devices. Final cleaning can use sorbents or water. Oil on other surfaces may use heavy equipment to remove oil and contaminated soil, water flooding within dikes to float oil, sorbents and water flooding to recover oil, or burning to remove oil.

Oil below the surface can be removed by aeration and biodegradation. Tilling, fertilizing, liming, adding bacteria and drained soil may increase aeration and biodegradation. Soil removal and water infiltration require special consideration of the effects of the techniques.

Final cleanup involves site restoration. Containment devices should be removed and sites revegetated where needed. Techniques should be used that facilitate site restoration as quickly as possible.

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SECTION 5

PART II

CONTAINMENT AND RECOVERY OF OIL IN ICE AND SNOW

SPILLS IN WATER WITH THIN ICE

The primary concern with oil recovery where ice is involved is personnel exposure due to extreme weather conditions which can cause frostbit, loss of limb, or loss of life. This threat along with the possibility of sudden weather deterioration makes oil containment and recovery particularly hazardous. Therefore, it is recommended that individuals working on or near icy waters have safety lines connected from themselves or their life jackets to a buddy who can pull a fallen buddy from the water. Additional cold weather survival gear, such as a warming house to limit exposure and a helicopter for emergency response, should be available at the cleanup site.

Another concern with oil recovery is the oil's movement. Oil spreading rates in cold weather are less than oil spreading rates in warm weather. Those oils that are semi-solid at 0°C will not spread significantly (i.e., Bunker C, heavy crude).

Oil in water with thin ice will move similarly to oil in water. However, where currents are involved, oil movement will be slower where ice is encountered. Dark colored oil may be visible beneath thin ice to aid in locating the oil, but light colored oils, such as diesel or gasoline, may be difficult to observe under ice.

Containment techniques are the same as for oil in water although a thick ice sheet can be manipulated to aid in oil containment. The ice can be broken so that the ice ridge acts as an oil barrier in no current situations or can be broken at an angle to the current to act as a deflection device in a current. At the recovery site, a boom or other oil barrier should be used.

Oil can be recovered with either vacuum trucks or skimmers. The major problem with these is ice debris. The use of screens and the skimmer types chosen can reduce the severity of this problem. One particularly useful skimmer has been the rope mop skimmer. At subfreezing temperatures, diesel is recoverable with these skimmers. However, for higher viscosity oils, such as Bunker C, hot water baths can be used to remove oil from the mop.

Another potential problem can be the pumps used with skimmers. Once started, a pump should be run continuously to prevent freeze-up of product in hosing. Since draining of pumping systems may not be feasible in freezing temperatures, antifreeze solutions should be added into the pump intake when a pump is not running. When a product is moving through the hose, product warmers, which heat the product or insulation placed below the hose (i.e., sorbent roll) can be used to keep the product moving. Since products under ice are near freezing temperature, subfreezing temperature above the ice surface can change the pumpability of products recovered. In some spills, bucket lines have been used to transport recovered oil from the skimmer to tank trucks when products in hosing has solidified.

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SPILLS IN WATER COVERED WITH THICK ICE

Oil can combine with thick ice in several ways to slow or stop its movement. Oil spilled on ice can stay on the surface or penetrate channels and cracks in the ice. Experiments with this phenomenon have recorded that as much as 25 percent of the crude oil spread on ice was absorbed in the ice. In sea water, brine channels form where salt is expelled from the ice. Generally, salt water is 31 parts per thousand (ppt) or less in salinity. Although first year ice is around 10 ppt in salinity, salinity decreases as ice ages. These brine channels can allow surface oil to rise to the surface. Oil under ice can be trapped in subsurface ice pockets or cavities. If the temperature decreases, oil will become encapsulated in the ice as the surrounding ice freezes. Oil under or encapsulated in ice can penetrate small channels that form as the ice freezes and melts to form surface melt pools. This process is accelerated when the dark oil under the ice surface absorbs radiant energy from sunlight. This can cause the ice to melt, forming more channels. Experiments have demonstrated that oil under ice can flow into channels to a height of 15 cm (5.9in) above the water, containing about 5 percent of the spilled oil.

The use of sophisticated aerial photography for detecting oil under ice has been unsuccessful or impractical; and although the use of radar and acoustic techniques have shown promise, they need more research and refinement. The most widely used technique for finding oil under thick ice involves waiting for the oil to appear on the water surface or drilling test holes through the ice and waiting for the oil to surface.

In a current, maximum oil movement can be predicted by assuming that the oil will move at the current velocity. However, the oil will usually move slower than the current velocity due to its contact with the ice (**FIGURE 7**). When oil does move in a current, hydrocarbon monitors, explosimeters, or "sniffers" can detect the presence of oil in test holes, ice leads, or other ice openings.

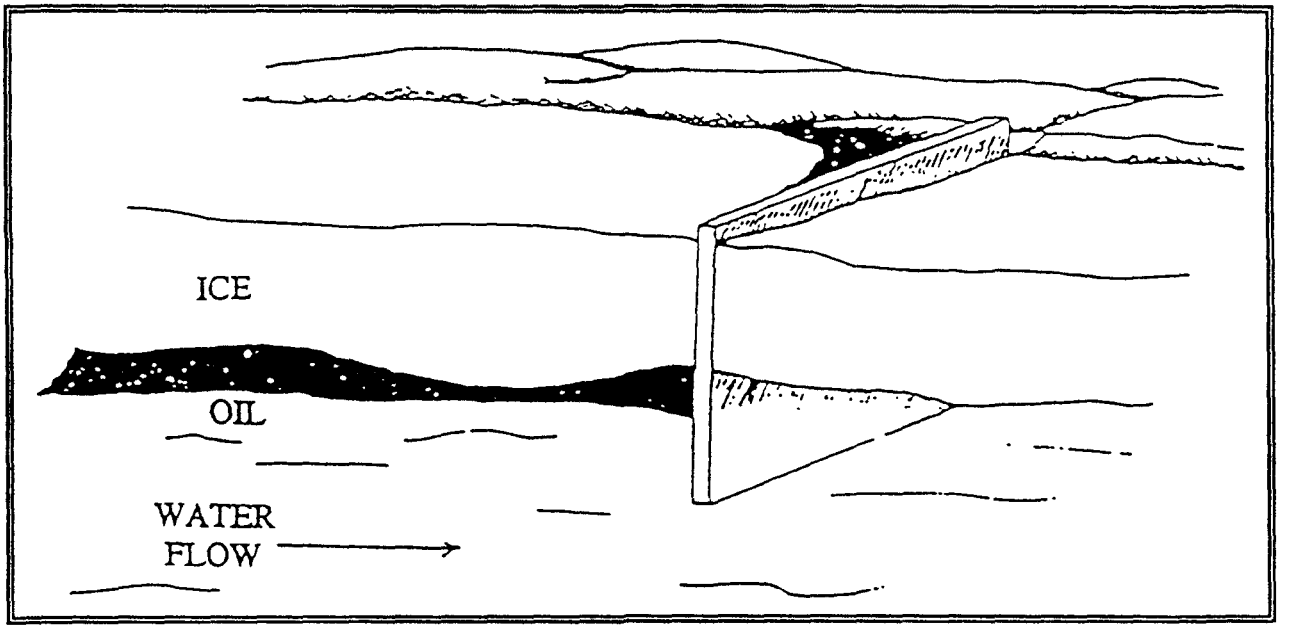

FIGURE 7
SUBSURFACE BARRIERS

Other techniques that have been used in clear water are the use of underwater divers who can monitor the ice under the surface for oil. The major difficulties with these two techniques are their inability to maneuver in fast currents and the expenses incurred.

A less expensive technique used when ice is clear or translucent is using lights lowered beneath the ice to reveal oil shadows cast through the ice when dark. Darkness will occur naturally at night or can be created using large black plastic sheeting over the ice during the day. The oil in the shadows should be confirmed by drilling an auger hole. Liquid can be removed from the hole to check for oil, or gas can be sampled with a hydrocarbon monitor for oil vapors.

When oil is found, the area should be marked, as additional snowfall can obscure a site and delay the cleanup response. Finding an unmarked site from memory will be difficult, as the site's physical characteristics may be changed by snowfall.

Before any oil spill control technique is initiated on ice, the ice thickness should be determined by drilling as many test holes through the ice as necessary. The weight bearing capacity of the ice should be checked, and other previously mentioned safety precautions should be observed.

Choosing a containment and recovery technique will not only depend on ice thickness but also on the ice type. If ice sheets are rafted (overlapping broken ice sheets), oil may surface between sheets in the openings. However, working on sloping ice sheets that may sink or rise due to the surrounding pressure from other rafted ice can be dangerous.

If access is available to oil contained by rafted ice, boring can be initiated when the oil collects to a minimum depth of five centimeters. Ice can make an effective containment device by holding the burning oil in place and keeping the burning oil from spreading as it does in open water.

The main problems with burning oil are getting the oil to ignite and keeping the oil ignited. Since oil fires are always smoky, health risks are associated with dark colored particulate carbon and soot. They can cool and fall on snow or ice, where these particles readily absorb radiant energy and melt the surrounding ice, causing slipper conditions. If the oil is of high sulfur content, burning will release sulfur dioxide, which can cause respiratory problems for individuals near the smoke. All of these burning products are potential health hazards to surrounding residential areas, as smoke from oil fires has been carried 50 miles or more from the oil burning site.

In areas where ice is relatively flat and stationary, oil can be contained with a number of subsurface barriers. One simple oil barrier can be made by cutting a thin slot in the ice and placing plywood or some similar barrier through the slot. Subsequent freezing will hold the material in place. These barriers should be placed at a 30° angle to the current to divert oil to a recovery point near the shoreline (**FIGURE 7**).

Barriers can also be constructed by simply using water on first year ice. This can be accomplished by adding water to the upper ice surface where it will quickly freeze. The added weight causes the ice to sink, forming a barrier (**FIGURE 8**). Since the ice thickness varies due to temperature, the subsurface ice will melt slowly. Adding more water to the surface can quickly minimize the problems with subsurface ice melt.

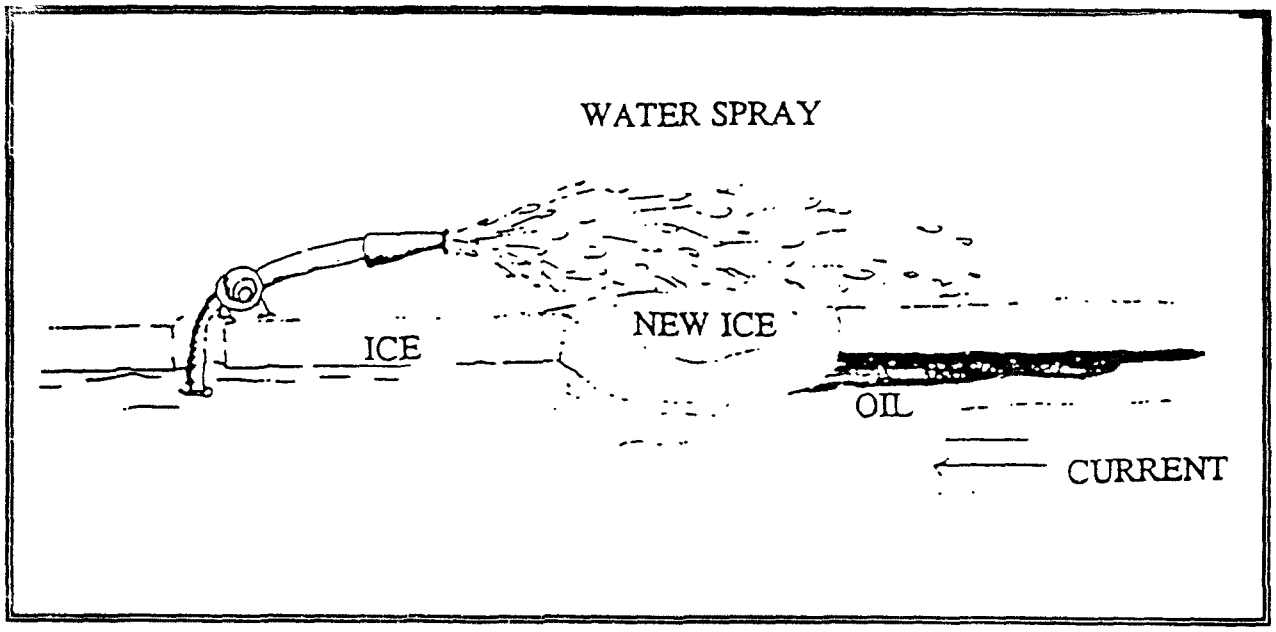

FIGURE 8
ICE BARRIER

Using the principle of ice thickness, response to temperature pockets or troughs in subsurface ice can be made by applying insulation to the ice surface (**FIGURE 9**). However, do not expect the subsurface ice to melt rapidly.

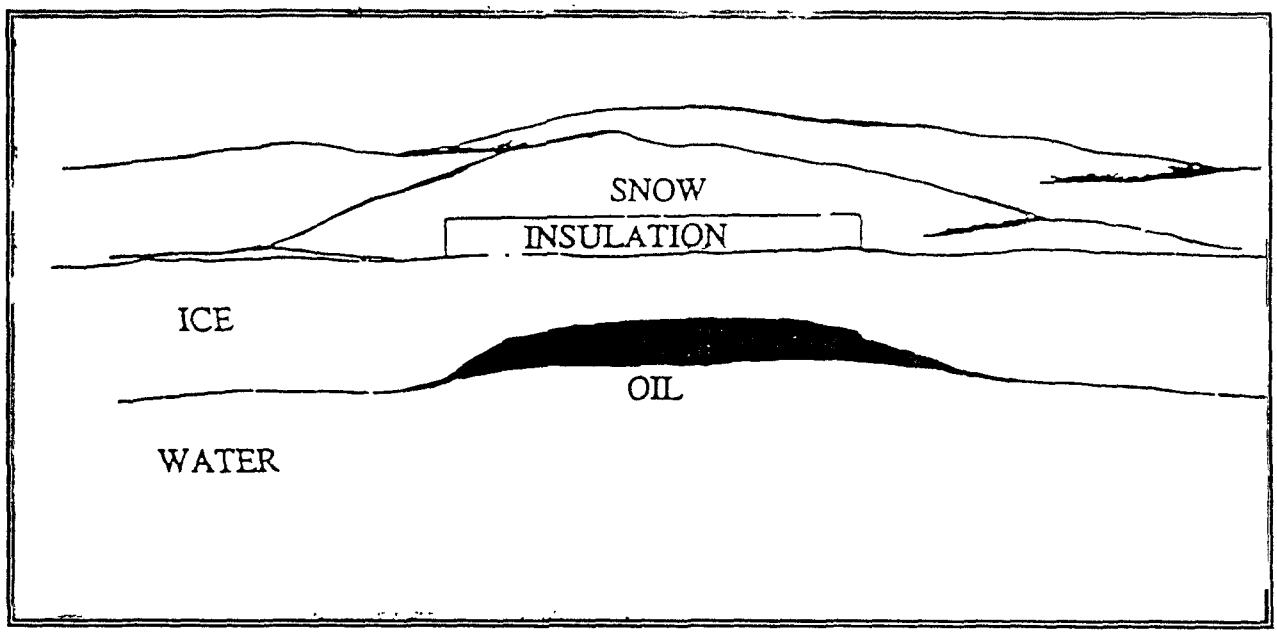

FIGURE 9
ICE TROUGH

Auger holes and slotting can also be used in conjunction with subsurface barriers or simply by themselves. These techniques allow oil to come to the surface waters. Since surface water will freeze, continued ice removal is required. Auger holes work best in stationary oil deposits. Care should be taken in coastal areas and in entrapped oil pockets where pressure from tidal action and ice crystal growth (respectively) can cause pressures under the ice and force oil and water to spurt out of newly cut holes. In stationary or flowing waters, slots can be used. Slots cut in the ice above flowing water should be placed at angles up to 30° to the current to force contained oil to a recovery site (**FIGURE 10**). Typically slots are one and a half times the ice thickness. This width allows oil caught in the flowing water time to surface.

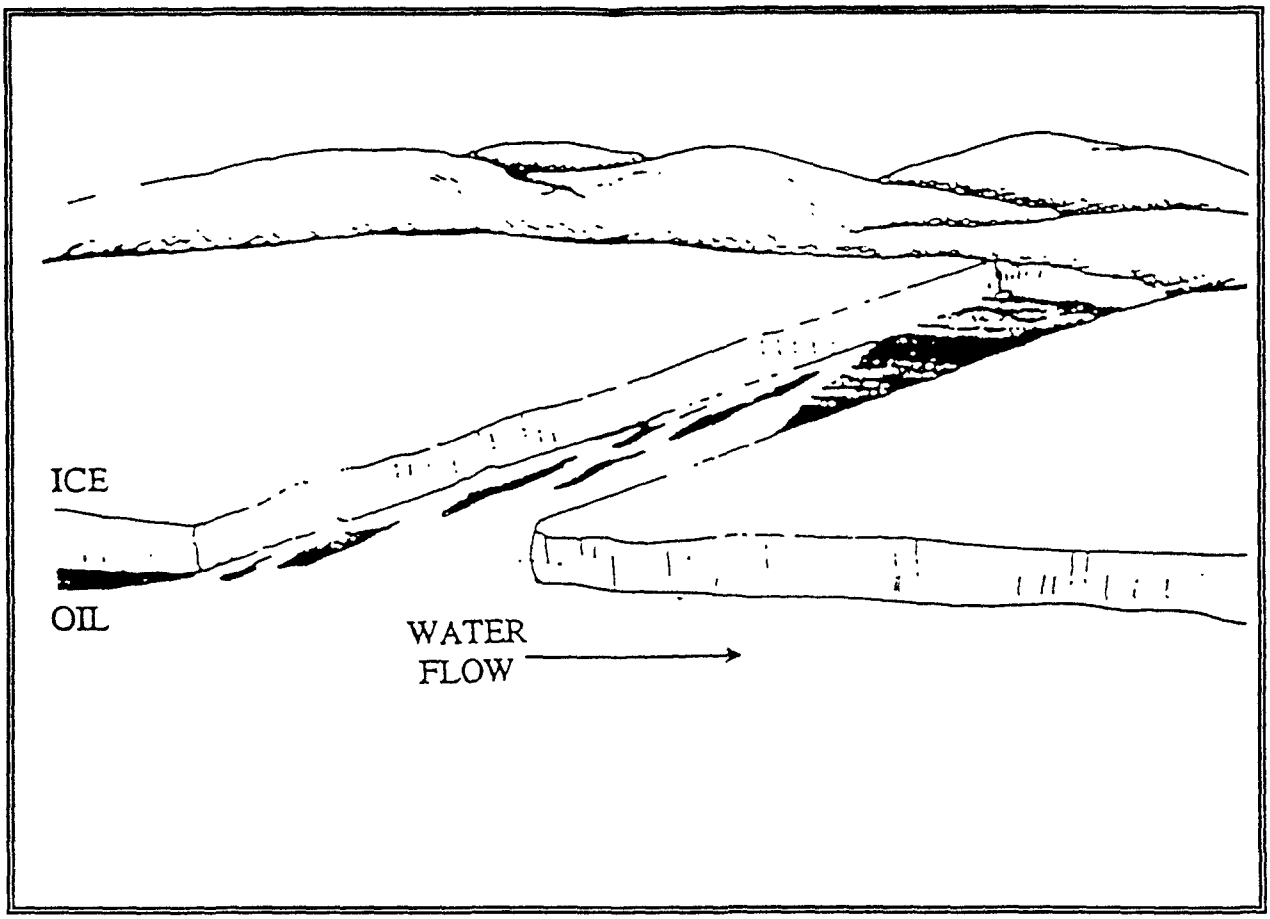

FIGURE 10
ICE SLOT

Equipment used in making slots are chain saws, circular saws and trenching machines, while manual or hydraulic lifts, cranes, and tractors are used in removing ice blocks. The water depth will determine if ice blocks need to be removed. Shallow water, sand bars or underwater obstruction may necessitate ice removal. On the other hand, if the water is deep enough, some blocks can be pushed under the ice on the downstream side of the slot and can be utilized as an additional barrier in the spill response. Once completed, all slush and ice fragments should be removed from the slot

to allow the oil to be carried down the slot by the current. Recovery equipment can be used to collect the oil on the down current side of the slot.

Another oil recovery technique that has been found to have limited success is contaminated ice removal. This method is usually considered unsuccessful since recovered oil is less than one percent of the total volume recovered. Even with the use of heavy mechanical equipment scraping oil off the ice, it is impractical at best. Oil on ice or snow surfaces is relatively easy to recover. Oil can be mixed with snow which can contain 30 to 50 percent oil by volume. The use of heavy equipment or manual removal techniques on oiled snow will depend on the ice thickness. The use of snow as a sorbent material decreases when oil viscosity is high, when oil-snow temperature differences decrease, and when snow porosity decreases (wet snow).

If access is not readily available, waiting for future recovery may be necessary. Due to the slow weathering of oil in cold climates, the formation of tar-like residue may take many months to form.

SUMMARY

A major concern with containment and cleanup of oil in icy waters is personnel safety. Oil can rise into pockets under ice sheets, freeze within ice, form surface pools, or surface between edges of ice sheets.

In a thin ice situation, conventional containment and recovery devices can be used once ice is broken. However, it may be possible to break ice in a way to aid in oil recovery.

Cleanup of oil with thick ice will involve finding oil and making cleanup sites. Containment of oil can include subsurface barriers, ice barriers, ice troughs and ice slots. Oil can be removed by vacuum devices, skimmers or burning. Oil on ice can be removed by manually or mechanically scooping oil into trucks, sucking oil with vacuum devices or mixing oil with snow with removal by trucks. Since oil weathers slowly with ice, spill cleanup can be postponed until weather conditions improve if access is poor or if weather or ice conditions threaten personnel safety.

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SECTION 5

PART III

NATURAL RESOURCE DAMAGE ASSESSMENT (NRDA)

A PROCESS OF ASSESSING AND ASSIGNING COMPENSATORY DAMAGES RELATED TO RELEASES OF OIL AND HAZARDOUS SUBSTANCES

AUTHORIZED BY:
CERCLA - COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT, NOW CALLED SARA - SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT.

SPECIFICALLY, SECTION 301 (C):
REQUIRING THE PROMULGATION OF REGULATIONS FOR THE ASSESSMENT OF DAMAGES FOR INJURY TO, DESTRUCTION OF, OR LOSS OF NATURAL RESOURCES RESULTING FROM THE RELEASE OF OIL OR HAZARDOUS SUBSTANCES.

NATURAL RESOURCES ARE DEFINED AS:

> "Land, fish, wildlife, biota, air water, groundwater, drinking water supplies, and other such resources belonging to, managed by, held in trust by ... or otherwise controlled by the United States ... any state or local government or foreign government."

(Note that this does not include damages to private property or to private parties, which are recoverable under other laws)

Also addressed by the CLEAN WATER ACT (CWA)

CERCLA Section 301 (c) specifies:

* Type A - a standard procedure for simplified assessments requiring minimal field observation, and

* Type B - alternative (complex) protocols for conducting assessments on a case-by-case basis.

* Section 301 (c) also stipulates that the regulations should:

  ** identify the "best available" procedures to determine damages

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** take into considerations factors including replacement value, use value, and the ability of the ecosystem or resource to recover.

NOTE: use of the rule is optional

* pre-assessment - decision to conduct an assessment: does the discharge warrant a NRDA?

** Criteria:

- a discharge or release occurred
- natural resources are potentially affected
- sufficient substance to potentially cause injury
- data is obtainable at a reasonable cost
- response actions may not remedy the injury

* assessment plan - planning; coordination; involvement of public, PRP's and other trustees;

- insures that the assessment is performed in a planned and systematic manner, and that the methodologies selected can be conducted at a reasonable cost

** level of detail

** type A/type B decision

** technical information: general

** assessment - injury, pathway, and damage determinations; injury distinguished from damages

** post-assessment - compile record, damage award, and restoration plan

TYPE A - OVERVIEW

* based on a computer model (sometimes referred to as the NRDA Model for Coastal and Marine Environments + NRDAM/CME)

* applicable only to spills in coastal and marine environments

* prepared for 10 different areas (including Northern Gulf Coast)

* contains three submodels:

- physical fates
- biological effects
- economic damages

TYPE A - CONSIDERATIONS FOR USE

* release occurred in a coastal or marine environment
* spilled substance is included in the program
* the injured biological resources are included in the program
* the discharge was of short duration
* the discharge or release was minor
* the discharge or release was a single event
* the discharge caused the closure of a fishing area, beach, or hunting area
* and others!
* type A model must be used if conditions apply, except that:
    ** the PRP's may request that a Type B assessment be performed

TYPE A - INPUTS

Inputs to the computer program include:

* case number of the spilled substance
* amount spilled
* date of release (spill)
* area of spill
* bottom type at spill site
* amount of spilled material recovered by cleanup
* number and duration of area closures
* information on currents, tides, winds, and water depth
* selected oceanographic and water quality conditions

TYPE B - OVERVIEW

* used for discharges in any area
* may require considerable field observations
* specific procedures determined by trustees; there are not specific procedures specified
* consider:
  ** short and long term injury, destruction, loss
  ** direct and indirect injury
  ** replacement value
  ** use value
  ** ability of resource to recovery

TYPE B - CONSIDERATION FOR USE

* the discharge must be covered by CERCLA or CWA
* a finding that the discharge could have resulted in some injury to a natural resource
* the trustees are concerned about the potential injury and the extent of injury

TYPE B - SPECIFIC TECHNICAL INFORMATION NEEDS

* confirmation of exposure
* economic methodology determination
* quality assurance plan
* objectives of testing and sampling for injury or pathways

TYPE B - DAMAGES

* to recover damages under a TYPE B assessment, the trustees must:
  ** demonstrate that an injury occurred to a natural resource (compare to standards, criteria, characteristics, guidelines, etc.)

** establish that the injury was the result of the discharge

- that is, demonstrate exposure pathways

** only committed resource uses may be considered

* damage costs may be determined by one of two methods:

** restoration/replacement method

** alternative valuation method - assigning a cost to the loss of a resource or the public's use of a resource

** damages were originally required to be the lesser of restoration costs, or loss of use values; this has since been overturned in court

** all money recovered through the NRDA process is to be used only for actions approved in the restoration plan

SECTION 5

PART IV

SHORELINE PROTECTION AND RESTORATION

Oil deposited on beaches and shorelines is one of the greatest problems of the cleanup crew because of the expense for cleanup and restoration. It has been estimated that up to 50 percent of the total cost for some spills was directly attributed to beach and shoreline restoration. Cleanup cost will depend on the natural and manmade features of the shoreline, tides, weather, distance to disposal pits and forms of restoration required.

SHORELINE PARAMETERS

Exposure

The potential for booming a shoreline will depend on its exposure to wind and wave action. Shoreline exposure varies along its length so that there is a transition from exposed sites to sheltered sites.

Exposed shorelines are subjected to swell and storm waves which allows them to be more self-cleaning than sheltered shorelines. Sheltered shorelines are protected from wave cleaning action by sand bars, peninsulas, reefs, or spits.

Energy Level

The energy level is determined by the amount of current, wave, and tidal action to the shoreline. These actions will influence oil persistence on the shoreline and contamination of other nearby shorelines.

High energy shorelines are generally exposed to swell and storm waves and swift currents that can bury or remove quantities of oily sediments over a short time interval. Low energy shorelines are generally sheltered from wave cutting actions and swift currents. Indicators of high energy shorelines include:

1. Short transitions from shallow to deep water.
2. Rounded sediment particles.
3. Highly sorted beach material (e.g., sand, pebbles, cobbles, boulders - only one type in beach material).

Shoreline Access

Transporting manpower and equipment to oiled shorelines is a prime consideration in deciding whether cleanup should be initiated.

Due to these factors, a shoreline sensitivity index has been developed. See **TABLE 5**.

TABLE 5 SHORELINE SENSITIVITY INDEX FOR OIL SPILLS
1. Exposed rocky coast 2. Wave cut platforms 3. Fine grained sand beaches 4. Coarse grained sand beaches 5. Exposed tidal flats 6. Mixed sand and gravel beaches 7. Gravel beaches 8. Sheltered rocky coasts 9. Sheltered tidal flats 10. Marshes, swamps, and mangroves

Sensitive or Unique Features

Biological, physical, and cultural characteristics will influence an area's sensitivity and uniqueness. Biological characteristics include:

1. rare, threatened, or endangered species,
2. reserves and preserves,
3. waterfowl concentrating areas,
4. mammal and bird rookeries,
5. commercial important species,
6. recreational important species, and
7. ecologically productive areas (e.g., marshes).

Physical characteristics include:

1. high erosion potential areas if disturbed,
2. geologically designated study sites,
3. fossiliferous formations, and
4. mineral-bearing formations.

Cultural characteristics include:

1. archaeological study areas,
2. tribal fishing areas, and
3. historical monuments.

Other Considerations

Recreation and industrial areas should be considered as to their use by the public. Public opinion can become adverse when favorite boating and swimming areas are fouled, private and public beach fronts are oiled, or private and public services are affected. For example, oil in cooling or process water intakes may reduce or totally close an industry. Further contaminated domestic and agricultural freshwater supplies may temporarily reduce services in water consumption.

PROBLEMS WITH SHORELINES CLEANUP

Shoreline cleanup is certainly one of the most visible activities which will invite the press, private citizens, and volunteers to the cleanup site. When these people arrive at the site, company personnel should be assigned to direct the press to designated public relations personnel and property owners with complaints to a claims person. Volunteers can be told that their help is not required or can be directed to the Coast Guard, EPA, or other government agency. Public relations and claims are covered in a later section. There is nothing wrong with sightseers watching cleanup operations as long as neither they nor their cars get in the way.

Often, operations must be conducted in confined areas where movement is severely restricted. In these cases one or more persons are necessary to direct the traffic of the trucks entering and leaving the shoreline. It is best to have a uniformed officer present to direct traffic where it enters the main road. This person can handle traffic as well as small incidents that may arise between citizens and the company. Off-duty policemen, sheriff's deputies, and constables are usually available for hire. They are trained to handle traffic, know how to handle confrontations, will place the cleanup operations in good stead with the police force, and will usually work for reasonable wages.

METHODS TO LIMIT SHORELINE DAMAGE

Under ideal conditions, there will be enough time between notification of an oil spill and its reaching the shoreline to take some measures to protect the beaches. Providing the wave action is not excessive, properly placed booms, angled away from the shoreline, will prevent oil from reaching areas that will be difficult and expensive to clean up (**FIGURE 11**). Booms can be commercially or "home" made such as logs, boards, or metal sheeting. Booms angled toward the shoreline can divert oil to a specific area for recovery (**FIGURE 12**). Small points, inlets and sand bars can be effective recovery areas. Heavy equipment can be used to build temporary dams to block off marshes or swamps from rivers or lakes until the oil threat has passed (**FIGURE 13**).

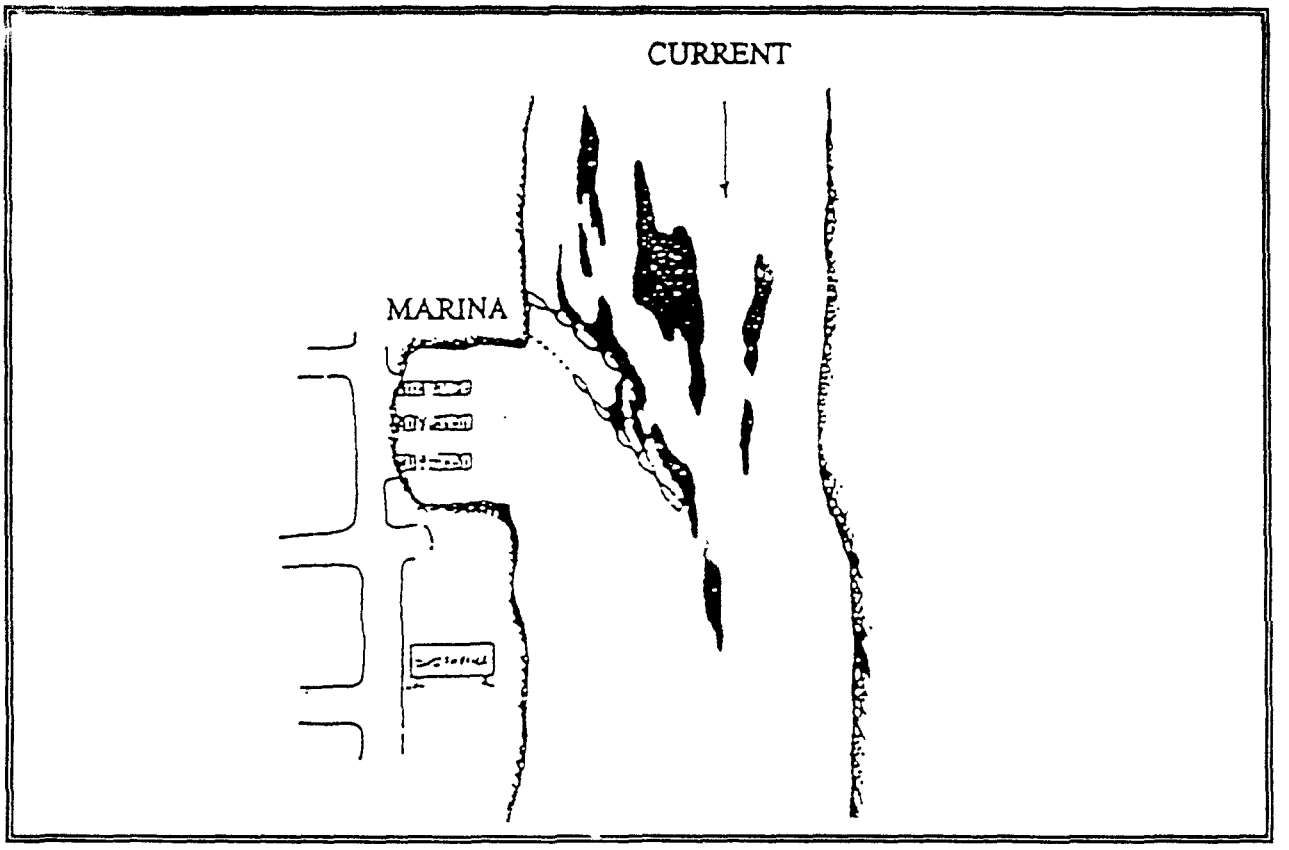

FIGURE 11
OIL DEFLECTION BOOMING

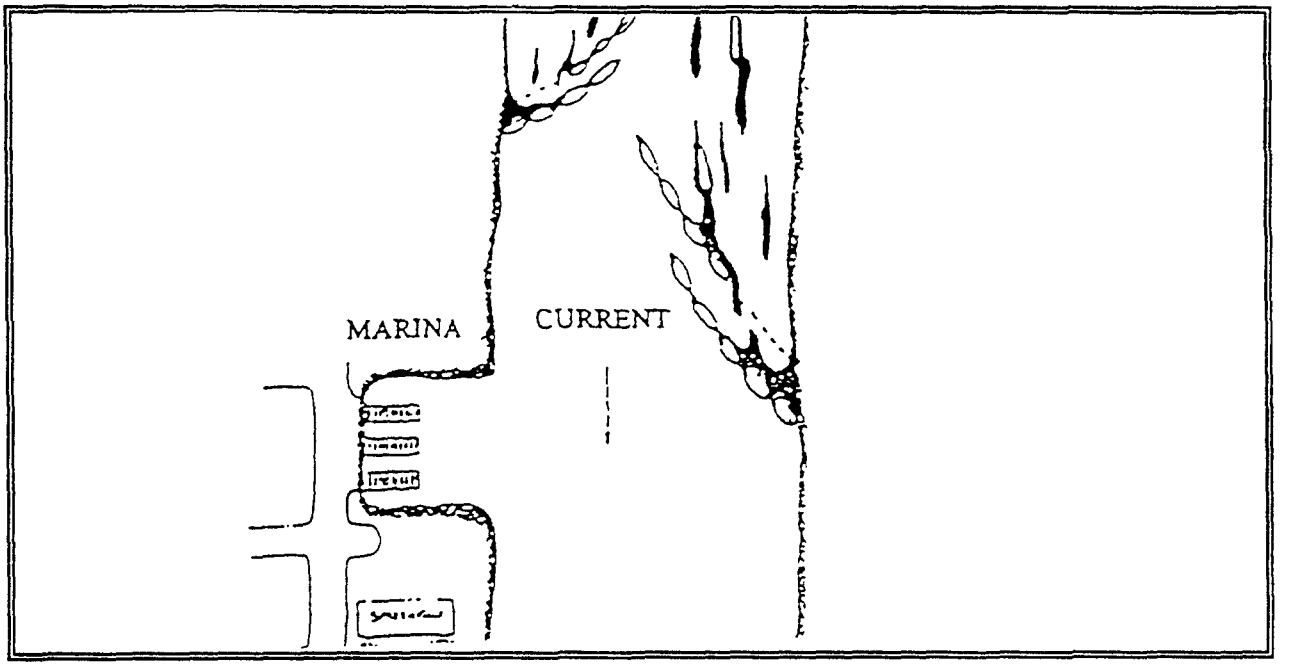

FIGURE 12
OIL COLLECTION BOOMING

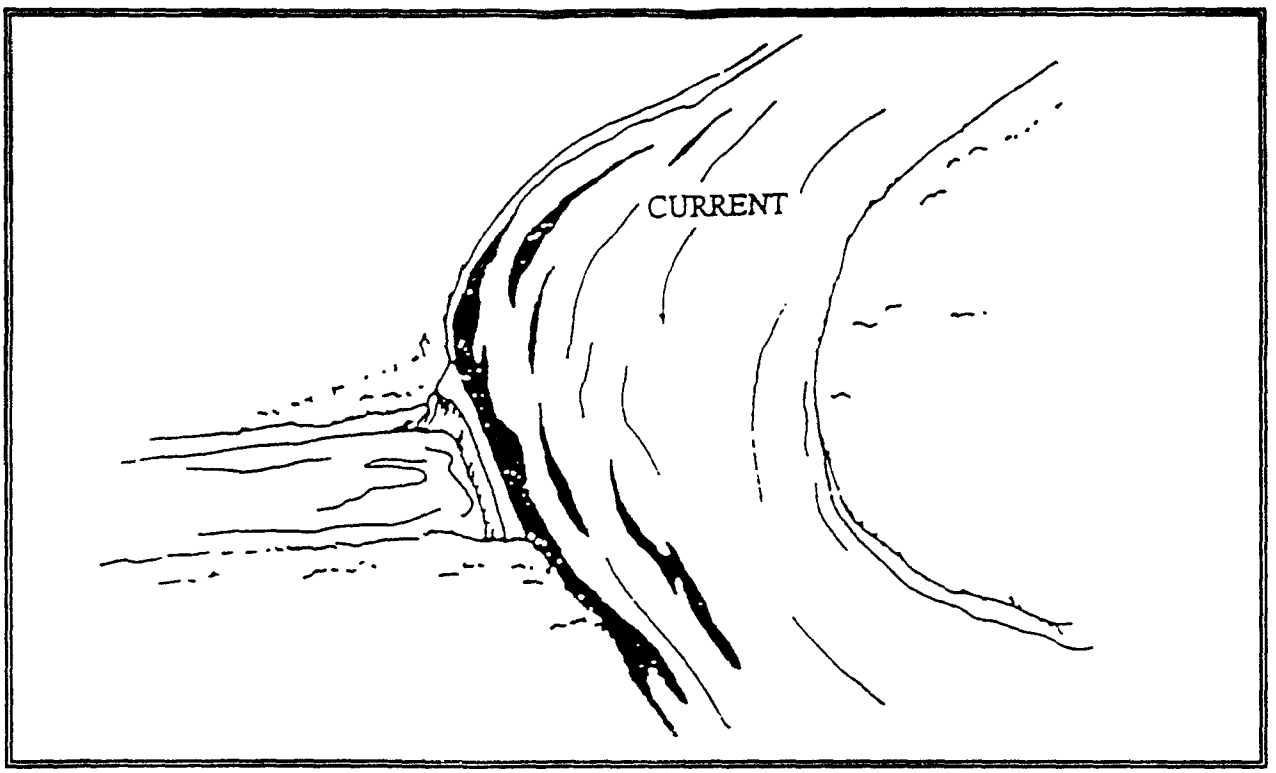

FIGURE 13
OIL DEFLECTION DAMMING

Sorbents placed on the beach to sorb the oil as it comes in are useful for rivers or small lakes, but not for open bodies of water subject to breaking waves. For effective usage of sorbents in areas subject to changing water levels, reservoir engineers, soil scientists, or local citizens should be consulted to predict the optimum time for deployment. Sorbent sheets and booms are superior to loose sorbent, which tends to mix with the sand and silt and be carried out into the water, posing recovery problems. To be most effective, the sorbent should be laid along the low-water mark, and as the water and oil move up the beach, the sorbent should be worked into the oil through natural wave action or by mechanical means. Straw should not be used if other sorbents are available. It can be used on shore to limit oiling or tied together into a temporary boom when other materials cannot be secured quickly.

Spraying water on a beach will reduce the amount of oil that adheres to rocks or bulkheads. Water soaked sand beaches will reduce the low penetration of low viscosity oil into pore spaces. Continued water spraying can wash oil off sand, rock, or bulkheads.

Spraying collecting agents along the shore has been suggested as a method to prevent contamination[1]. In the United States, collecting agents cannot be used until authorized by the government on-scene coordinator and can be applied no more than four times every six hours over a 24-hour period.

A considerable research effort sponsored by the API is underway to develop new and more effective methods to protect beaches. In addition to chemical collecting new methods include the use of oil-

eating bacteria and chemical films that spread a coating on the sand and rocks to prevent oil from adhering to the shoreline. This work is still in the development stage. Application of chemicals to beaches for protection from oil is usually not permitted by the EPA in the United States. The EPA's stringency regarding the use of dispersants stems from the toxicity of first generation dispersants and their limited effectiveness. New second generation dispersants have been used successfully on foreign beaches. These water-soluble agents are much less toxic and more effective than their first generation counterparts. However, the EPA continues to carefully regulate their application.

BEACH RESTORATION

When oil reaches a shoreline and contaminates the surface, various cleanup methods can be used that should be matched to the limitation of the shore substrate. These methods are:

1. Removal of oil with heavy equipment.
2. Removal of oil with manual scraping.
3. Evaporation of oil by tilling.
4. Water flushing and oil collection.
5. Removal of oil with sorbents.

Many types of heavy equipment can be used on beaches[2] (Appendices I and II). For long expanses of oiled, sandy beach, it is suggested that a motor grader be used in combination with a self-loading pan. The first step of the procedure is to windrow the oiled sand with the motor grader. Most graders are fitted with narrow tires which will bog the machine down on a sandy beach. This can be solved by fitting the grader with large flotation tires. The pans will have flotation tires and should have little trouble maneuvering on the beach. If this becomes a problem, the pans can reduce the volume of sand carried per trip.

The motor grader-pan combination is considered to be the most efficient method to remove oiled sand. However, standard pans with pushers to help load the material and front-end loaders substituted for pans can also be used. Because the front-end loaders carry less material per trip than pans, a much lower production rate will be achieved. It is best to use rubber-tired front-end loaders because track-mounted loaders are slow and inefficient.

Another type of heavy equipment is the beach cleaner (**FIGURE 14**). They are used on recreation beaches to remove debris that comes ashore. Oil, especially heavy oil, on top of a shoreline can be picked up. Many beach cleaners are towed by tractor or front-end loader where a rotating blade or drum with blades scoops up surface material onto an inclined plane. Inclined planes can be solid, solid with small holes, or wire conveyor belts. The latter two inclined planes allow loose sand to fall back on the beach. At the end of the conveyor is a container for holding the debris.

Heavy equipment can be used to remove most of the oily sand or rocks, but hand cleaning will be necessary around rocks, jetties, and marinas. For open beaches where heavy equipment cannot have access, it is suggested that oiled sand, silt, and debris be raked and shoveled by laborers into piles for pickup. Piles can be removed by front-end loaders or by manual labor. This technique removes less sand or gravel than using heavy equipment. Be sure not to remove more sand than is necessary and not to destroy vegetation bordering the beach. Accept slightly oiled spots around vegetation, boulders, and imbedded rocks.

Number 2 fuel oil poses a special problem to beaches because it penetrates deeply and quickly. This condition is best handled by exposing as much contaminated beach sand as possible to the sun and wind to speed evaporation. The oiled sand can be exposed with motor graders or by plowing. After oil removal, sites can be tilled to mix any unrecovered oil into the beach to increase biodegradation.

Techniques used on gravel, cobbles, or shingle beaches are few. Due to the large pore spaces in the beaches, medium to light oils can penetrate below the surface which hinders cleanup operations. Most heavy equipment and draglines remove massive amounts of beach material.

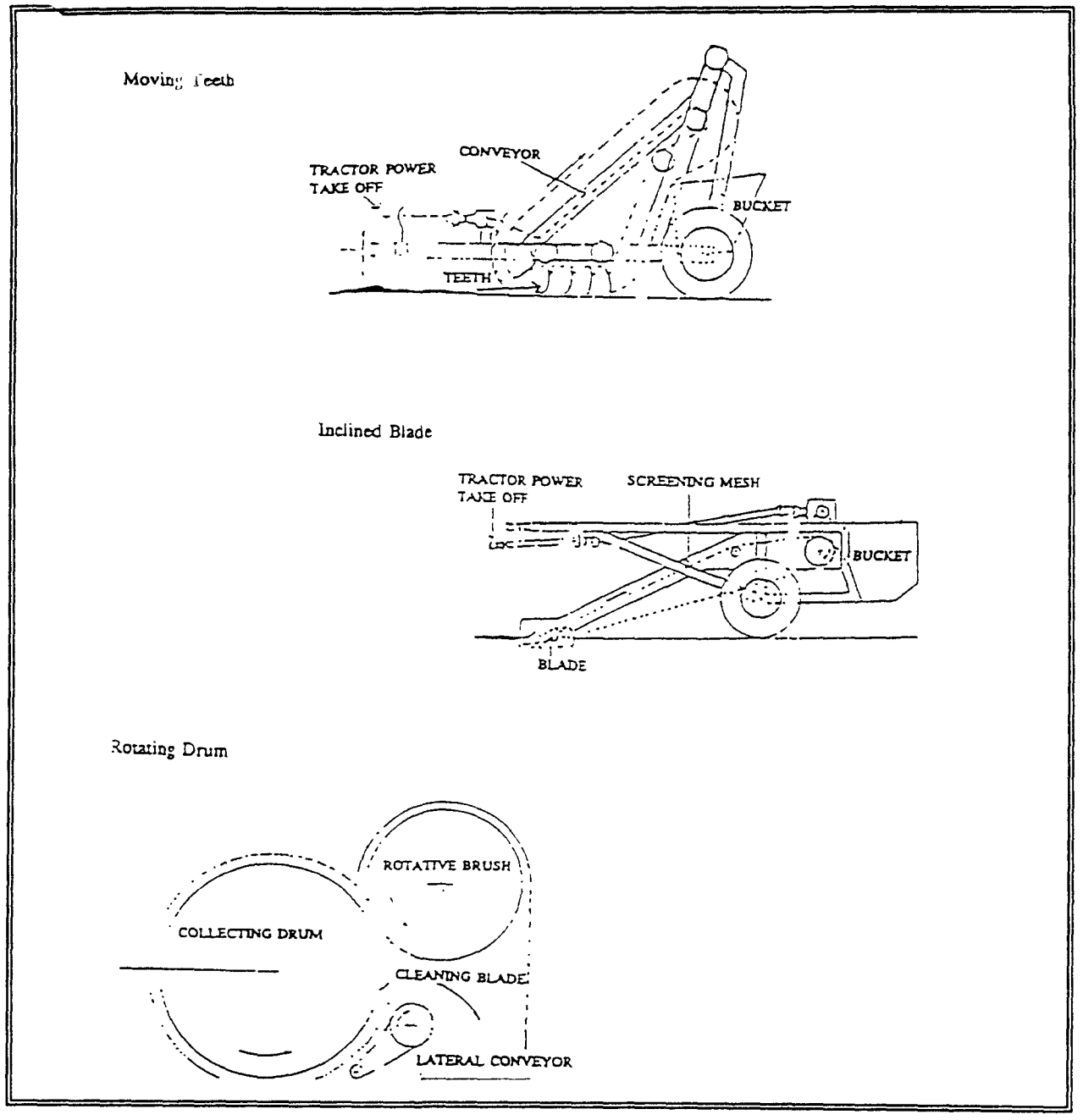

FIGURE 14
BEACH CLEANER WORKING PRINCIPLES[3]

Water flushing can float oil out of the beach or can drive oil deeper into the beach. Water flushing has been used on mud, sand, gravel, cobbles, and shingle beaches. It is used to remove non-sticky oils. Generally, large amounts of low-pressure water are sprayed on the highest elevation of contaminated beach to wash oil into containment devices. A series of low pressure hoses, perforated pipe, or irrigation systems can be used to apply water. Berms can be built on the shore to channel the oil to a collection sump (**FIGURE 15**) or booms can be placed just off shore. Skimmers or vacuum trucks can remove oil from the sumps. Test flushing should determine the suitability of this technique before large scale use.

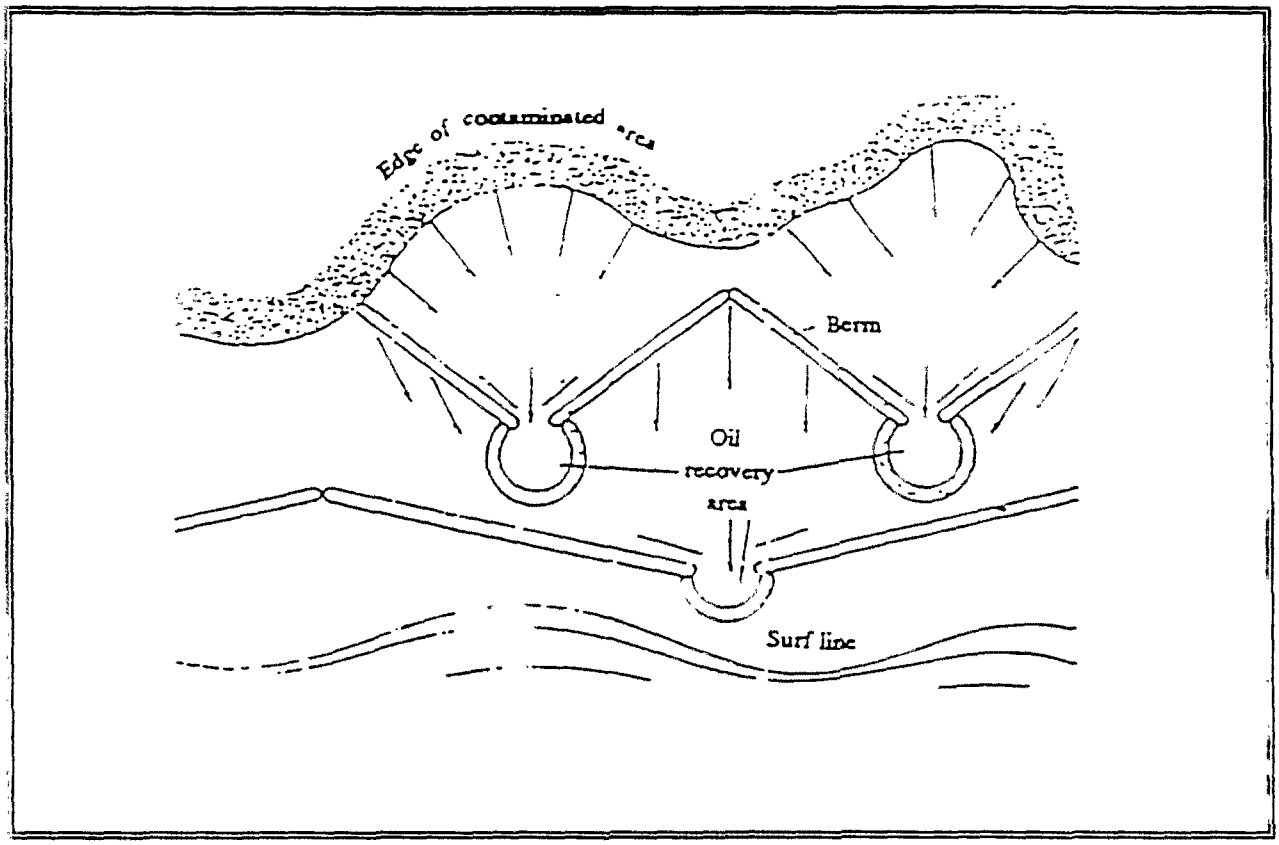

FIGURE 15
LOW PRESSURE FLUSHING[5]

Sorbents are useful at removing thick pockets of non-sticky oil. They can also remove thin sheens of oil after water flushing. Large scale use of sorbents will require sorbents, manpower and disposal in massive quantities.

OIL REMOVAL FROM ROCKS AND BULKHEADS

Shoreline restoration often includes the removal of oil from rocks and bulkheads using high pressure water sprays or steam cleaning. High pressure sprays used for this purpose can produce working pressures as high as 10,000 psi and therefore require the operator to wear heavy work clothes, gloves, hard hat, and eye protectors. This is necessary because pieces of rock and oil can ricochet

back to the operator. Protective clothing is also used in steam cleaning to protect the operator from the steam and hot water. The processes are slow and expensive; a skimmer crew must follow behind the rock cleaning crew and a boom should be placed around the working area to prevent recontamination of the cleaned area.

MARSH RESTORATION

The difficulty in marsh cleanup and restoration arises from its susceptibility to change from various factors. A change in water level, water drainage, burning, insect blights, and oil spill cleaning activities can trigger a marsh community change that can result in gradual or massive plant die-offs and subsequent changes.

Furthermore, the effects of marsh cleaning activities will vary with plant species[4]. Generally, annual marsh plants are affected more than perennial marsh plants. The effects from cleanup activities vary with the technique[5, 6].

Some marsh cleaning techniques are manual or mechanical cutting of plants, use of sorbents, water flushing with skimming, burning, soil removal and natural recovery. In some cases a combination of techniques is used. Cutting plants to remove oil has been successful after some spills. Although most marsh plants can withstand massive foliage loss from insects or cutting, marsh roots and rhizomes can be severely damaged by foot or vehicular traffic. Loss of plants can increase soil erosion and upset the entire marsh community. Some mechanical harvesters have been modified for marsh cutting and manual cutting from atop boats and plywood sheeting will minimize impact. Soil disturbance when foot traffic is used for sorbent recovery causes oil to penetrate into footprints (sometimes leg prints). In some cases, this problem has been diminished by water flooding and skimming. Pumping water to an enclosed marsh and floating the oil to a recovery site does not require foot traffic. However, care should be taken to applying water so that channels are not dug at pump discharge sites. Natural or mineral sorbents may be added at the pumpsite. Sorbents may be collected in screens from behind barriers. Care should be taken to return the site to its normal water level.

Another alternative is burning. Some marsh grasses are intolerant of burning. Additional problems can arise if the heat of combustion creates more harmful chemicals than the original oil Another consideration is that even though marsh grasses may die, an increase in open water in a once dense marsh will provide more areas for ducks, herons, or blackbirds. Local authorities should be consulted about the effects of burning on the marsh and nearby human communities.

Cases of soil erosion upon soil removal in marshes are many. Making channels for "easy" oil removal have changed water flow patterns which in turn have changed marsh plant dominance or eliminated marsh plants altogether. This technique is sometimes used for marsh drainage operations. Consult local authorities before removing soil from a marsh.

Small quantities of oil may produce fewer harmful effects than cleanup techniques. For large spills, removing most of the oil and naturally degrading the remaining oil may be a good choice.

SHORELINE REVEGETATION

Revegetation of shorelines will most likely be marshes or mangroves. Many techniques are currently being developed[7]. Some studies are using artificially grown plants and transplanting them into a marsh by tieing the roots to 16-penny nails and sinking the nails into the marsh. Others are hand planting grasses or mangroves or seeds, juvenile plants or adult plants. In transplanting intolerant marsh or mangrove species, some success has been demonstrated using seeds or plants from areas that have survived previous oil spills.

TERMINATION OF CLEANUP

The decision to end cleanup activities and allow natural degradation of remaining oil must be made on a case-by-case basis. Generally, shoreline cleanup will terminate when fresh oil contamination is no longer occurring and the remaining oil is immobilized and not a threat to other areas. However, other factors that should be considered are:

1. when environmental damage from cleanup operations is greater than environmental damage from leaving oil in place,
2. when the local environmental expert or OSC agrees to a halt of cleanup activities,
3. when cleanup costs increase significantly while oil removal decreases significantly, and
4. when occasional oil spots remain.

OAKLAND ESTUARY SPILL CLEANUP

During the Oakland Estuary spill, as with most spills, there were many tons of oily debris to remove from the water. Around dock areas debris was contained with booms while cranes with clamshell buckets were used to dip debris from the water. In all some 1400 cubic yards of debris were recovered and had to be transported from the area. This type of operation calls for many dump trucks making continuous circuits for more debris. Since the equipment is rented by the hour, care should be taken to be certain that there is a proper balance between the number of trucks and loading equipment. One cannot afford to have trucks waiting for the crane or cranes waiting for trucks. It is best to station a person at the loading site to spot the trucks and keep them moving. This may be a good position for an off-duty police officer if highway or city traffic is involved.

At the Oakland spill, two Corps of Engineers trash removal boats were placed in service to help with debris removal. A 1500 cubic yard trash barge was anchored in the area to receive the debris picked up by clamshell buckets. In areas which were difficult to reach with a clamshell, small boats carrying laborers cleaned up pockets of oil and debris. This method was particularly useful under piers and dwellings that extended over the water.

After the Oakland Estuary spill was cleaned up, local observers noted that the estuary was cleaner than it had been for many years because of the massive removal of debris. This was also noted at the Paulsboro, New Jersey spill. At the Paulsboro spill, however, it was necessary to bring in new sand to replace a stretch of beach in front of a number of residences. Sand replacement is extremely costly and should be avoided by removing only as much sand as necessary when cleaning the beach. If sand must be replaced, it becomes a typical heavy construction project best handled through a contractor.

The depth of sand along a beach subject to waves, tidal action and seasonal high water stages, such as along a river, will not be constant throughout the year. This is particularly true for coastal beaches that tend to erode during winter storms and redeposit during summer storms. This phenomenon can work to the advantage of the cleanup crew if the spill occurs during high sand levels, but will be a disadvantage when sand levels are low. One may be expected to haul in sand after cleanup has been completed when the normal sand level is low.

OIL REMOVAL FROM ROCKS AND BULKHEADS

Shoreline restoration often includes the removal of oil from rocks and bulkheads using high pressure water sprays. Sprays used for this purpose can produce working pressures as high as 10,000 psi and therefore require the operator to wear heavy work clothes, gloves, hard hat, and eye protectors. This is necessary because pieces of rock and oil ricochet back to the operator. The process is slow and expensive; a skimmer crew must follow behind the rock cleaning crew and a boom should be placed around the working area to prevent recontamination of the cleaned area. EXXON recommends that dispersants be used to aid oil removal from solid objects. The procedure involves spraying a concentrated oil-based detergent directly on the oiled surface just prior to cleaning and using a three percent addition of a water-based dispersant with the high pressure spray. This technique was used by EXXON at the Tampa Bay spill on seawalls oiled with No. 6 oil. This was done prior to the recent legislation on oil spill cleanup and was approved by the State of Florida on-scene coordinator. Before using this method, one must obtain permission from the on-scene coordinator.

HANDLING RECOVERED OIL

Pumps

Choosing a pump to transfer oil should be carefully considered. Some pumps may emulsify the oil and water picked up while other pumps may not work well against a strong back pressure. A general description of pump types is:

Centrifugal Pumps

- Can pump at very high rates.
- Simple, rugged, inexpensive and easy to repair.
- Best suited for pumping water or low viscosity oil.
- Will emulsify oil and water if pumped together.
- Sensitive to debris, especially stringy material.
- Cannot pump against high back pressure.

Diaphragm Pumps

- Simple, one moving part construction.
- Handles thick slurries and debris without stalling.
- Lends itself to ultra-safe, compressed air operation.
- Moderate tendency to emulsify oil and water.
- Cannot pump against high back pressure.
- Gives pulsating flow - undesirable for weir skimmers.

Positive Displacement

- Handles extremely high viscosity slurries or emulsions.
- Can pump against extremely high back pressure.
- Can pass debris up to two inches in diameter or more.
- Only slight tendency to emulsify oil and water.
- Generally more difficult to repair in the field than other type pumps.
- More expensive than centrifugal or diaphragm of equal capacity.

Vacuum Systems

- Extremely gentle treatment of the fluids handled.
- Handles all kinds of debris up to several inches in diameter and several pounds in weight.
- Can pick up "chocolate mousse" in thick or thin layers from water or land surfaces.
- Cannot lift a water column more than 30 feet.
- Vacuum pump is usually large and expensive.
- Usually requires a large integral storage vessel to contain the picked up liquid.

Storage - See Containment/Debris Disposal

SUMMARY

Shoreline restoration and protection are usually the most expensive cleanup operations, the most time-consuming, and often cause the most problems. Designated public relations personnel should be assigned the job of handling sightseers, the press and volunteers. Booms, sorbents and berms will limit damage to the shore, but some oiling may take place. It is important to maximize the use of earthmoving equipment and minimize hand labor. Modern dispersants or collecting agents have been used effectively outside the U.S. but are not normally approved for use in this country. Research is presently underway through the API directed toward improved beach protection.

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APPENDIX I

SHORELINE CLEANUP TECHNIQUES

Cleanup Technique	Description	Primary Use of Cleanup Technique	Technique Requirements
1. Motor grader/ elevating scraper	Motor grader forms windrows for pickup by elevating scraper.	Used primarily on sand and gravel beaches where oil penetration is 0 to 3 cm, and trafficability of beach is good. Can also be used on mudflats.	Good Trafficability. Heavy equipment access.
2. Elevating scraper	Elevating scraper picks up contaminated material directly off beach.	Used on sand and gravel beaches where oil penetration is 0 to 3 cm. Can also be used to remove tar balls or flat patties from the surface of a beach.	Fair to good trafficability. Heavy equipment access.
3. Motor grader/ front-end loader	Motor grader forms windrows for pickup by front-end loader.	Used on gravel and sand beaches where oil penetration is less than 2 to 3 cm. This method is slower than using a motor grader and elevating scraper but can be used when elevating scrapers are not available. Can also be used on mudflats.	Fair to good trafficability. Heavy equipment access.
4. Front-end loader - rubber tired or tracked	Front-end loader picks up materials directly off beach and hauls it to unloading area.	Used on mud, sand or gravel beaches when oil penetration is moderate and oil contamination is light to moderate. Rubber-tired front-end loaders are preferred because they are faster and minimize the disturbance of the surface. Front-end loaders are the preferred choice for removing cobble sediments. If rubber-tired loader cannot operate, tracked loaders are the next choice. Can also be used to remove extensively oil-contaminated vegetation.	Fair to good trafficability for rubber-tire loader. Heavy equipment access.
5. Bulldozer/ rubber-tired front-end loader	Bulldozer pushes contaminated substrate into piles for pickup by front-end loader.	Used on coarse sand, gravel or cobble beaches where oil penetration is deep, oil penetration is deep, oil contamination extensive and trafficability of the beach is poor. Can also be used to remove heavily oil contaminated vegetation.	Heavy equipment access. Fair to good trafficability for front-end loader.
6. Backhoe	Operates from top of a bank or beach to remove contaminated sediments and loads into trucks.	Used to remove oil contaminated sediment (primarily mud or silt) on steep banks.	Heavy equipment access. Stable substrate at top of bank.
7. Dragline or clamshell	Operates from top of contaminated area to remove oiled sediments.	Used on sand, gravel or cobble beaches where trafficability is very poor (i.e., tracked equipment cannot operate) and oil contamination is extensive.	Heavy equipment access to operating area. Equipment reach covers contaminated area.
8. High pressure flushing (hydro-blasting)	High pressure water streams remove oil from substrate where it is channeled to recovery area.	Used to remove oil coatings from boulders, rock and manmade structures; preferred method of removing oil from these surfaces.	Light vehicular access. Recovery equipment.

APPENDIX I

SHORELINE CLEANUP TECHNIQUES

Cleanup Technique	Description	Primary Use of Cleanup Technique	Technique Requirements
9. Steam cleaning	Steam removes oil from substrate where it is channeled to recovery area.	Used to remove oil coatings from boulders, rocks and manmade structures.	Light vehicular access. Recovery equipment. Fresh water supply.
10. Sand-blasting	Sand moving at high velocity removes oil from substrate.	Used to remove thin accumulations of oil residue from manmade structures.	Light vehicular access. Oil must be semi-solid. Supply of clean sand.
11. Manual scraping	Oil is scraped from substrate manually using hand tools.	Used to remove oil from lightly contaminated boulders, rocks and manmade structures or heavy oil accumulation when other techniques are not allowed.	Foot access. Scraping tools and disposal containers.
12. Sump and pump/vacuum	Oil collects in sump as it moves down the beach and is removed by pump or vacuum truck.	Used on firm sand or mud beaches in the event of continuing oil contamination where sufficient long-shore currents exist and on streams and rivers in conjunction with diversion booming.	Heavy equipment access. A long-shore current present.
13. Manual removal of oiled materials	Oiled sediments and debris are removed by hand, shovels, rakes, wheelbarrows, etc.	Used on mud, sand, gravel and cobble beaches when oil contamination is light or sporadic and oil penetration is slight or on beaches where access for heavy equipment is not available.	Foot or light vehicular access.
14. Low pressure flushing	Low pressure water spray flushes oil from substrate where it is channeled to recovery points.	Used to flush light oils that are not sticky from lightly contaminated mud substrates, cobbles, boulders, rocks, manmade structures and vegetation.	Light vehicular access. Recovery equipment.
15. Beach cleaner	Pulled by tractor or self-propelled across beach, picking up tar balls or patties.	Used on sand or gravel beaches, lightly contaminated with oil in the form of hard patties or tar balls.	Moderate to heavy vehicular access. Good trafficability.
16. Manual sorbent application	Sorbents are applied manually to contaminated areas to soak up oil.	Used to remove pools of light, non-sticky oil from mud, boulders, rocks and manmade structures.	Foot or boat access. Disposal containers for sorbents.
17. Manual cutting	Oiled vegetation is cut by hand, collected and stuffed into bags or containers for disposal.	Used on oil contaminated vegetation.	Foot or boat access. Cutting tools.
18. Burning	Upwind end of contaminated area is ignited and allowed to burn to down-wind end.	Used on any substrate or vegetation where sufficient oil has collected to sustain ignition; if oil is a type that will support ignition and air pollution regulations so allow.	Light vehicular or boat access. Fire control equipment.

APPENDIX I

SHORELINE CLEANUP TECHNIQUES

Cleanup Technique	Description	Primary Use of Cleanup Technique	Technique Requirements
19. Vacuum trucks	Truck is backed up to oil pool or recovery site where oil is picked up via the vacuum hose.	Used to pick up oil on shorelines where pools of oil have formed in natural depressions, or in the absence of skimming equipment to recovery floating oil from the water surface.	Heavy equipment access. Large enough pools on land or thick enough oil on water for technique to be effective.
20. Push contaminated substrate into surf	Bulldozer pushes contaminated substrate into surf zone to accelerate natural cleaning.	Used on contaminated cobble and lightly contaminated gravel beaches where removal of sediments may cause erosion of the beach or backshore area.	Heavy equipment access. High energy shoreline.
21. Breaking up pavement	Tractor fitted with a ripper is operated up and down beach.	Used on low amenity cobble, gravel or sand beaches or beaches where substrate removal will cause erosion where thick layers of oil have created a pavement on the beach surface.	Heavy equipment access. High energy shoreline.
22. Disc into substrate	Tractor pulls discing equipment along contaminated area.	Used on nonrecreational sand or gravel beaches that are lightly contaminated.	Heavy equipment access. Fair to good trafficability. High energy environment.
23. Natural recovery	No action taken. Oil left to degrade naturally.	Used for oil contamination on high energy beaches (primarily cobble, boulder and rock) where wave action will remove most oil contamination in a short period of time.	Exposed high energy environment.

APPENDIX II

IMPACTS ASSOCIATED WITH CLEANUP TECHNIQUES

Cleanup Technique		Description	Physical Effect of Use	Biological Effect of Use
1.	Motor grader/ elevating	Motor grader forms windrows for pickup by elevating scraper.	Removes only upper 3 cm of beach.	Removes shallow burrowing Polychaetes, bivalves and amphipods. Recolonization likely to rapidly follow natural replenishment of the substrate.
2.	Elevating scraper	Elevating scraper picks up contaminated material directly off beach.	Removes upper 3 to 10 cm of beach. Minor reduction of beach stability. Erosion and beach retreat.	Removes shallow and deeper burrowing polychaetes, bivalves and amphipods. Restabilization of substrate; reestablishment of long-lived indigenous fauna may take several years.
3.	Motor grader	Motor grader forms windrows for pickup by front-end loader.	Removes only upper 3 cm of beach.	Removes shallow burrowing polychaetes, bivalves and amphipods. Recolonization likely to rapidly follow natural replenishment of the substrate.
4.	Front-end loader - rubber-tired or tracked	Front-end loader picks up material directly off beach and hauls it to unloading area.	Removes 10 to 25 cm of beach. Reduction of beach stability. Erosion and beach retreat.	Removes almost all shallow and deep burrowing organisms. Restabilization of the physical environment slow; new faunal community could develop.
5.	Bulldozer/ rubber-tired front-end loader	Bulldozer pushes contaminated substrate into piles for pickup by front-end loader.	Removes 15 to 50 cm of beach. Loss of beach stability. Severe erosion and cliff or beach retreat. Inundation of back-shores.	Removes all organisms. Restabilization of substrate and repopulation of indigenous fauna is extremely slow; new faunal community could develop in the interim.
6.	Backhoe	Operates from top of a bank or beach to remove contaminated sediments and loads into trucks.	Removes 25 to 50 cm of beach or bank. Severe reduction of beach stability and beach retreat.	Removes all organisms. Restabilization of substrate and repopulation of organisms is extremely slow; new faunal community could develop in the interim.
7.	Dragline or clamshell	Operates from top of contaminated area to remove oiled sediments.	Removes 25 to 50 cm of beach. Severe reduction of beach stability. Erosion and beach retreat.	Removes all organisms. Restabilization of substrate and repopulation of indigenous fauna is extremely slow; new faunal community could develop in the interim.
8.	High-pressure flushing (hydro-blasting)	High pressure water streams remove oil from substrate; oil is channeled to recovery area.	Can disturb surface of substrate.	Removes some organisms and shells from the substrate, damage to remaining organisms variable. Oil not recovered can be toxic to organisms downslope of cleanup activities.

APPENDIX II

IMPACTS ASSOCIATED WITH CLEANUP TECHNIQUES

Cleanup Technique		Description	Physical Effect of Use	Biological Effect of Use
9.	Steam cleaning	Steam removes oil from substrate where it is channeled to recovery area.	Adds heat (> 100°C) to surface.	Removes some organisms from substrate but mortality due to the heat is more likely. Empty shells remaining may enhance repopulation. Oil not recovered can be toxic to organisms downslope of cleanup activities.
10.	Sand-blasting	Sand moving at high velocity removes oil from substrate.	Adds material to the environment. Potential recontamination, erosion and deeper penetration into substrate.	Removes all organisms and shells from the substrate. Oil not recovered can be toxic to organisms downslope of cleanup activities.
11.	Manual scraping	Oil is scraped from substrate manually using hand tools.	Selective removal of material. Labor-intensive activity can disturb sediments.	Removes some organisms from the substrate, crushes others. Oil not removed or recovered can be toxic to organisms repopulating the rocky substrate or inhabiting sediment downslope of cleanup activities.
12.	Sump and pump/vacuum	Oil collects in sump as it moves down the beach and is removed by pump or vacuum truck.	Requires excavation of a sump 60 to 120 cm deep on shoreline. Some oil will probably remain on beach.	Removes organisms at sump location. Potentially toxic effects from oil left on the shoreline. Recovery depends on persistence of oil at the sump.
13.	Manual removal of oiled materials	Oiled sediments and debris are removed by hand, shovels, rakes, wheelbarrows, etc.	Removes 3 cm or less of beach. Selective. Sediment disturbance and erosion potential.	Removes and disturbs shallow burrowing organisms. Rapid recovery.
14.	Low-pressure flushing	Low-pressure water spray flushes oil from substrate and is channeled to recovery points.	Does not disturb surface to any great extent. Potential for recontamination.	Leaves most organisms alive and in place. Oil not recovered can be toxic to organisms downslope of cleanup.
15.	Beach cleaner	Pulled by tractor or self-propelled across beach picking up tar balls or patties.	Disturbs upper 5 to 10 cm of beach.	Disturbs shallow burrowing organisms.
16.	Manual sorbent application	Sorbents are applied manually to contaminated areas to soak up oil.	Selective removal of material. Labor intensive activity can disturb sediments.	Foot traffic may crush organisms. Possible ingestion of sorbents by birds and small mammals.

APPENDIX II

IMPACTS ASSOCIATED WITH CLEANUP TECHNIQUES

Cleanup Technique		Description	Physical Effect of Use	Biological Effect of Use
17.	Manual cutting	Oiled vegetation is cut by hand, collected and stuffed into bags or containers for disposal.	Disturbs sediments because of extensive use of labor; can cause erosion.	Removes and crushes some organisms. Rapid recovery. Heavy foot traffic can cause root damage and subsequent slow recovery.
18.	Burning	Upwind end of contaminated area is ignited and allowed to burn to down-wind.	Causes heavy air pollution; adds heat to substrate, can cause erosion if root system damaged.	Kills surface organisms caught in burn area. Residual matter may be somewhat toxic (heavy metals).
19.	Vacuum trucks	Truck is backed up to oil pool or recovery site where oil is picked up via vacuum hose.	Some oil may be left on shore-line or in water.	Removes some organisms. Potential for longer-term toxic effects associated with oil left on the shoreline. Recovery depends on persistence of oil left in the pools.
20.	Push contaminate d substrate into surf	Bulldozer pushes contaminated substrate into surf zone to accelerate natural cleaning.	Disruption of top layer of substrate; leaves some oil in intertidal area. Potential recontamination.	Kills most of the organisms inhabiting the uncontaminated substrate. Recovery of organisms usually more rapid than with removing substrate.
21.	Break up pavement	Tractor fitted with a ripper is operated up and down beach.	Disruption of sediments. Leaves oil on beach.	Disturbs shallow and deep burrowing organisms.
22.	Disc into substrate	Tractor pulls discing equipment along contaminated area.	Leaves oil buried in sand. Disrupts surface layer of substrate.	Disturbs shallow burrowing organisms. Possible toxic effects from buried oil.
23.	Natural recovery	No action taken. Oil left to degrade naturally.	Some oil may remain on beach and could contaminate clean areas.	Potential toxic effects and smothering by the oil. Potential incorporation of oil into the food web. Potential elimination of habitat if organisms will not settle on residual oil.

SECTION 6

PREVENTING OIL SPILLS

THE VALUE OF SPILL PREVENTION

This section stresses the importance of avoiding oil spills in the environment through a conscientious program of spill prevention. Prevention measures are always worth the money because of the staggering costs for oil spill cleanup. As an example, the cost of the Oakland Estuary spill came to $1.2 million or about $300 per barrel. Additional costs such as loss of property and bad publicity occur that are not easily measured in dollars.

A SYSTEMATIC APPROACH

It is helpful to follow a systematic approach to effectively prevent oil spills. The following procedure is recommended:

1. review oil spill statistics, with emphasis on spills originating under similar operations to those under study;

2. analyze the causes of the incidents;

3. based on this analysis, inspect the facility for potential spill situations;

4. develop a priority ranking for potential spill sites based on the likelihood of occurrence, volume of oil involved, frequency of transfers and effect on the environment;

5. initiate action to reduce the probability of these incidents in order of their priority.

PRINCIPLE CAUSES ON LAND

Natural Forces

Natural forces often cause oil spills. Heavy rains can cause drip pans to overflow, and hurricanes may cause spills at offshore wells, around dock areas and at refineries. There is no way to prevent natural catastrophes, but there are ways to decrease effects, such as closing valves, tying down drums and other loose objects, filling tanks with water, raising dikes, shutting in wells and evacuating unneeded personnel.

Excluding acts of God, the majority of oil spill incidents are caused by human error or equipment failure.

Human Error

Operating procedures should be reviewed on a regular basis to ensure that they reflect current requirements. Operation training programs should be reviewed to ensure that personnel are receiving adequate instruction on equipment and procedures. Employee awareness and motivation programs should be instituted to convince the employee of the necessity of preventing oil spills. The concern demonstrated by management is a critical aspect of such a program (for example, fixing minor leaks, acting promptly on suggestions and insisting on good housekeeping).

Equipment Failure

Proper equipment must be used for each job. For example, flexible hose with the correct pressure rating should always be used. Equipment must be kept in good condition through adequate maintenance and inspection programs.

THE SPCC PROGRAM

A federal program designed to help prevent oil spills in the Spill Prevention Control and Countermeasure (SPCC) program administered by the Environmental Protection Agency (EPA). SPCC plans are required to be available at all facilities large enough to require them. A copy of the SPCC rules and regulations is included in the front pocket of the binder (Federal Register Vol. 38, Number 237, Part II).

The SPCC program covers "non-transportation related onshore and offshore facilities" which includes facilities engaged in drilling, producing, gathering, storing, processing, refining, transferring, distributing or consuming oil and oil products. A facility is under SPCC regulation if it has discharged or could discharge oil to navigable waters. The rules do not cover small facilities with aboveground storage capacity of less than 32 barrels or facilities that do not have single containers with a capacity greater than 16 barrels. A SPCC plan is required for underground storage facilities having total capacities in excess of 1000 barrels.

General Prevention Measures

An example of the spill prevention measures outlined in SPCC rules and regulations is the requirement of drainage valves at diked storage areas. The purpose of the valves is to prevent oil from entering the storm drainage system. The valves must be installed unless the storm drainage system is designed to handle leakage. Before storm water can be released to a water course it must be inspected to be certain that free oil is not present. Dikes constructed around oil storage tanks must be impervious to oil and capable of holding the entire contents of the largest single tank plus storm water. An alternative to dikes is an oil-holding moat constructed around tanks. This system requires pumps to keep the moats dry and ready for a spill.

High level alarms on tanks should be installed. Fail-proof communication systems should be provided between the tank gauges and pumping state operations. Installation and regular testing of liquid level indicators on storage tanks is a must. Portable oil storage tanks would be positioned to prevent any spilled oil from reaching navigable waters.

Leaks

Properly maintained tanks in tank farms will not leak. Dikes should eliminate the immediate problem in the event of a leak and water can be pumped into the bottom of the tank to prevent problems from becoming worse as the product is removed by swing lines. However, with small leaks, especially in the tank bottom, other measures need to be taken. One method that has been used in large, old tank farms utilizes well points to monitor the underground water table for oil contamination. If contamination is found, oil can be removed by direct pumping.

An ever present source of oil spills in tank farm operation is tank overrun resulting from mechanical failure such as the malfunction of level alarms and recorders or more often from human error. A prime example is when one tank is being filled from two sources because a cross connection valve is accidentally opened. A second example is when a tank is scheduled to accept a certain number of barrels but, unknown to the operator, the tank is already partially full due to an earlier mistake in oil transfer.

Pipelines transferring oil can product slow leaks at valves and flanges, but periodic checks can avert serious problems. Despite the expense a conscientious program of replacing old oil lines with new ones should be considered. Implementation of a continual replacement program on a long-term basis may prove to be economically wise. Buried pipelines should be protected by wrapping, coating and by cathodic protection. Pipelines that are out of service for any length of time should be blind-flanged.

Mechanical Failures

A program of preventive maintenance can eliminate many mechanical failures. Hose line should be properly rigged to prevent kinks in the line which can cause the hose to fail prematurely. Valves should be checked visually for leaks. Valve-blocked hoses should be tested hydrostatically. This is especially critical for valves, flanges and hoses used on the waterfront. Packing glands are a common source of leakage and should be checked visually. Gaskets on working flanges should be replaced after each use.

Loading Racks

Workers must be careful when loading trucks with oil to prevent spillage. Racks should be constructed with concrete collector pads to recover spilled products. Concrete aprons must be large enough to collect most spills. The aprons should also be piped directly into separator facilities and should be large enough to handle storm runoff without washing out the oil collected in the separator. Separators must be regularly attended by an operator. A typical system is shown in **FIGURE 1**.

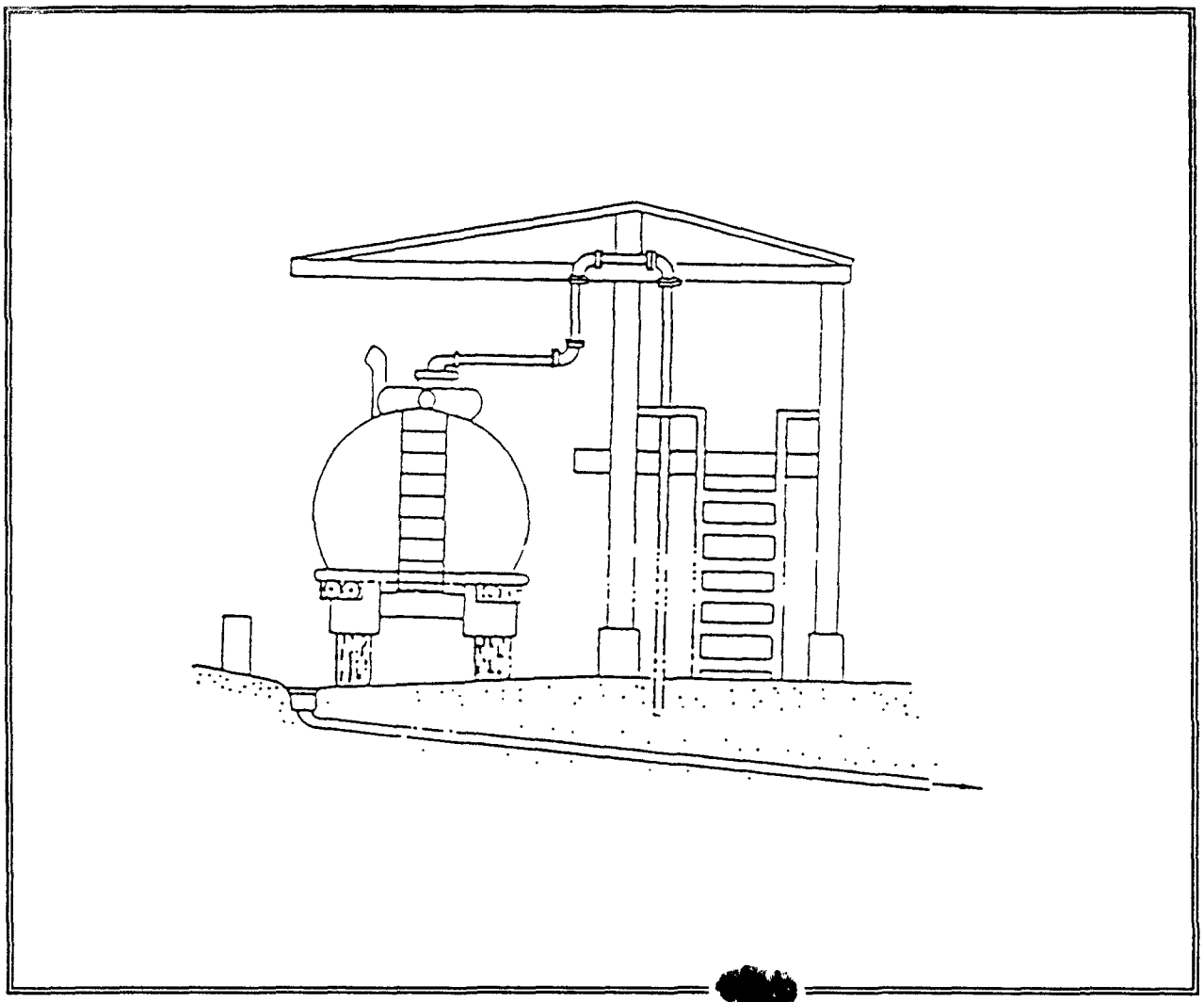


FIGURE 1
OIL SPILL PREVENTION SYSTEM FOR LOADING RACKS

Dikes

Tank dikes should be routinely inspected to ensure against leakage in the event of a tank rupture. Many dikes are not high enough to contain the entire contents, or they may have leaks from lack of maintenance. Storm water valves in dikes should be closed at all times as shown in **FIGURE 2** except during supervised drainage. A program should be developed for each tank farm for rain conditions. If the operator decides the water is contaminated, provisions should be made to prevent oil from reaching a body of water.

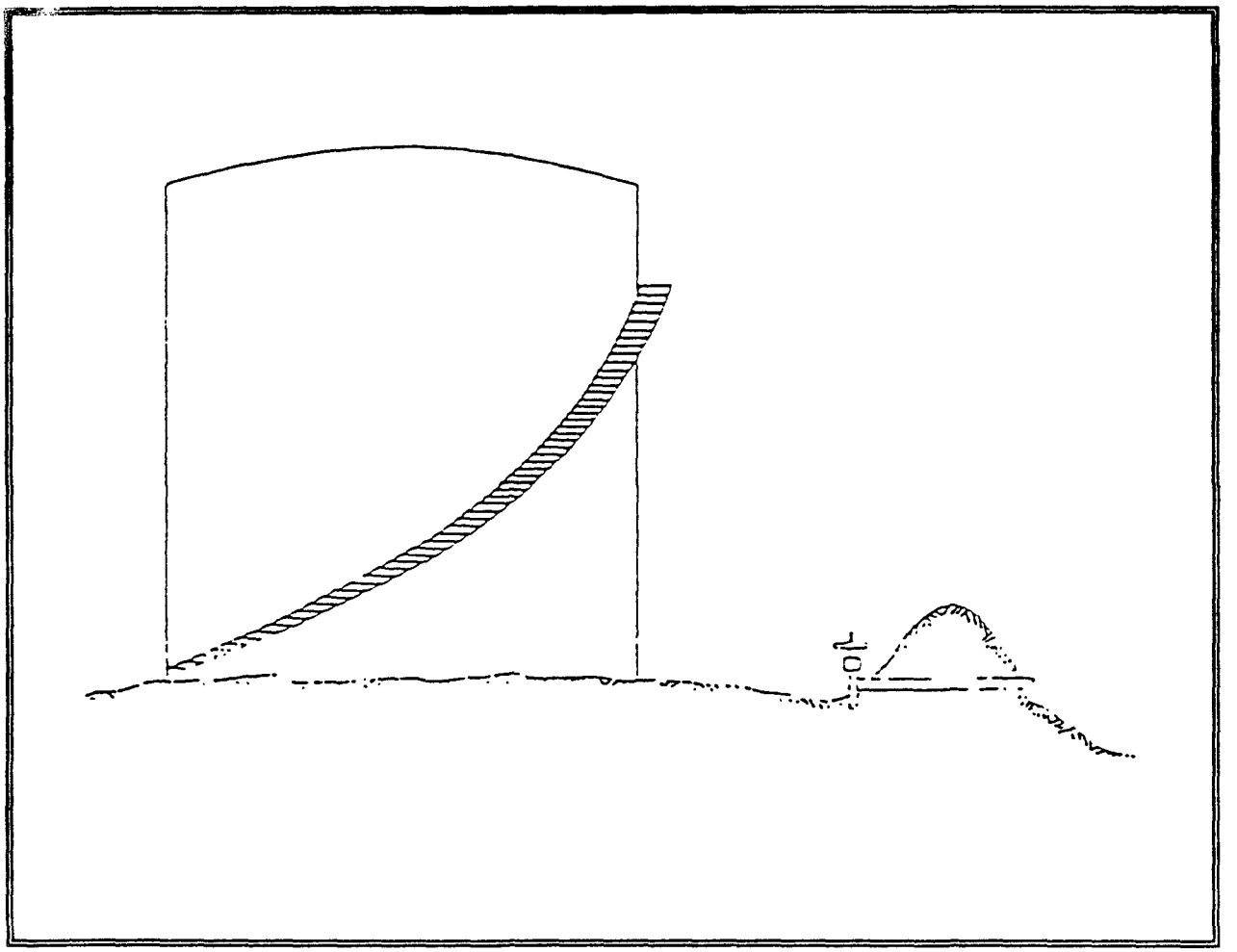


FIGURE 2
STORM WATER VALVES IN DIKES

Onshore Production Facilities

All oil and water transfer facilities should be examined for leaks on a routine basis. This includes aboveground valves, pipelines, drip sand and rod stuffing boxes. Saltwater disposal facilities should be examined frequently. Blowout preventor assemblies and well control systems should be installed and in working order.

Offshore Platforms

Spills from platforms are not limited to production. They also include small spills that originate from platform drains and during the transfer of fuel oil used on the platform. Like onshore production facilities, automatic shutoff valves that activate on pressure loss or buildup should be provided. It is also essential that automatic spill prevention equipment be checked for proper operation on a routine basis. Since dikes are not practical, offshore tanks should be equipped with high level alarms.

THE COAST GUARD SPILL PREVENTION PROGRAM

Much of the Coast Guard program is based on Public Law 92-500 (as amended) and covers vessels and oil transfer facilities. The Coast Guard rules and regulations are provided in the front pocket of the binder. They apply to facilities that transfer oil in bulk to or from any vessel with a capacity of 250 or more barrels. The regulations require that the owner or operator submit a letter of intent to conduct transfer operations accompanied by an operations manual to the Coast Guard Captain of the Port at least 60 days prior to operations. The manual must describe the operation and methods used for prevention and mitigation of oil spills. If the manual is incomplete, the Captain of the Port may require that it be amended to comply with the requirements of the regulations. Equipment requirements such as: hoses with minimum bursting pressures, loading arms which meet the requirements of the American National Standards Institute, adequate closure devices, discharge containment equipment, emergency shutdown devices and adequate communications and lighting must be met.

The Oil Pollution Act of 1961 requires that an oil record book be carried and maintained by every ship. All operations which involve oil are to be recorded in this book. Persons who fail to comply with the provisions regarding the oil book or who make false or misleading entries are subject to fines and/or imprisonment.

Under the Ports and Waterways Safety Act of 1972, the Coast Guard is responsible for preventing damage to vessels, bridges and other structures associated with the navigable waters of the United States and also for preventing harm to waters resulting from vessel or structural damage. The Coast Guard has the authority to control vessel traffic and to regulate operations of vessels, including movement of vessels, anchoring, equipment requirements and establishing waterfront safety zones.

Under Title II of the Ports and Waterways Safety Act of 1972, the Coast Guard established regulations for ship design, maintenance, handling and equipment carrying oil in bulk on the navigable waters of the United States. Ships must carry a certificate of inspection demonstrating compliance with the Act, and tanker personnel must hold certificates of qualification to handle specific cargos. Any vessel not in compliance with this law and the regulations may be denied entry to navigable waters of the United States.

OTHER SPILL PREVENTION CONSIDERATIONS

Highway Accidents

Personnel in charge of trucks and trains transporting oil products should be particularly careful of the danger of fire if a wreck occurs. Oil-transporting vehicles are required to be properly labeled and drivers trained to react properly in case of an accident. The driver should assist emergency personnel in helping prevent oil carryover to bodies of water. Unless required for safety purposes, oil should not be washed into drainage systems.

Service Stations

Service stations are another potential source of oil pollution. Underground storage tanks can leak due to corrosion, resulting in gasoline permeating the ground. The presence of gasoline in the water table, a sewer or basement can be dangerous. This type of leak can be monitored by checking inventories daily and by comparing gasoline tank gauges with pump readings. Tanks should be pressure tested on a routine basis. This practice can indicate a leak, can tell which tank the gasoline is leaking from and can approximate the amount of leakage. The company should investigate and repair leakages immediately to prevent ground saturation and possible explosions.

Service stations should properly dispose of waste oils, greases and solvents. Oil filters should be drained completely before disposal. The company should make certain that proper disposal facilities are available and that employees understand the correct method of disposal.

Pumps can be oil spill sources at filling stations. If pumps are not cleaned regularly, oil can carry over into storm drains which usually empty into waterways. If gasoline reaches a storm sewer system, the fire department should be called immediately. Instances have been recorded where a mile or more of storm drain exploded beneath a town.

Marketing Terminals

Terminals have storage tanks, dikes, pipelines and loading racks and therefore have many of the potential oil spill sources discussed previously. Most terminals are fenced for security purposes to prevent theft. However, a number of spills have been caused by vandals opening valves. Security precautions should include provisions for minimizing vandalism by locking valves where possible.

Storm drainage facilities in tank farms should be blocked off in case of a spill to prevent products from leaving the property. Drains must be opened during storms for water release. This can present problems for the small terminal that does not have a 24-hour staff. In such cases, some personnel should be on call in the event of a storm to release water from tanks.

Electronic instruments have been developed to detect oil spills on water surfaces. These units can be installed at separators and over open water along docks. They are sensitive enough to detect a sheen on water and can sound an alarm. Although the equipment is expensive, an early warning of a spill could result in cleanup savings that would pay for the device. These units are particularly useful at night and during times when few people are available to notice a spill.

Design Considerations

Spill prevention practices should be a part of company engineering design criteria. As in the case of pollution control devices, it is more economical to include oil spill prevention systems in the design of new facilities. Design standardization promotes employee familiarity with the operation and maintenance of certain devices. This should aid in controlling spills.

SUMMARY

Spills are expensive and should be prevented by initiating a rigorous prevention program. Analysis of oil spill statistics and incident reports can help locate areas needing attention. Incidents caused by human error and equipment failure can be reduced by a critical evaluation of operating procedures, operations training, equipment inspection and maintenance programs, Mandatory SPCC and Coast Guard prevention rules and regulations include many suggestions which will help operators spot areas of concern.

There are special cases where vigilance is needed, including spills caused by highway accidents, overflowing tanks and pressure vessels, natural forces and vandalism. For the future it is beneficial to incorporate spill prevention practices into company design criteria. If this is accomplished, spill prevention devices will be built into all new facilities.

SECTION 7

PART I

RESPONSE ORGANIZATION

INTRODUCTION

The number of people needed to respond to an incident involving the release or potential release of oil can vary greatly. To successfully accomplish the primary response goal of protecting public health and the environment, requires the coordinated, cooperative effort of these people.

Every incident is unique. The oil involved, it's impact on public health and the environment, and the activities required to remedy the event are incident specific. Each incident tends to establish its own operational and organizational requirements. However, common to all incidents are planning, organizational considerations, personnel, and the implementation of operations.

OIL SPILL CONTINGENCY PLANS

Many of the problems encountered by responders can be reduced if an oil spill contingency plan exists. When an incident (involving oil or other kinds of man-made or natural disasters) occurs, local government reacts. An organization, comprised of all who are available, will naturally evolve. It's capability, however, to efficiently manage the situation may be severely restricted. Expertise, equipment, and funds needed to prevent or reduce the impact of the event may not be readily available. Necessary actions to ameliorate the situation may be delayed.

A contingency plan can lessen many of the problems encountered in a response. However, even a good plan cannot anticipate and address all the circumstances created by a release of oil. Even with a plan, modifications may be needed in the response organization to accommodate unforeseen situations. A well-written plan acknowledges that adaptations are necessary and provides the framework for doing so without impeding the progress of implementation.

A more effective response occurs when a contingency plan exists. In general, contingency plans anticipate the myriad of problems faced by responders and through the planning process solves them. An organization for responding is established, resources are identified, and prior arrangements made for obtaining assistance. A good plan minimizes the delays frequently encountered in a no-plan response permitting more prompt remedial actions. It also reduces the risk to the health of both the responders and public by establishing, in advance, procedures for protecting their safety. Without a plan the ability to effectively manage the incident is diminished. Time is wasted attempting to define the problem, get organized, locate resources, and implement response activities. These organizational difficulties can cause delays in the response actions creating additional problems that prompt action would have avoided. For oil spill contingency plans to be effective they must be:

- Well-written

- Agreed upon by all involved
- Current
- Flexible
- Reviewed and Modified
- Tested

ORGANIZATION

The responders needed for an incident may range from a few to hundreds, representing many government agencies and private industries. Functions and responsibilities of each responders group differ. These diverse elements must be organized into a cohesive unit capable of managing and directing response activities toward a successful conclusion.

Relatively few well-trained response teams exist. These teams, generally associated with metropolitan fire services or with industry, are small and may have limited capability or responsibility. In an incident of any magnitude, where more personnel and resources are needed, a team is assembled from the various responding government agencies or private contractors. An organization is then established according to an existing contingency plan; without a plan, an ad hoc organization is created to manage that specific incident.

The organization which is established, by a contingency plan or ad hoc, regardless of the number of people or agencies involved, to function effectively must:

- Designate a leader
- Determine objectives
- Establish authority
- Develop policy and procedures
    - Assign responsibilities
    - Plan and direct operations
    - Manage resources (money, equipment, and personnel)
    - Establish internal communications

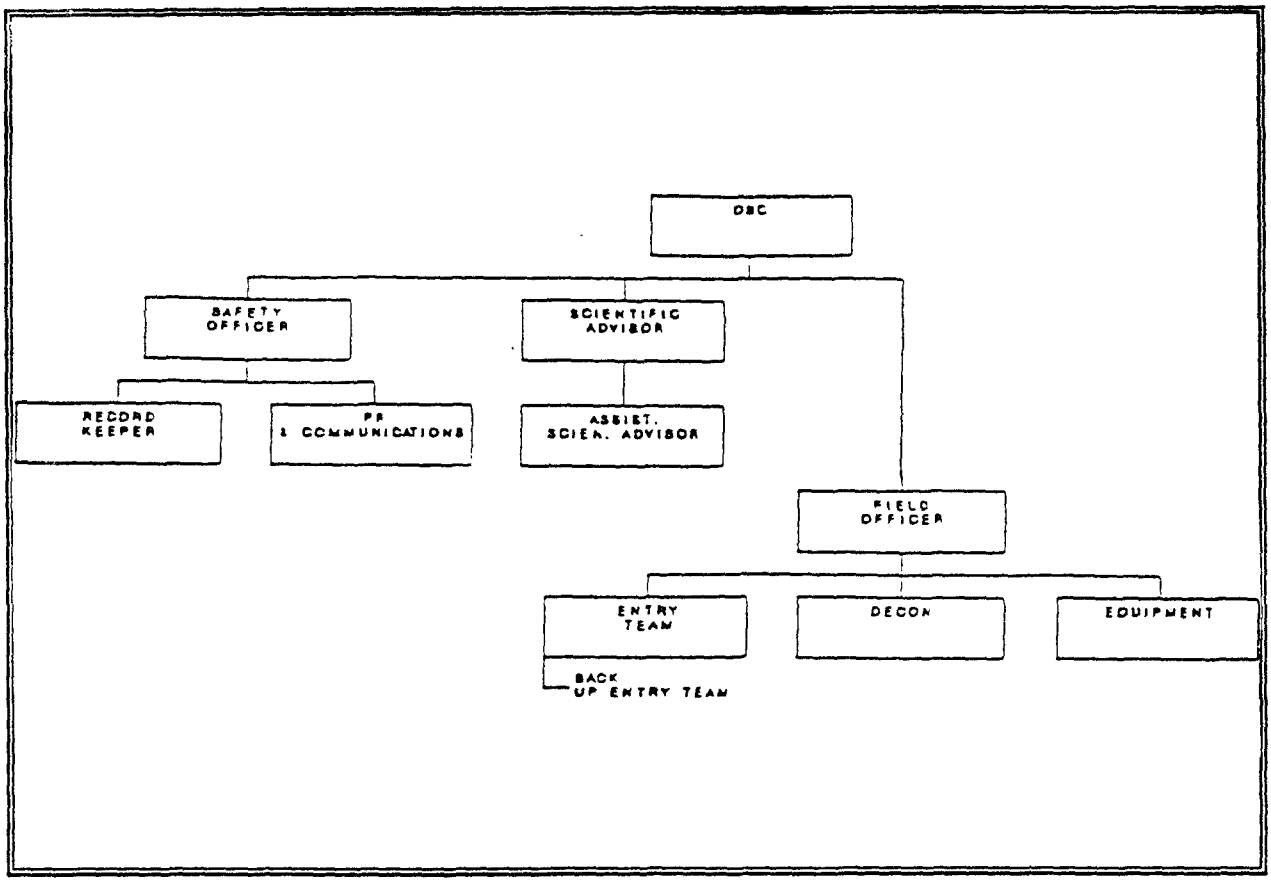


FIGURE 1
EXAMPLE OF A POSSIBLE RESPONSE ORGANIZATION FLOWCHART

TABLE OF ORGANIZATION

In any incident, involving more than a few responders, it is generally necessary to develop an organization chart. This chart depicts the organization's structure. It links personnel or functions, defines lines of responsibility, and establishes internal communication channels. To a large degree, the form and complexity of the organization chart depends on the magnitude of the incident, the activities needed, the number of people and agencies involved, and the project leader's mode of operation. The key requirements are:

- Establish a chain-of-command
- Assign responsibilities and functions
- Develop personnel requirements
- Establish internal communications

PERSONNEL

To manage and direct the various operations, personnel or responding agencies must be assigned the responsibility for certain activities. The positions, functions, and responsibilities listed here represent personnel requirements for a major response effort. They should be tailored to fit a particular oil spill incident.

- Project Leader/On-Scene Coordinator/Incident Manager: Has clearly defined authority and responsibility to manage and direct all response operations.

- Scientific Advisor: Directs and coordinates scientific studies, sample collection, field monitoring, analysis of samples, interpretation of results, and recommends remedial plans and/or actions. Provides technical guidance to the project leader in those areas.

- Safety Officer: Advises the Project Leader on all matters related to the health and safety of those involved in site operations. Establishes and directs the safety program. Coordinates these activities with the Scientific Advisor. The Safety Officer can halt operations if unsafe conditions exist.

- Field Leader: Directs activities related to clean-up contractors and others involved in emergency and long-term restoration measures.

- Public Information Officer: Disseminates information to news media and the public concerning site activities.

- Security Officer: Manages general site security. Provides liaison with local law enforcement, fire departments, and controls site access.

- Recordkeeper: Maintains official record of site activities.

- Operations Officer: Directs activities of team leaders. Coordinates these operations with the Scientific Advisor and Safety Officer.

- Team Leaders: Manage specific assigned tasks such as:

    - entry team(s)
    - decontamination
    - sampling
    - monitoring
    - equipment
    - photography
    - communications

- Financial Officer: Provides financial and contractual support.
- Logistics Officer: Provides necessary equipment and other resources.
- Medical Officer: Provides medical support. Acts as liaison with medical community.

IMPLEMENTING RESPONSE OPERATIONS

The release or potential release of oil requires operations (or activities) that will eventually restore the situation to normal, or as near as possible to pre-incident conditions. Although each incident establishes it's own operational requirements, there is a general sequence of events for all responses. Planning and implementing a response involves, as a minimum, the following:

- Organize: Select key personnel. Establish an organization. Assign responsibilities. Modify as operations proceed. Institute emergency actions.
- Evaluate Situation: Based on available information, make preliminary hazard evaluation.
- Develop Plan of Action: Develop preliminary operations plan for gathering and disseminating information, taking immediate counter measures and emergency/remedial actions. Re-evaluate the situation as supplemental information becomes available.
    - Make Preliminary Off-Site Survey: Collect additional data to evaluate situation (monitor direct-reading instruments, sample, make visual observations). Institute emergency actions to protect public health and environment. Identify requirements for on-site reconnaissance. Determine Level of Protection, if necessary, for off-site personnel. Establish boundaries for contaminated areas.
    - Make Initial On-Site Reconnaissance: Collect data (monitor, sample, make visual observations) to determine or verify hazardous conditions and make an overall assessment of the incident. Modify initial entry safety procedures as more data is obtained. Determine Levels of Protection for initial entry team(s) and subsequent operations. Plan and implement site control and decontamination procedures.
- Modify Original Plan of Action: Modify or adapt original plan based on additional information obtained during initial entries. Revise immediate emergency measures. Plan long-term actions including:
    - Additional monitoring and sampling.
    - Resource requirements

- Site safety plan
- Clean-up and restoration measures
- Legal implications and litigation
- Site activity documentation

SUMMARY

To effectively prevent or reduce the impact of an oil spill incident on people or the environment, the personnel responding must be organized into a structured operating unit - a response organization. For the response organization to be effective it must be developed in advance, be tested and be an integral part of an Oil Spill Contingency Plan. To a large degree, the success of the response is dependent upon how well the response personnel are organized. The more organized, the more rapid it (the organization) can begin to function. However, an organization (specified in a contingency plan or as an "ad hoc" incident-specific group) is developed, it must be flexible enough to adapt to the ever changing conditions created as the incident progresses.

SECTION 7

PART II

REPORTING REQUIREMENTS

Spilling oil is illegal. The quantity considered illegal by 40 CFR 110 is that amount that will cause a sheen on the surface of water or cause a sludge or emulsion to be deposited beneath the surface of the water or on adjoining shorelines. The amount necessary to cause a sheen can be less than a teacup full.

Another qualification is that the oil must be spilled in a location that could result in the oil reaching navigable waters. Navigable waters have been defined by federal courts as "waters of the United States" which means almost any watercourse, including intermittent dry creeks.

There are several federal laws concerning the discharge of oil, but Public Law 92-500, Section 311, also known as the Federal Water Pollution Control Act Amendments of 1972, is probably the most important and explains the rules for oil spill occurrences.

REPORTING SPILLS

When an oil spill occurs, the person in charge of a vessel or an onshore or an offshore facility must immediately notify the National Response Center 1-800/424-8802. The maximum fine for failing to report a spill will be $250,000 for individual or $500,000 for an organization, and/or five years in jail. The appropriate agency is the U.S. Coast Guard. For inland spills, the EPA should also be notified. Some states also require notification. Determine if this is the case for your state and also report to that agency. The EPA or U.S. Coast Guard on-scene coordinator should know what other federal or state agencies should be called. But find out before you have a spill.

Even when a spill is properly reported, there can be a civil penalty assessed against the owner or operator of up to $25,000. The Coast Guard has the authority to compromise the severity of penalties. The penalties above are on the national level. Many states may have additional penalties that match or exceed federal penalties. This is not considered double jeopardy because more than one law may have been broken. For all practical purposes, if an employee follows company procedure when a spill occurs, he personally should be protected from legal action. However, if it is clear than an employee has deliberately or maliciously spilled oil, legal action may be brought directly against the employee. The person may also be subject to company discipline.

FEDERAL GOVERNMENT INVOLVEMENT AFTER A SPILL

The federal government has overall responsibility to see that an oil spill is cleaned up properly. If the spiller does not take steps to remove the oil to the satisfaction of the federal on-scene coordinator

(OSC), the federal government can take over the management of the spill and arrange for the removal of the oil. All costs incurred after the federal OSC takes over will be submitted to the spiller for reimbursement. For this reason most companies prefer to handle their own cleanup operations.

For most inland (onshore) spills, the federal OSC will be from the EPA. Exact boundaries between the USCG and EPA responsibility for responding to spills have been established by memorandums of agreement between these two agencies. Any storer, transporter, or producer of oil should identify these boundaries for local contingency plans.

Although the OSC means the federal official predesignated by the EPA or the USCG, a state official may act as the OSC. When he/she is acting pursuant to a contract or cooperative agreement with the federal government. Any potential spiller should also be aware that many other federal agencies could be involved. These could include the Army Corps of Engineers, the Bureau of Land Management, the Mineral Management Service, the Bureau of Indian Affairs, the National Park Service, and the National Oceanographic and Atmospheric Administration (NOAA), as well as others. Below the federal level will be state department of environment agencies, or commissions that have state jurisdiction over oil spills. Within their boundaries, state and local laws will be discussed later.

For onshore or offshore facilities that discharge oil, the limit of liability is $75,000,000. There is no limit of liability where the discharge is proven to be the result of willful negligence or misconduct. Exceptions which remove the owner or operator from liability include an act of God, an act of war, negligence on the part of the United States government, or an act or omission of a third party. If it appears that the spill falls under one of these exceptions, contact the company supervisor immediately.

Owners and operators of vessels and facilities must comply with regulations for the removal of oil, implementing local and regional contingency plans, procedures to prevent discharges and inspections of vessels containing oil. Those who do not comply with the regulations are liable to a civil penalty of $10,000 per offense.

STATE AND LOCAL LAWS

State and local regulations must be followed in addition to the federal regulations regarding oil pollution, spills, and cleanup. The more important state requirements will often be found in the respective Regional or Local Pollution Contingency Plan.

In Texas, for example, the two state agencies involved in discharges of oil are the Texas Water Quality Board and the Texas Railroad Commission. Any oil spill in Texas must be reported to one of these agencies. The Texas Water Quality Board has developed regulations which require their approval or the approval of the Texas Parks and Wildlife Department before oil cleanup chemicals are used.

Most state laws now follow closely the same general policies, laws, and regulations found in the federal statutes and regulations. However, there are occasions when state or local requirements

differ or exceed federal laws. The most notable example was when Florida passed legislation that provided for unlimited liability for recovery of cleanup costs for oil spilled in Florida waters. This provision was challenged in American Waterways Operators vs Askew. However, the Supreme Court upheld the Florida law. Florida has recently amended the law, however, and presently has the same limits on liability as the federal government.

OUTER CONTINENTAL SHELF REGULATIONS

The Outer Continental Shelf Lands Act (43 U.S.C. 1331 - 1343) gives the Department of Interior the authority to regulate the exploring for, developing, removing, and transporting resources from the Continental Shelf. The Continental Shelf is considered to be that area beyond submerged lands that are controlled by the states under the Submerged Lands Act. The Geological Survey is the agency designated to require compliance with all applicable laws, lease terms, and regulations.

In general it is expected that operations on the outer continental shelf be conducted to protect the natural resources of the shelf and maximize the economic recovery compatible with sound conservation practices. Regulations cover control of operations (including emergency suspensions where operations threaten immediate harm or damage to life, property, or the environment), control of wells, and pollution and waste disposal. The Geological Survey has the authority to control and remove oil spills which the lessee has failed to handle. Costs to the Federal Government are recoverable from the lessee.

OTHER REGULATIONS

In the federal regulations there is an exception for discharges of oil from a vessel's engine; however, the exception does not extend to oil accumulated in bilges. There is a specific prohibition against adding dispersants or emulsifiers to oil to be discharged in an attempt to circumvent these provisions. Demonstrations or research projects such as those that may be involved with this course are exempted from the prohibitions on discharges of oil.

CLEANUP COSTS

Two private contractual agreements which are of importance in oil spill cleanup are the Tanker Owners Voluntary Agreement Concerning Liability for Oil Pollution ("TOVALOP") and the Contract Regarding an Interim Supplement to Tanker Liability for Oil Pollution ("CRISTAL"). An additional private agreement that is currently proposed is entitled the Offshore Pollution Liability Agreement ("OPOL"). TOVALOP is an association whose members guarantee that parties can recover costs up to $100 per gross ton or up to $100,000,000 (whichever is less) for cleanup of a spill of a persistent oil caused by a tanker. This contract also provides procedures for tanker owners to recover costs of cleanup regardless of fault. CRISTAL is designated to establish a fund contributed to by the tanker and oil owners which will be available to reimburse those who have expended funds for cleanup or who have been damaged by oil spills or discharges beyond the amount covered by

TOVALOP. CRISTAL supplements TOVALOP and provides additional funds up to an overall per incident amount of $30,000,000.

There is a revolving fund authorized in the amount of $35,000,000 to provide for cleanup costs that the Federal Government may incur. The fund is administered by the U.S. Coast Guard. According to the regulations, only costs for response Phase II (Containment and Countermeasures) and Phase III (Cleanup and Disposal) actions under the National Contingency Plan or the Regional or Local Plans may be reimbursed. If the Coast Guard or EPA uses the revolving fund in a cleanup the government will attempt to reimburse the fund by collecting from the spiller. In most cases, the spiller will notify the appropriate agencies and pay a contractor or will utilize his own forces to cleanup the spill.

SUMMARY

Any oil spill that can reach navigable waters (waters of the U.S.) must be reported to the National Response Center. Failure to do so may result in $250,000 fine. Various state agencies also require reports of oil spills and may levy fines.

Most oil spills cleaned up are paid for by the company responsible for the spill. But, a company's exposure for cleanup cost is sometimes limited by insurance and/or government regulation. If possible, spills by unknown parties should be handled under the direction for the Government On-Scene Coordinator.

THE ROLE OF THE U.S. COAST GUARD IN OIL SPILL CLEANUP

THE U.S. COAST GUARD AND OIL SPILL CLEANUP

The U.S. Coast Guard has been designated by the President of the United States as the "appropriate agency" to be notified immediately in cases of oil spills that can reach navigable waters. Once notified, the Coast Guard will appoint an on-scene coordinator for the spill in their areas of responsibility. These areas include the high seas, coastal and contiguous zone waters, and coastal and Great Lakes ports and harbors. The EPA provides the on-scene coordinator for other areas.

The Coast Guard on-scene coordinator, upon arrival at the spill scene, will assess the situation and assure that containment, cleanup, and restoration activities are underway. Coast Guard personnel are trained in handling oil spills and may have considerable practical experience in this area. The Coast Guard is prepared to act during spills with a nucleus of manpower available 24 hours a day, backup personnel for large spills, equipment, and sophisticated communication gear. Coast Guard personnel are usually familiar with the spill area and will have current charts, tide data, and weather information available.

The general philosophy of the Coast Guard and the EPA is to allow the spiller to clean up his spill, provided there is adequate progress. The Coast Guard will give advice and directions concerning methods of handling the spill and the thoroughness of the cleanup. The approach the Coast Guard will use depends on the individual officer, his opinion of the spiller, and the area and extent of the spill. If the spiller has a reputation of being competent in oil cleanup, the Coast Guard may give minimal attention. Many Captains of Ports have oil spill equipment stockpiled at their headquarters for use on oil spills. The equipment will have to be cleaned and replaced, if necessary, if it is borrowed.

Before using any chemicals, the on-scene coordinator must first approve their use. The Coast Guard may allow the use of oil collecting agents, but again, permission must be received. Upon request, prior permission to use Shell's Oil Herder has been granted in some states and has also been granted to some specific cleanup organizations and contractors. Prior permission has been granted because of the material's low toxicity and because collecting agents are very effective if they can be applied soon after the spill has occurred. The amount of application is strictly limited, as previously described.

THE COAST GUARD NATIONAL STRIKE FORCE

The Federal Government directed the Coast Guard to carry out the spirit of the National Contingency Plan by establishing trained and equipped emergency task forces located strategically throughout the United States. This resulted in the establishment of three strike teams and the coordination center: the Atlantic Strike Team located in Fort Dix, NJ, the Gulf Strike Team located in Mobile, AL, the Pacific Strike Team located in Novato, CA., and the Coordination Support Center in Elizabeth City, NC.

The strike team can provide communications support, advice, and assistance for oil and hazardous substance removal. These teams provide expertise in ship salvage, diving, and removal techniques and methodology. Their missions, in order of importance, are:

1. Response; upon request, strike teams will respond to calls for assistance from on-scene coordinators.

2. Training; strike teams are responsible to conduct both unit (internal) and field training.

3. Planning/liaison; strike teams are required to participate in regional response team contingency planning. Since the regional teams are not comprised solely of Coast Guard personnel, liaison with other governmental agencies (EPA and local groups) is necessary to ensure that maximum benefit in contingency planning is achieved. Planning and liaison with industrial groups is also of importance in contingency planning.

4. Research and Development; the strike teams serve as the repositories and major users of government owned pollution control equipment.

The strike teams are on call 24 hours a day and are prepared to board and load aircraft to fly to the spill site. Although most of the major equipment can be air dropped, to date the teams have flown to local airports and unloaded the equipment onto trucks. An assortment of skimmers, booms, communications gear, and special clothing are part of the equipment, but the most important units are the pumps. Portable diesel unit power pumps, which are capable of removing product or crude up to the rate of 2000 gallons per minute from damaged tankers or barges, are used to minimize the release of petroleum to the environment. The product can be pumped into smaller vessels alongside the stricken vessel or into portable storage containers with a capacity of 120,000 gallons.

The grounding of the VLCC METULA on the coast of Chile was a recent spill handled by the strike team. The Chilean government requested the National Strike Force to transfer the remaining cargo from the stricken tanker to smaller vessels alongside to minimize the release of oil into the environment and to assist in the refloating operations. Yokohama fenders were used to prevent damage to the tankers due to extremely hazardous weather conditions. The technique of using portable pumps and large air bag fenders proved invaluable.

The members of the strike force are dedicated professionals with the mission of getting to the spill site, cleaning it up, and minimizing damage to the environment. They are also asked to act as consultants to the on-scene coordinator or to industrial personnel. When the strike force acts as a

consultant to the spiller, there is no charge for the service. However, if the personnel are directly cleaning up the spill, the spiller will be charged. Equipment and manpower charges are set by a rate sheet. One of the more expensive items is the aircraft used to transport the personnel and equipment. Therefore, caution should be taken in calling for aircraft services. The spiller will ultimately pay for the work.

PREPLANNING SPILL CLEANUP OPERATIONS

The time to meet the Captain of the Port is before a spill, not afterward. Time should be taken to become informed of the local Coast Guard services including manpower, mode of operation, and available equipment. It is also helpful to talk to other oil spill supervisors from companies that have had spills to determine what kind of relationship they have had. If the local Coast Guard unit has oil spill cleanup equipment the possibility of adding this equipment to the company contingency plan should be considered.

SUMMARY

The on-scene coordinator for coastal spills is the U.S. Coast Guard Captain of the Port. This is the person to whom the spill should be reported, and the person who has the final say as to the cleanup operation. The Strike Forces are available to act as oil spill consultants as well as an effective and experienced cleanup crew. It is advantageous to work with the Coast Guard when preplanning spill cleanup operations. Prior approval of cleanup methods, including the use of chemicals, should be obtained from the Coast Guard.

THE ROLE OF THE EPA IN OIL SPILL CLEANUP

THE EPA AND OIL SPILL CLEANUP

The Environmental Protection Agency (EPA) has been designated by federal statute as one of the governmental agencies taking a major responsibility for oil spill matters. More specifically, the EPA has the authority to act as the on-scene coordinator for inland spills (those spills on land or on water not affected by tidal ebb and flow) and to act as a pollution consultant to the Coast Guard for spills in coastal waters 933 U.S.C. 1151 et reg., see Federal Register Vol. 37, Number 246 in front pocket of binder).

The EPA covers the United States and its possessions from ten regional offices, (**FIGURE 1**). Each region has a predesignated response team ready to act when an oil spill occurs. During a recent year, the EPA provided on-scene coordination or advice on 60 percent of the major incidents. The EPA believes that the continuing success of the response program depends on rapid action at state and local levels. Many coastal states now have response programs, and the EPA encourages all states, local agencies, and port authorities to develop similar programs.

THE EPA ON-SCENE COORDINATOR

When a spill occurs, the EPA will expect the spiller to first take action to safeguard life and property. An OSC then evaluates a report and determines the degree of response that is appropriate. The next step is to determine the source of the spill and to make an effort to stop the flow. Manpower and equipment should then be assembled to contain and clean up the spill. the EPA on-scene coordinator will have listings of equipment for the area and can aid the spiller by giving this information. The EPA on-scene coordinator can direct a cleanup if it is appropriate and must direct the clean-up during significant and substantial threats. The OSC can also assist in obtaining local government equipment and manpower.

Because the EPA on-scene coordinator is involved in oil spill cleanup, he may have a good deal of experience on which to draw to assist the spiller. For example, he may have suggestions as to contractors that may be available to help in the cleanup. It should be remembered that the on-scene coordinator is similar to the inspector on a construction job. He will have authority over the thoroughness of the cleanup effort. His instructions will be important and should be recorded in the daily log.

The EPA on-scene coordinator is the person who decides whether or not to authorize the use of dispersants and collecting agents. He will usually not permit the use of dispersants, but may allow the use of collecting agents. It is best to obtain permission to use chemicals prior to having a spill. The EPA on-scene coordinator should be consulted for non-coastal spills.

Region I	Boston	Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island
Region II	New York	New York, New Jersey, Virgin Islands, Puerto Rico

Region III	Philadelphia	Pennsylvania, Maryland, Delaware, West Virginia, Virginia
Region IV	Atlanta	Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Florida
Region V	Chicago	Ohio, Indiana, Illinois, Michigan, Wisconsin
Region VI	Dallas	New Mexico, Texas, Oklahoma, Arkansas, Louisiana
Region VII	Kansas City	Kansas, Nebraska, Iowa, Missouri
Region VIII	Denver	Colorado, Utah, Wyoming, South Dakota, North Dakota, Montana
Region IX	San Francisco	California, Nevada, Arizona, Guam, Hawaii, Samoa
Region X	Seattle	Washington, Oregon, Idaho, Alaska

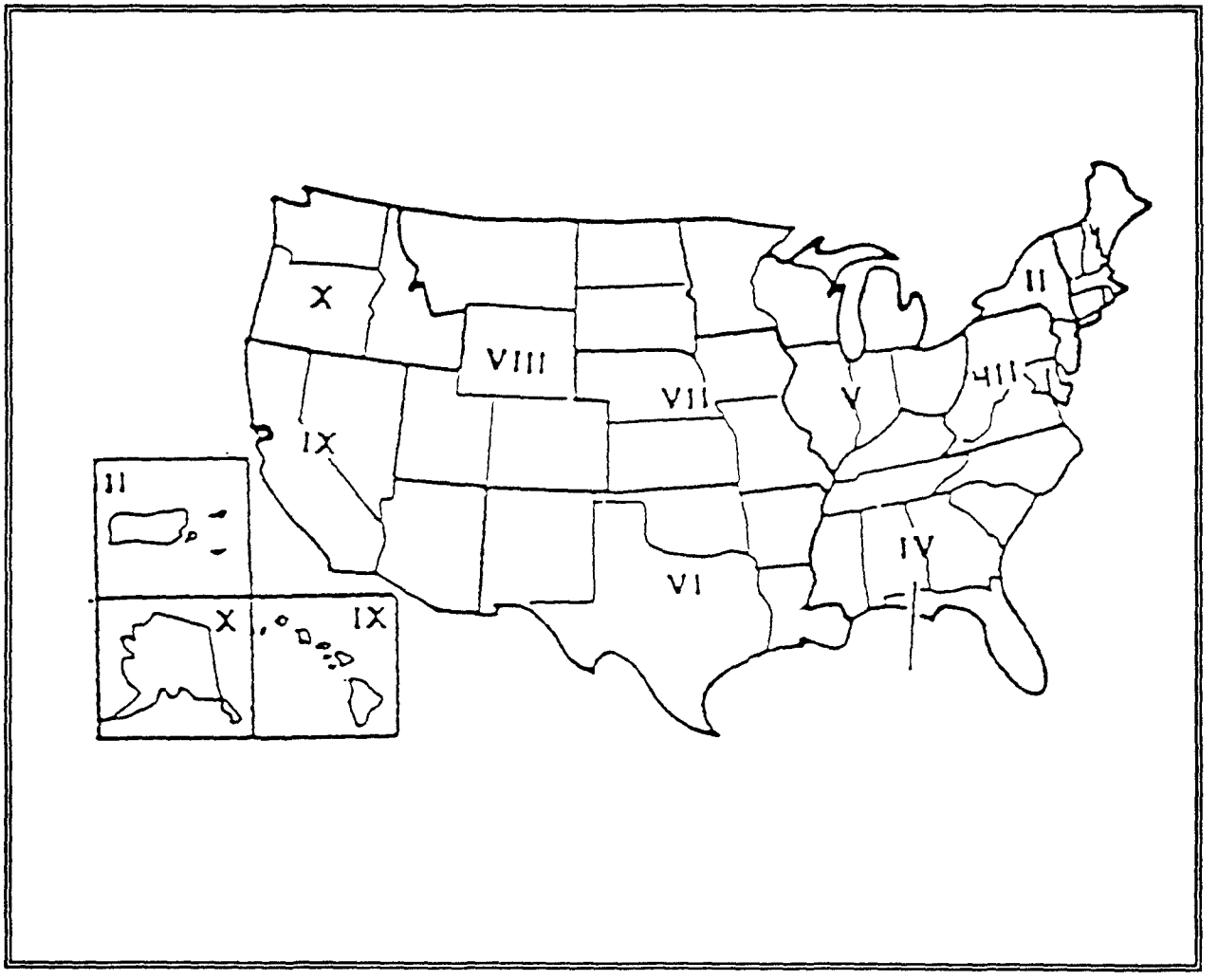


FIGURE 1
EPA REGIONAL OFFICES

The EPA representative will usually be the person to approve of burning debris and using burial sites. This activity may be handled by a state agency, but the EPA should be consulted first. This point should be confirmed with local authorities when a contingency plan is developed. If problems arise with a private property owner with regard to working near or on the property, the EPA on-scene coordinator should handle it. He has a legal right of access during oil spill operations and can designate the spiller and a contractor as his representatives. Like the Coast Guard on-scene coordinator, the EPA coordinator will handle the cleanup activity of a mystery spill or of a spill where the spiller cannot or will not clean up. The cost for cleanup will come from the revolving fund that is administered by the U.S. Coast Guard.

THE REGIONAL CONTINGENCY PLAN

It is suggested that a current copy of the Regional Contingency Plan be obtained for the EPA region where the company is located. Sections of the documents can be incorporated into the company plan. This would include the EPA and Coast Guard telephone numbers and addresses and state agency telephone numbers and addresses. The plan will list the names of the EPA on-scene coordinators and names of the Coast Guard Captains of the Ports. a map is usually included to explain the boundaries between the Coast Guard and EPA authority. Usually, there is a section on recovery equipment and techniques. One of the most important sections of the EPA Regional Plan is an equipment inventory section listing booms, skimmers, and other equipment.

OTHER EPA RESPONSIBILITIES AND ACTIVITIES

The 1972 Federal Water Pollution Control Act required that rules and regulations be established to prevent discharges of oil from vessels and facilities. The EPA was designated to administer the non-transportation related onshore and offshore facilities as outlined in the December 11, 1973 Federal Register. The program calls for preparing a Spill Prevention Control and Countermeasure plan (SPCC) for most company facilities. SPCC plans were required to be prepared by July 1974. Each facility should have this plan completed and posted, but it is up to the company to keep the plan current and workable.

The plan is essential to a company contingency plan and is to include a history of past spills, cleanup techniques and safeguards to prevent further spills, predictions of spill behavior, equipment and manpower available to combat a spill, and actions to be taken when a spill occurs. The EPA oil spill personnel are available to help in upgrading the company plan.

Some regional offices also publish their own materials on oil spills such as Inland Oil Spills, a booklet published by the Region VII office in Kansas City, MO, and Oil Pollution Control Primer by Al Smith of Region IV in Atlanta, GA, and Oil and Hazardous Substances Response Manual by Region X in Seattle, WA. The best way to find out about any special publications is to visit the regional on-scene coordinator.

EPA OIL SPILL RESEARCH EFFORTS

The EPA has been conducting significant research programs in oil and hazardous material spills. Reports cover topics such as oil spill equipment and chemicals, oil spill case studies, spill conferences, proceedings, and oil spill surveillance. Most of the publications can be obtained from the Government Printing Office. Most of the work has been directed through the EPA research office at Edison, New Jersey. The EPA does significant research on dispersants, chemical treatment, and bioremediation, while the Coast Guard does research on mechanical development, e.g., Booms, skimmers, etc.

SUMMARY

Land spills or spills on water not affected by tidal ebb and flow should be reported to the oil spill response member at the EPA regional office. He will become the on-scene coordinator of the spill and will look to the spiller for control of the spill and cleanup activities. If reasonable efforts are not taken to clean up the spill, he will take whatever action he believes is necessary to have the spill cleaned up and will forward the bill to the spiller. The EPA has access to the Coast Guard revolving fund for oil spill cleanup. A copy of the EPA Regional Contingency Plan should be obtained and incorporated into the company plan. The company SPCC plan should be upgraded but kept realistic. Companies should take advantage of the EPA research program by obtaining copies of research bulletins that may be of help.

MISSISSIPPI LAW ENFORCEMENT

Marine Safety Office (MSO) St. Louis played a major role in an 18-month federal investigation of criminal violations of U.S. water pollution laws. The case was successfully concluded recently with guilty pleas and criminal sentences to two corporations, a senior corporate officer and the director of a marine tank barge cleaning terminal.

The corporations, Wisconsin Barge Line, Inc. and Reidy Terminal Inc., were convicted of felony violations of the Resource Conservation and Recovery Act for improper disposal of hazardous wastes into the Mississippi River, and for multiple misdemeanor violations of the Federal Water Pollution Control Act.

A total of $375,000 in fines were assessed against the companies by a federal judge. The Vice President of Wisconsin Barge Lines and the Terminal Manager of Reidy Terminal were each sentenced to 3 years of supervised federal probation and a total of 300 hours of compulsory community service.

In early 1986, MSO St. Louis began investigating a series of "mystery" spills on the Mississippi River just below downtown St. Louis. These spills typically occurred just after dark. With its current of four to eight mph and flow volumes of 200,000 to 500,000 cubic feet per second at St. Louis, the Mississippi can quickly assimilate and dissipate large volumes of pollutants, making it very difficult to trace spills back to a source. The area is highly industrialized with a number of waterfront petrochemical facilities and substantial vessel traffic.

Believing that large amounts of oil and chemicals were being discharged, the MSO stepped up its nighttime surveillance in the area and began to narrow the list of possible sources. On March 4, 1986, these efforts paid off. MSO Pollution Investigators caught Reidy Terminal, a tank barge cleaning facility, stripping oil directly from a tank barge into the Mississippi. After interviewing terminal personnel, transcripts of statements were prepared and CDR Bob Luchun, Chief of the Second District's Marine Environmental and Port Safety Branch was contacted.

At this point, MSO St. Louis had one solid case and the potential for a maximum fine of $5,000 under the Clean Water Act. However, the pattern of discharges indicated that a much larger problem existed. Lacking subpoena power needed to investigate prior discharges and believing that Reidy Terminal was routinely and intentionally discharging hazardous waste into the river, MSO St. Louis asked CDR Luchun to contact the EPA through the Region VII Regional Response Team.

EPA's Office of Criminal Investigations in Kansas City was immediately interested and after a review of the Coast Guard's investigation, agreed to take the case. Extensive discussions with MSO St. Louis were conducted on how to go about "backtracking" the disposal of wastes from inspected tank barges.

The U.S. Attorney in St. Louis was brought in and a Federal Grand Jury was convened. Through this mechanism, Grand Jury subpoenas were issued and an exhaustive investigation of Reidy Terminal's waste disposal practices was conducted. The result - a pattern of routine disposal of wastes into the Mississippi from tank barge cleaning operations was uncovered. The practice

extended back for at least two years and involved hundreds of instances of covert dumping of crude oil, benzene, toluene, xylene, gasoline, turpentine, methanol, ethylene glycol and diesel oil. The company had no permit and disposed of virtually all of its tank cleaning residues in this manner.

On the request of the U.S. Attorney, the Office-in-Charge, Marine Inspection Office (OCMI) in St. Louis agreed to refrain from bringing charges against the Coast Guard licenses of marine industry personnel involved in the dumping. Only those personnel who "cooperated" in the grand jury and trial proceedings to the satisfaction of the U.S. Attorney were granted this immunity. The OCMI did reserve the right to issue suspension and revocation proceedings Letters of Warning against the license of merchant mariner's document of any implicated persons.

At the sentencing of the corporations, U.S. District Court Judge George F. Gunn, Jr. called the actions of company employees an "egregious flouting of the law".

The case was the first prosecution in Missouri under the Resource Conservation and Recovery Act.

CDR T. W. Josiah, MSO St. Louis
Commandant's Bulletin (Jan. 22/88)

APPENDIX I

REPORTING OIL SPILLS

OIL SPILL REPORT FORM

DATE:_____

1. DATE AND TIME SPILL WAS DISCOVERED _____

2. LOCATION OF THE OIL SPILL _____

3. TYPE OF OIL SPILLED _____

4. QUANTITY OF OIL SPILLED _____

5. SOURCE OF SPILL _____

6. CAUSE OF SPILL _____

7. WHO DISCOVERED THE SPILL _____

8. DATE AND TIME SPILL WAS REPORTED TO THE POLLUTION CONTROL SUPERVISOR _____

9. DATE AND TIME SPILL WAS REPORTED TO GOVERNMENT AGENCIES _____

10. NAME AND POSITION OF THE GOVERNMENT REPRESENTATIVE CONTACTED _____

11. WERE SAMPLES OF THE SPILLED OIL COLLECTED? _____

    A. WHERE WERE SAMPLES COLLECTED _____

    B. WHEN WERE SAMPLES COLLECTED _____

    C. DISPOSITION OF SAMPLES _____

12. CONDITIONS AT THE TIME OF THE SPILL: _____

    A. WIND SPEED AND DIRECTION _____

    B. STATE OF THE TIDE _____

C. SEA STATE _____

D. VISIBILITY _____

13. ACTION TAKEN BY RESPONSIBLE AUTHORITIES: _____

A. CONTAINMENT _____

_____

_____

RESULTS _____

_____

_____

B. CLEANUP _____

_____

_____

RESULTS _____

_____

_____

14. ACTIONS TAKEN BY OUTSIDE AGENCIES: _____

_____

_____

_____

_____

15. CURRENT STATUS _____

_____

_____

_____

_____

_____

POLLUTION CONTROL SUPERVISOR

POLLUTION PREVENTION REGULATIONS ON U.S. WATERS

Non-Transportation Related Operations
(i.e., drilling, producing, storing, gathering, processing, refining, transferring, distributing, consuming)

40 CFR 112 (EPA)

Designated Waterfront Facilities
(facilities which transfer oil from a facility over a navigable waterway to a vessel)

33 CFR 154 (USCG)

Vessel Operations
(barges and tankers which carry oil for commerce)

33 CFR 155 (USCG)

Transportation of Oil via Rail, Truck, Pipeline

49 CFR 195 (DOT)

Outer Continental Shelf Activities

33 CFR 135 (USCG, MMS)

Deep Water Ports
(any fixed or floating man-made structures other than a vessel which are used or intended for use as a port or terminal for the loading, unloading or further handling of oil for transportation outside the territorial seas of the U.S. economic conservation zone)

33 CFR 149 (USCG, MMS)

Marpol Annex II 73/78
(vessels which carry 250 bbl or more of oil into international waters)

33 CFR 157 (USCG)

APPENDIX II

FWPCA/MARPOL ANNEX I APPLICABILITY

There has been some confusion at field units as to the applicability of the Federal Water Pollution Control Act (FWPCA) or the Act to Prevent Pollution From Ships (implementing MARPOL ANNEX I) during an oil discharge sighting. So that we may shed some light on this subject, the following page contains a jurisdictional diagram.

Simply stated:

1) any vessel discharging oil into the territorial sea which causes a sheen, sludge, emulsion, or film upon the surface of the water is in violation of the FWPCA;

2) any vessel discharging oil into the contiguous zone which causes a sheen, sludge, emulsion or film upon the surface of the water and not in accordance with the MARPOL ANNEX I provisions will be processed exclusively in violation of the FWPCA;

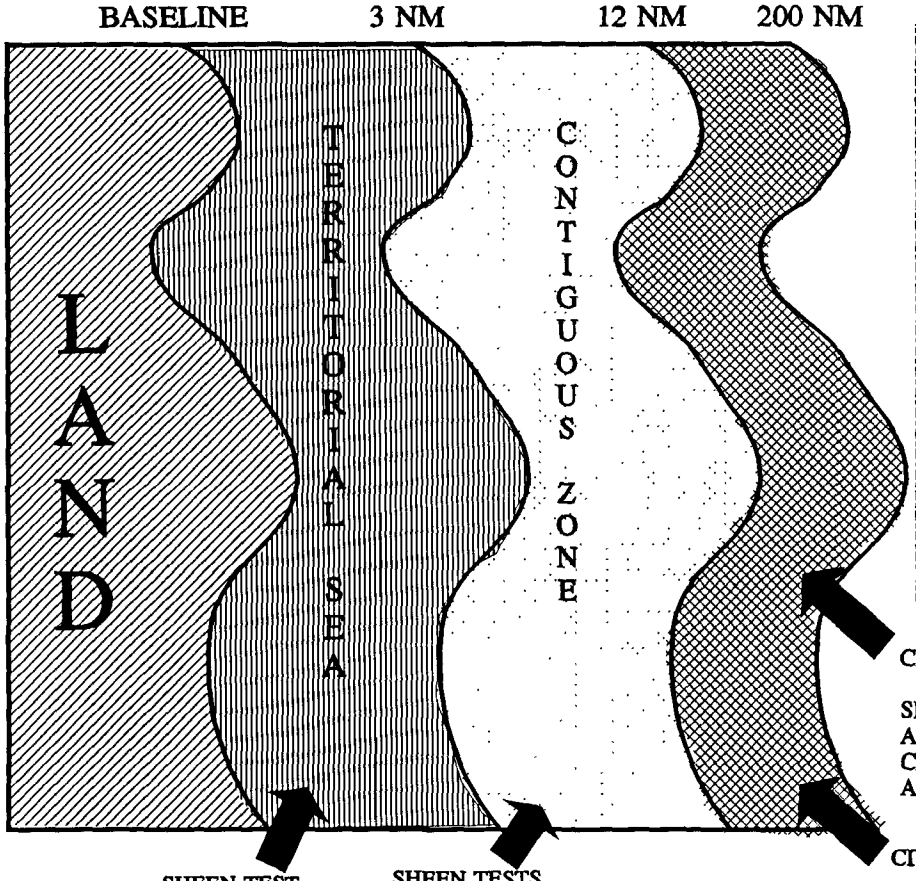
3a) any vessel discharging oil into the exclusive economic zone (EEZ - 200 nm), outside of the contiguous zone, not in accordance with MARPOL 73/78 ANNEX I provisions is liable for pollution clean-up cost in accordance with the FWPCA;

3b) any U.S. owned, operated or chartered vessel discharging oil into the EEZ, outside of the contiguous zone, which causes a sheen, sludge, emulsion or film upon the surface of the water, and not in accordance with MARPOL 73/78 ANNEX I provisions is subject exclusively to a civil penalty under the FWPCA; and,

3c) any foreign vessel case involving a discharge of oil into the EEZ, outside of the contiguous zone, not in accordance with MARPOL ANNEX I provisions will be forwarded by Commandant (G-MPS-1) to the flag state for enforcement.

For more specific details of the provisions of MARPOL 73/78 ANNEX I, review COMDTINST M16450.26.

FWPCA AND MARPOL ANNEX 1



LEGAL CITE:
FWPCA
(33 USC 1321)
311(b)(6)(A) AND
311(b)(3)

MARPOL ANNEX 1
PROVISIONS INCLUDE:

CONTIGUOUS ZONE:
< 15 PPM

OUTSIDE 12NM:
< 100 PPM &
CONTINUOUS
MONITOR:
-OR-
< 15 PPM

FOR DETAILS
SEE COMDTINST
M16450.26

CLEAN-UP LIABILITY:

SHEEN TEST APPLIES TO ALL VESSELS NOT DISCHARGING IN ACCORDANCE WITH MARPOL 73/ 78

CIVIL PENALTY:

SHEEN TEST APPLIES TO ALL U.S. OWNED, OPERATED, OR CHARTERED VESSELS NOT DISCHARGING IAW MARPOL 73/78 ANNEX 1 PROVISIONS, FOREIGN VESSEL CASES INVOLVING DISCHARGES NOT IAW MARPOL 73/78 ANNEX 1 PROVISIONS WILL BE SENT TO THE FLAG STATE FOR ENFORCEMENT.

SHEEN TEST APPLIES TO ALL VESSELS IN THIS AREA AND ALL NAVIGABLE WATERS.

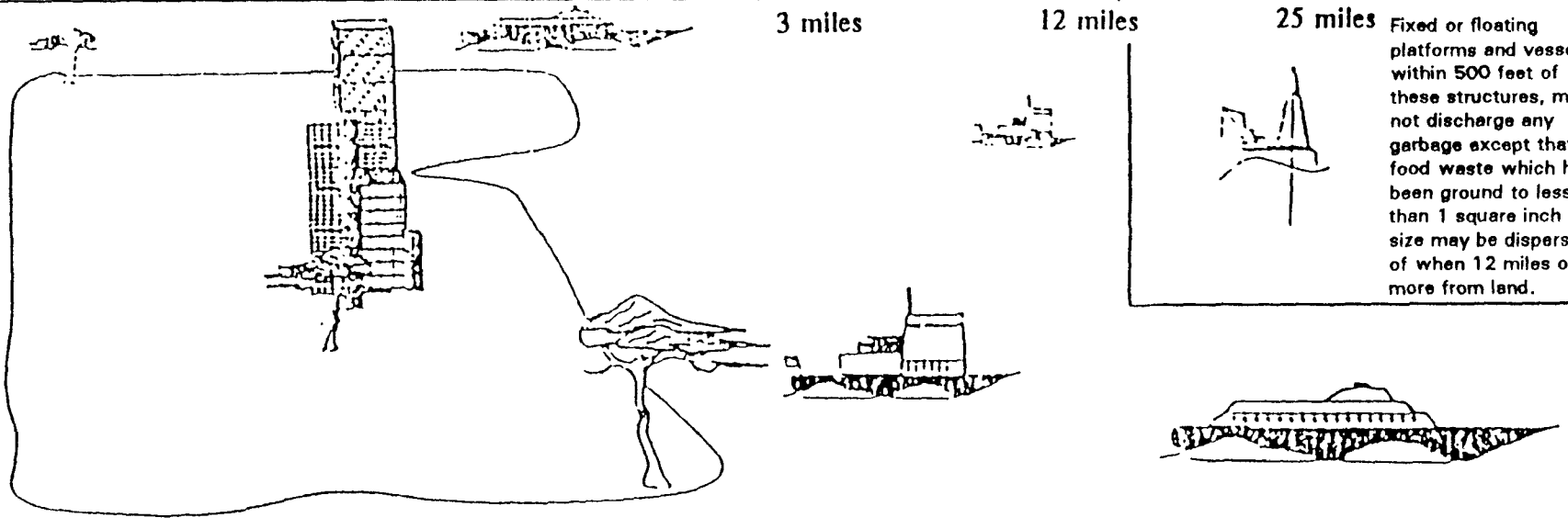
SHEEN TESTS APPLIES TO ALL VESSELS NOT DISCHARGING IN ACCORDANCE WITH MARPOL 73/78 ANNEX 1 PROVISIONS.

6/92

ANNEX V OF MARPOL 73/78 PROHIBITS THE DISCHARGE OF PLASTIC FROM ANY VESSEL ANYWHERE IN THE MARINE ENVIRONMENT.

PLASTIC INCLUDES BUT IS NOT LIMITED TO: plastic bags, styrofoam, styrofoam (popcorn) packing materials, six pack holders, bottles, caps, lids, styrofoam cups and lids, plastic strapping bands, sheeting, fishing nets, buckets, hard hats, vegetable sacks, milk jugs, egg cartons, gloves, rope, shoes, sneakers, flashlights, straws, stirrers, syringes, lighters, and shrink wrap or materials which contain only small portions of plastics like a plastic lined paper cup.

Special areas: On 1 Oct 1989 the Baltic Sea will become a "Special Area". In special areas only food waste beyond 12 miles can be discharged from vessels. **Definitions:** "Graywater" means drainage from dishwater, shower, laundry, bath, and washbasin drains and does not include drainage from toilets, urinals, hospitals, and drainage from cargo spaces. "Dishwater" means the liquid residue from the manual or automatic washing of dishes and cooking utensils which have been pre-cleaned to the extent that any food particles adhering to them would not normally interfere with the operation of automatic dishwashers.	Disposal of any garbage prohibited except dishwater or grey water. *including the internal waters of the U.S. and the Great Lakes*	Food waste, paper, rags, glass, metal bottles, crockery and similar refuse if comminuted or ground to pieces no larger than 1 square inch (*except plastic material and garbage that floats and dunnage*).	All garbage allowed closer plus paper, rags, glass, metal, bottles, crockery and similar refuse without being ground (*except plastic material and garbage that floats and dunnage*).	All garbage allowed closer plus dunnage and garbage that floats (*except plastic material*)



Fixed or floating platforms and vessels within 500 feet of these structures, may not discharge any garbage except that food waste which has been ground to less than 1 square inch in size may be dispersed of when 12 miles or more from land.

MARPOL 73/78 ANNEX V SUMMARY OF GARBAGE DISPOSAL RESTRICTIONS

Garbage Type	All Vessels Except Offshore Platforms & Associated Vessels		*** Offshore Platforms & Associated Vessels
	Outside special areas	** In special areas	
Plastics - includes synthetic ropes and fishing nets and plastic bags	Disposal prohibited	Disposal prohibited	Disposal prohibited
Floating dunnage, lining and packing materials	Disposal prohibited less than 25 miles from nearest land	Disposal prohibited	Disposal prohibited
Paper, rags, glass, metal, bottles, crockery and similar refuse	Disposal prohibited less than 12 miles from nearest land	Disposal prohibited	Disposal prohibited
* Paper, rags, glass, etc., comminuted or ground	Disposal prohibited less than 3 miles from nearest land	Disposal prohibited	Disposal prohibited
Food waste not comminuted or ground	Disposal prohibited less than 12 miles from nearest land	Disposal prohibited less than 12 miles from nearest land	Disposal prohibited
* Food waste comminuted or ground	Disposal prohibited less than 3 miles from nearest land	Disposal prohibited less than 12 miles from nearest land	Disposal prohibited less than 12 miles from nearest land
Mixed refuse types	****	****	****

* Comminuted or ground garbage must be able to pass through a screen with a mesh size no larger than 25mm.
** Special areas are the Mediterranean, Baltic, Red and Black Seas, and Persian Gulf areas.
*** Offshore platforms and associated vessels includes all fixed or floating platforms engaged in exploration or exploitation and associated offshore processing of seabed mineral resources, and all vessels alongside or within 500m of such platforms.
**** When garbage is mixed with other harmful substances having different disposal or discharge requirements the more stri

OIL POLLUTION ACT OF 1990 (OPA '90)

SUMMARY

Below is a limited summary of changes brought about by the signing of the Oil Pollution Act of 1990 by President Bush:

LIABILITY	$1200 per gross ton from a previous $150; offshore facilities, $75M plus unlimited removal costs; onshore facilities and deepwater ports (i.e., LOOP), $350M.
SPILL FUND	$1 billion national oil spill liability trust fund, change from the 311(k) revolving fund of $35 million
LARGER COAST GUARD	Oil spill response groups in each of the CG's 10 districts, re-establish the Atlantic Strike Team (three strike teams); upgrade vessel traffic services notably in Prince William Sound; give CG access to driving records to review applicants for Merchant Mariner documents.
DOUBLE HULL TANKERS	All newly constructed U.S. flag tankers shall be double hulled, phase out existing single hulls by 1995, single hull tankers will be phased out after the year 2010.
CONTINGENCY PLANS	All vessels shall address cleanup for "worst case", loss of vessel's entire cargo during heavy weather. A private means to mitigate the worst case spill is also required.
MARINE SPILL RESPONSE ORGANIZATION (MSRC)	MSRC has been developed to address the legislative requirement for shippers to identify a private entity to mitigate the worst case spill. MSRC is being financed by most of the large API member companies. MSRC start-up costs are estimated at $100M with a $70M annual operating cost fee, they will respond to major oil spills only which will be referred to spills of national significance.
FAILURE TO REPORT	The fines for failure to report have been raised from $10,000 and one year in prison to $250,000 for individuals and $500,000 for corporations. The potential jail term has been extended to 5 years.

At the time of this printing actual implementation of this legislation pends the issuance of an Executive Order and delegation of authority to the appropriate federal agency.

APPENDIX III
PART I

MEMORANDUM OF UNDERSTANDING BETWEEN THE ENVIRONMENTAL PROTECTION AGENCY AND U.S. COAST GUARD ON ASSESSMENT OF CIVIL PENALTIES FOR DISCHARGES OF OIL AND DESIGNATED HAZARDOUS SUBSTANCES

(August 15, 1979; Published at 44 FR 50785, August 29, 1979, and 44 FR 50916, August 30, 1979)

The United States Environmental Protection Agency (EPA) and the United States Coast Guard (USCG) have determined that it is necessary to establish procedures pursuant to which decisions may be made:

(1) Whether a discharge of a designated hazardous substance is excluded from the application of the civil penalty procedures prescribed by section 311(b)(6) of the Clean Water Act (CWA) and

(2) Whether action will be taken under paragraph (a) or under paragraph (B) of section 311 (b)(6) CWA to impose a penalty for the discharge of a designated hazardous substance not so excluded.

The EPA and the USCG agree that decisions as to whether a discharge of a designated hazardous substance is excluded from the application of section 311(b)(6) CWA will be made initially by the EPA in cases evidencing particular potential violation gravity, e.i., meeting criteria set out in section III of this memorandum. In all other cases the decision will be made initially by the agency providing the On-Scene Coordinator to the discharge incident. When a decision is made that a discharge is excluded, penalty action under section 311(b)(6) CWA will be withheld.

The EPA and the USCG agree that decisions as to whether action will be initiated to impose civil penalties under paragraph (B) of section 311(b)(6) CWA, will be made by the EPA. Cases involving USCG responses, which evidence particular potential violation gravity, i.e., meeting criteria set out in section III of this memorandum, will be transmitted to the EPA for its consideration. In all cases where EPA determines that it is appropriate to initiate civil penalty action under paragraph (B) of section 311(b)(6) CWA, the USCG will withhold the initiation of civil penalty action under paragraph (a) of section 311(b)(6) CWA.

This memorandum establishes policies, procedures, and guidelines concerning the responsibilities of the EPA and the USCG in carrying out the foregoing agreement.

The respective responsibilities of each agency specified in this memorandum may be delegated to their respective subordinates consistent with established procedures.

The EPA and the USCG will review the implementation of this memorandum at least one year from the effective date of 40 CFR Part 117 or sooner if agreed to by both agencies, and will make any changes to the policy, procedures, and guidelines set forth herein which are agreed to by both agencies.

Section 1: General

The amendment of November 2, 1978 to section 311 CWA (Public Law 95-576) excluded certain discharges of hazardous substances from the application of section 311(b)(6) CWA. The discharges so excluded are: (a) discharges in compliance with a section 402 DWA permit, (b) discharges resulting from circumstances identified and reviewed and made a part of the public record with respect to a permit issued or modified under section 402 CWA, and subject to a condition in such permit, and (c) continuous or anticipated intermittent discharges from a point source, identified in a permit or permit application under section 402 CWA, which are caused by events occurring within the scope of relevant operating or treatment systems.

In addition, this amendment created two methods for penalizing discharges of hazardous substances. The first, which already existed as section 311(b)(6) CWA prior to the amendment, authorizes the USCG to assess a civil penalty not to exceed $5,000 for the discharge of oil or a designated hazardous substance (section 311(b)(6)(A)). The second method created by the new amendment, provides that the EPA, through the Department of Justice, may initiate a civil action in Federal district court for penalties not to exceed $50,000 per spill of hazardous substance, unless such discharge is the result of willful negligence or willful misconduct, in which case the penalty shall not

exceed (250,000 (section 311(b)(6)(B)).

The legislative history accompanying the amendment makes clear that Congress intended to create a dual option system for penalizing discharges of hazardous substances under section 311(b)(6) CWA. A discharger of a designated hazardous substance can be penalized under paragraph (A) or paragraph (B), but not both. The EPA and the USCG agree that paragraph (B) does not apply to oil discharges. The USCG will continue to assess oil discharge penalties administratively under paragraph (A).

Section II: Coordination

When a spill of a designated hazardous substance occurs, the On-Scene Coordinator (OSC) will prepare a factual report of the incident. At the minimum, the report will address those criteria set forth in section III, of this memorandum.

The OSC will submit this report within 60 days of the spill incident. The OSC will submit the report to the District Commander when he is a USCG OSC, and to the Regional Administrator, when he is an EPA OSC.

When the District Commander reviews the USCG OSC's report and determines that one or more the criteria set forth in section III, below is applicable to that case, the entire record of that case will be referred to the EPA Regional Administrator for review. In addition the District Commander will refer the entire record of:

(a) Any other case involving a designated hazardous substance from a point source subject to a section 402 permit or permit application, which, prior to or after the commencement of penalty action, the USCG determines is excluded from the application of section 311(b)(6) CWA; and

(b) Any other case which, the District Commander considers appropriate for possible application of section 311(b)(6)(B) CWA.

When the Regional Administrator receives a case, either from an EPA OSC or upon referral from the District Commander, he will determine:

(a) Whether the case is excluded from the application of section 311(b)(6) CWA, and, if not,

(b) Whether a civil penalty action under section 311(b)(6)(B) CWA will be initiated.

The Regional Administrator will made these determinations within 90 days of his receipt of referral documents and will notify the District Commander promptly of the determinations in cases which have been referred. If the Regional Administrator determines that an action under section 311(b)(6)(B) CWA will be initiated, the case will be prepared in the EPA Regional Office and forwarded to the Department of Justice (DOJ) in accordance with established EPA case referral procedures.

If the Regional Administrator determines that the discharge is not excluded from the application of section 311(b)(6) CWA and that paragraph (B) action is inappropriate, or if EPA Headquarters declines to refer a Regional case, EPA will return the case to the USCG for appropriate action under paragraph (A).

Upon request, each Agency will make available to the other any or all cases, files, and records, including OSC reports and official determinations, regarding decisions concerning exclusions or the imposition of section 311(b)(6)(A) or (B) penalties. Where there is a disagreement as to the disposition of a particular case, the District Commander and the Regional Administrator will consult to resolve the matter. If necessary, the matter will be submitted to the respective Agency Headquarters for final resolution.

Section III: Criteria

The USCG and the EPA agree that if one or more of the following criteria exists, the District Commander will refer the case to the Regional Administrator in accordance with section II of this memorandum.

a. Any indication of misconduct or lack of reasonable care on the part of the owner, operator, or person in charge with respect to the discharge or with respect to the failure on the part of the owner, operator, or person in charge to adhere to the guidance of the OSC regarding clean-up or any policies, procedures, guidelines, or regulations applicable to clean-up;

b. Any discharge incident other than a threat for which payments are made or to be made from the section 311(k) fund pursuant to 33 CFR 153.407, except where no discharger has been identified;

c. Any indication of prior violations by the discharger of any provision of the CWA, or violations of provisions of the CWA other than section 311(b)(6) CWA occurring at the time of the discharge, such as violations of a section 402 permit;

d. Any discharge incident (other than a threat) as defined in 40 CFR 1510.5(1) which requires activation (by full or limited assembly, or by telephone) of the Regional Response Team as required by 40 CFR 1510.34(d), as amended; and

e. Any discharge involving human injury or evacuation, damage to plant or animal life, or contamination of water supply or underground aquifers.

Other referrals to the EPA may be made on a discretionary basis.

Dated: August 15, 1979.
Marvin B. Durning, *Assistant Administrator for Enforcement, United States Environmental Protection Agency.*

Dated: August 17, 1979.
R.H. Scarborough, *Acting Commandant, United States Coast Guard.*

APPENDIX III
PART II

MEMORANDUM OF UNDERSTANDING BETWEEN THE U.S. ENVIRONMENTAL PROTECTION AGENCY REGION IV - ATLANTA, GA AND THE U.S. COAST GUARD SECOND DISTRICT - ST. LOUIS, MO CONCERNING SPECIFIED PORTS AND HARBORS WITHIN THE SECOND COAST GUARD DISTRICT

PURPOSE: The purpose of this document is to identify the specified ports and harbors common to the USEPA Region IV and the U.S. Coast Guard Second District. This document delineates the geographical areas of responsibility and operational conditions under which the U.S. Coast Guard will be the lead agency and furnish a predesignated On-Scene Coordinator for pollution response pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan.

The U.S. Coast Guard Second District has identified the following river reaches as specified ports and harbors for the inland river systems within USEPA Region IV and U.S. Coast Guard Second District. The zones shall encompass the area from bank to bank or levee to levee wherever a levee is present.

Lower Mississippi River System:

Cairo, IL	mile 953.8 to mile 941
Memphis, TN	miles 738 to mile 724
Greenville, MS	mile 540 to mile 535

Ohio River System:

Cairo, IL	mile 981 to mile 974
Paducah, KY	miles 944 to mile 919
Louisville, KY	mile 630 to mile 592
Cincinnati, OH	mile 491.7 to mile 461.9
Huntington, WV	mile 323 to mile 317.2

Tennessee River:

Paducah, KY	mile 0.0 to mile 22

Cumberland River:

Paducah, KY	mile 0.0 to mile 30
Nashville, TN	mile 146.7 to mile 225

Licking River:

Cincinnati, OH	mile 0.0 to mile 5.0

Big Sandy River:

Huntington, WV	mile 0.0 to mile 4.0

The U.S. Coast Guard, through the appropriate Captain of the Port, shall be responsible for furnishing the predesignated On-Scene Coordinator for all discharges of oil and hazardous substances which result from a vessel casualty or vessel-transfer activity which occur in these specified Ports and Harbors of the Inland River System (see chart A for specific predesignated USCG OSC/COTP zones of jurisdiction).

The Coast Guard will not normally respond to those discharge incidents within their predesignated zone which occur (1) at industrial facilities, (2) from non-marine transportation casualties, (3) at bulk storage facilities, and (4) at hazardous substance waste sites.

Operations and resources permitting, the USCG will, at the request of USEPA Region IV, provide assistance and a First Federal Official on-scene to those major incidents which occur in the inland zone that require immediate federal response presence to assess the impact and extent of the oil/hazardous materials release.

The U.S. Coast Guard will continue to respond to significant marine casualty incidents which occur upon the commercial navigable waters of the inland rivers. The Coast Guard will respond to those vessel casualty incidents which are outside of the limits of specified ports and harbors for investigative purposes. If a discharge of oil or hazardous substance is involved, the USCG will either act in the role of First Federal Official on-scene pending the arrival of the USEPA Region IV predesignated OSC, or, at the request of the USEPA Region IV Predesignated OSC, the Coast Guard may provide the incident specific OSC.

In accordance with the NCP, the Coast Guard, through the appropriate Captain of the Port, shall be responsible for developing and maintaining a Federal local contingency plan for the specified port and harbor area identified above.

This document is official authorization by USEPA predesignated OSC's for Coast Guard First Federal Officials on-scene to activate Federal pollution funds for spills of oil or designated hazardous substances prior to the arrival of the predesignated OSC.

In the initial hours of response to each significant discharge or release, the Coast Guard will establish communications with the EPA, discuss details of the incident, and, together with the EPA, consider the necessity of activating the incident specific RRT.

Jack E. Ravan Regional Administrator U.S. Environmental Protection Agency Region IV, Atlanta, GA	R.T. Nelson, Rear Admiral Commander Second Coast Guard District St. Louis, MO

APPENDIX III
PART III

MEMORANDUM OF UNDERSTANDING BETWEEN THE U.S. ENVIRONMENTAL PROTECTION AGENCY REGION V - CHICAGO, IL AND THE U.S. COAST GUARD SECOND DISTRICT - ST. LOUIS, MO CONCERNING SPECIFIED PORTS AND HARBORS WITHIN THE SECOND COAST GUARD DISTRICT

PURPOSE: The purpose of this document is to identify the specified ports and harbors common to the U.S. Environmental Protection Agency Region V and the U.S. Coast Guard Second District. This document delineates the geographical areas of responsibility and operational conditions under which the U.S. Coast Guard will be the lead agency and furnish a predesignated On-Scene Coordinator for pollution response pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan.

The U.S. Coast Guard Second District has identified the following river reaches as specified ports and harbors for the inland river systems within U.S. Environmental Protection Agency Region V and U.S. Coast Guard Second District. The zones shall encompass the area from bank to bank or levee to levee wherever a levee is present.

RIVER SYSTEM		PREDESIGNATED OSC
Upper Mississippi River	Mile 168.6 to Mile 202.9	COMSO ST. LOUIS
	Mile 0.0 to Mile 13.0	COMSO PADUCAH
Ohio River	Miles 919.0 to Mile 944.0	COMSO PADUCAH
	Mile 974.0 to Mile 981.0	COMSO PADUCAH
	Mile 592.0 to Mile 630.0	COMSO LOUISVILLE
	Mile 461.9 to Mile 491.7	COMSO LOUISVILLE
	Mile 303.0 to Mile 323.0	COMSO HUNTINGTON

The U.S. Coast Guard, through the appropriate Captain of the Port, shall be responsible for furnishing the predesignated On-Scene Coordinator for all discharges of oil and hazardous substances which result from a vessel casualty or vessel-transfer activity which occur in these specified Ports and Harbors of the Inland River System.

The Coast Guard will not normally respond to those discharge incidents within their predesignated zone which occur (1) at industrial facilities, (2) from non-marine transportation casualties, (3) at bulk storage facilities, and (4) at hazardous substance waste sites.

Operations and resources permitting, the USCG will, at the request of USEPA Region V, provide assistance and a First Official on-scene to those major incidents which occur in the inland zone and require immediate federal response presence to assess the impact and extent of the oil/hazardous materials release.

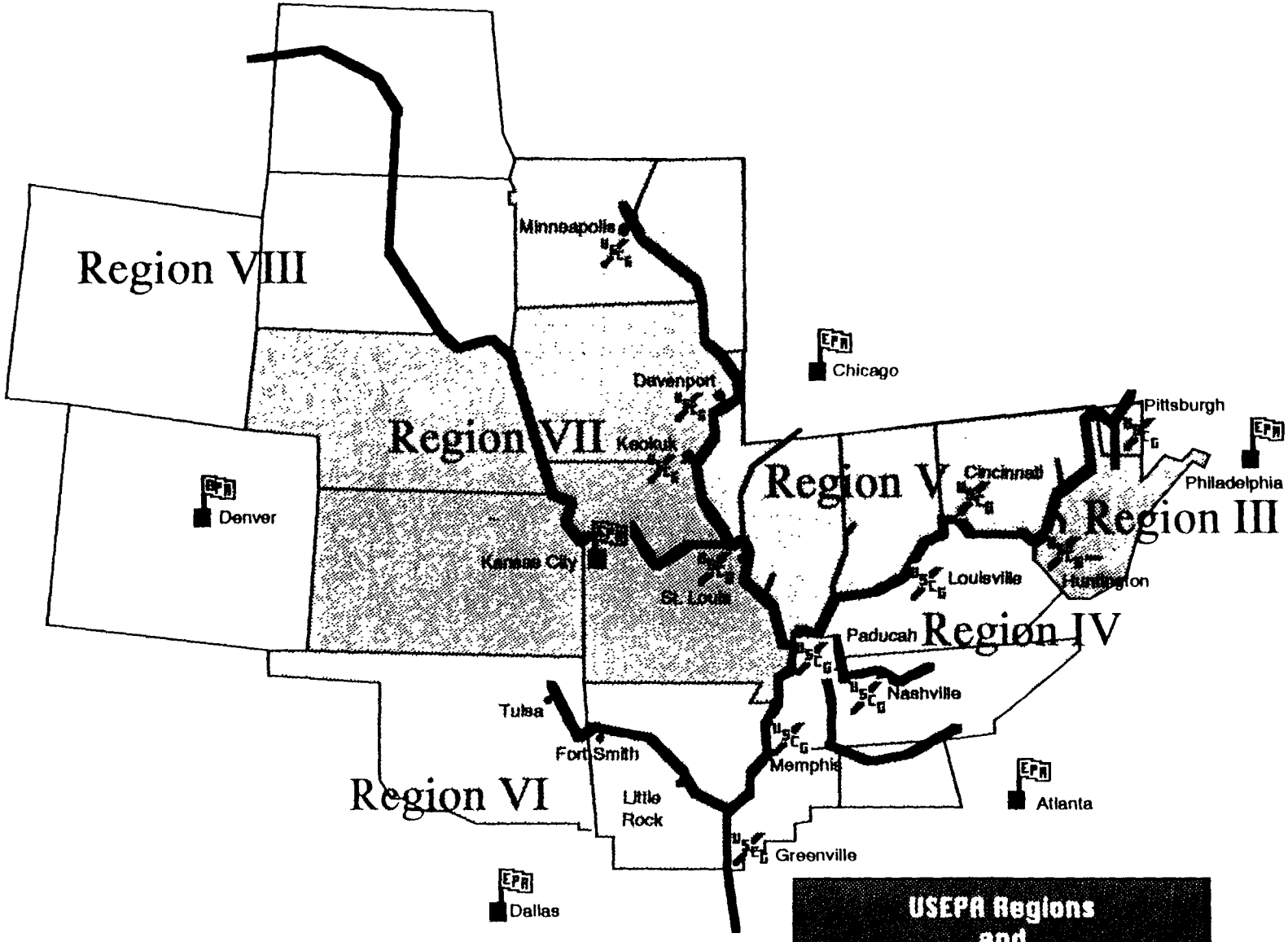
The U.S. Coast Guard will continue to respond to significant marine casualty incidents which occur upon the commercial navigable waters of the inland rivers. The Coast Guard will respond to those vessel casualty incidents which are outside of the limits of specified ports and harbors for investigative purposes. If a discharge of oil or hazardous substance is involved, the USCG will either act in the role of First Federal Official on-scene pending the arrival of the USEPA Region V predesignated OSC, or, at the request of the USEPA Region V Predesignated OSC, the Coast Guard may provide the incident specific OSC.

In accordance with the NCP, the Coast Guard, through the appropriate Captain of the Port, shall be responsible for developing and maintaining a Federal local contingency plan for the specified port and harbor area identified above.

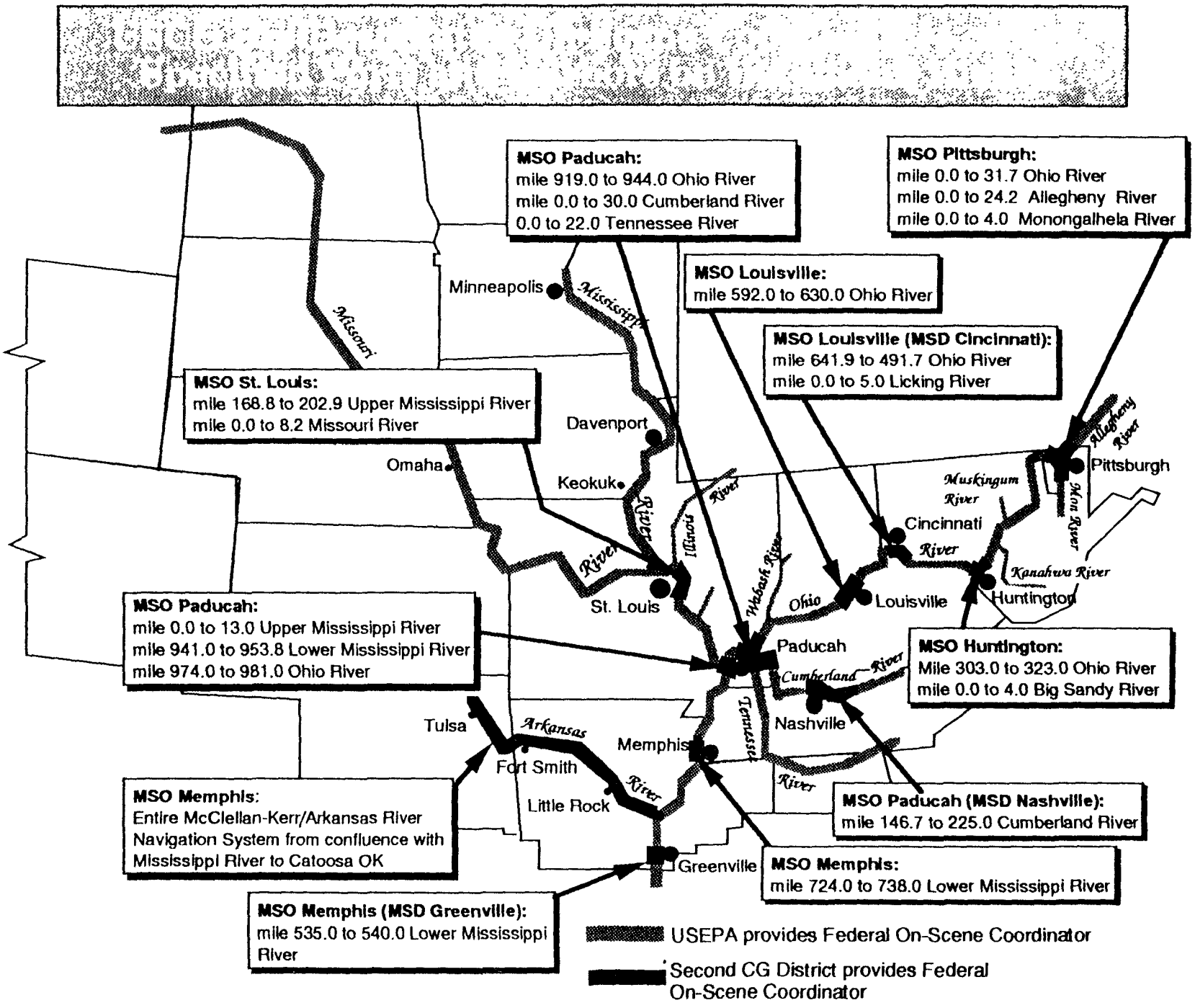
This document is official authorization by USEPA predesignated OSCs for Coast Guard First Federal Officials on-scene to activate Federal pollution funds for spills of oil or designated hazardous substances prior to the arrival of the predesignated OSC.

In the initial hours of response to each significant discharge or release, the Coast Guard will establish communications with the EPA, discuss details of the incident, and, together with the EPA, consider the necessity of activating the incident specific RRT.

Regional Administrator U.S. Environmental Protection Agency Region V, Chicago, IL	R.T. Nelson, Rear Admiral Commander Second Coast Guard District St. Louis, MO
Date:_____	Date:_____



USEPA Regions and Regional Response Team boundaries within the Second Coast Guard District


MSO Paducah:
mile 919.0 to 944.0 Ohio River
mile 0.0 to 30.0 Cumberland River
0.0 to 22.0 Tennessee River
MSO Pittsburgh:
mile 0.0 to 31.7 Ohio River
mile 0.0 to 24.2 Allegheny River
mile 0.0 to 4.0 Monongalhela River
MSO Louisville:
mile 592.0 to 630.0 Ohio River
MSO Louisville (MSD Cincinnati):
mile 641.9 to 491.7 Ohio River
mile 0.0 to 5.0 Licking River
MSO St. Louis:
mile 168.8 to 202.9 Upper Mississippi River
mile 0.0 to 8.2 Missouri River
MSO Paducah:
mile 0.0 to 13.0 Upper Mississippi River
mile 941.0 to 953.8 Lower Mississippi River
mile 974.0 to 981.0 Ohio River
MSO Huntington:
Mile 303.0 to 323.0 Ohio River
mile 0.0 to 4.0 Big Sandy River
MSO Memphis:
Entire McClellan-Kerr/Arkansas River
Navigation System from confluence with
Mississippi River to Catoosa OK
MSO Paducah (MSD Nashville):
mile 146.7 to 225.0 Cumberland River
MSO Memphis:
mile 724.0 to 738.0 Lower Mississippi River
MSO Memphis (MSD Greenville):
mile 535.0 to 540.0 Lower Mississippi River
USEPA provides Federal On-Scene Coordinator
Second CG District provides Federal On-Scene Coordinator
Minneapolis
Davenport
Omaha
Keokuk
St. Louis
Tulsa
Fort Smith
Little Rock
Memphis
Greenville
Paducah
Cincinnati
Louisville
Pittsburgh
Huntington
Nashville
Missouri River
Mississippi River
Illinois River
Wabash River
Ohio River
Arkansas River
Tennessee River
Cumberland River
Muskingum River
Kanawha River
Allegheny River
Mon River

SECTION 8

PART I

SMALL BOAT HANDLING

Most people have some experience in small boat handling from activities such as fishing, water skiing, or duck hunting. Although these experiences are good introductions to using boats for work, additional skills need to be acquired before a boat can be used effectively and safely.

PROBLEMS OF OPERATING SMALL BOATS

Like a car, a boat has a steering wheel, a throttle and a gear shift. What a boat doesn't have, however, is a brake. The only means of slowing a boat is to shift the propeller into reverse. Boat operators must also contend with forces of wind and current acting on the craft. The direction a boat will move is dictated by propeller, wind, and current forces. In cases of strong wind and/or currents, the result can be, at best, surprising for the inexperienced operator.

If a boat were always operated in a perfectly calm body of water without currents, the driver would find that the boat steered similarly to a car, with a small amount of rudder needed to make a sharp turn at high speeds and a large amount to make the same change in direction at low speeds. Although both propeller and rudders are on the stern of the boat, the pivot point for a light boat may change with increasing speed. At high speeds, the pivot point is closer to the stern, as that section of the keel becomes more effective as the bow tends to plane on the water. Because the pivot point is ahead of the rudder, the stern of the boat will tend to go to the left for a right-hand turn. Deck hands should be prepared to fend off boats and docks on the opposite sides of a turn when maneuvering in close surroundings.

WORKING SAFELY FROM A BOAT

The operator must, at all times, be aware of the boat's position in the water in relation to other objects. If the operator's view is partially blocked, a deck hand should be stationed to relay information. Ropes, floats, and other pieces of equipment must be secure to prevent entanglement or injury. Life jackets should be worn at all times, and gloves should be worn if working with ropes or cables over the side of the boat. Knives should be handy to cut any lines that may endanger life or damage property. Persons on board should be alert to the possibilities of rope backlashing if cut or broken. Extra care must be taken when transferring equipment or personnel between boat and dock or between boats. The differential movement between floating objects can potentially crush a person or cause severe damage to vessels. Heavy breaking surf presents additional hazards and requires an expert crew.

The buddy system has great advantages for work over the side of a boat. One person can assist by handing parts and tools or by holding cables and lines as the other completes the task. About twice the time necessary to complete the task on land is needed when working from a boat. A considerable amount of this additional time is needed to adjust to working on a moving platform.

Docking a boat requires an understanding of the maneuverability of the boat, the ability to stop and reverse direction and knowledge of prevailing winds and currents. Slow, deliberate movements should be effected to avoid collisions. Since a boat is usually more maneuverable heading into the current, in rivers it is best to bring the craft alongside the dock heading upstream. When leaving a mooring calm water, it is usually best to push the bow away from the dock and slowly move the boat forward, turning out and away from the dock. Currents and wind can be used advantageously by letting these forces move the boat away from the dock before placing the engine in gear.

To insure operator maneuverability, towing is accomplished by attaching the tow line to a bridle or to a point inboard from the rudder and very near the turning or pivot point of the craft. If the line is tied to the stern, the boat will skid sideways through the water during turns and will be more difficult to handle. Proper technique is essential to avoid capsizing at the expense of an improperly rigged tow line.

Setting and retrieving anchors can also be problematic if proper techniques are not employed. Anchoring is necessary for position boom as well as for stationing a boat. Large vessels may have power-operated anchoring systems, but small vessels likely will not. Anchors should be slowly eased into the water and permitted to drop to the bottom while backing the boat downstream. Backing of the vessel is necessary to keep the anchor rope from becoming entangled in the propeller. When raising the anchor, a deck hand should be stationed at the bow to pull in the line as the boat is slowly headed upstream over the anchor. When the rope is vertical over the anchor, it is sometimes necessary to tie the rope to a cleat and propel the boat forward, pulling the anchor loose from the bottom. When the anchor is free, it can be raised into the boat by hand or winch. A pulley attached to the bow can be invaluable in handling the anchor line in a small boat, as it speeds up the job and reduces the changes for personal injury.

BOAT OPERATION FUNDAMENTALS

Some basic rules for operating boats are as follows.

1. Except when a boat is at anchor, aground, or made fast to the shore, a boat is considered underway and the "rules of the road" are applicable.

2. The Golden Rule for small boat handling is safety first and keep to the right. Indecisive action or actions with an obscure motive mislead other vessels, resulting in confusion.

3. Vessels that are being passed have the right-of-way over the passing vessel.

4. Boats underway must stay clear of boats fishing while at anchor or while traveling.

5. When two vessels are crossing each other's path, the motor vessel which has the other on the port (left) side shall have the right-of-way.

There are special lighting requirements for different length and type vessels. These rules are enforced by the Coast Guard. The rules and regulations can be obtained from the Coast Guard or from a recent edition of a boating handbook such as Piloting, Seamanship and Small Boat Handling, by Charles F. Chapman. Chapman's book includes a wealth of information about boat operations.

Daytime navigation in a canal or ship channel has advantages over night navigation because channel markings can be clearly seen. The primary rule is to keep to the right of the channel. Small boats are easier to maneuver than ships and should be able to avoid most problems. Buoys are used to mark the channel and are color-coded as follows:

1. Red buoys mark the right side of the channel when entering from seaward. Seaward is the datum for channel marking and holds for markers hundreds of miles inland.

2. Red and black horizontally-banded buoys mark obstructions or a junction of one channel with another.

3. Black and white vertically striped buoys indicate the middle of the channel.

4. White boys mark anchorages.

Most buoys are numbered to indicate which side of the channel the buoys mark and to aid in locating them on charts. Numbers increase from seaward and are kept in approximate sequence up channel. Odd-numbered buoys mark the left side and even-numbered buoys mark the right side.

Night navigation is complicated by difficulties in locating obstructions and forks in the channel, and limited by a person's restricted depth perception. Lighted buoys aid in marking channels, green lights marking the left side of channels and red lights marking the right side when entering from the sea.

Nautical charts for coastal waters prepared by the Coast and Geodetic Survey should be obtained for the area. Company personnel should become familiar with using them. Charts are necessary to plan spill cleanup operations and to use in training the company response team. The Coast Guard should be invited to lecture at training sessions concerning local conditions and the use of nautical charts.

The Coast and Geodetic Survey Department issues tide tables, current tables, and tidal current charts for certain harbors. Buoys and navigation lights are marked on the charts, and knowledge of them is mandatory for night operations. Charts are kept up to date by a weekly bulletin published by the Navy. The Coast Guard also publishes a list of lights and other marine aids for various sections of the coast.

OIL SPILL CLEANUP VESSELS

There is no single vessel that is best for all oil spill cleanup operations. Offshore work requires large, steel-hulled vessels longer than 50 feet. These types of vessels require professional operators, usually have large diesel engines and generators, and are well equipped with radio and navigation equipment.

Large vessels are necessary offshore to withstand pounding waves. Because the vessels will be used to tow large offshore booms, heavy-duty bits or cleats must be welded to the structure of the vessel to prevent pulling the tow-point loose. Oceangoing tugs are well suited to this type of operation. Aboard the vessel should be a captain, one or more deck hands, and an oil spill cleanup supervisor with communications to the rest of the operation. The captain will operate the vessel and the supervisor will instruct the captain as to how his vessel will work with regard to the overall operation. The craft should be both heavy enough and large enough for the operation. Work in some areas is best handled by heavy-duty craft with twin screw power. This is particularly helpful when working along docks or for tending boom in swift-moving rivers.

Smaller boats work well for inshore spills by carrying personnel, towing boom, and by handling debris barges. For this type of operation, a large boat may be necessary, but use of a more shallow draft vessel has distinct advantages. For small spills in sheltered waters, outboard vessels of sufficient power and size are adequate. Engines of at least 50 horsepower are recommended. A particularly useful vessel is a flat-top design similar to a house boat constructed on pontoons or as a catamaran. A flat-top vessel can store several hundred feet of boom ready for quick deployment, provides a stable platform from which to work, and is easier on which to place drums to be used for recovered oil, debris, or oiled sorbent. Some vessels can be equipped with a small crane to transfer the drums from vessel to dock.

When purchasing a small outboard type boat, one should look for shallow draft, high sides, large horsepower, and sturdy tow points. Unfortunately, boats designed for heavy operations are generally too large for use in confined areas. Likewise, smaller boats designed for recreational purposes generally are not sturdy enough for the heavy towing and hard treatment cleanup operation demand. Excluding smaller, flat-top design boats, "Boston Whaler"-type vessels have a lot of open area to accommodate personnel and equipment. These boats also tend to be more stable than many small boats.

Boats are an obvious necessity in handling oil spills on water and should be included in the contingency plan and used in training the response team. Vessels should be located in the area of the facility that would be called upon in the event of a spill. The Oakland Estuary cleanup employed 58 small boats and 23 large marine vessels ranging from tugs to a small tanker. The self-propelled tanker owned by Clean Bay Inc. was used as a floating oil-water separator to receive oil skimmed by other units. Small boats were used for transferring personnel, bird catching and cleanup, boom and skimmer tending, and reconnaissance of the spill. Clean Bay also owns or has access to eight floating skimmers including a large, double belt, self-propelled Marco skimmer. The largest skimmer is propelled by twin diesels, mounted on a catamaran hull, and is equipped with navigation lights for night operation.

Some suggestions involving the use of boats in oil spill cleanup operations are as follows.

1. Boats must be selected to be compatible with the location and job.

2. Boats must be maintained ready for use.

3. Boats must be cleaned throughout the spill to eliminate them as a source of injury and water recontamination.

4. Boats must not be overloaded.

5. Fuel cans must not be filled in small boats.

6. The crew must have ample weather-proof clothing.

7. Sorbent pads must be used on the decks to walk on.

8. The discharge wake can be used effectively to move oil toward skimmers.

SUMMARY

Experienced boat operators are necessary for safe boat handling during spill cleanup. Care should be taken while working from a vessel and when tying up, towing, or boarding a vessel. Charts for the area should be used to locate navigational facilities in the area, and personnel should learn to use these aids for both day and night operations. The response team should be trained under realistic conditions using vessels. When purchasing or leasing vessels, every attempt should be made to match the watercraft to the task.

SECTION 8

PART II

TRAINING PROGRAM FOR THE RESPONSE TEAM

Experienced, well-trained people are essential for successful implementation of an oil spill contingency plan. Training sessions must be held on a regularly scheduled basis since persons on the response team will be continuously changing, new equipment will be acquired, and the oil spill contingency plan will be modified as more experience is gained. For a good training program to exist, it must have the support of the company. The supervisor of the oil spill response team is responsible for the team's continued training.

PURPOSE OF THE TRAINING

The objective of the response team is to clean up an oil spill efficiently and quickly with a minimal adverse effect on the environment. The purpose of the training program is to prepare the response team to meet this objective. The training program should be divided into quarterly meetings which can be devoted to classroom exercises, field training and response drills. The specific goals of the training program are to teach the response members to:

1. use oil spill cleanup equipment safely;
2. identify cleanup sites;
3. utilize the oil spill contingency plan;
4. handle the respective duties of a response member; and
5. critically review and upgrade the contingency plan.

RESPONSIBILITIES OF RESPONSE TEAM

Each member of the response team should be familiar with all aspects of the oil spill contingency plan. This includes how to use the notification system for reporting spills and the call-up procedure for activating the response team. Each member of the response team should have a folder with the following information:

1. organization chart of response team with the names of people assigned to the various positions;
2. notification plan with phone numbers of all members of the team;
3. map of plant area showing:
   a. potential spill sites
   b. environmentally sensitive areas
   c. boom deployment sites
   d. access roads to deployment and waste disposal sites

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4. description of each deployment site; and
5. complete job description for each response team member (the job description will help new members become oriented).

Members of the response team in the procurement group must periodically check to ensure that their lists for furnishing personnel, equipment and supplies are current.

THE TRAINING PROGRAM

Most of the training program should be oriented around drills and demonstrations rather than formal classroom instruction. However, certain aspects of the training program can be covered efficiently in group training classes. Training sessions should be held regularly, perhaps for a few hours each month, and large-scale exercises should be held once or twice each year.

Training is time consuming and expensive. Like any other expenditure, it must justify the overall program. Whenever possible, consideration should be given to holding joint sessions with other plants in the area. A local spill cooperative can provide a valuable service organizing and coordinating training sessions.

Vendors are often willing to put on demonstrations of their equipment or materials. However, although observing demonstrations are worthwhile, it is not a substitute for actual first-hand practice with one's own equipment.

The practical field work required to contain and clean up an oil spill should be broken down into a series of elements. Each element should be practiced separately before a full-scale exercise is attempted. A full-scale exercise can be a chaotic experience and wasteful if it is not well planned and organized.

Classroom instruction should include the following:

1. discussion of new ideas, equipment problems and results of field exercises;
2. movies on new equipment and its use, oil spill cleanup operations and drills;
3. instruction on boom theory, day and night navigation, oil movement, water current measurements and cleanup techniques;
4. review of the oil spill contingency plan, responsibilities of individual members, characteristics of various deployment sites, water currents about the plant site and use of equipment.

SUMMARY

Training must be regularly scheduled since persons on the response team will be continuously changing, new equipment will be acquired and the oil spill contingency plan will be revised regularly. Training should be such that each team member knows exactly what to do in case of a spill at any time. Each member of the team should be issued a folder with information detailing his role in the cleanup organization, a notification plan, and various maps of the area locating potential spill sites, boom sites and access roads.

Training sessions should emphasize hands-on experience with specific pieces of equipment. Limited classroom discussions can consist of equipment status reports and review of the contingency plan. A full-scale response team exercise should be had one or two times each year.

SECTION 9

CONTAINMENT OF OIL ON WATER

Most containment devices are designed to hold oil "long enough" for the oil to be removed. However, no device should be expected to hold oil indefinitely. Depending on the water current, wind current and wave heights, "long enough" might be a few minutes to several days. Due to the wide variety of water conditions, containment devices can be simple "home-made" devices or sophisticated commercial booms and air barriers.

AIR BARRIERS

The use of air or pneumatic barriers has been demonstrated to be an effective means of controlling the movement of floating products in water in little or no current. Air barriers can be classed as air bubblers or coherent water jets.

The air bubbler is constructed by placing a perforated pipe or manifold in the water close to the bottom. Injecting air into the pipe causes bubbles to rise from the openings. The rising bubbles produce a vertical current in the water which causes a horizontal current or water flow on the surface. This horizontal movement counteracts the forward movement of the oil and prevents the oil from passing.

Advantages of this system include: rapid start up, unrestricted vessel movement and continuous operation. There are a number of disadvantages as well. These include: ineffectiveness in high currents, silting or clogging of openings, high energy consumption, high initial cost and system design problems.

Tests under controlled conditions have shown that the excess water at the surface tends to entrain oil droplets into the water column. This is because the water sets up a recirculating pattern near the bubble plant (**FIGURE 1**). When a current is present, the entrainment causes massive oil loss. Losses occur at current speeds below 0.5 knots (**FIGURE 2**)[1].

Under ideal conditions (no current or wave action), oil could be contained in areas such as barge slips with an air barrier. Oil layers could be contained up to five inches thick.

Recent experience with air barriers at an angle to the water current have shown them to be nearly as effective as containment booms. If large debris or ice is present, they may be the only chance for containment.

Silting of the manifold openings is a problem caused by placing the manifold system too close to the bottom. Raising the manifold off the bottom may prevent this from happening. Another problem can be the accumulation of marine growth such as barnacles and seaweed.

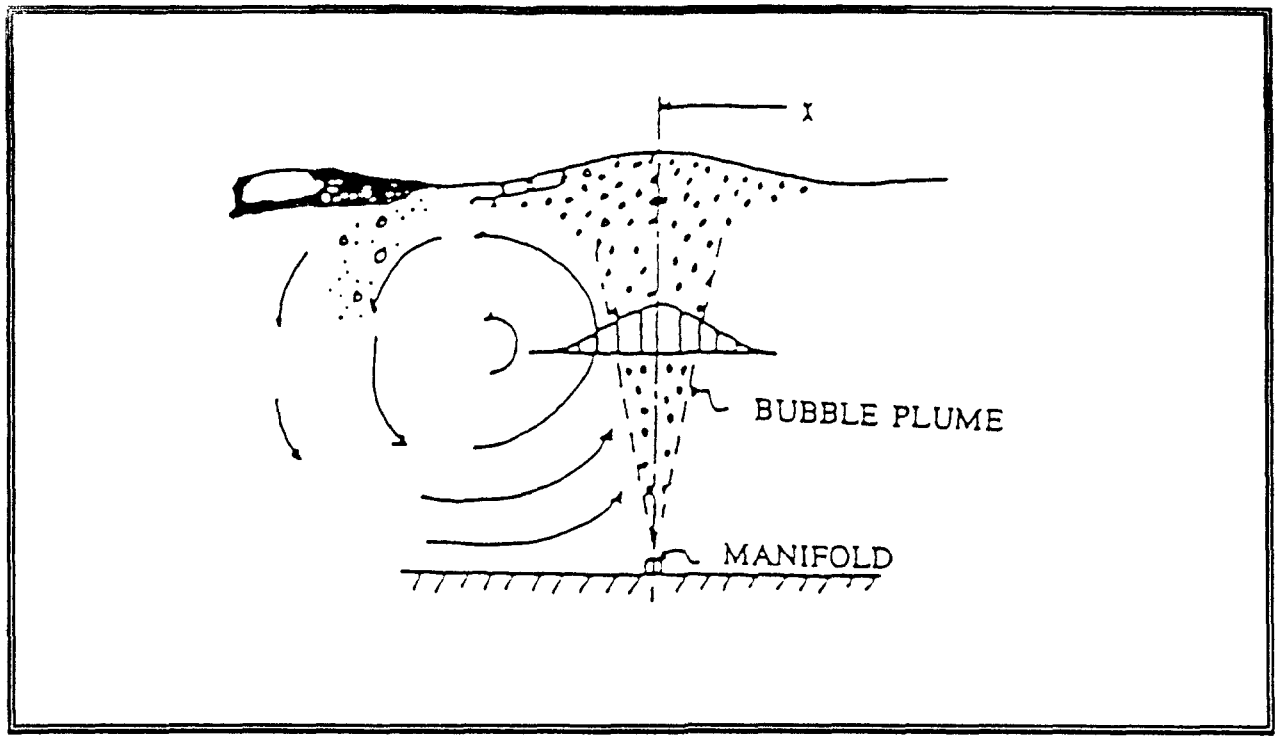


FIGURE 1
AIR BARRIER WITH NO CURRENT

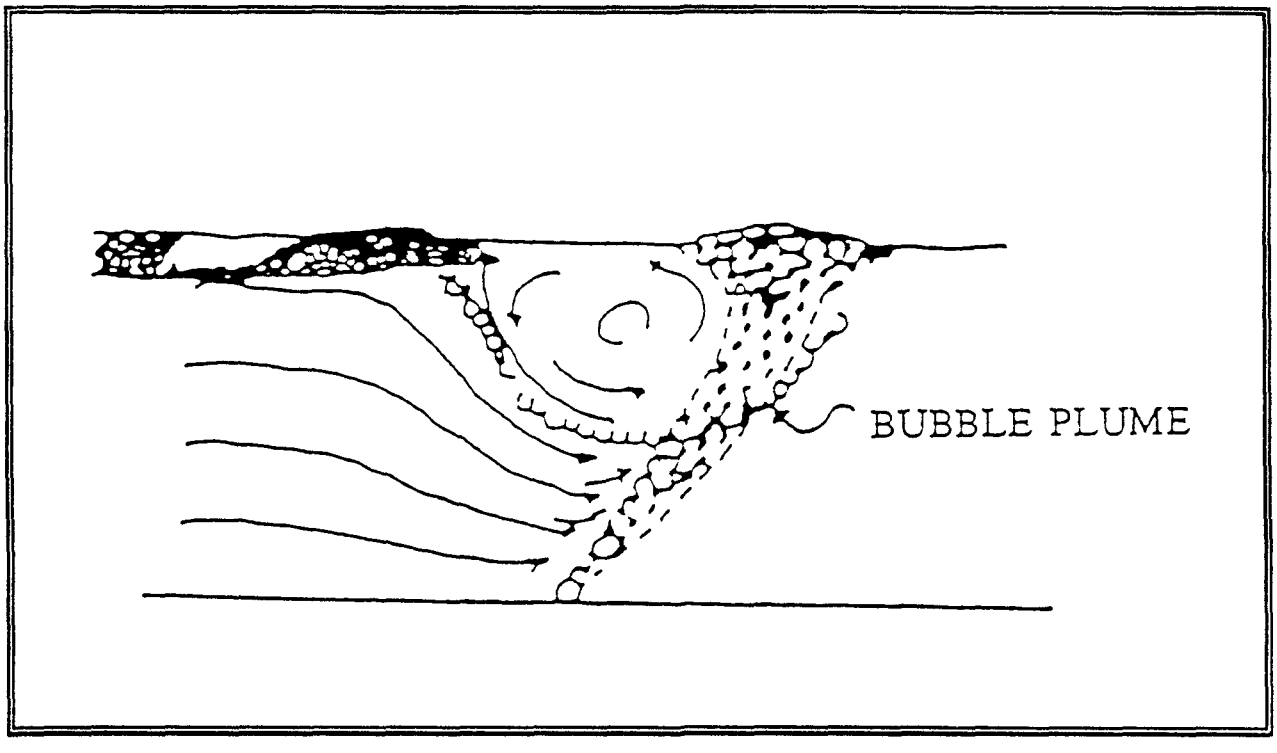


FIGURE 2
AIR BARRIER WITH CURRENT

The amount of air required to operate a system depends on the length of the perforated manifold, water depth, opening size, number and spacing of the openings and the desired surface current. Systems in the 200 to 300 feet range typically require 400 to 1200 c.f.m., depending on these variables.

System cost is one of the most prohibitive disadvantages of air barriers. A complete installation can run as much as $500/foot. Even if a compressor is already available, the cost for an installed manifold system can exceed $50/foot. Add to this the annual maintenance and energy costs and the operating expenses become high.

One area of new technology in air barriers is the use of coherent water jets. From above, a concentrated jet of water is directed vertically into the water column, and a large amount of air is introduced. The air rising back to the surface will act as a typical air barrier. An extra oil holding ability is produced by the splashing of the water and a standard headwave that is produced. Tests have shown that the coherent water jets (**FIGURE 3**) consume less energy than standard air barriers of equal effectiveness[4].

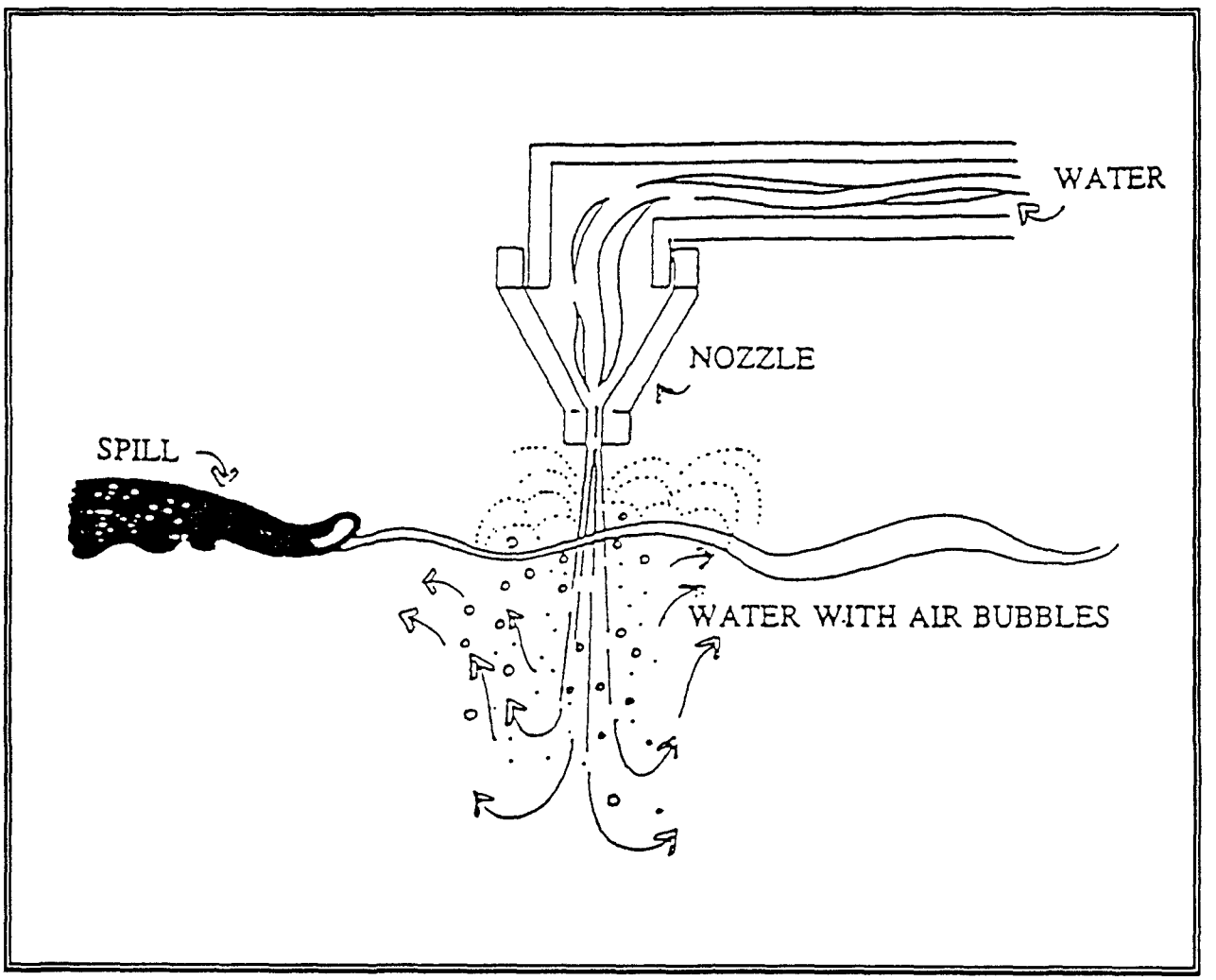


FIGURE 3
COHERENT WATER JETS

BOOMS

A boom is a floating barrier designed with sufficient freeboard and draft to contain oil floating on the surface of the water. Most booms will have the following characteristics:

1. a means of flotation or freeboard to contain the oil and to resist waves splashing oil over the top,

2. a skirt to prevent oil from being carried underneath the boom,

3. a longitudinal tensile strength member, such as chain or cable, to hold the boom together and provide a means of anchoring the boom, and

4. a ballast to aid in maintaining a vertical skirt orientation.

The following discussion will primarily cover typical floating booms similar to the one shown in **FIGURE 4**. Fixed barrier booms, supported from the bottom of a channel, will be discussed later.

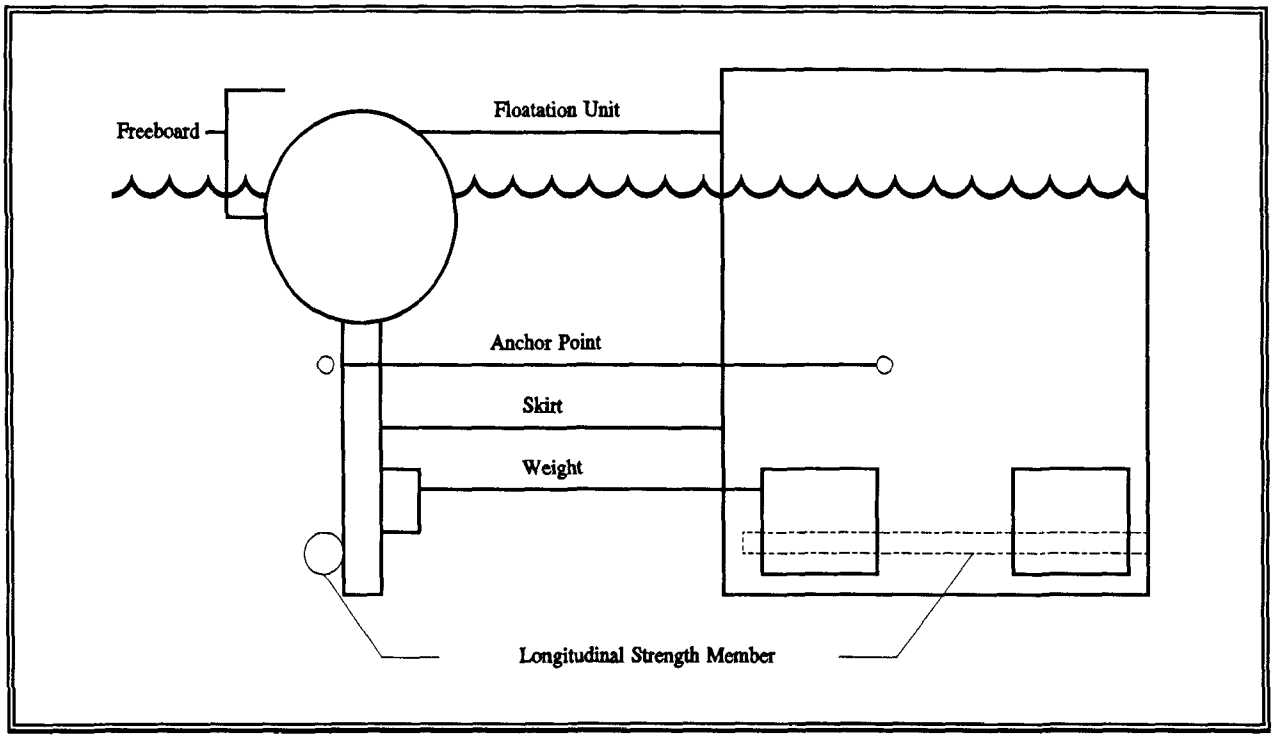


FIGURE 4
CROSS-SECTION OF A TYPICAL BOOM SHOWING MAJOR PARTS

To be effective, booms must float and be stable in currents, winds and waves. It should also be made of materials which are not subject to deterioration from the sun, storage and chemical attack.

Oil Carryunder

Booms will contain oil when placed in quiescent water. If there is only a slight velocity in the water perpendicular to the boom, and no wind or waves, the boom will still contain oil.

As the current moving perpendicular to the boom becomes greater, forces begin acting on the trapped oil and will cause the oil to escape under the boom. Oil can move under the boom by two methods. "Leakage", or sheet breakaway, occurs when oil builds up to such a depth behind the boom that the oil layer is almost equal to the draft and escapes under the skirt. "Entrainment", or droplet breakaway, involves the carryunder of oil due to a shearing action at the interface of oil and water at the headwave (**FIGURE 5**).

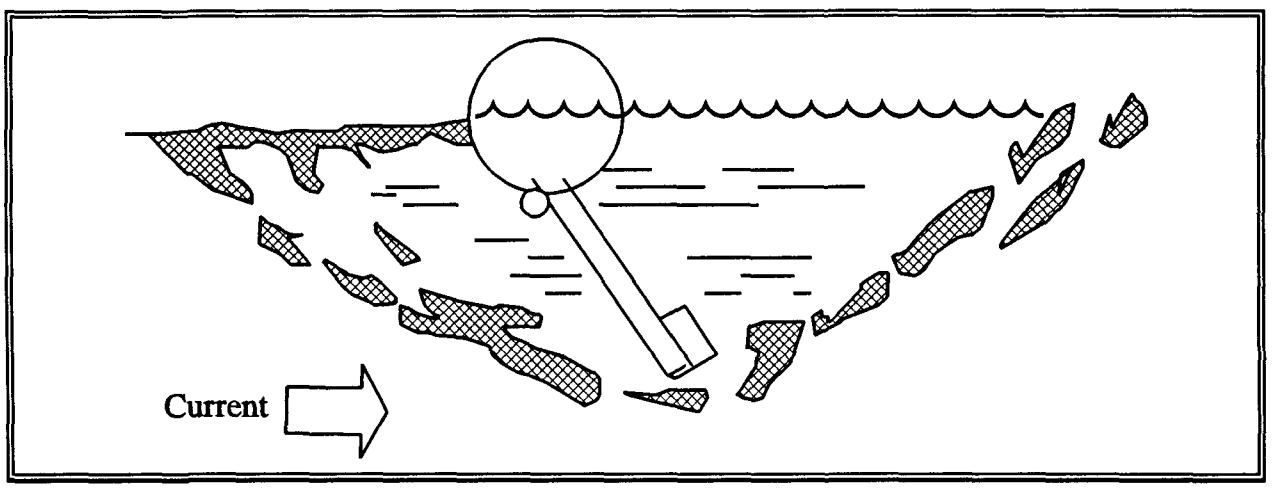


FIGURE 5
BOOM CONTAINMENT FAILURE CAUSED BY ENTRAINMENT OF OIL BY SHEARING ACTION

The containment effort fails when oil droplets break away from the oil layer and become entrapped in the flowing water as it passes beneath the boom. The amount of droplet carryunder is a function of the thickness of the oil layer and the velocity of water. The phenomenon is related to water velocity and the specific gravity of the oil. Thus, the greater the velocity or the greater the specific gravity of the oil, the greater the carryunder.

For a given oil land skirt depth, carryunder will not occur until a critical velocity is reached. As the velocity increases above the critical velocity, the greater the carryunder will be.

Increasing the length of the skirt increases the ability of the boom to retain oil, but the advantage is not substantial. Disadvantages of a longer skirt are the increases in weight, cost, and mooring requirements to hold the boom in position. A boom should be effective regardless of skirt depth when currents are below 0.75 feet per second for a No. 2 oil. For a No. 6 oil, no droplets are formed if the velocity is less than 0.4 feet per second, but leakage will occur if the boom has a skirt of less than 12 inches. Therefore, there is no advantage in making the skirt length greater than twelve inches to prevent the movement of oil beneath a boom in slow-moving waters. A longer skirt is required in rough waters.

Oil Splashover

Although a boom, properly deployed, can minimize carryunder, it may be subject to another form of failure - splashover. Splashover will depend on the basic boom design, freeboard, angle of the waves to the boom, wave heights, and distance between successive waves. No boom will be capable of holding oil under all sea conditions, but some boom designs are more effective than others. Under slow swell conditions in the open ocean, most booms will be flexible enough to conform to the waves. Under choppy conditions, it is difficult to keep oil from splashing over the boom. Such conditions require a boom with a relatively high freeboard and long skirt and may still be ineffective.

BOOM DESIGN

General Criteria

A bigger boom is not necessarily a better boom except for the advantage of preventing oil splashover in waves. Booms can be classified as round, fence, inflatable and self-inflating (**FIGURES 6, 7, 8, and 9**). Each type has specific advantages and disadvantages which are illustrated in the figures.

Booms are available in different lengths. For spills in creeks and rivers, lengths of 100 and 200 feet are recommended. Each section of boom should be supplied with connector to extend the length as required.

Anchor points should be constructed in the boom at several places along the length. A maximum distance of about 100 feet between anchor points is acceptable, with a 50-foot spacing preferable. Some booms are designed with handles to assist in deployment and recovery. Bright colors such as international yellow or orange make booms more visible, while dark colored booms are difficult to see, particularly at night. Dark colored booms can cause problems for the cleanup personnel and may present a navigational hazard.

Several pieces of auxiliary boom equipment are important, such as line, tow bridles, boat attachments, anchor sets, floats, shovels, pipes and a sledge hammer. Much of this equipment will be used in the field exercises on boom development.

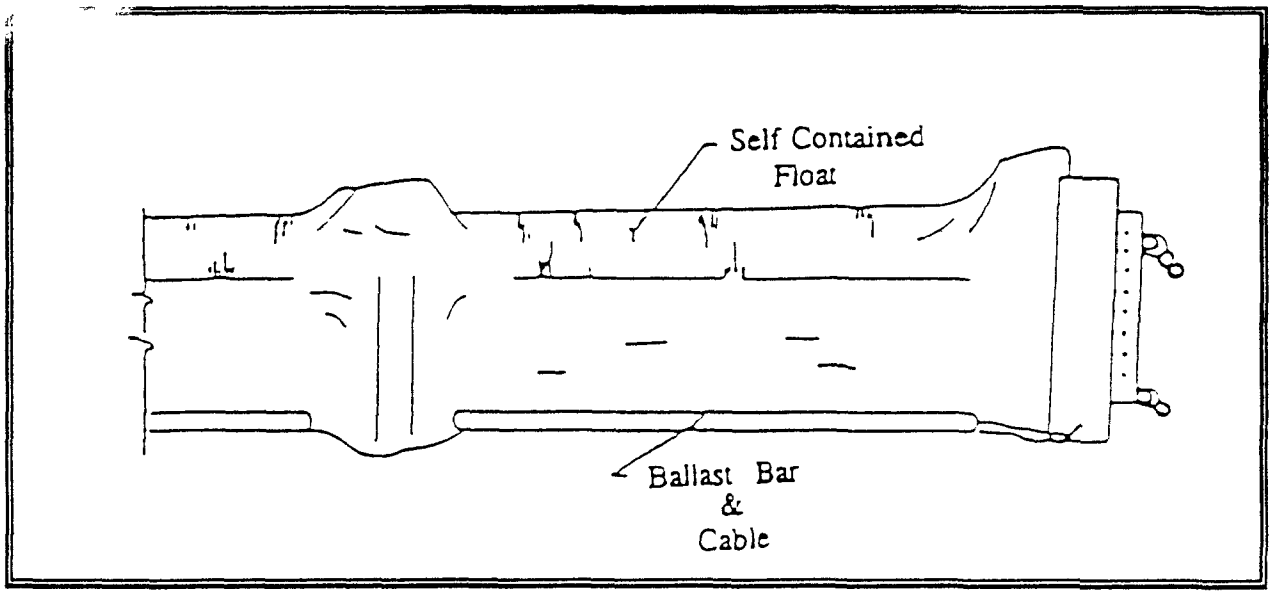


FIGURE 6
GENERALIZED ROUND BOOM

Possible Advantages	Possible Disadvantages	Representative Types
1. Good wave conformance in chop and swell	1. Bulky to store	1. Kepner
2. Inherent reserve buoyancy	2. Not as easy to clean	2. Slickbar
3. Tows well	3. Floats can be damaged	3. Acme
4. Allows bottom tension design		4. Bennett
5. Floats with punctures		5. American Marine
		6. Containment Systems
		7. Parker Systems
		8. Texas Boom
		9. Abasco
		10. American Boom and Barrier
		11. Skimmex
		12. Versatech

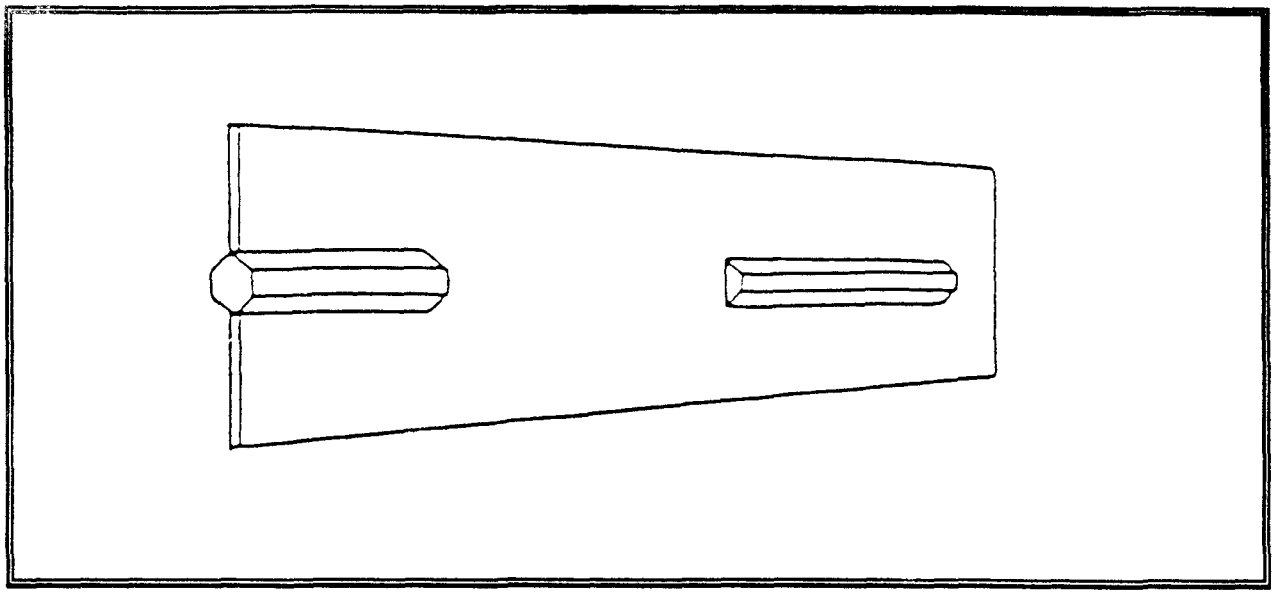


FIGURE 7
GENERALIZED FENCE BOOM

Possible Advantages	Possible Disadvantages	Representative Types
1. Easy to store	1. Twists and corkscrews in wind and current (some models)	1. Navy boom
2. Abrasion resistant	2. Poor towing characteristics (some models)	2. Uniroyal
3. Good freeboard performance	3. Poor wave conformity	3. Bennett
4. Can be stored on reels	4. May require stiffeners that can chafe or break	4. Oilfence
5. Low cost	5. Little reserve buoyancy	5. Goodrich
6. Light for its size		

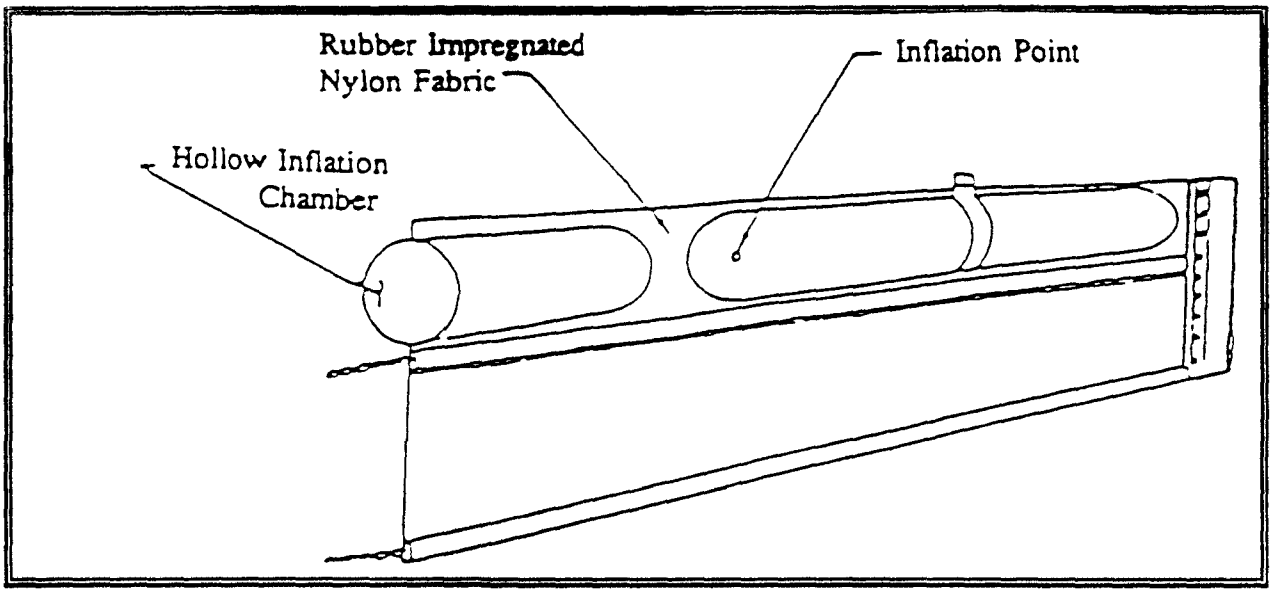


FIGURE 8
GENERALIZED INFLATABLE BOOM

Possible Advantages	Possible Disadvantages	Representative Types
1. Easy to store	1. Requires inflation prior to use	1. Vikoma
2. Made in floating-sinking configuration	2. Requires deflation after use	2. Goodyear
3. Good Wave conformity	3. Subject to puncture	3. Ro Boom
4. Easy to clean	4. Expensive	
5. Small storage space requirements	5. May have valve problems in freezing temperatures	

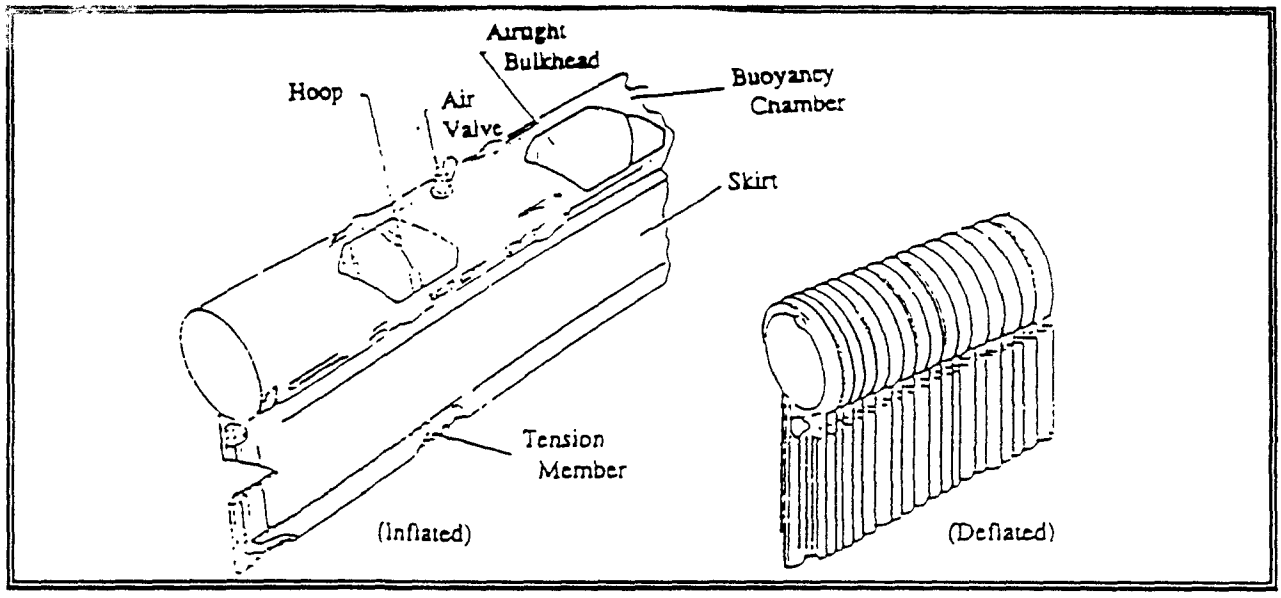


FIGURE 9
GENERALIZED SELF-INFLATING BOOM

Possible Advantages	Possible Disadvantages	Representative Types
1. Easy to store	1. Complex design	1. Kepner
2. Compactable	2. Subject to puncture	2. Bennett
3. Easy to tow	3. Subject to physical damage	3. Expandi
4. Self-inflating	4. Expensive	
5. Good wave conformity	5. May have valve problems in freezing weather	

Any given boom will normally fit into one of the four previously mentioned general categories. However, some booms, while they might fit into one of these four categories, often distinguish themselves from the others by distinct designs or other features.

For example the Oilfence, generally considered a fence boom, is unique with its folding "paddle" flotation units (**FIGURE 10**). The boom has some of the generic advantages associated with the typical fence boom. Distinct advantages include the relative ease with which the boom can be stored, deployed and cleaned. Also, the outrigger flotation units provide extra stability. This boom has an extraordinary amount of freeboard to help minimize splashover. Possible disadvantages include added complexity and more parts subject to damage, although experience has not shown this to be a problem. This design will twist in high currents and has caused problems where tug boats are used close to the boom.

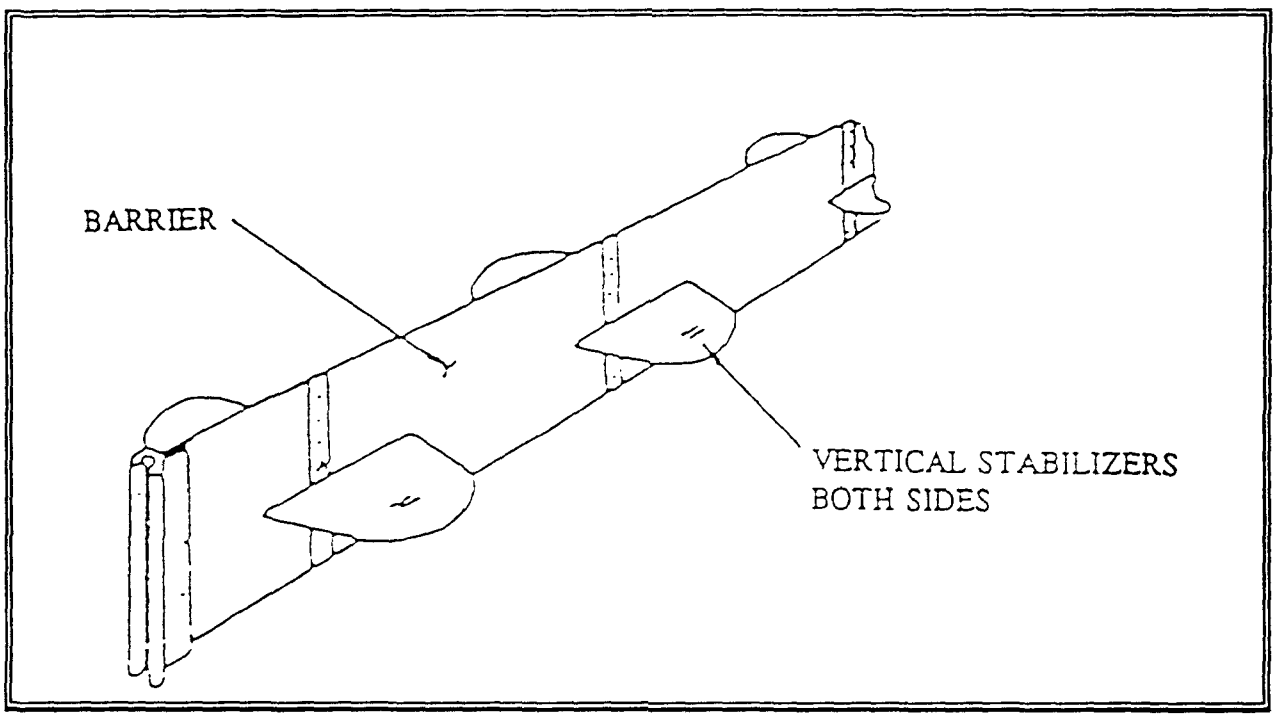


FIGURE 10
OIL FENCE BOOM

Most boom manufacturers offer at least one type of high current boom (**FIGURE 11**). This option consists of a round boom with short, solid containment skirts. Below this short containment skirt the boom has a large open-weave mesh or net. The netting, which allows water to pass through while the solid skirt material near the surface, is designed to contain the floating product. Distinct advantages include the boom's ability to remain stable in swift currents and to substantially reduce the current load on the boom in high currents.

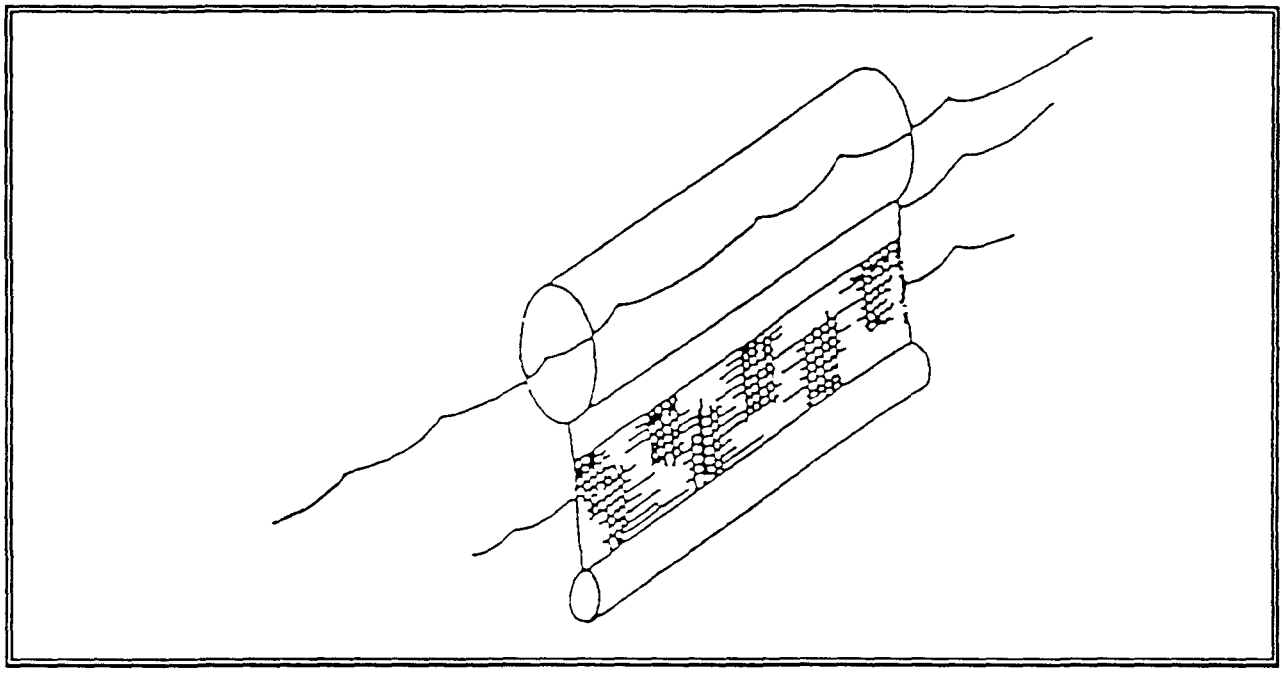


FIGURE 11
HIGH CURRENT BOOM

Floats

Boom floats should be made of solid rather than granular material so that a puncture does not result in loss of floatation. The floats should be constructed in relatively short segments to better conform to waves. Detachable floats are easy to repair but can be ripped from the skirt. Floats within the skirt material eliminate metal or plastic connector straps but make replacement or repair difficult. A round shape features a built-in reserve buoyancy and is more common than a square or rectangular shape. The shape and size of the float can have a significant effect on the ease of deployment and use. Inflatable floats are subject to puncture and valve malfunction but are very light weight and flexible.

Tension Member

Nylon belting is strong but may stretch more than other parts of the boom. Should this occur, the parts that stretch less could break. For light service and short lengths, elaborate tension members may not be necessary.

Cables in a pocket of fabric or attached to the outside of the boom corrode and break or fray and become dangerous to personnel handling the boom. Chains in pockets chafe the fabric and eventually wear through unless extra care and expense are used to reinforce the fabric.

Booms are available that use the fabric of the boom as the only tension member. This arrangement solves most of the problems associated with other types of tension members, except that these high strength fabrics are more expensive than the average boom fabric, and high tensile strength does not necessarily mean that the fabric has higher tear strength.

Ballast

Ballast should be attached to a boom so that it does not shift or chafe the skirt. Multi-metallic fasteners promote electrolysis and subsequent corrosion. The ballast should be non-sparking and be heavy enough to keep the skirt nearly vertical in unexpected currents. Some boom designs with stiff fabric and stable flotation do not use ballast.

Skirt

The skirt should be made of durable material that does not tear easily and resists chafing. The skirt should be designed to be compatible in depth to the float. In any case, a skirt length over 18 inches is rarely justified. The owner's name should be stenciled on each section of boom or otherwise marked for easy identification to avoid confusion when more than one company supplies boom for cleanup.

Skirts can be formulated or coated with an antifouling agent to retard marine growth if they are to be left in the water for long periods.

Methods of Connection

An ideal connector is one that could be used by one man from a small boat, is uncomplicated and quickly connected, would not have any small parts that could be lost overboard, would be leak-proof (close-coupled) and be of a unisex design. ASTM developed a standard connector based on the design of the Slickbar Slickhitch. If several booms are used from different manufacturers, it is recommended that adapters be available to facilitate connection.

BOOM DEVELOPMENT

To direct an effective cleanup operation, a supervisor must know what factors govern boom operation and understand how to minimize the amount of oil that splashes over or comes under a boom. The three factors that affect oil containment by booms are:

1. boom design,

2. characteristics of the oil, and

3. positional method of boom deployment.

Obviously, the cleanup crew has no control over the type of oil spilled. When a spill occurs, the cleanup crew must use the available equipment. The first two factors listed above should be considered when acquiring a boom. Booms should be purchased which are compatible with the type of oil that may be spilled and with design features that work well in the stream, river, or other type of water at a particular facility. After a spill occurs, the cleanup crew has only the third variable to use to its advantage.

As discussed previously, oil carryunder will decrease as the velocity of the water perpendicular to the boom decreases. In currents above about 0.5 knots, the only way booms can be used effectively is by placing them at angles to the current. For any given stream condition, the velocity

perpendicular to the boom will depend on how the cleanup crew angles the boom to the current. **FIGURE 12** is a guide for selecting angles for use in various currents. The figure is based on a maximum water velocity perpendicular to the boom of 0.7 knots. As an example, if the velocity of the current in a stream is two knots the boom should be set at a 24 degree angle with the bank.

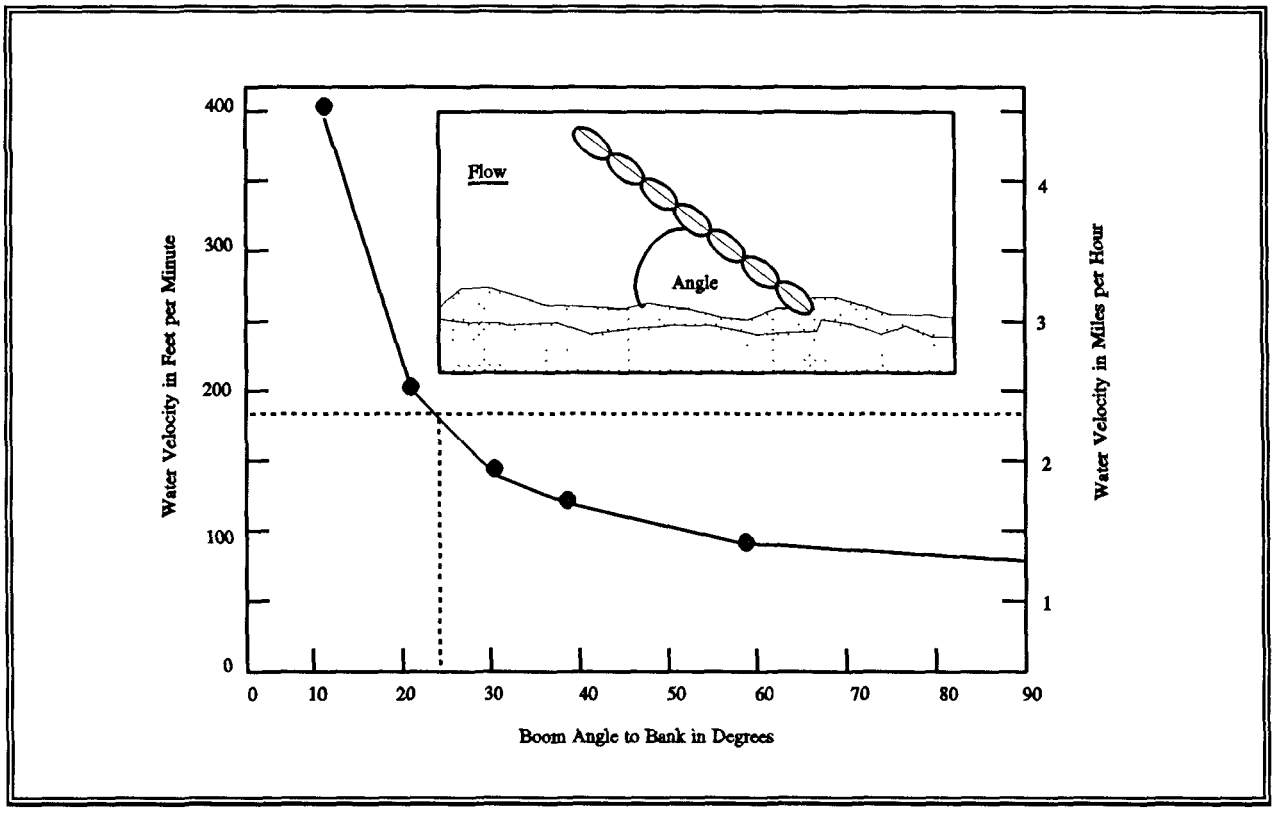


FIGURE 12
BOOM ANGLES FOR VARIOUS CURRENTS

The force on a boom caused by the current is significant. The force can be calculated using the following formula:[2]

$$F_c = 1.92 \times (V_c)^2 \times D_{ft}$$

F_c	=	Force due to current in pound per linear foot of boom
V_c	=	Current velocity in feet per second
D_{ft}	=	Boom skirt depth in the water in feet

Assuming the worst possible case where the boom is placed perpendicular to the current, the load on rope and anchors can be calculated. For example, if 500 feet of a 24 inch boom which has a 16 inch skirt is stretched across a stream which has a 2.11 feet/second current, the equation will estimate

F_c	=	$1.92 \times (2.11)^2 \times 1.33$
F_c	=	11.39 lbs/foot
F_{total}	=	11.39 x 500' = 5,695 lbs.

Although the figure estimates the worst case, it is useful in planning the types of anchors, ropes, boats, etc. that could be used during a spill (**TABLE 1**).

TABLE 1
CURRENT LOAD IN POUNDS PER LINEAR FOOT OF BOOM FOR VARIOUS SKIRT DEPTHS

Current Speed			Skirt Depth		
Knot	**Ft. per Minute**	**Ft. per Second**	**6"**	**12"**	**24"**
0.5	51	0.84	0.68	1.35	2.71
1.0	101	1.69	2.74	5.48	10.96
1.5	152	2.53	6.15	12.29	24.56
2.5	253	4.22	17.10	34.19	68.33

The wind force can also add to boom loading, but compared to current, wind is usually negligible. In high winds, it is unlikely that a boom will be effective because of large waves. Also, human safety and equipment damage are concerns. Wind force can be calculated with the following formula.[2]

$F_w = .00339 \times V_w \times H_{ft}$

F_w = Force due to wind in pounds per linear foot of boom
V_w = Wind velocity in knots
H_{ft} = Height of boom above the water in feet

Approximate Safe Working Loads/Tensile Strengths of New Rope

Rope Inches	Manila Pounds	Nylon Pounds	Polyester Pounds
Diameter	#1 (3 Strand)	(3 Strand)	(3 Strand)
5/16	200/1000	500/2500	500/2500
3/8	270/1350	700/3500	700/3500
7/16		1140/5700	
1/2	530/2650	1250/6250	1200/6000
5/8	880/4400	2100/10500	1950/9750
3/4	1080/5400	2750/5400	2300/11500

Towing load can be significant when a boom is anchored on one end and pulled against the current. Boats must have sufficient horsepower and be properly rigged to tow. Lines must be capable of withstanding the forces, and the boom must have a tension member capable of high loads. If the boom is extended behind the tow boat and pulled free in the current, there is only the frictional drag along the boom. Because this drag is a function of boat speed, proper motor size becomes a function of boom size and length, boat size and water velocity. Although free towing drag is low, when one end of the boom is anchored to the shore a small boat may be incapable of positioning the boom because of the high current drag exerted on the boom. The boom must also be able to withstand the forces. The tension member must not become detached from the boom due to differential expansion.

Attempting to moor a boom in a straight line across a current (i.e., 90 degrees) is not recommended. The result is a sag in the boom that will trap free floating oil at a point inaccessible to the shore. In swift currents the resulting forces on moorings can cause large lines to break and present possible safety hazards. The current can be so swift that the boom may tend to dip and become completely or partially submerged. If this happens, the boom's position should be readjusted. The total force on the moorings points will be a combination of the forces caused by currents, wind and waves.

Boom positioning is an important subject. The first step is to decide where the boom should be located. It is likely that the boom would be on an angle to the current; therefore, the prime concern becomes the location of upstream end. If the selected upstream location is inaccessible, a spot further upstream can be used for access and the boat and boom allowed to drift to the selected mooring location. The boom may be secured to trees, stakes, anchors or other solid objects.

Unless there is little or no current, there will always be a sag in the boom. The objective is to reduce the sag sufficiently to provide easy collection access. Intermediate anchor points may be needed to lessen the load on the end mooring points and to reduce the sag.

FIGURE 13 shows a typical mooring set up with anchor, chain, rope, float and boom. The chain acts as a shock absorber, provides ballast and keeps a low angle between the bottom and the anchor line. The float keeps the end of the boom from being submerged.

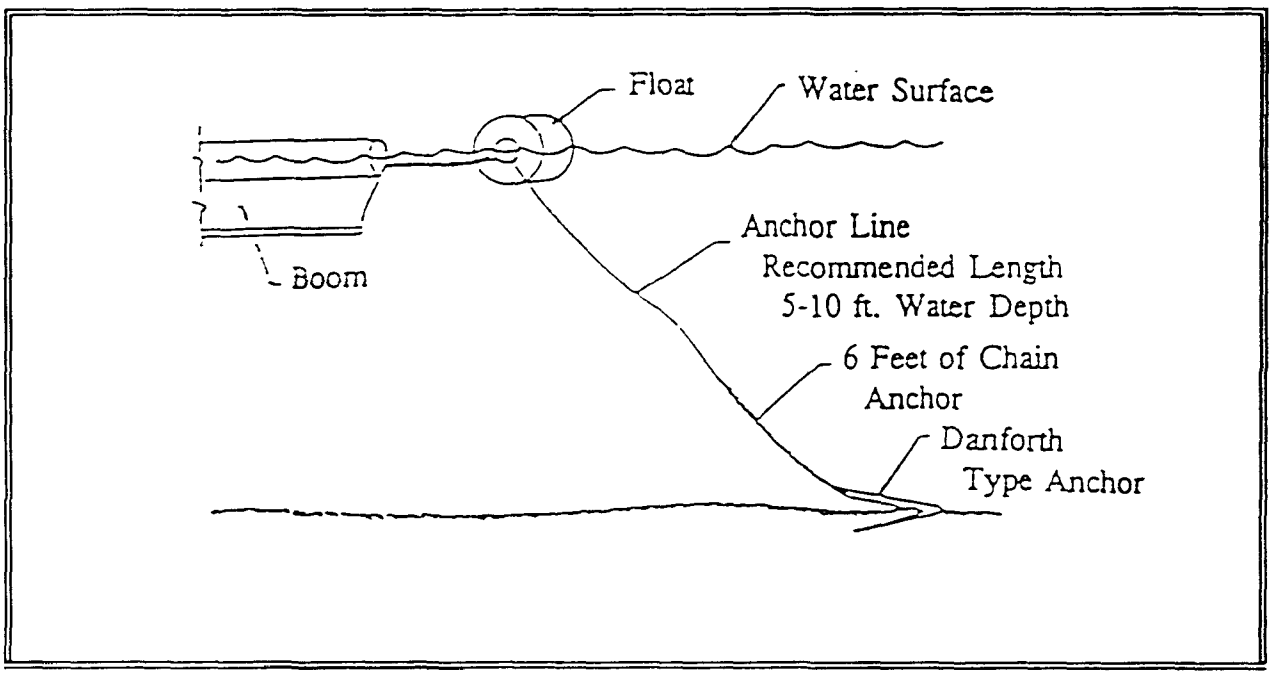


FIGURE 13
TYPICAL ANCHORING SYSTEM FOR A BOOM

A practical boom location will meet the following criteria:

1. accessible by truck or boat so that the cleanup crew can collect and remove the oil
2. in the path of the oil so that the oil will be intercepted
3. have low to moderate currents which will facilitate handling and collection and reduce stress.

Spills in Creeks

Deep draft booms should not be used for spills in shallow creeks, streams or ponds. They may be ineffective because they act as a dam, causing the boom to lie flat or to back up the water to such an extent that it overflows the boom. If the water is too shallow, the stream might be deepened by a dragline or backhoe, or by constructing a temporary dam downstream. These techniques may require permission of local or state agencies. This equipment can also be used to dig an oil collection pit (**FIGURE 14**). Oil can be directed by a boom to the pit for recovery.

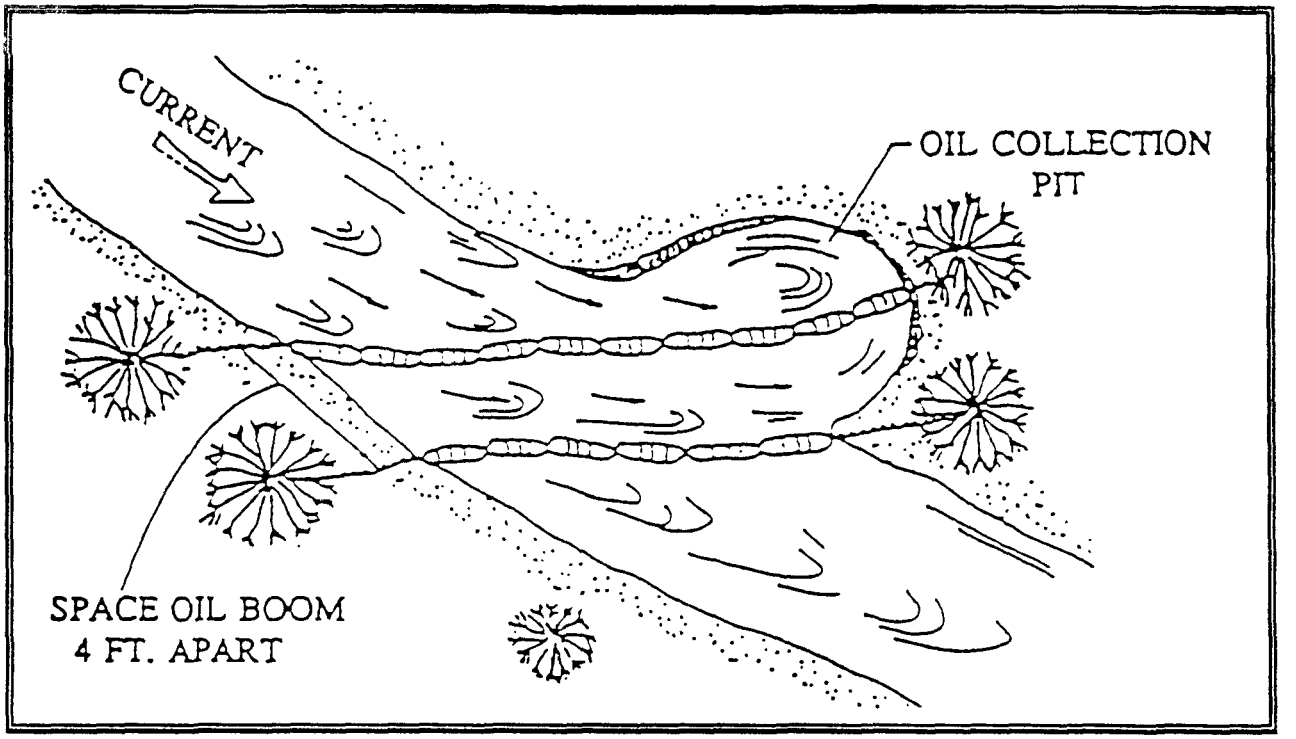


FIGURE 14
OIL COLLECTION PIT SHOWING BOOM PLACEMENT

Alternatives to expensive commercial booms may be field fabricated. These "homemade" booms use similar designs as commercially available booms, but instead of plastic and rubber, use materials such as fiberglass, plywood, metal sheeting or metal flashing. One simple design uses metal roll flashing with one foot long 2 x 4 floats spaced about 16 inches apart (**FIGURE 15**). Floats are attached alternately.

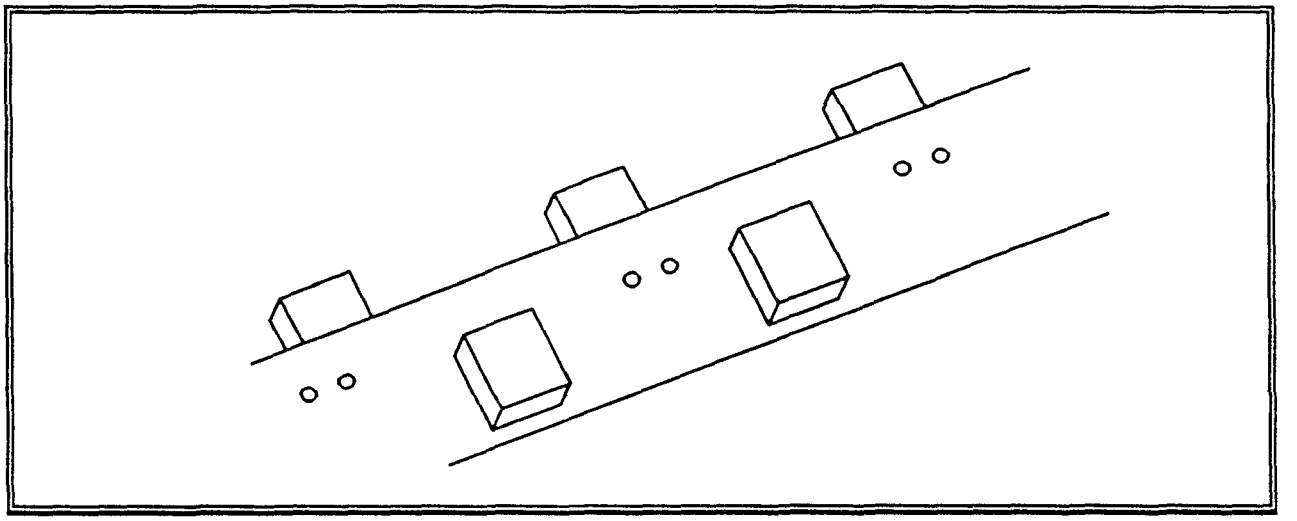


FIGURE 15
METAL FLASHING BOOM

NOTE: Floats should be sufficient to provide adequate flotation and attached above the midpoint of the flashing.

Another device which can be used consists of wooden or metal stakes driven into the ground, spaced across a water body. Board, planks, or metal sheets can be nailed, bolted, or tied to the stakes at the surface to contain oil (**FIGURE 16**).

If sorbent is placed ahead of the dam, a sorbent filter fence has been created.

Another kind of filter fence may be constructed by using chicken wire and stakes with synthetic sorbents or loose straw upstream of the fence. The fence should be constructed perpendicular to the current so that the sorbent will remain distributed along the entire length and not be carried to the edge of the creek. For very small creeks, a log can be placed across the water. Sorbents can be placed ahead of the log.

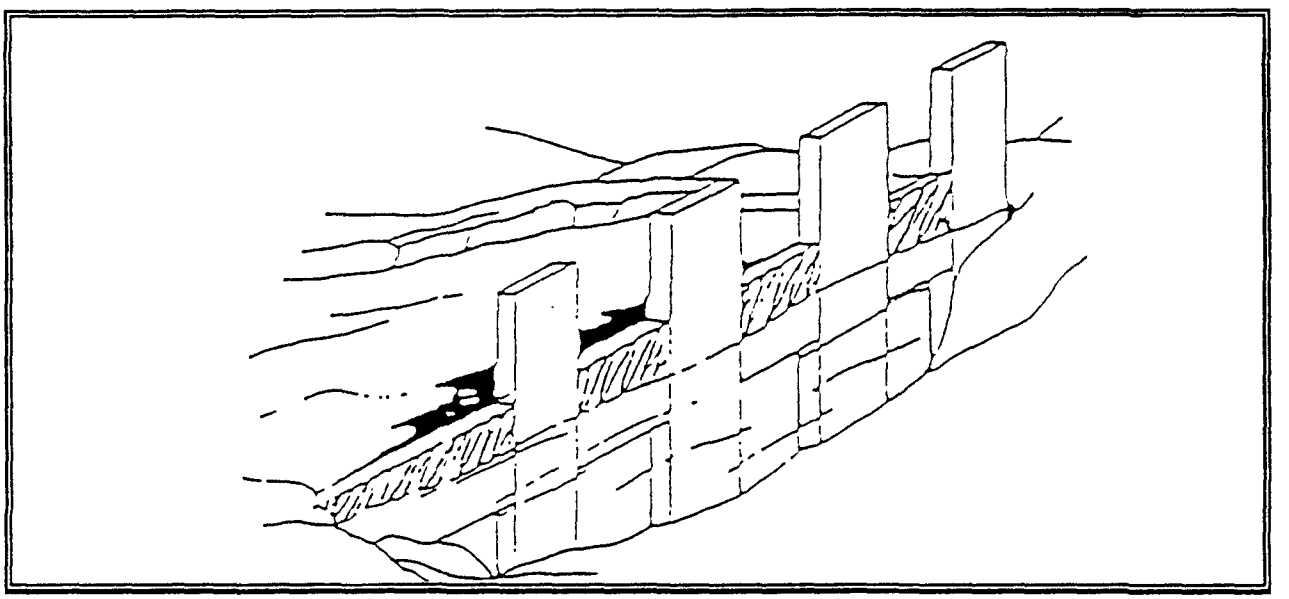


FIGURE 16
WOODEN FENCE BOOM

In small creeks a dam might be constructed with an underflow pipe or conduit (**FIGURE 17, 18, 19, Tables 2 and Graph 1**).

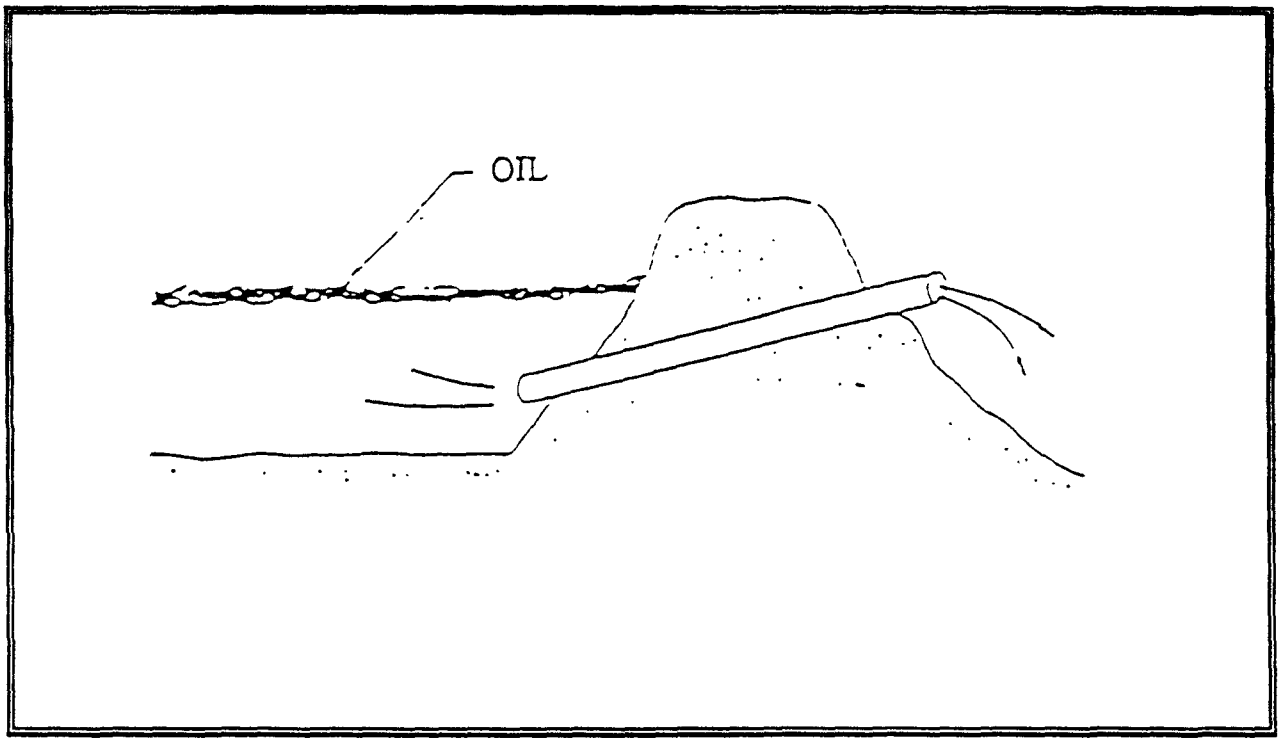


FIGURE 17
DAM WITH UNDERFLOW PIPE

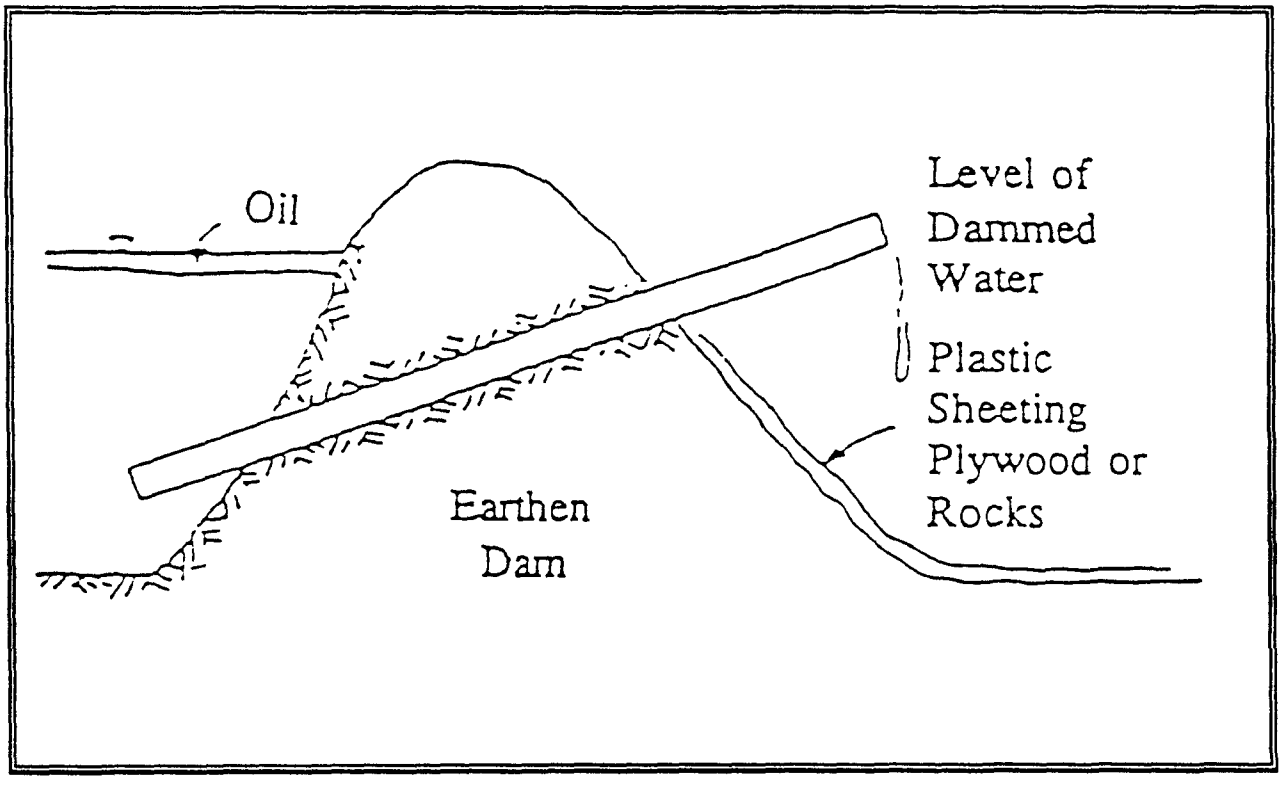


FIGURE 18
UNDERFLOW DAM

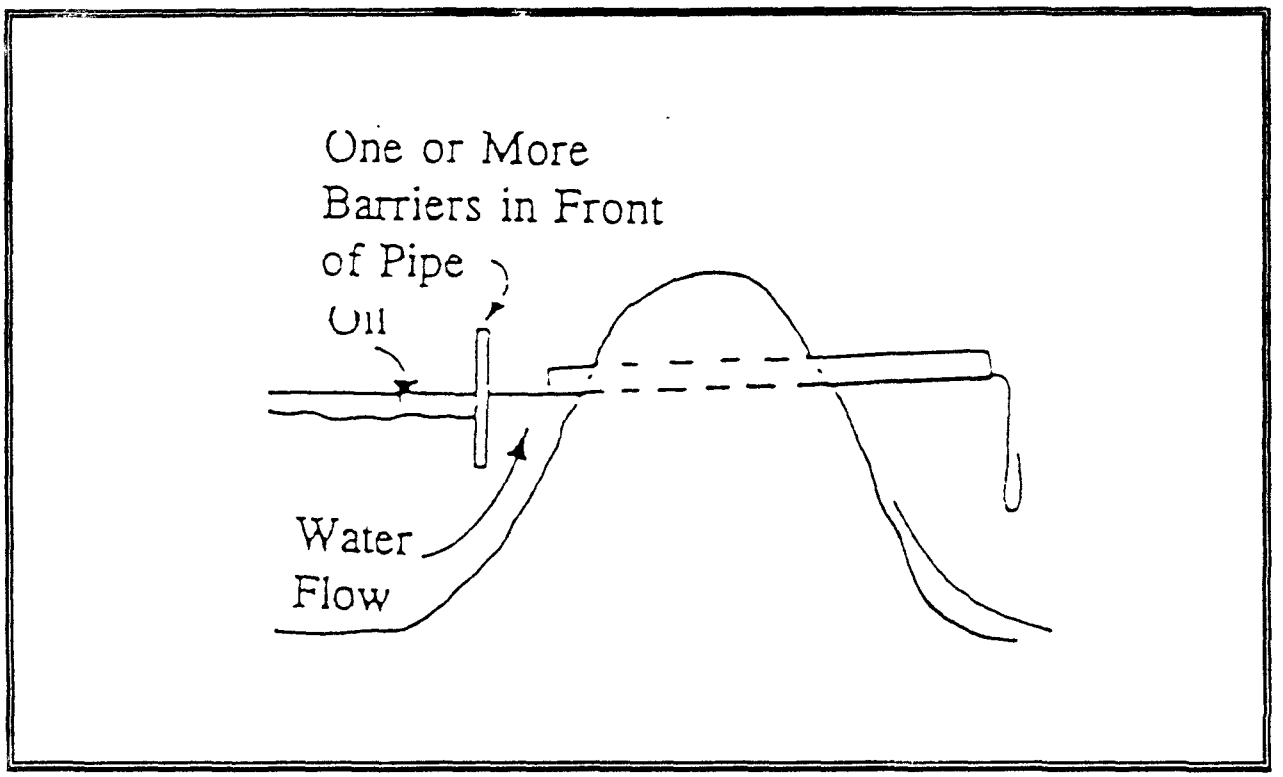


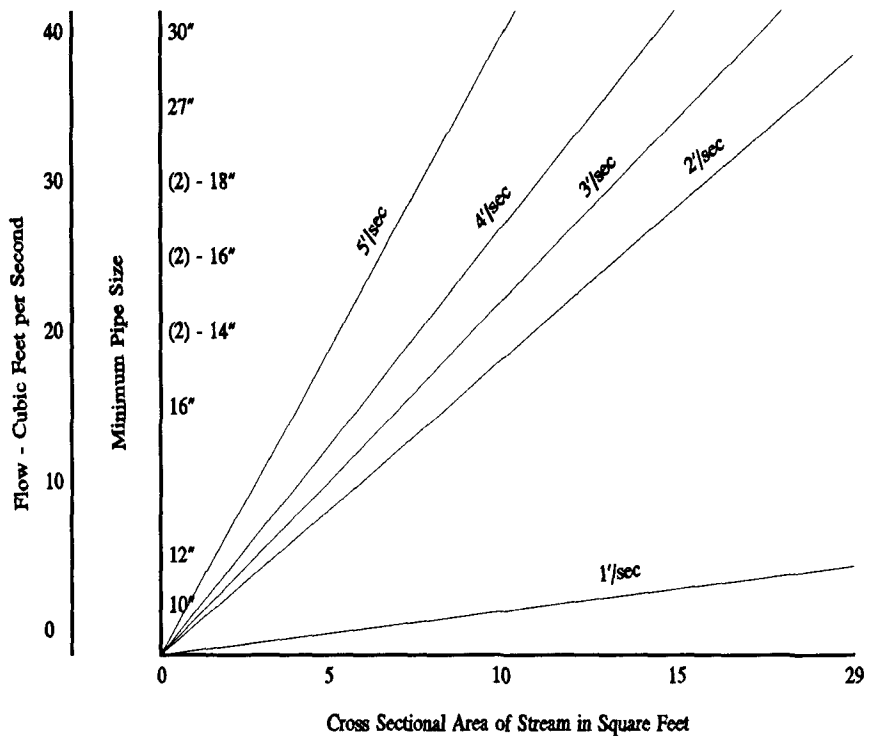
FIGURE 19
HORIZONTAL PIPE DAM

TABLE 2
UNDERFLOW DAM PIPE SIZE CHART

	Equivalent Number of Pipes													
Pipe Size (In Inches)	**4**	**6**	**8**	**10**	**12**	**14**	**15**	**16**	**18**	**21**	**24**	**27**	**30**	**36**
36	81	36	20	13	9	7	6	6	4	3	2	2	2	1
30	60	30	15	9	7	5	4	4	3	2	2	2	1	
24	40	16	9	6	4	3	3	3	2	2	1			
18	21	9	6	4	3	3	3	2	2	1				
16	16	8	4	3	2	2	2	1						
14	13	6	4	2	2	1								
12	9	4	3	2	1									
10	7	3	2	1										
Area in square feet	.073	.196	.349	.545	.785	1.07	1.23	1.39	1.77	2.41	3.14	3.95	4.81	7.07

Nested Pipe Area 4" + 8" + 12" + 16"=2.611 sq. ft.
6" + 10" + 14" + 18"=3,588 sq. ft.

GRAPH 1
UNDERFLOW DAM PIPE SIZE GRAPH



This design consists of a length of pipe or culvert placed parallel to the direction of water flow with the upstream end lower than the downstream end as shown in the drawing. The dam can be constructed with a shovel, dragline, backhoe, or bulldozer. The objective is to pass water through the pipe, but retain the floating oil. The pipe must be large enough to allow water to pass without backing up to a depth greater than the dam. Several pipes at various depths or side by side may be used in the dam to carry the required flow. An alternate method is to add a valve downstream on a level pipe to control the water flow.

Culverts in a creek will serve as a barrier for oil if the entire culvert is below the water surface. Existing culverts can be utilized at some locations along a creek by damming the creek downstream and thereby raising the water level above the top of the culvert.

Spills in small creeks and ponds can also be contained by dams built of hay bales. The bales should be placed touching each other and perpendicular to the flow to contain and sorb the oil. Bales must be removed and disposed of as necessary. Hay bales are very heavy when soaked with oil and water and may present a handling and disposal problem.

Some additional illustrations are listed as seen in **FIGURES 20-25.**

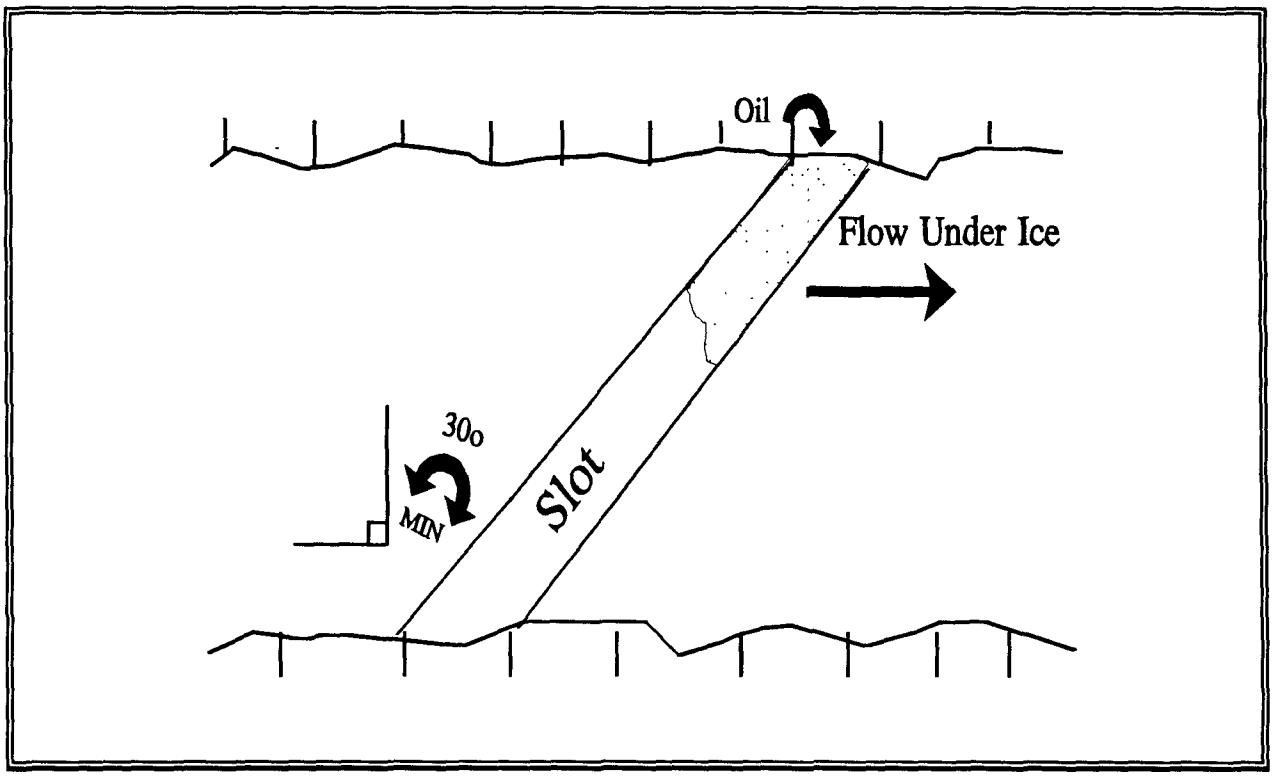


FIGURE 20
ICE SLOTTING

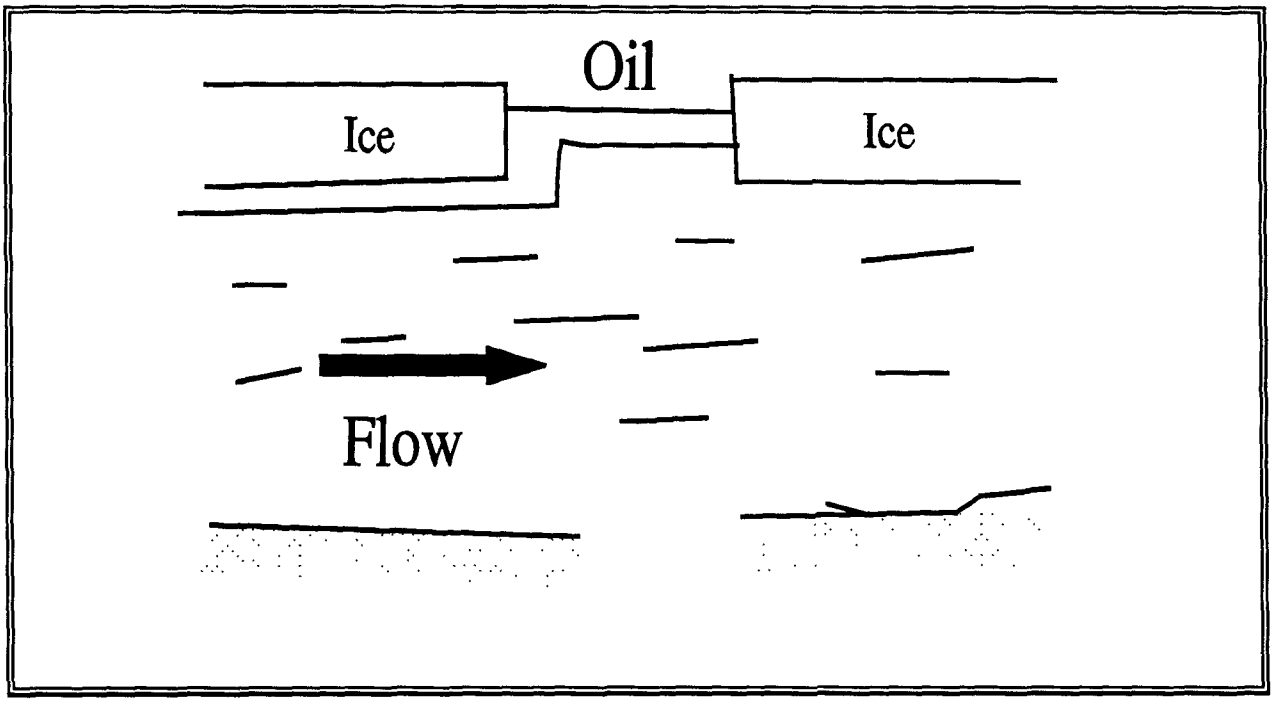


FIGURE 21
OIL COLLECTION IN ICE SLOT

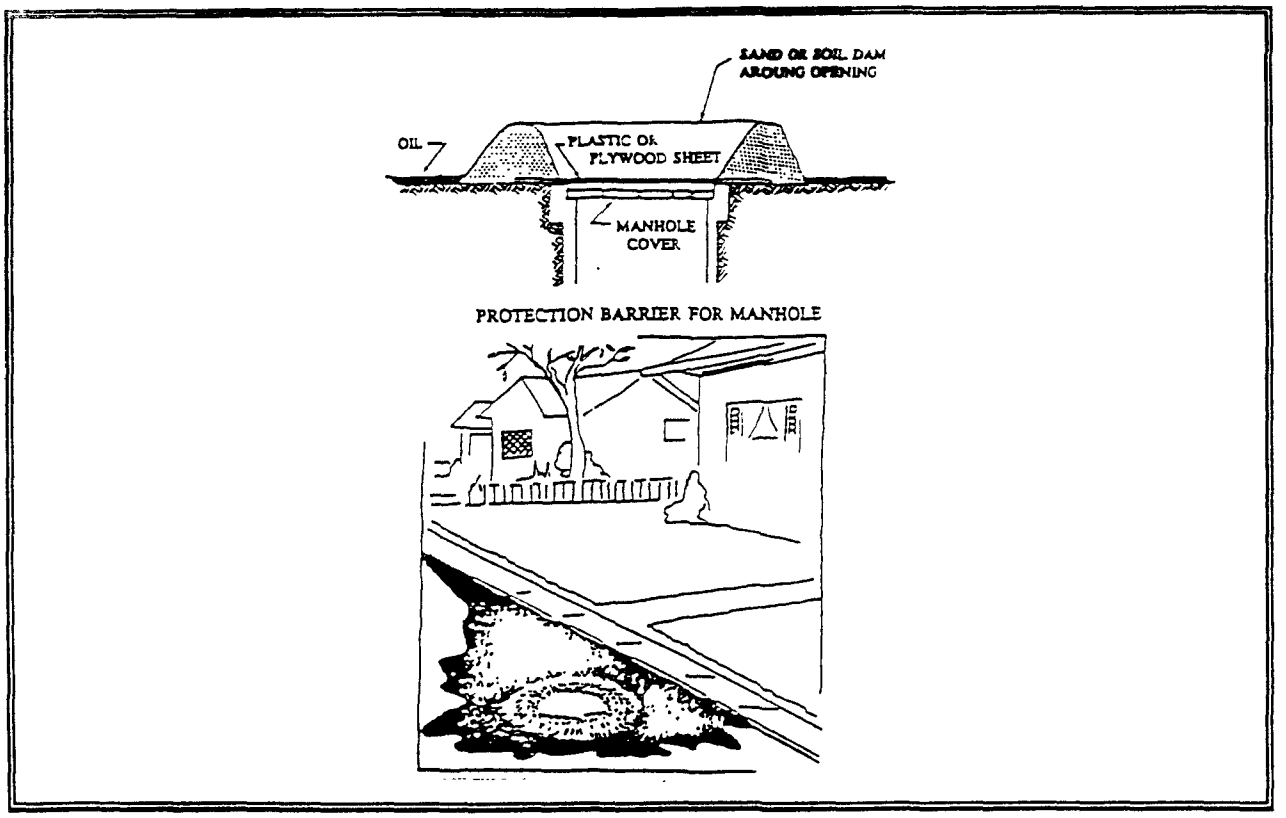


FIGURE 22
PROTECTION BARRIER FOR MANHOLE

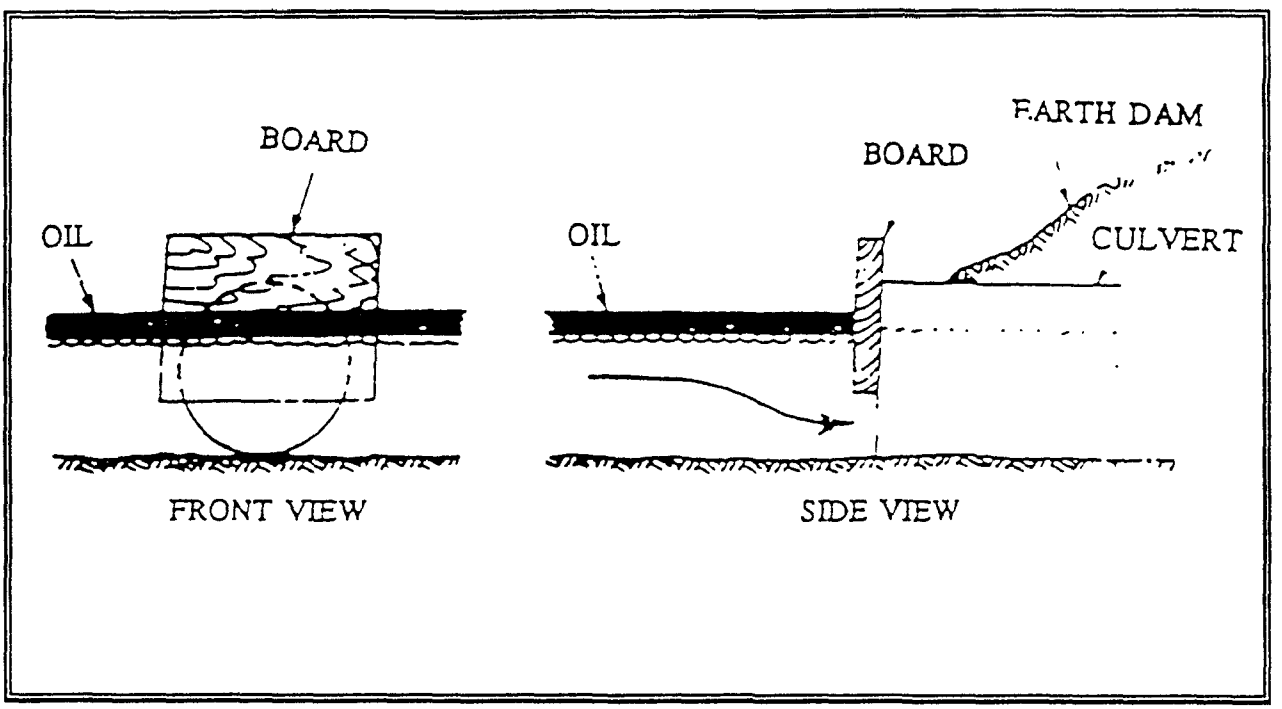


FIGURE 23
CULVER WEIR

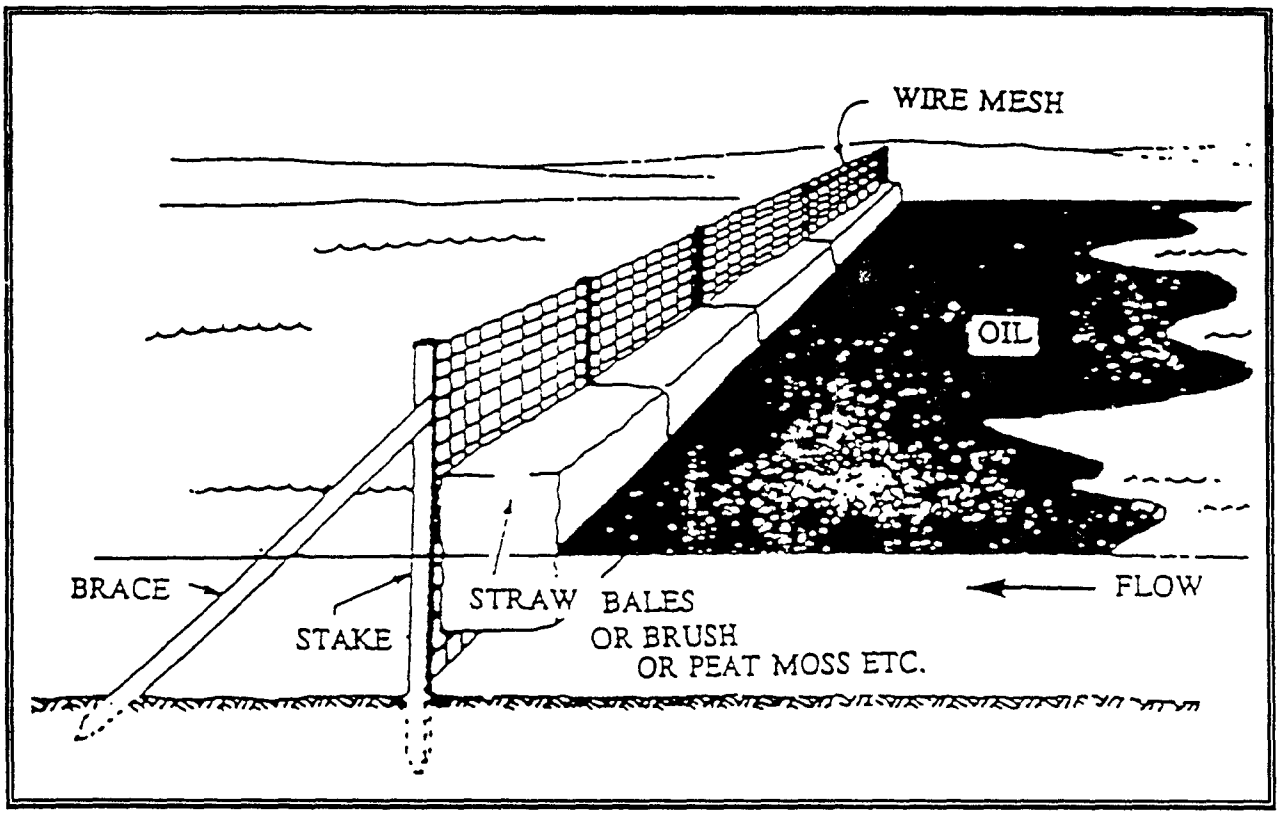


FIGURE 24
WIRE FENCE FILTER BOOM

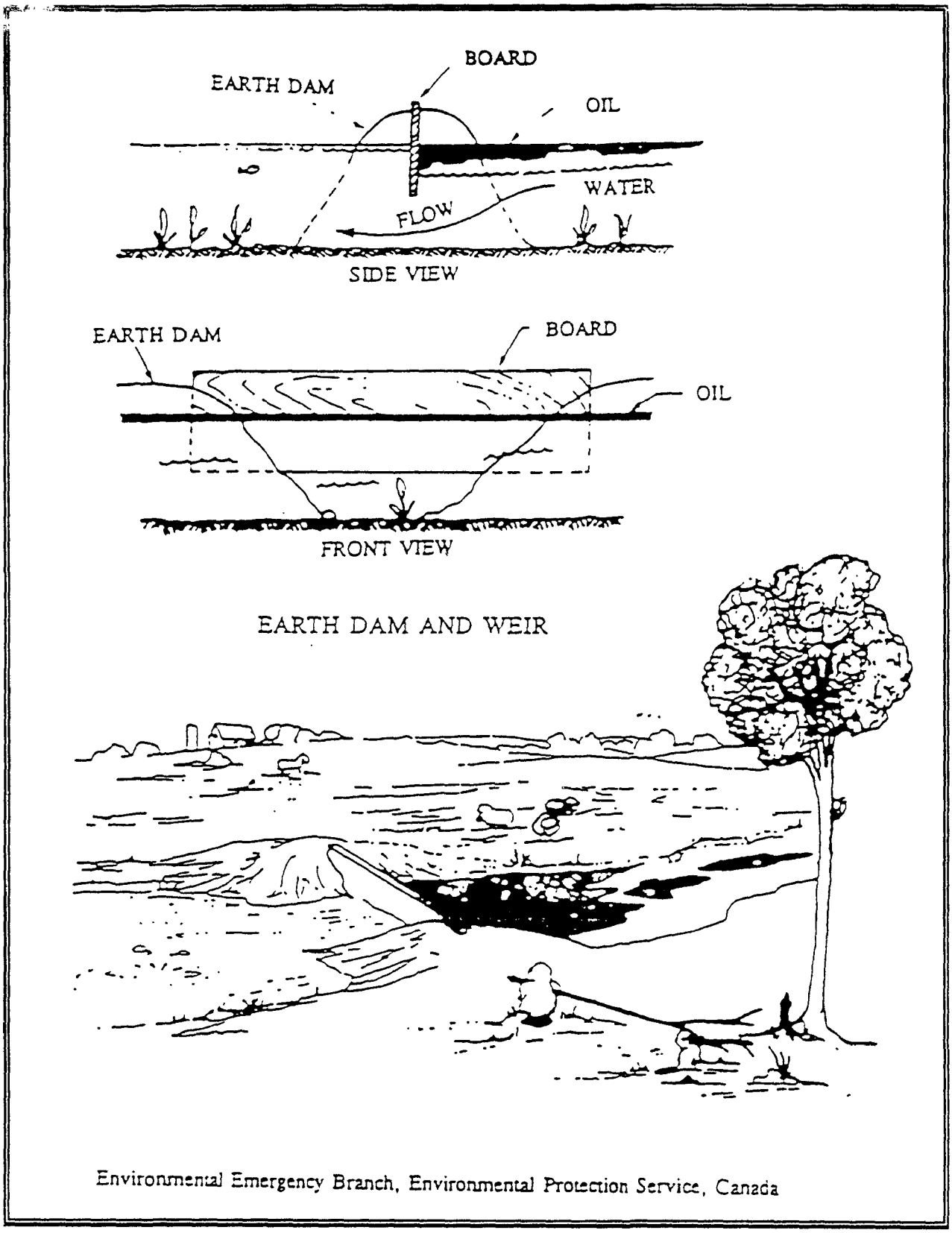


FIGURE 25
EARTH DAM AND WEIR

Spills in Rivers

River spills may require more than one boom because strong currents or turbulence may cause oil losses beneath the boom. Booms should always be angled, otherwise a pocket will be formed in the center of the river and the loads can be excessive on the boom, mooring lines and anchors (**FIGURE 26**). Booms deployed completely across a river will hamper boat and ship traffic. Remember, oil slicks moving down a river will eventually drift to either side of the channel.

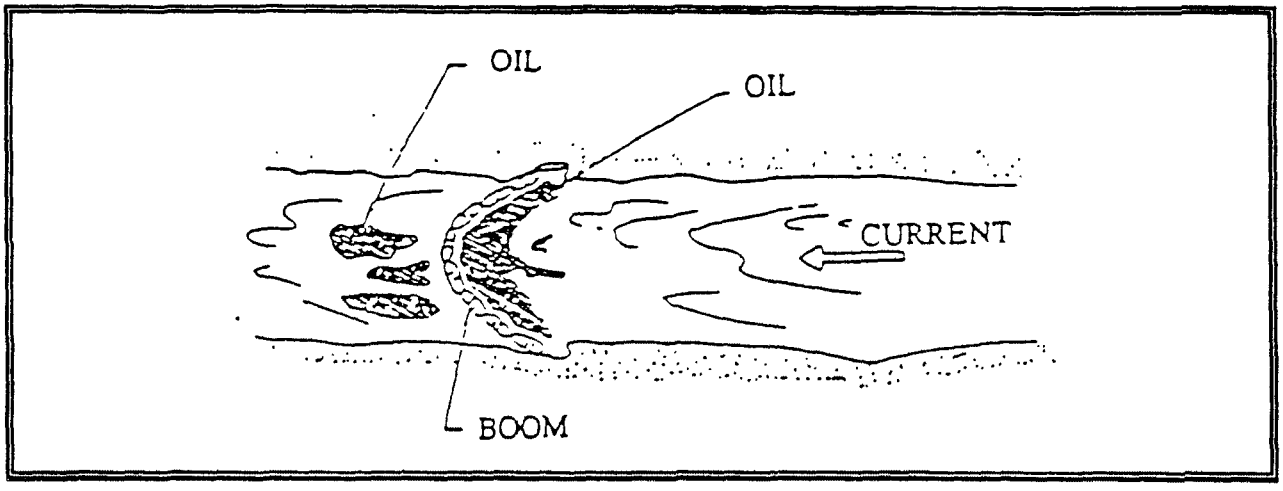


FIGURE 26
BOOM FAILURE DUE TO IMPROPER DEPLOYMENT

By placing several booms at strategic points along the river one can take advantage of the oil's tendency to accumulate naturally in certain areas (**FIGURE 27**).

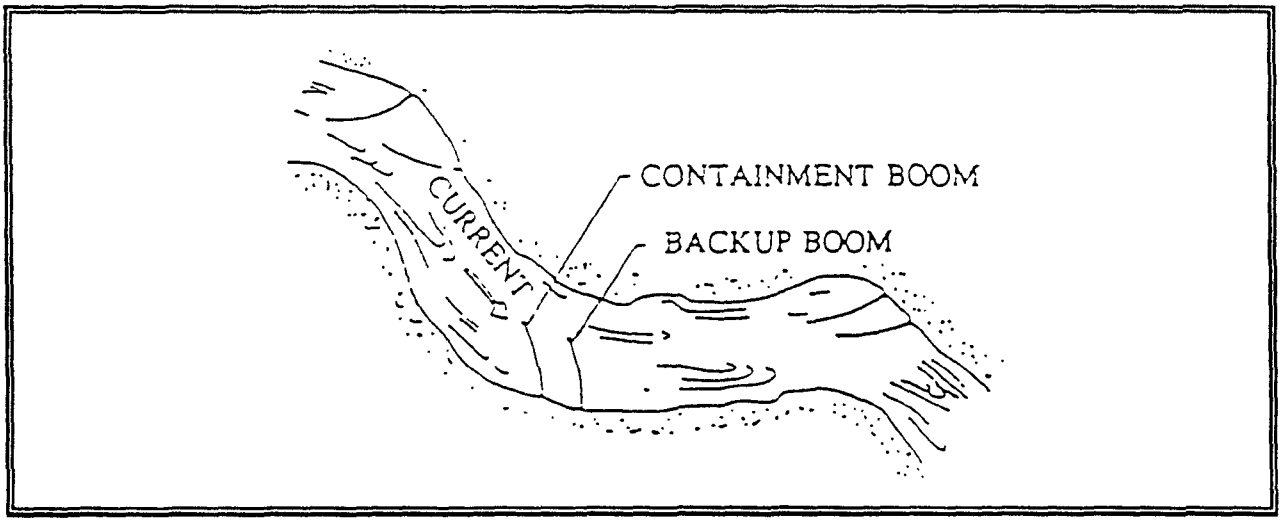


FIGURE 27
BOOM LOCATION ALONG THE OUTSIDE BENDS IN A RIVER

Strategic locations can be the wide places in the river (pools) where the current speeds are lower and booms are likely to be more effective. Bends are also convenient places in the river where the floating oil can be more easily intercepted.

Booms used in rivers usually do not need a skirt deeper than 12 inches. However, floating debris is a problem in large rivers. Debris can destroy booms and release oil already contained. It may be necessary to keep a patrol boat upstream of booms to protect them against floating objects. Debris booms may also be required (**FIGURE 28**).

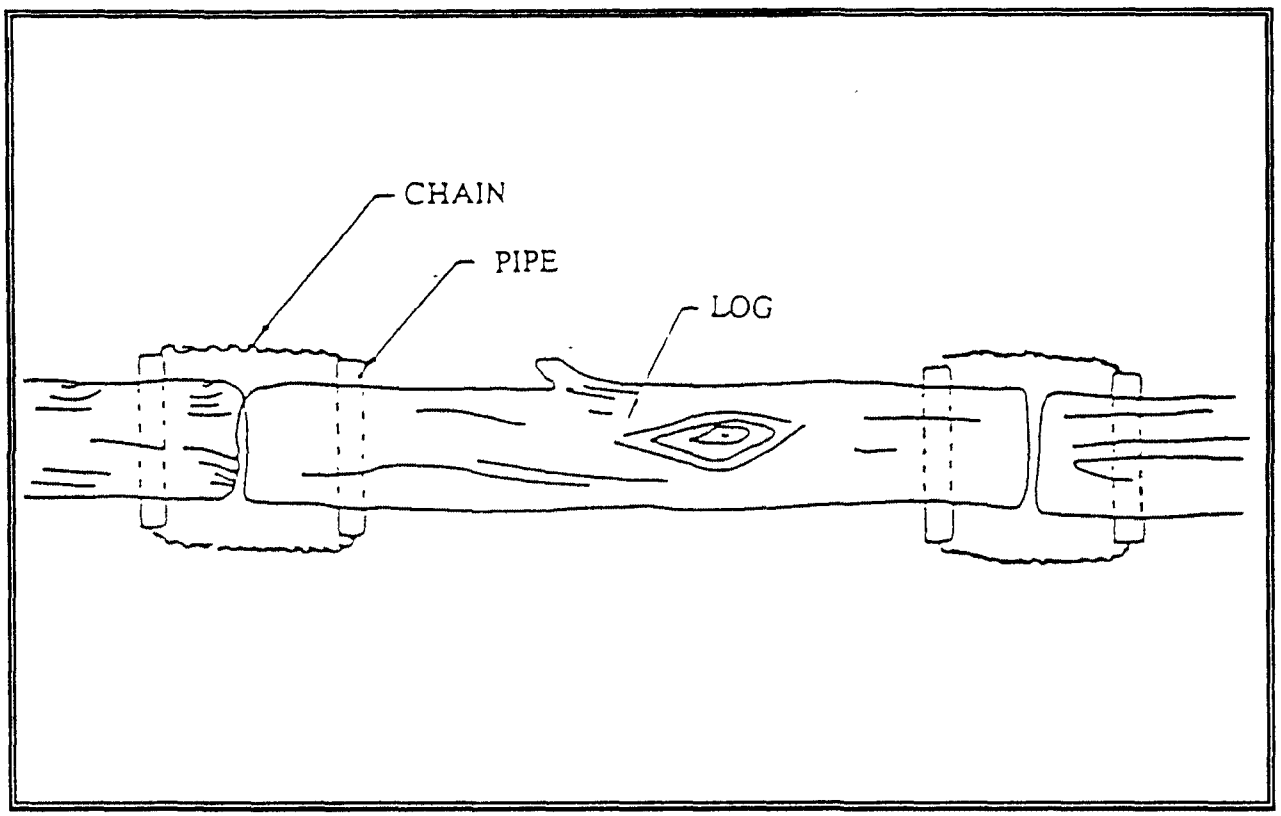


FIGURE 28
DEBRIS BOOM MADE OF LOGS WITH CHAIN OR CABLE STRUNG THROUGH A PIPE

Spills in Lakes, Estuaries, and Bays

Containment of oil on lakes and bays is complicated by the special problems caused by river currents, boat traffic, wind and tides. Changes in wind velocity and direction will effect the movement of oil. **FIGURE 29** illustrates the steps that can be taken to contain an oil spill in a lake or bay. After the cleanup crew deploys a boom at the proper angle downstream from the spill, as shown in the first drawing, a second boom is deployed as a backup in case any oil flows from wind generated currents. A third boom is deployed upstream of the first to completely contain the spill, as shown in the third drawing. As the oil is skimmed from the pocket, the boom crew could begin taking in the boom to reduce the size of the pocket and contain the oil in a smaller area.

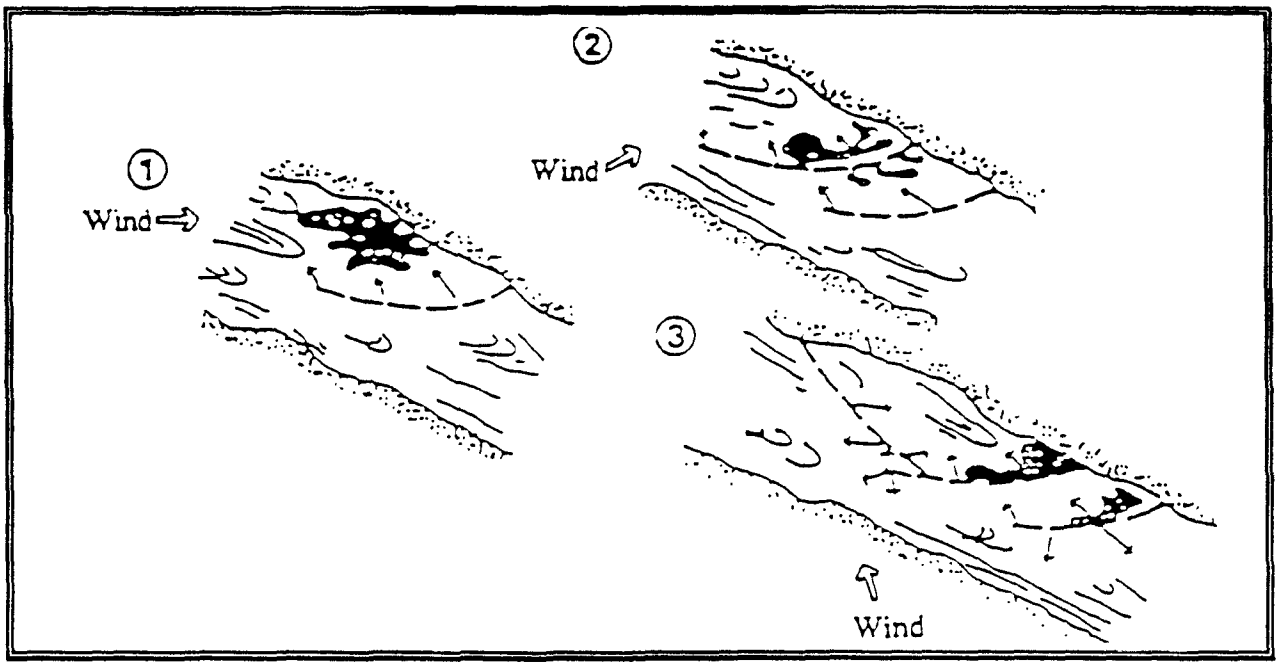


FIGURE 29
BOOMING A SPILL IN WINDY CONDITIONS

Spills in the Ocean

The most common approach for ocean spills utilizes large booms with ocean-going skimmers (see the section on skimmers). Large, strong booms are needed for this type of service. Many booms designed for offshore use are inflatable. Deployment time is not greatly increased with inflatable boom. Inflation usually takes place automatically with deployment. Some inflatable types are fabricated of vulcanized rubber-coated fabric which is sturdy and shows good tensile strength, tear strength, abrasion resistance and puncture resistance.

Cleaning and Storing Boom

Booms can be stored in several ways. A convenient method is on the deck of a boat so that it can be deployed as needed. When this is not available, the boom can be stored on a dock or barge and pulled into the water using a ramp or roller which provide some protection from wear and tear. Booms may also be stored in the water by attaching segments to anchors. Considerable lengths of booms can be stored in the water in a small area by folding sections back and forth similar to the way fire hoses are stored on trucks. One major disadvantage is the formation of marine organisms on the boom which add weight and drag.

Booms can be cleaned by separating the boom into sections and laying each section out on a clean sloping surface. Oil can be removed by washing the boom with water and steam spray. The boom washing area should direct the wash water to a sump where the oil can be collected. Cleaning a boom coated with heavy layers of viscous oil may be a time-consuming and expensive process.

SUMMARY

Containment devices are designed to contain oil floating on the surface of water. A properly installed containment device should contain the oil and cause the oil to move to a selected location where it can be removed from the water surface. Air barriers use currents and a mound of air and water generated by air bubbles to contain oil. They work best in little or no currents.

Barriers constructed of sorbent materials can be effectively used in creeks. Dams and culverts are also useful in stopping the movement of oil slicks. Series of booms are normally used in spills in rivers and other large bodies of water because it is difficult to contain or divert large spills with one boom, especially when high currents are involved.

Booms are often stored on the deck of a boat or barge which facilitated deployment. Booms are also stored on docks which lends itself to deployment using a ramp or roller to assist in launching and recovery.

BOOM SELECTION CHECKLIST

1. Booms should be operational in waves with height to wavelength ratios of 8:1. Booms should work in winds equal to a Beaufort Force 5.

2. At an effective current velocity of 0.7 knots, the skirt should remain within 20 degrees of the vertical.

3. The boom should be capable of being deployed at a 5 knot rate.

4. The boom should be capable of being towed at 10 knots in a straight line without twisting. It should follow behind a maneuvering tow boat without twisting at 2 knots.

5. Sections should be capable of being connected and disconnected, without nuts and bolts or tools, from a small craft in not over two minutes.

6. Recovery and storage should be able to be accomplished by not more than three trained men.

7. In calm water the boom should have a freeboard of at least 4½ inches.

8. the boom should allow 180 degrees folding at least every 10 feet of length or less.

9. The boom should have reserve buoyancy of at least 200 percent. The buoyancy should double within 18 percent of the normal water line.

10. The boom should have at least a 0.2 percent UV oxidizer/inhibitor coating or be capable of withstanding two years continuous exposure to direct sunlight.

11. The flotation should have a smooth surface and must be puncture resistant.

12. Puncturing or cutting of a foam float section should not significantly reduce flotation or allow escape of flotation.

13. The flotation should be an integral part of the entire boom.

14. Flotation should be closed cell foamed plastic resistant to hydrocarbons. Granular type flotation material is not recommended.

15. The color should be international orange or yellow or another bright color. (Some locations use orange to identify medical waste. This color may become a poor choice for pollution control equipment).

16. Skirt fabric should show good break strength, abrasion resistance and be oil resistant.

17. The base fabric for the skirt should be high strength and U-V stable.

18. No laminated materials should be used in the skirt.

19. Stiffeners should not rust and should not wear through or puncture the fabric after use in the water with normal wave action.

20. The boom should be capable of a direct tensile load, end-to-end, of not less than 3,000 pounds.

21. The primary tension member should not elongate more than 10 percent at 60% of its ultimate tensile strength.

22. Tension members should be attached to the boom flotation at no less than six points every 10 feet.

23. Tension members should not be located where they would prevent the freeboard from remaining vertical when the boom is used perpendicular to a 0.7 knot current.

24. Ballast must be non-sparking. If cable or chain is used, it should be designed to prevent chafing.

25. The ballast should not collect static electricity.

26. For a 0.7 knot current, the following minimum ballasts are recommended per linear foot of boom:

Skirt Depth	Ballast lbs/ft of boom
6"	0.33
8"	0.44
10"	0.54
12"	0.75

27. The ballast should not be rigid for more than four inches in any one piece.

28. Anchor points should be placed every 100 feet on both sides and directly connected to the tension member.

29. End connectors should not permit oil leakage.

30. End connectors constructed of metal should only use stainless steel, anodized aluminum or other strong non-corroding material.

LIST OF COMMON BOOMS

The following list of boom types is intended as a guide for the trainee and is not for the purposes of recommending a particular brand. Because of space limitation, not all types are included in the list. If a type is not included, this does not mean that the boom should not be used. The following classification system can be used to distinguish among booms appropriate to inland water, bays and ocean service based on freeboard and draft.

Classification	Service	Freeboard	Draft
I	Inland Water	4-10'	6-12'
II	Bay	10-18'	12-24'
III	Ocean	18' & above	24' & above

LITERATURE CITED

1. Jones, W.T., 1970. Air barriers as oil spill containment devices. Paper #SPE 3050, presented to Petroleum Engineers of AIME.

2. Smith, M.F., 1975. Planning - Equipment and training for oil pollution control. Slickbar Inc. 98 pp.

3. Texas A & I University at Corpus Christi. Spill training and educational program. United States Energy Research and Development Administration Contract No. E-(40-1)-4995.

4. Breslin, M.K., 1981. Using coherent water jets to control oil spills. EPA-600/52-81-141. Environmental Protection Agency, Washington, D.C.

5. Slickbar Corp., 1981. Handling the Slickbar oilboom.

6. Oil spill cleanup manual, volume IV. Oil Spill cleanup technology: equipment and techniques. Exxon Corporation 1982.

ADDENDUM TO LIST OF BOOMS

Manufacturer	Model	Class
3M Company Ceramic Materials Department Building 225-4N 3M Center St. Paul, MN 55144 612/733-1558		
ABASCO American Boat & Skimmer Company 363 West Canino Road Houston, TX 77037 713/931-4400	Swamp Boom (SSB) Protected Harbor Boom Debris Bar, Harbor Boom Harbor Boom	I I II II
Acme Products Company 2660 N. Darlington Tulsa, OK 74115 918/836-7184	Acme Mini-Boom O.K. Corral 6 x 12 Heavy-Duty O.K. Corral 6 x 12 O.K. Corral 12 x 24 O.K. Corral 12 x 24 Heavy-Duty	I I II II II
Advanced Technology Center A Division of GemEng Ltd. 1200 Aerowood Drive Unite 35 Mississauga, Ontario L4W 2S7 416/629-1991	High Temperature Boom	II
Alba International Ltd. Leading Light Building 142 Sinclair Road Torry, Aberdeen Scotland, U.K. AB1 3PR 44/224-989199		
AllMaritim A/S Bredsgaarden-Bryggen 5003 Bergen, Norway 47/596-0480		
Ajit Shah, Inc. (ASI) 1326 West 12th Street Long Beach, CA 90813 213/436-0211	Diab-Barracuda Disposable Boom Expandi Harbor Boom 2000 Expandi Harbor Boom 3000 Expandi Ocean Boom Expandi Sea Boom	I I II III III

ADDENDUM TO LIST OF BOOMS

Manufacturer	Model	Class
American Boom & Barrier Corporation 8052 Astronaut Blvd. Cape Canaveral, FL 32920 305/784-2110	Mini Boom	I
	CG-1 Standard	I
	Contain-it	I
	Mark I-A	I
	Mark I-A-22	I
	Mark I XR58	I
	Mark I Boom - Industrial	I
	Industrial - Series Standard	I
	Mark II Oil Boom	I
	River Boom	I
	XR58	I
	Mark II-A Light Duty	I
	Mark II-A Current Boom	I
	Mark II-A XR58	I
	Mark IV	I
	Mark II-B Current Boom	I
	Heavy Duty	I
	Mark III-B Heavy Duty	I
	Mark III-C & Stern Boom	II
	Mark III-A Heavy Duty Sea Boom	II
	Mark III Heavy Duty Sea Boom	II
	Mark II Heavy Duty Sea Boom	II
American Marine Inc. P.O. Box 940 401 Shearer Boulevard Cocoa, FL 32922 305/636-5783	Swamp Boom	I
	Minimax	I
	Simplex	I
	Optimax	II
	Maximax	II
	Supermax	III
Applied Fabric Technologies, Inc. 227 Thorn Avenue P.O. Box 575 Orchard Park, NY 14127 716/662-0632		

ADDENDUM TO LIST OF BOOMS

Manufacturer	Model	Class
Aqua Guard Technologies 1130 West Pender Street Suite 200 Orchard Park, NY 14127 604/681-3773	Liteflex A Liteflex B Liteflex C Harborflex A Harborflex B Permaflex	I I I II II II
Aquaphysik Friedensstrasse 215 D-415o Krefeld 11 West Germany 49/2151/270885	Nessie Half-Size Nessie Full-Size	III III
Bennett Environmental Cons., Ltd. 1130 West Pender, Suite 200 Vancouver, BC V6E 4A4, Canada 604/681-8828		
Bennex A/S N. Tollbodkai P.O. Box 1992 N-5011 Bergen-Nordnes, Norway 05-32 41 60	NOAS 300 X NOAS 450 X NOAS 600 X NOAS 800 N NOAS 1000 N	II II III III III
Bregoil Sponge International Inc. P.O. Box 595 Fredericksburg, VA 22404 703/373-3482		
CECA S.A. Division Ingenierie SAPEC Avenue Alfred Nobel Lot.I'Echangeur 64000 PAU France 59-02.94.40	Delta Devipol	I III

ADDENDUM TO LIST OF BOOMS

Manufacturer	Model	Class
Containment Systems Corporation 658 South Industry Road P.O. Box 1390 Cocoa, FL 32922 305/632-5640	4 x 6 Boom Fence Boom River Boom Performance Boom Contractor Boom Compactable Boom Harbor Boom	I I I I I I II
Crowley Environmental Services 3400 E. Marginal Way South Seattle, WA 98134	Petro Barrier 18 inch Petro Barrier 24 inch Petro Barrier 36 inch	II II II
Diab-Barracuda	Disposable Boom	I
Engineered Fabrics Division (Formerly Goodyear Aerospace) 669 Goodyear Street Rockmart, GA 30153 404/684-7855		
Duxbury Offshore Inc. 52 Josselyn Avenue P.O. Box 6 SHS Duxbury, MA 02331 617/934-7301	Duxboom 15 Duxboom 18 Duxboom 24 Duxboom 36	I I I II
Environetics, Inc. 9824 Industrial Drive Bridgeview, IL 60455 312/430-4740	BOA Boom II BOA Boom III BOA Boom I	I I II
Geotechnical Resources Ltd. 4500 5th Street NE Calgary, Alberta Canada T2E 7C3 403/230-4128	70 inch 39 inch	III III

ADDENDUM TO LIST OF BOOMS

Manufacturer	Model	Class
Glove International Inc. 1400 Clinton Street Buffalo, NY 14206 716/824-8484	GlobeBoom	I
	GlobeBoom VHW/UHW	I
	GlobeBoom	I
	GlobeBoom VHW/UHW	I
	Pyroboom	I
	Oilfence 16	I
	Oilfence 24	II
	Oilfence 36	II
	Oilfence 48	II
Goodyear Aerospace Corporation Engineered Fabrics Division Rockmart, GA 30153 404/684-7855	9-18 Pier Boom	II
	12-24 Offshore	II
	14-24 Offshore	III
Hans A. Mathiesen Mattssonprodukter P.O. Box 667 S-451 24 Uddevalla Sweden + 46 522 36 400		
Hurum Marine Inc. 981 Rue Pierre Dupuy Suite 121 Longueuil, Quebec Canada J4K 1A1 514/463-0160	Flexy 2-14	I
	Flexy 2-18	I
	Flexy 3-10	I
	Flexy 3-18	I
	Flexy 4 ESF-14	I
	Flexy 4 ESF-18	I
	Flexy 4 ESF-24	I
	Flexy 2-24	II
	Flexy 2-12	II
	Flexy 3-24	II
	Flexy 3-36	II
Hyde Products, Inc. 28045 Ranney Parkway Cleveland, OH 44145 216/871-4885		

ADDENDUM TO LIST OF BOOMS

Manufacturer	Model	Class
Jackson Trawls Ltd. Blackhouse Industrial Estate Peterhead, Scotland, U.K. 0779-78383		
JPS/Oiltrol, Inc. Foster Pond Road Box 500 Bristol, NH 03222 603/744-6400		
Kepner Plastics Fabricators 3131 Lomita Boulevard Torrance, CA 90505 213/325-3162	Seacurtain 141808 RF	II
	Seacurtain Reelpak 1115 RP	II
	Seacurtain Reelpak 1418 RP	II
	Supercompactable 1115 CHF	II
	Supercompactable 1418 CHF	II
	Reelpak Firegard 1115 FG	II
	Reelpak Firegard 1418 FG	II
	Reel Pak	III
	Supercompactable 1823 CHF	III
	Seacurtain Compactable 1823 DF	III
	Seacurtain 182308 RF	III
	Seacurtain 243620 RF	III
	Compactable Seacurtain 2436 DF	III
McDonald R. David, Inc. (MRD) 2649 Kilmarnock Crescent North Vancouver, BC Canada V7J 2Z3 604/980-4918		
Megator Corporation 562 Alpha Drive Pittsburgh, PA 15238 412/963-9200	Mini-boom	I
Morris Industries 1527 Columbia Street North Vancouver, BC V7J 1A3 Canada 604/986-2189	MI-12B	I
	MI-20B	I

ADDENDUM TO LIST OF BOOMS

Manufacturer	Model	Class
Norpol Environmental Service P.O. Box 120 N-1364 Hvalstad Norway +47 2 845760	350 (Sea) 250 (Harbour) Nordan Oil Boom 600 Ocean	II II III
O.M.I. Ltd. Pollution Control Unit G 22 Morley Road Tonbridge Kent England, U.K. TN9 1RA 44/732-352125		
Offshore Devices, Inc. Bldg. 6A Summit Industrial Park Peabody, MA 01960-5199 617/532-3341	Harbor Oil Containment Barrier High Seas Oil Containment Barrier	II III
Oil Mop, Inc. P.O. Box 820 Belle Chasse, LA 70037 504/394-6110		
Oilchem Recovery Denmark Pollution Combatting Systems AS Wilders Plads, Bygning O P.O. Box 9033 1022 Copenhagen K, DK-1401 Denmark 45-1-95-70-95		
OSR Systems Ltd. 808-2829 Arbutus Road Victoria, BC Canada V8N 5X5 604/598-8940		
Parker Systems Inc. Bantam P.O. Box 1652 Norfolk, VA 23501 804/485-2952	Basin Mark II Model O-RD Mark II Model O-HD SpillMaster 24" SpillMaster 36"	I I I II II

ADDENDUM TO LIST OF BOOMS

Manufacturer	Model	Class
Rhin.Rhone 7, rue du Cirque 75008 Paris France 16.1.225.90.10	IRHR Type 22 Variant type 22 Type 13	I I I
A/S Roulunds Fabriker Hestehaven, DK-5260 Odense S Denmark 09 11 55 15	RO Boom RO Boom 100 Harbour RO Boom 1500 Bay RO Boom 200 Ocean RO Boom 2200/1 Ocean RO Boom 2200/11	I II III III III III
AB Sandvik Process System Hedasvagen 55 S-811 Sandviken, Sweden 026-270950	SSB 600 SSB 800	II II
Skimmex Oil Pollution Control Ltd. 270 Earls Court Road London, SW5 9ASX, U.K. 01-370 3315	SK4-6-12D SLB9-12-40A SK6-6-30BN SK9-12-30-BLM SK4-6-12B SK6-6-30B SK9-12-30B SK6-6-30AN SK9-12-30AN SK4-6-12A SK6-6-30A SK9-12-30A SK12-18-50A SK18-20-50A SK12-18-50AN SK12-18-50B Standard Boom SK12-18-50BN SK50-6-12AB	I I I I I I I I I I I I II II II II II II

ADDENDUM TO LIST OF BOOMS

Manufacturer	Model	Class
Slickbar, Inc. 250 Pequot Avenue Southport, CT 06490 203/255-2601	Light MK12A (12" overall)	I
	Standard MK12A (12" overall)	I
	Heavy MK12A (12" overall)	I
	Ex. Heavy MK12A (12" overall)	I
	Light MK12A (14" overall)	I
	Standard MK12A (14" overall)	I
	Heavy MK12A (14" overall)	I
	Extra Heavy MK12A (14" overall)	I
	Light MK12A (16" overall)	I
	Standard MK12A (16" overall)	I
	Heavy MK12A (16" overall)	I
	Ex. Heavy MK12A (16" overall)	I
	Light MK12A (18" overall)	I
	Standard MK12A (18" overall)	I
	Heavy MK12A (18" overall)	I
	Ex. Heavy MK12A (18" overall)	I
	Light MK10 (18" overall)	I
	Standard MK10 (18" overall)	I
	Heavy MK10 (18" overall)	I
	Ex. Heavy (18" overall)	I
	Light MK10 (16" overall)	I
	Standard MK10 (16" overall)	I
	Heavy MK10 (16" overall)	I
	Ex. Heavy MK10 (16" overall)	I
	Light MK10 (12" overall)	I
	Standard MK10 (12" overall)	I
	Heavy MK10 (12" overall)	I
	Ex. Heavy MK10 (12" overall)	I
	Light MK10 (14" overall)	I
	Standard MK10 (14" overall)	I
	Heavy MK10 (14" overall)	I
	Ex. Heavy MK10 (14" overall)	I
	MK E 10" overall	I
	MK E 18" overall	I
	MK E 24" overall	I
	Standard MK7 24" overall	II
	Standard MK7 36" overall	II
	Standard MK7 48" overall	II
	Standard Flotation MK8 24"	II
	Standard Flotation MK8 48"	II

ADDENDUM TO LIST OF BOOMS

Manufacturer	Model	Class
Sunshine Technology Corporation 2475 Albany Avenue West Hartford, CT 06117 203/232-9227	Mini Sea Boom Fast Response S-B Permanent Sea Boom	I I II
Tammiholma OY PL39, 00401 Helsinki, Finland 90 578 055	AKI Oil Prevention Booms	II
Texas Boom Company, Inc. 1304 Langham Creek Drive Suite 218 Houston, TX 77084 713/492-7963		
Trelleborg AB Protective Products Division S-231 81 Trelleborg Sweden International + 47 41051000	Trellboom Sea Boom 850 Trellboom Bantam 750 Trellboom Ocean Boom 1400 Trellboom Universal 1050 Trellboom Giant 1500	II II III III III
Versatech Products Inc. 8070 Winston Street Burnaby, British Columbia Canada V5A 2H5 604/420-7755	River 6/6 River 7/7 River 7/11 Nav Pak 7/11 Zoom 7/11 Inshore 24 Inshore 36 General Purpose 9/15 General Purpose 12/18 River 9/11 Nav-Pak 9/15 Nav-Pak 12/18 Nav-Pak 18/18 Zoom 12/18 Zoom 12/18 Permanent Harbor Boom 18 Permanent Harbor Boom 24 Permanent Harbor Boom 30 Permanent Harbor Boom 36 Zoom 24/24	I I I I I II II II II II II II II II II II II II II III

ADDENDUM TO LIST OF BOOMS

Manufacturer	Model	Class

Versatech Products, Inc.
2479 Bellevue Avenue
West Vancouver, BC
Canada V7V 1E1
604/922-5357

SECTION 10

PART I

PHYSICAL AND CHEMICAL TREATMENT OF OIL

NEED TO OBTAIN GOVERNMENT APPROVAL

According to the National Contingency Plan (NCP), chemicals, including biological and burning agents, can be used only with specific approval from the On-Scene Coordinator (OSC). The OSC can only approve products that are listed on the NCP Product Schedule. The EPA maintains the Schedule and a list of products with data provided by the manufacturer. This Schedule is listed for you in appendix 3 of this section. In some locations, several companies and co-ops have received prior approval to use collecting agents under specific circumstances. An OSC should be familiar with areas that have prior approval for the use of chemical agents.

BURNING AGENTS

Burning of oil needs to be mentioned because it presents such an inviting solution to oil spill cleanup. The Regional Response Team (RRT) approves the use of burning as a means to cleanup a spill. Since oil is a volatile compound, why not burn it? Theoretically, burning should be quick, nontoxic, and economical.

Unfortunately, the solution is not simple because spilled oil spreads quickly into a thin layer. As this occurs, the volatile fractions of the oil quickly evaporate. The remaining oil spreads over large areas into thin, broken patches and some emulsions form. All of these factors make oil difficult to ignite. Even if a wicking agent is added, only a portion of the oil will burn because heat is transferred rapidly from the flame to the water beneath the oil. Attempting to burn oil on water can be hazardous to personnel starting the fire, can result in clouds of unsightly black smoke, and to date there is no field data which indicates burning agents work. While the problems associated with such a burn are chiefly cosmetic (black smoke, unburned residue), it may be better to spend the time and resources in recovering the oil by conventional means.

Burning may be useful for removing both spills on ice and oily debris along small creek banks in some special cases. However, burning necessitates having trained personnel start the fire and closely monitor it to ensure the safety of people and property. Since burning oil creates some problems, most states require prior approval, except in cases of emergency (immediate danger to life or property).

BIOREMEDIATION AGENTS

Subpart J of the NCP (40 CFR 300.900) defines biological agents as "microbiological cultures, enzymes, or nutrient additives that are deliberately introduced into an oil or hazardous substance spill for the specific purpose of encouraging biodegradation to mitigate the effects of a spill". Most commercially available biological agents are special blends of naturally occurring bacteria that consume oil. Such bacterial agents may be freeze-dried and stored as fine dusts or powders. In theory, when a spill occurs, the agents can be used to seed the immediate spill vicinity. This seeding action might increase the rate at which the spilled oil is biodegraded. However, waterways in areas with petroleum facilities normally contain sufficient bacteria; nutrient to support biodegradation are usually the limiting factor. Biological agents, as well as other chemical agents, must be approved for use by the appropriate governmental representative.

DISPERSANTS

Dispersants are surface-active agents that divide and suspend the oil into small droplets in water. Oil spill dispersants consist primarily of surfactants in a solvent base. Surfactants are long-chain molecules resembling oil molecules on one end and water on the other. Because of the "bipolar" structure, the surfactant will migrate to the oil-water interface. At the interface, surface tension properties are reduced so that droplets of oil are formed and dispersed throughout the water. Again, prior governmental approval must be obtained before dispersants are used (except under emergency conditions involving fire or explosion hazards).

GELLING AGENTS

Use of gelling agents in oil spills has been generally not practical due to high costs of gelling material and problems with gelling only oil. However, gelling the oil in leaking tanks or tankers might be a feasible alternative in preventing the oil from becoming a spill.

Gelling agents have in the past formed grease-like material, but some now form a solid (sometimes called oil solidifying additives). These latter agents use a liquid polymer and cross-linking system which react to form a molecule matrix which entraps large quantities of oil. Crudes at -5C can be gelled in as little as 15 minutes. These agents work faster as temperatures increase.

CONDITIONS FOR THE USE OF DISPERSANTS

The federal OSC, on a case-by-case basis, can approve the use of chemical dispersants on any spill if it is determined they will prevent or substantially reduce explosion or fire hazard to property. All other cases must be approved by the EPA RRT representative after consultation with appropriate Federal and State agencies. In all cases, appropriate application rates and methods must be used.

RATE AND EFFECTS OF DISPERSED OIL

The most important advantage gained by using dispersants is rapid oil dilution. Dispersed oil mixes downward in near-surface waters, removing the oil from most of the wind's influence. During a spill from a Gulf of Mexico platform dispersed oil was observable only about one mile from the spill site; untreated surface slicks extended six to nine miles on most days. These observations suggest that significant amounts of dispersed oil are much less likely to reach shore than untreated oil.

Dispersants drive oil into the H_2O column, however, we don't know what effect this has on microorganisms. We do know that by getting it off the surface, wildlife won't be affected. Some report that the oil resurfaces after some time. However, good field data is essential for this determination. Static laboratory bioassays have shown that oil treated with modern dispersants is only slightly more toxic than the same amount of untreated oil. However, such static bioassays are unlike field conditions. The test organism is exposed to dispersed oil for extended periods of time without provision for the dilution and the evaporation of hydrocarbons that naturally occur; also the avoidance capabilities of mobile marine organisms (nekton) and natural waste accumulation are not considered.

In 1970, approximately 65,000 barrels of 34° API gravity crude oil were spilled from a platform located about 11 miles offshore in the Gulf of Mexico in 40 feet of water. Extensive chemical and biological investigations during and following this spill thoroughly documented for the first time the fates of dispersed oil in the water column and sediments. The measured levels of hydrocarbons in the water within one mile of the platform varied from one to 70 ppm. No adverse effects upon the benthic community, shell, of fin-fish were recorded.

These findings suggest that in offshore areas only those organisms in the upper surface waters and in the immediate area of a spill might be adversely affected. Some plankton near a dispersed spill might be killed, but repopulation is rapid and no extended effect on the area should be noted.

The marine environment can tolerate a limited quantity of oil such as might be caused by a prudently dispersed oil spill. This tolerance is not surprising since geologists estimate that there have been marine oil seeps for 300 million years. The total amount of natural seepage is estimated at 200 trillion barrels, hundreds of times more than man has ever produced. Microorganisms which utilize oil as food are responsible for preventing a major portion of this oil from being a problem today.

Dispersants have been successfully used to control oil spills in many instances. For example, on November 12, 1975, a supertanker and a British frigate collided in the Dover Straits, resulting in a spill of about 15,000 barrels of crude oil. small craft applied approximately 1,000 drums of non-concentrated dispersant and 40 drums of concentrated dispersant. As a result, no more than approximately 230 barrels of oil reached the shore. The British Department of Trade concluded that concentrated dispersant is more efficient than non-concentrated dispersant and advised that spray vessels be readily available. Relatively little harm was noted to the marine environment from the oil or the dispersant even though dispersants were used close to the shoreline.

REGULATIONS

The use of dispersants and other chemicals is tightly controlled by the United States Government. Under Subpart J of the present National Contingency Plan, the use of dispersants may be authorized by the government on-scene coordinator only to prevent or substantially reduce hazard to human life or limb or to substantially reduce explosion or fire hazard to property. In other situations, the Environmental Protection Agency's Regional Response Team member can authorize the use of dispersants to reduce environmental damage. This division of authority over the use of dispersants could at times create confusion.

Only chemicals listed by the EPA can be authorized for non-emergency use. Such acceptance requires that extensive data, including chemical composition as well as toxicity and effectiveness tests, be submitted.

EFFECTIVENESS AND TOXICITY

The effectiveness of modern dispersants has increased almost as rapidly as their toxicity has decreased. The original agents were able to break up about ten parts of oil per one part of dispersant. Newer concentrated dispersants can reputedly disperse about 50 parts of oil per one part of dispersant. Under ideal conditions factors such as oils with high wax or asphalt content, very low temperatures, thin or scattered oil slicks, and lack of agitation can increase the amount of dispersant needed by three or four times. Dispersants today must meet certain testing criteria established in the NCP for effectiveness and toxicity. (40 CFR Part 300 (Appendix C)).

EQUIPMENT

Equipment for application of dispersants has two primary functions: to operate under a wide range of conditions with limited personnel, and to reliably deliver the correct chemical dosage. Various types of equipment have successfully demonstrated these capabilities.

The simplest arrangement consists of an adductor system that works on the venturi principle. It may utilize either a portable pump or a conventional fire fighting system to supply the water flow. Such a system is most useful for moderate size spills requiting rapid response and is suitable only for applying dispersants that are designed to be mixed with water.

The most popular system for spraying dispersants from boats was developed by Warren Spring Laboratory (WSL) in England. Basically, it consists of a portable self-priming pump, port and starboard spray booms, and specially constructed breaker boards, towed astern, to provide agitation. A great deal of experience has been accumulated in effectively dealing with spills using this equipment. The WSL system has proven to be easily handled, adaptable to a wide range of vessels, inexpensive, and durable.

With sea-mixing dispersants, one manufacturer recommends mounting the spray booms near the bow of the boat.

Aircraft spraying is appropriate for large remote spills or when sea conditions are too rough for dispersant application from vessels. Crop spraying and fire fighting planes are usually available and are capable of dispersant application when outfitted with proper nozzles and spraying apparatus. Where tight control of the spray pattern is important, helicopter spraying has advantages.

The cost/effectiveness and conservation of materials associated with dispersant use are attractive features. A vessel of opportunity can be equipped with simple spray and storage equipment weighing about one ton for approximately $25,000. When properly applied, 30 drums of chemical can disperse about 1,000 barrels of oil (chemical cost would be approximately $15,000). One the other hand, a sea-propelled mechanical skimmer capable of tackling a similar offshore oil spill could weigh over 100 tons and cost over $2,500,000. In high seas, it would not be as effective as dispersants. The maintenance of dispersant spraying equipment would cost about $2,500 per year, while the maintenance cost of a skimmer would be about $250,000 per year.

In summary, both mechanical equipment and dispersants are necessary weapons in the arsenals of major coastal oil spill cleanup organizations. Dispersants may also have advantages in controlling inshore spills, but their use in such areas must be carefully studies due to the potential for damaging environmentally sensitive areas.

COLLECTING AGENTS

Another aid to controlling oil spills is the collecting agent. The National Contingency Plan (Subpart J) defines surface collecting agents as "those chemical agents which are a surface film forming chemical for controlling oil layer thickness". They are considered to be generally acceptable provided that they to not in themselves or in combination with the oil increase the pollution hazard. Like dispersants, the use of collecting agents must be approved by the government on-scene coordinator.

The best known commercially available collecting agents include various herding agents. They are best applied in a straight stream with a sprayer on the water surface adjacent to a spill. They should not be applied directly to the oil slick or in a fine mist. Helicopters are usually best for this service. It is of prime importance to carefully plan the use of any collecting agent. The first rule is to apply them only when you are ready to remove the oil. If collecting agents are applied prematurely their effectiveness is gradually lost and the oil may spread again. The agents do not herd the oil against wind or tide but only against the natural spreading action of the oil. Hence, collecting agents have a limited use and work best under static conditions. The maximum recommended application rate is two gallons of agent per mile of spill perimeter. The agent can be re-applied, if needed, every six hours to a maximum of three applications in any 24-hour period.

Presently there are several collecting agents including commercially available products and Navy piston oil. Piston oil (sorbitan monooleate) is not commercially available but is similar to the commercial products. Collecting agents are most effective in restricting spills to be picked up immediately, for spraying booms, and for decreasing movement to critical areas such as beaches, marshes, or marinas where collection may be difficult. Dispersants and collecting agents are not compatible and should not be used on a spill at the same time. It is practical to apply a collecting agent and, after the slick is compressed, to pick it up with sorbents.

LITERATURE CITED

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APPENDIX I

FOAMS FOR CONTROL OF HAZARDOUS CHEMICAL VAPORS

I. Foam is a mass of gas-filled bubbles formed either through a chemical reaction of by the mechanical mixing of air and a foaming agent. The foam bubble functions as a vehicle for carrying and dispensing water.

All foams extinguish fires by:

1. smothering - preventing air from mixing with vapors
2. suppressing the release of flammable vapors
3. separating flames from fuel
4. cooling fuel and surrounding surfaces

II. There are a number of types of foam commonly available, each with certain advantages and desirable characteristics applicable to hazardous materials incidents.

1. **Protein foam** - natural proteinaceous polymers, metallic salts for strength in heat and flame and organic solvents for foamability. Dense, viscous foams, highly stable, highly heat resistant, resistant to burnback.

2. **Fluoroprotein foam** - similar to protein foam except that it contains fluorinated surface active agents. Able to shed fuels so that foam may be injected into tanks or plunged into fuel. Superior sealing and burnback resistance to protein foam.

3. **Aqueous film-forming foam (AFFF)** - fluorinated hydrocarbons and polymers. Forms water solution films on flammable liquid surfaces. Low viscosity, fast spreading and develops continuous aqueous layer of solution on fuel surface to cool and suppress vapors. Aqueous film layer can spread over surfaces not fully covered with foam, is self healing and continuous as long as there is a foam reservoir. This film, however, is produced at the sacrifice of the burnback resistance and cooling ability of the foam.

4. **Alcohol-type foam (ATF)** - developed for fuels which are water soluble or polar solvents. These substances ordinarily will cause the rapid deterioration of other foam types. Consists of a protein base with a polymeric additive to form an insoluble chemical film between the foam bubbles and fuel surface. This "plastic" barrier prevents the fuel from destroying the foam bubbles. Most alcohol-type foams must be applied gently and not submerged in the

fuel to preserve the barrier. Manufacturers are now producing combination foams so that at one concentration an aqueous film-forming foam is produced and at a higher concentration an alcohol-type foam barrier is formed. These foams can be used with a greater variety of chemical classes.

5. **High expansion foam** - consists of synthetic hydrocarbon surfactants which produce large volumes of foam with a small amount of mixing energy. The foam is capable of expanding from 100-1000 to one. High expansion foam has been used for total flooding of confined spaces and for displacement of vapors, heat and smoke. It is suitable for confined areas but natural forces such as wind may limit its use outdoors. This foam, under suitable conditions may be built up to very thick layers.

III. Most protein, fluoroprotein and AFF foams are available in three percent and six percent concentrations. Alcohol foams are available in six-10 percent (some may be used as AFF at low concentrations and ATF at higher concentrations). High expansion foams are used in 1.5-2.0 percent concentrations. The percentage indicates the number of foam liquid parts to be mixed with water for a 100 percent solution.

IV. Foams are in widespread use for controlling releases of flammable or combustible liquids. Foams are able to suppress vapors, extinguish fires and can fill pockets or enclosures where vapors would collect. The effectiveness of foams for the suppression of toxic vapors, however, has not been fully investigated. M.S.A. Research Corporation and the U.S. EPA have conducted studies in an attempt to determine some of the capabilities and limitations of common foam types on hazardous substances other than flammable liquids.

APPENDIX II

DISPERSANTS (wetting agents) AS FIRE SUPPRESSION AND PREVENTION AGENTS

I. Dispersants are surface-active agents that contain an oil-compatible and a water-compatible chemical group. Because of this characteristic, when applied to a hydrocarbon spill on water, dispersant molecules orient themselves at the oil-water interface. By this orientation, the dispersant lowers the interfacial tension and greatly enhances droplet formation of the hydrocarbon in water.

Wetting agents are a particular type of dispersant formulation that lower the surface tension of the water whether or not a hydrocarbon is present. This tends to increase the amount of free water surface available for absorption of heat, thus increasing the efficiency of the extinguishing properties of the water.

II. Dispersants may not be used on spills without the consent of the Federal on-scene coordinator. The law does make special provisions for possible fire situations and approval can be obtained if, in the judgment of the on-scene coordinator, use of a dispersant is justified.

III. Dispersant usage to suppress or prevent fires is best accomplished through the use of an educator system like that used for firefighting foams. Application rates vary according to the manufacturer. Usual dilutions are one to two percent in water. Mixing energy is essential, and fine mists or sprays will not provide effective dispersion.

IV. Dispersants are used on shallow spills such as those on roadways which are not amenable to pumping or other recovery. Foams should be used on spills where pumping can be accomplished.

V. All dispersants are not designed to be used for fire suppression or as wetting agents. Flashpoint of the dispersant is usually the determining factor. If the dispersant is combustible, it will probably not be an effective extinguishing agent.

APPENDIX III

ENVIRONMENTAL PROTECTION AGENCY

NATIONAL CONTINGENCY PLAN

PRODUCT SCHEDULE

MAY 1990

Prepared by:

U.S. Environmental Protection Agency
Emergency Response Division

For Information Contact:
John M. Cunningham, 202/382-4130

DISPERSANTS

Bulletin Number	Product Name	Manufacturer	Date Listed
1	ENERSPERSE 1100 (Hydrocarbon Solvent Based)	BP Detergents, Ltd. Pumpherton Works Livingston, West Lothian EH53 O1Q, Scotland Tel: 0506 31111 Telex: 72278 (Margaret C. McCaw) U.S. Contact: BP North America, Inc. 620 5th Avenue New York, NY 212/887-9046 (Dr. Ronald G.L. Spiers)	10/20/77
2	COLD CLEAN 500 (Water Based)	Essex Fire & Safety Co. P.O. Box 801247 Houston, TX 77280-1247 713/690-0416 (Mrs. Virginia A. Watters)	10/7/77
3	CONCO DISPERSANT K (Concentrate)	Continental Chemical Co. 270 Clifton Blvd. Clinton, NJ 07011-3638 201/472-5000 (Mr. Philip D. Turits)	4/25/78
4	COREXIT 7664 (Water Based)	Exxon Chemical Co. 8230 Stedman St. Houston, TX 77029 713/671-8614 (Mr. Larry G. Coker)	11/1/78
5	COREXIT 8667 (Hydrocarbon Solvent Based)	Exxon Chemical Co. 8230 Stedman St. Houston, TX 77029 713/671-8614 (Mr. Larry G. Coker)	11/1/78
6	COREXIT 9527 (Concentrate)	Exxon Chemical Co. 8230 Stedman St. Houston, TX 77029 713/671-8614 (Mr.	

DISPERSANTS

7	EC.O ATLAN'TOL AT7 (Water Based)	ASPRA, Inc. 4401 23rd Avenue West Seattle, WA 98199 206/284-9838 (Mr. A.I. Janofsky)	11/13/79
8	FINASOL OSR-7 (Water Based Concentrate)	Fina Oil and Chemical Co. P.O. Box 2159 Dallas, TX 75221 214/750-2640 (Mr. Jerry W. Johnson)	5/21/80
9	GOLD CREW DISPERSANT (Water Based Concentrate)	Ara Chemical, Inc. P.O. Box 5031 San Diego, CA 92105-0001 619/286-4131 (Mrs. Rita Jimenez McNeely)	8/31/77
10	MAGNOTOX (Water Based Concentrate)	Drew Chemical Corporation One Drew Plaza Boonton, NJ 07005 201/263-7600 (Mr. William F. O'Brien, Jr./ Mr. Nels Hendrickson)	7/1/81
11	OFC D-609 OIL SPILL DISPERSANT (Concentrate)	Chemlink Petroleum, Inc. 9100 W. 21 St. Sand Springs, OK 74063 918/245-2224 (Mr. James Skaggs, Jr.)	8/20/79
14	PETRO-GREEN ADP-7 (Water Based Concentrate)	Petro-Green, Inc. 3952 Candlenut Lane P.O. Box 814665 Dallas, TX 75381 214/484-7336 (Dr. Arnold Paddock)	9/30/84
Dispersant #12, OIL SPILL ELIMINATOR, is no longer being manufactured and has been removed from the Product Schedule. The formula for Dispersant #13, OSD/LT OIL SPILL DISPERSANT has been revised, and the product is now being sold as Dispersant #33 OSD/LT OIL SPILL DISPERSANT (NEW FORMULATION).			
15	PETROMEND, MP-900-W (Water Based Concentrate)	Petromend, Inc. P.O. Box 47532 8600 Sovereign Row Dallas, TX 75247 214/630-1330 (Mr. Alan Cohn)	9/30/84

DISPERSANTS

18	SLIK-A-WAY (Water Based)	MI-DEE Products, Inc. 5253 Springdale Ave. Pleasanton, CA 94566 415/846-8166 (Mr. Paul Spellman)	10/5/78
19	DISPERSANT 11 (Concentrate)	DuBois Chemicals 1100 DuBois Tower Cincinnati, OH 45202 513/762-6894 (Mr. W.N. Grawe)	10/16/84
20	TOPSALL #30 (Oil and Petroleum Cleaning Agent) A/K/A SUPER ALL #38	Stutton North Corp. P.O. Box 724 Mandeville, LA 70448 504/626-3900 (Mr. David Anton)	1/7/85
21	COREXIT 9550 (Hydrocarbon Solvent Based)	Exxon Chemical Company 8230 Stedman Street Houston, TX 77029 713/671-8614 (Mr. Larry G. Coker)	5/22/85
22	JANSOLV-60 DISPERSANT (Principally Water Based with some Solvent)	Sunshine Technology Corp. 2475 Albany Avenue West Hartford, CT 06117 203/232-9227 (Mr. Stephen Kaufman)	7/9/85
23	RUFFNEK (Oil and Petroleum Cleaning Agent)	Malter International 80 First Street Gretna, LA 70053 504/362-3232 (Ms. Gail Mavromatis)	7/16/85
Dispersant #16, PROFORM-POLLUTION CONTROL AGENT, and Dispersant #17, SEA MASTER NS-555, are no longer being manufactured and have been removed from the Products Schedule.			
24	NEOS AB 3000 (Hydrocarbon Based)	NEOS Company Limited 8th Floor, Kanden Bldg. 201, Kano-cho 6 Chome Chuo-ku, Kobe 650, Japan Tel: Kobe 078-331-9381 Telex: 5622293 JKNEOS J (Mr. S. Miyoshi)	4/22/85

DISPERSANTS

25	PHIREX (Organic Surfactant Based) (formerly CRUDEX)	Environmental Security, Inc. 5 Blackburn Center Gloucester, MA 01930 508/283-1306 (Mr. Jay Greene)	6/4./86
26	BIO SOLVE (Water Based) A/K/A Conseal P.N.A.	Metra Chem Corporation 270 Littleton Road P.O. Box 427 Westford, MA 01886-0427 508/392-0571 / 1-800/225-3909 FAX: 508/392-0576 (Mario J. Genduso/ Ronald D. LaRoche)	12/22/86
27	NK-3 (Water Based) A/K/A BREAKER-4 ATLANTIC-PACIFIC OIL DISPERSANT, REAL KLEEN, SHIP SHAPE	GFC Chemical Company, Inc. P.O. Box 80537 Lafayette, LA 70598-0537 318/234-8262 (Mr. Joe Winkler)	2/19/87
28	ENERSPERSE 700 (Solvent Based)	BP Detergents Limited Pumpherston Works Livingston West Lothian, Scotland EH53 OLQ Tel: 0506 3111 (Margaret C. McCaw)	7/27/87
29	SLICKGONE NS (Solvent Based)	Dasic International, Ltd. Winchester Hill - Romsey Hampshire SO51 7YD United Kingdom Tel: 0794/512419 Telex: 47548 (Mr. John L. Belk)	2/22/88
30	MARE CLEAN 505 (Solvent Based)	Taiho Industries Co., Ltd. 21-44 Takanawa 2-chome Minato-ku, Tokyo, Japan Tel: 03/445-8111 FAX: 03/443-0213 (Mr. Y. Tamai)	2/23/88

DISPERSANTS

31	EDF EMULSA FIRE (Water Based)	SynTech Products Corp. 520 E. Woodruff Avenue Toledo, OH 43624 419/241-1215 (Mr. James J. Doherty)	6/17/88
32	PETRO TITE M.M.E. (Water Based)	Heath Consultants Inc. 100 Tosca Drive Stoughton, MA 02072-1591 617/344-1400 (Mr. Robert Perry)	10/4/88
33	OSD/LT OIL SPILL DISPERSANT (New Formula)	Drew Chemical Corporation One Drew Plaza Boonton, NJ 07005 201/263-7600 (William F. O'Brien, Jr./ Nels Hendrickson)	10/4/88
34	TOXIGON - 2000	Formula IV Corporation 9756 North 90th Place Suite 200 Scottsdale, AZ 85258 602/391-3426 (Mr. G. Scott Miller)	6/17/87
35	SUPER ALL #38 (Oil and Petroleum Cleaning Agent)	Tavelle Corporation P.O. Box 841236 Hollywood, FL 33084 305/473-6718 (Mr. Bruce Dorfman)	11/16/88
36	M.C. #1 DISPERSANT	Safeworld Products Corporation 103 Clearfield Drive Brentwood, TN 37027 (Mr. Craig A. Thomas)	3/31/89
37	CN-110	Chemex, Incorporated P.O. Box 31228 Lafayette, LA 70593-1228 318/837-9148 (Mr. Gale Campbell)	Pending Review
38	COREXIT 9580 SHORELINE CLEANER (Hydrocarbon Based)	Exxon Chemical Company Technology Division 8230 Stedman Street Houston, TX 77029 713/671-8614 (Mr. Larry Coker)	7/21/89

DISPERSANTS

39	BIOVERSAL (Water Based)	Bio Versal U.S.A., Inc. 1703 Victoria Drive #303 Mount Prospect, IL 60056 312/228-7316 FAX: 312/228-7318 (Dr. Mohsen Amiran)	6/7/89
40	DE-SOLV-IT	Orange-Sol, Inc. 9 North Roosevelt Avenue Chandler, AZ 85224 602/961-0975 FAX: 602/921-0854 (Dr. J.A. Gurney)	6/26/89
41	PREMIER 99	Gold Coast Chemical Corporation 3301 North 29 Avenue Hollywood, FL 33020 305/921-9100 FAX: 305/921-9122	8/11/89
42	OMNI-CLEAN (Water Based) A/K/A OMNI-CLEAN T.C.R., OMNI-CLEAN A.P.C., OMNI-CLEAN P.A.S., OMNI-CLEAN C.B.R. OMNI-CLEAN MULTI-FORM	Delta-Omega Technologies, Inc. 218 Rue Beauregard Suite K Lafayette, LA 70508 318/237-5091 FAX: 319/237-5131 (Mr. Troy Mallett)	8/31/89
43	SDS-300 (Hydrocarbon Solvent Based)	Services Marketing Group 303 Wells Fargo Drive Suite 13 Houston, TX 77090 713/580-0500 FAX: 713/444-3289 (Mr. Jesse R. Sanders)	9/15/89
44	FORMULA 98 (Water Based)	Malone Chemical, Inc. 130 Marion Avenue Linden, NJ 07036 201/862-8595 FAX: 201/862-1260 (Mr. Thomas F. Malone)	3/5/90

DISPERSANTS

45	GRANCONTROL-O (Water Based)	C & A Products P.O. Box 360 125 Main Avenue Elmwood Park, NJ 07407 201/791-6700 FAX: 201/791-0038 (Mr. Chuck Granatell)	3/21/90
46	SIMPLE GREEN (Water Based)	Sunshine Makers, Inc. 15922 Pacific Coast Hwy. Huntington Harbor, CA 92649 213/592-2844 FAX: 213/592-3034 (Mr. Bruce P. FaBrizio)	4/23/90

SURFACE COLLECTING AGENTS

Bulletin Number	Product Name	Manufacturer	Date Listed
1	COREXIT OC-5	Exxon Chemical Company 8230 Stedman St. Houston, TX 77029 713/671-8614 (Mr. Larry G. Coker)	11/1/78
2	OIL HERDER	ASI, Inc. 1326 W. 12th Street Long Beach, CA 90813 213/436-0211 (Mr. Parag Gandhi/Mr. Mark Ploen)	9/16/76

BIOLOGICAL ADDITIVES

Bulletin Number	Product Name	Manufacturer	Date Listed
1	HYDROBAC	Polybac Corporation 954 Marco Blvd. Allentown, PA 18103 215/264-8740 (Mr. David M. DeClement)	12/3/80
2	NO-SCUM	National Hydrocarbon Elimination Company 2500 East T.C. Jester Suite 165 Houston, TX 77024 713/880-0604 (Mr. Ben Calderoni)	9/16/76
3	PETROBAC	Polybac Corporation 954 Marcon Blvd. Allentown, PA 18103 215/264-8740 (Mr. David M. DeClement)	8/4/79
4	PHENOBAC	Polybac Corporation 954 Marcon Blvd. Allentown, PA 18103 215/264-8740 (Mr. David M. DeClement)	8/4/79
5	PETRODEG-100	Bioteknika International, Inc. 3108 Hayes St. Arlington, VA 22202 703/836-3393 (Mr. John Ludlum)	12/15/78
6	PETRODEG-200	Bioteknika International, Inc. 3108 Hayes St. Arlington, VA 22202 703/836-3393 (Mr. John Ludlum)	12/15/78
7	TYPE L, DBC PLUS	Flow Laboratories, Inc. Environflow 7655 Old Springhouse Road McLean, VA 22012 1-800/634-9195 (Ms. Jane Hood)	6/10/82

BIOLOGICAL ADDITIVES

8	TYPE R-5, DBC PLUS	Flow Laboratories, Inc. Enviroflow 7655 Old Springhouse Road McLean, VA 22102 1/800-634-9195 (Ms. Jane Hood)	6/10/82
9	BACTOZYME (formerly ROLFZYME A/K/A ALFA, DESCUM, SKY BLUE CHEMS OIL SPILL EATER	International Enzymes, Inc. 1706 Industrial Road Las Vegas, NV 89102 702/388-0145 (Mr. Harold G. Ambler)	10/25/84
10	INIPOL EAP 22	Societe CECA, S.A. LaDefense 5 - Cedex 54 92062 Paris-la-Defense France Tel: 1/49.04.12.34 *Telex: CECAS 611444F* FAX: 011-33-1-49-04-12-35 U.S. Contact: Elf Aquitaine Suite 400, Lafayette Ctr. 1155 21st Street, N.W. Washington, DC 20036 Tel: 202/872-9580 Telex: 277566 FAX: 202/872-0896 (Mr. Jacques A. Bodelle)	7/9/85
11	BIO-ZYME 1000-HC (formerly PETROZYME 1000)	High-Line Chemicals, Inc. Innovation Place 108 Research Dr. Suite 4 Saskatoon, Saskatchewan Canada S7N 2X8 306/975-0015 (Dr. Mongi Ferchichi)	1/21/88
12	WOODACE BRIQUETTES	Vigoro Industries, Inc. 2007 West Highway 50 P.O. Box 4139 Fairview Heights, IL 62208- 2928 618/624-5522 (Mr. Richard Helpinstine)	6/7/89

BIOLOGICAL ADDITIVES

13	CUSTOMBLEN	Sierra Chemical Company 1001 Yosemite Drive Milpitas, CA 95035 408/263-8080 FAX: 408/262-8943 (Mr. John Cunningham)	7/26/89
14	EEC BIOLOGICAL MEDIA	Environmental Engineering Consultants, Inc. 2323 W. 7th Place Stillwater, OK 74074 405/377-5561 (Dr. Don Kincannon/Dr. Leon Potter)	7/27/89
15	AE BIOSEA PROCESS	Alpha Environmental, Inc. 7748 Highway 290 West Austin, TX 78736 512/448-8927 (Mr. H. Eugene Douglas)	8/11/89

MISCELLANEOUS OIL CONTROL AGENTS

Bulletin Number	Product Name	Manufacturer	Date Listed
1	SEE-JELL (formerly NEOS JELLY ROCK) (Gelatinization Agent)	Ajinomoto Company, Inc. 5-8, 1 Chome, Kyobashi, Chou-Ku Tokyo, 104 Japan Tel: 272-111 Sigma Enviro Enterprises, Inc. (Primary Distributor) 140 Spring Road Orinda, CA 94563 415/254-7633 (Mr. Leonard O. Walde)	10/30/85
2	OIL BOND-100 (Plasticization Agent) A/K/A NORSOREK A-P POLYNORBORNENE OIL SOLIDIFIER (Particulate Form)	C d F Chimie S.A., Tour Aurore Place des Reflets CEDEX 5 92080 Paris Defense 2 Paris, France Tel: 1/47.78.64.82 U.S. Contact: Liquid Waste Technologies, Inc. (Primary Distributor) 999 Roosevelt Trail 207/892-5530 (Mr. Frank Hoff) Liquid Waste Technologies, Inc. P.O. Box 467 Blackwood, NJ 08012 609/232-8088 and 1-800/545-2006 (Mr. Bill Gannon)	6/4/86

MISCELLANEOUS OIL CONTROL AGENTS

3	LIQUID OIL BOND-200 (Gelatinization Agent)	Toho Titanium Company, Limited 17th Mori Building 1-26-S Toranomon, Minato-Ku, Tokyo, Japan Tel: Tokyo 504-3165 U.S. Contact: Liquid Waste Technologies, Inc. (Primary Distributor) 999 Roosevelt Trail 207/892-5530 (Mr. Frank Hoff) Liquid Waste Technologies, Inc. P.O. Box 467 Blackwood, NJ 08012 609/232-8088 and 1-800/545-2006 (Mr. Bill Gannon)	6/4/86
4	ELASTOL (Oil Viscoelastic Enhancing Agent)	General Technology Applications, Inc. 7720 Mason King Court Manassas, Virginia 22110 703/631-6655 (Mr. Thomas J. Scambos)	6/23/86
5	OIL SPILL ELASTOL (Oil Viscoelastic Enhancing Agent)	General Technology Applications, Inc. 7720 Mason King Court Manassas, Virginia 22110 703/631-6655 (Mr. Thomas J. Scambos)	7/17/87

SECTION 10

PART II

DEBRIS DISPOSAL

When an oil spill occurs, the primary consideration is for minimizing damage and removing the spilled oil from the environment. Hasty action on cleanup has resulted in large quantities of debris being needlessly removed and transported to a disposal site. Lack of pre-planning has allowed transport of debris to distant disposal sites when local disposal sites were available. The choice of inappropriate cleanup and disposal techniques without adequate planning increases problems and costs in a spill.

Generally, oily debris comes in two types: oily liquids and oily solids. What can be done with these materials will depend on the condition of oil, oil processing equipment availability and government regulations (federal and local).

The first consideration in debris disposal should be consolidation of debris types. Generally, this will require debris storage, oil/water separation, oily liquid pumping and debris transport. Oily debris can be stored in a wide variety of containers, from plastic bags to oil storage tanks (**TABLE 1**). In most cases, the container type chosen will depend on availability and cost. Further, several container types may be needed. Some containers can also be used as oil/water separators.

TABLE 1
TYPES OF CONTAINERS FOR SPILLED OIL AND DEBRIS

Container	Comments
Drums	1) may require drum handling devices
Tank Truck[1]	1) consider road access
Dump Trucks/Flat Bed	1) requires impermeable barrier to hold dripping oil
Railroad Tank Car	1) consider rail access
Barges	1) consider venting of tanks
Oil Storage Tanks	1) consider problems of large quantities of water in oil
Bladders	1) may require special hoses or pumps for oil transferral
Earthen Dikes$_1$	1) may require impermeable liner

[1] Can be made into oil/water separators

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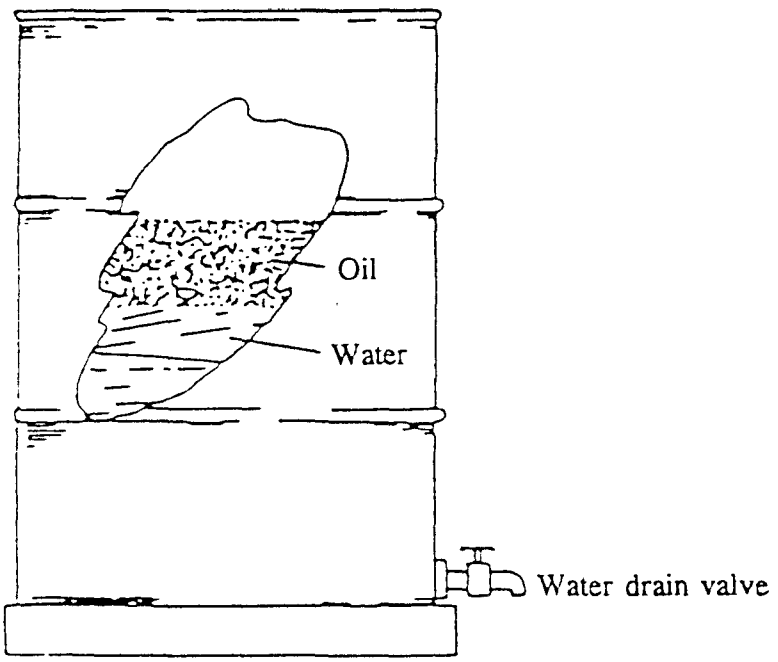
Separating the water from oil will reduce the amount of liquid to be transported to a disposal site and improve the oily liquid's acceptability to be refined. Some containers, such as tank trucks, are already equipped to separate the water from oil. However, not all tank trucks have this ability. Mechanical separators can be purchased to separate liquids.

Many have moving parts and heating elements to aid in separation. Simple gravity separators can be made using earthen dikes or drums to remove water from oil (**FIGURE 1**). Floating solids can be removed from oil using screens, pitchforks or shovels with oil drain holes in the blade.

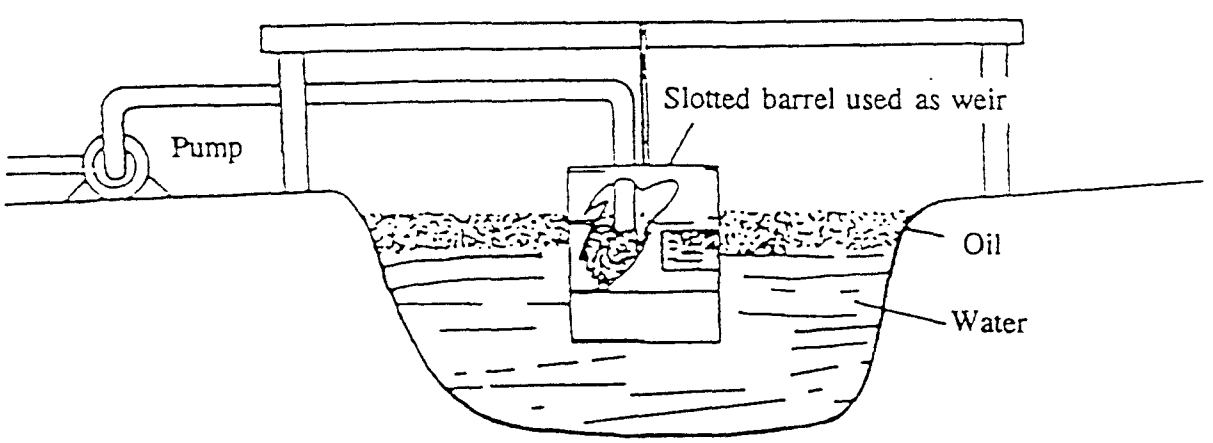
Oil on solids can be separated using water to dislodge the oil from the solid. Heavier than water solids (sand or gravel) can be placed in shallow pools and oil floated when sprayed with cold or hot water. The oily liquid can be separated using an oil/water separator. The oil on large materials such as logs and rocks may best be removed in place using water spray or steam cleaners using sorbents to collect oil. For solids that float (organic debris), the material should be placed on grating or an inclined surface (preferably concrete) to allow oil to wash away from debris. If oily solids are coated with light products such as diesel or number 2 fuel oil, mixing the material with hot sand can vaporize the oil and separate the oil from the solid.

In cold climates, viscous oil spills can be separated from solid debris such as sorbents, if time permits, by storing the oily debris until temperatures rise. The increased temperature will decrease oil viscosity so that oil will drip out of debris. Viscous emulsions are best broken by using mechanical oil/water separators which have heating elements and by using chemical demulsifiers. Some pumps and skimmers have attachments for the introduction of chemicals into the equipment to eliminate oil emulsions.

During spill cleanup operations, a series of oil/water separators can eliminate water from the oil. Waste water can be treated by aeration to remove volatiles, the filtration, ultra-filtration or activated carbon adsorption to remove nonvolatiles. Oily material collected is usually biodegraded, but if possible, recovered oil should be reused. Water is returned to the environment.



A. 55-gal. drum oil/water separator.



B. 55-gal. drum and sump oil/water separator.

FIGURE 1
OIL/WATER SEPARATION

Choosing a pump to transfer oil should be carefully considered. Some pumps may emulsify the oil and water picked up while other pumps may not work well against a strong back pressure. A general description of pump types follows:

Centrifugal Pumps

- can pump at very high rates
- simple, rugged, inexpensive and easy to repair
- best suited for pumping water or low viscosity oil
- will emulsify oil and water if pumped together
- sensitive to debris, especially stringy material
- cannot pump against high back pressure

Diaphragm Pumps

- simple, one moving part construction
- handles thick slurries and debris without stalling
- lends itself to ultra-safe, compressed air operation
- moderate tendency to emulsify oil and water
- cannot pump against high back pressure
- gives pulsating flow - undesirable for weir skimmers

Positive Displacement

- handles extremely high viscosity slurries or emulsions
- can pump against extremely high back pressure
- can pass debris up to two inches in diameter or more
- only slight tendency to emulsify oil and water
- generally more difficult to repair in the field than other type pumps
- more expensive than centrifugal or diaphragm of equal capacity

Vacuum Systems

- extremely gentle treatment of the fluids handled
- handles all kinds of debris up to several inches in diameter and several pounds in weight
- can pick up "chocolate mousse" in thick or thin layers from water or land surfaces
- cannot lift a water column more than 30 feet
- vacuum pump is usually large and expensive
- usually requires a large integral storage vessel to contain the recovered fluid.

Transportation of liquid debris is usually by barge, tank truck or railroad tank car. However, trucks with sealed drums can also be used. If using a tank truck, the size of tank truck chosen can depend on weight limiting roadways or bridges near the spill scene. For solid debris, the main problem has been oil dripping out of flat-bed or dump trucks. As oil solids warm, oil drips off of the solids and

onto the truck bed and onto roadways or parking areas, causing driving hazards and more cleanup problems. Plastic sheeting should be used in truck beds to reduce this problem.

The second consideration involves disposal options in the spill area. Generally, the options used to dispose of oily debris are:

1. reuse of oil
2. controlled burning
3. biodegradation
4. landfill
5. burial

Reuse of Oil

There are several possibilities for reuse of oily debris. Oiled sand and gravel can be used in road construction. However, the oily aggregate should be checked for leachability of toxic compounds. The materials can be stabilized by mixing the oily aggregate with a binding agent, such as lime. Oily liquids have been used in road construction, as well as in dust suppression on gravel and dirt roads. In coal burning power plants, oily liquids can be sprayed on coal piles to suppress dust. Some power plants can burn waste oily liquids with their other feedstock.

Another reuse possibility is recycling oily debris into waste oil reclamation facilities. Their acceptance process of an oily liquid may depend on the percentage of water in the liquid and the amount of other material in the liquid (leaves, sand, etc.).

Controlled Burning

Open burning of oily debris can sometimes be handled at the spill site after receiving approval from appropriate regulatory agencies. This is particularly true for small spills in remote areas. It is best to hire local volunteer fire departments to monitor and control the fire if a large area is to be burned. The main problem arises from smoke and particulate matter which may cause respiratory ailments in some people. Coke and associated particles have been known to travel up to 50 miles from the burn site.

Burning oil on water is difficult, if not impossible, because

1. oil may be hard to ignite,
2. burning oil heats the slick and causes it to spread,
3. wicking agents may be needed,

4. unburned residue remains (sometimes more toxic than oil),
5. burning creates hazards near population centers, and
6. burning is not effective on weathered or emulsified oils.

However, burning oil between ice sheets where oil is several inches thick is feasible. If oil is removed from the water, controlled burning can eliminate large quantities of oil debris. A rotary kiln incinerator has been developed which can pick up oiled sand, burn oil off of sand and drop sand back on the beach. Industrial incinerators can also be used to burn oil debris (**FIGURE 2**). This incinerator uses a blowing overfire air source to recirculate smoke through the fire to obtain a clean burn.

Burners mounted on skimmer vessels similar to burners used on offshore oil well testing can burn 50-50 mixtures of oil and water. Also, fireproof boom development will facilitate burning oil that congregates in thick pools.

Biodegradation

Biodegradation of spilled oil on water is usually not a disposal practice due to the length of time needed to degrade the oil. However, oil can be degraded on land. The biodegradation rate is dependent on temperature, pH of soil, and oxygen, water, and nutrient availability. In the biodegradation process, bacteria, fungi and yeasts break down the oil components piece by piece.

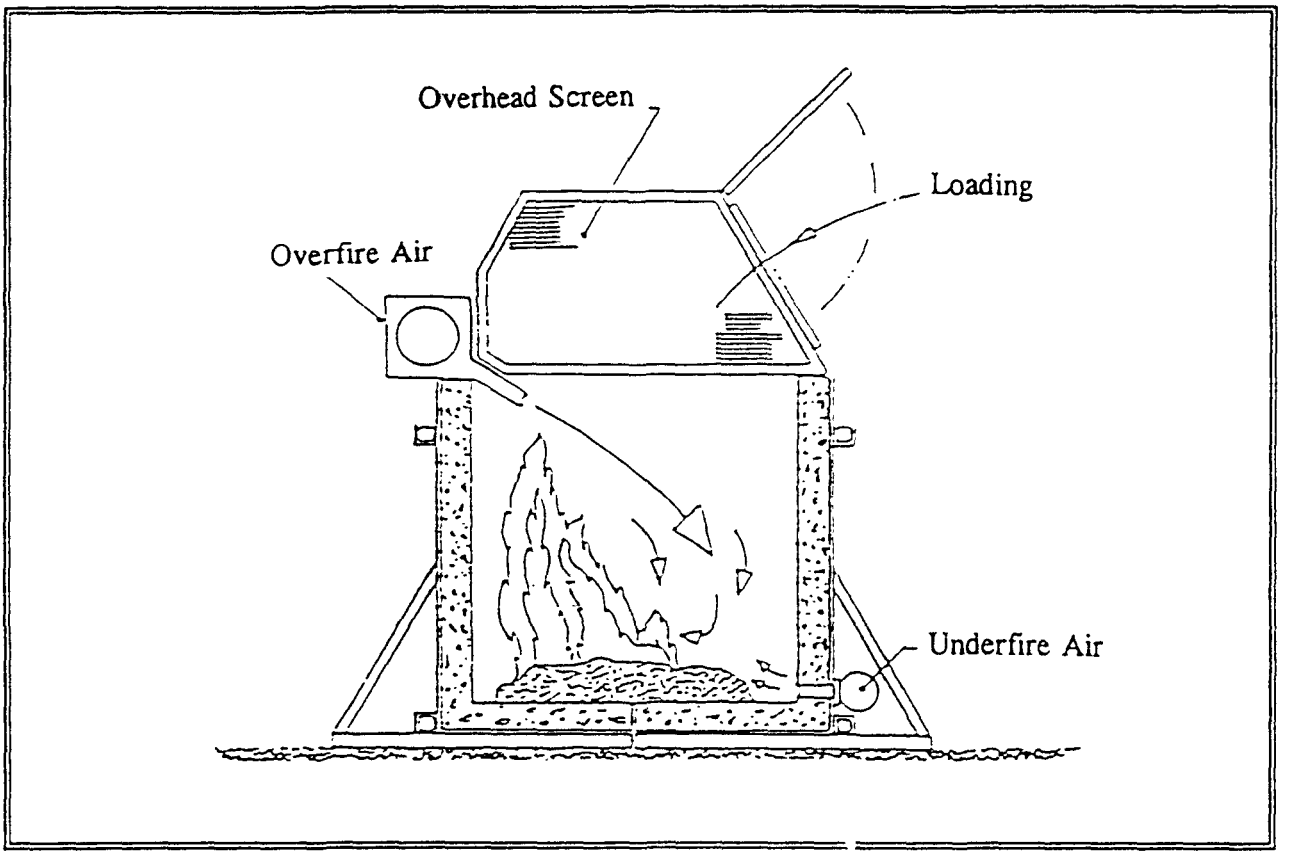


FIGURE 2
AIR PORTABLE INCINERATOR SCHEMATIC

In land farming, the oily material must be small in size and degradable such as waste oil, oily organic matter and salt-water free oil. Land farming can be practiced at exiting sites or by preparing a site so that oil applied to the soil does not run off or leach into surface or subsurface waters.

First, oily material is applied to the site. In cool climates, such as southern Canada, one to two inch thick oil layers are added to a site, while in warmer climates, such as southern United States, three to four inch thick oil layers are added to a site.

These estimates will vary with soil type, temperature, oil type and oil amount previously in soil.

Water and short-chained hydrocarbons are permitted to evaporate while the surface is slippery. Once the site allows a tractor to be driven over the surface, a rototiller, plow or harrow can be used to break up the oily crust. Some land farm operators claim that deep plowing to a six-inch depth works best. In warm, humid areas, a rototiller will allow an eight- to 14-inch depth for oily material mixing. Subsequent mixing will add oxygen to the soil which will expedite biodegradation. Mixing can be as often as once a month.

Oil may biodegrade in one to three years under normal land farm practices. In one study, it was determined that oil decomposed at a rate of about one-half pound of oil per cubic foot of soil per month. In another study oil was applied at 500 to 1500 barrels of oil per acre per year using only the upper six inches of soil.

In a study by Shell Oil Company (Houston) 3,000 gallons of refinery waste per acre per month were decomposed during the summer months. Other biodegradation rates vary from 0.1 to 22 percent of the oil degraded monthly. The use of fertilizer and weekly soil tilling (aeration) was employed to increase biodegradation rates.

In some cases the biodegradation rate has been doubled by adding fertilizer at the same application rate as used for corn. Some land farm operators claim that the cheapest high nitrogen fertilizer is the best fertilizer. Generally, oily waste changes from an oily, black liquid to a black surface sludge to a dry, cakey soot-like matter that crumbles in the hand. The soil changes also. An alkaline bentonite-like clay soil that was a very hard cake when dried changed to a soft loam soil after land farming, presumably due to the addition of organic matter. Other changes in most oil-conditioned soil are increased soil moisture retention and increased vegetation growth.

Composting is not a standard disposal practice in the United States. However, in some countries, oily organic matter has been added to waste garbage sites. Since biodegradation results in the release of heat, temperatures can increase which will decrease oil viscosity. This may increase oil penetration in the ground. Oily debris can easily be over-applied to a garbage site. Proper application degrades most of the oil in a few to several months, depending on the temperatures.

Landfilling and Burial

The main difference in landfilling and burial is that landfill sites have been established before the oil spill, and oil debris can be mixed with other waste in disposal, while burial sites are established after the oil spill, and oil debris may or may not be mixed with other waste. Both techniques require approval from the government agency in charge of landfills.

Oily liquids can be stabilized to reduce oil leaching into the ground by the addition of chemical binding agents, such as quick lime. The chemical will react with the oil to produce a practically insoluble powder or block.

Site choices should be determined prior to a spill when prices can be agreed upon in a relaxed climate. Contract disposal services should be investigated to determine if the firm is financially responsible, technically capable, protected by insurance and reputable. Local air or water pollution control officers may be able to recommend contractors that meet state requirements.

FURTHER READING

CONCAWE 1980. Disposal Techniques for Spilt Oil, CONCAWE Report N. 9180. The Hague, 51 pp.

Day, T. 1979. Characteristics of atmospheric emissions from an in-situ crude oil fire. EPS-4-EC-79-1. Environmental Protection Service, Ottawa, Ontario. 79 pp.

Farlow, J.S. and C. Swanson. 1980. Disposal of oil and debris resulting from a spill cleanup operation. ASTM Special Tech. Publ. 703. American Society for Testing Materials, Philadelphia, PA. 147 pp.

Farlow, J.S., D.E. Ross, and R. Landreth. 1977. Practical Recommendations for Oil Spill Debris Disposal. In 1977 Oil Spill Conference, American Petroleum Inst. pp 265-269.

Hansen, W.G., D.E. Ross, and J.R. Sinclair. 1979. Oil Spill Debris Disposal Hardware System: Methods for Conceptualization and Development. In 1979 Oil Spill Conference. American Petroleum Inst. pp. 507-513.

Leo, R. and B. Nill. Disposal of oily sludges and oil spill debris by using the patented OCR-process. In Proc. 5th Arctic Marine Oil Spill Program Technical Seminar. Environmental Protection Service, Ottawa, Ontario. pp. 341-348.

SECTION 11

PART I

CONTAINMENT AND RECOVERY OF OIL ON GROUNDWATER

Although spilled oil may adhere to soil particles, roots and rocks, changes in land geology or water regimes can cause trapped oil to enter groundwater. In other cases, spilled oil easily penetrates the soil to contaminate groundwater. Since oil on groundwater weathers and degrades slowly, if at all, oil can affect potability and its use in industrial processes for decades or centuries. This is important since about one-half of the population of the United States depends on groundwater (primarily the small to medium sized communities and farms).[1]

Many large groundwater spills have been well publicized. For example, a refinery in Brooklyn, New York apparently had tanks, pipelines or valves leaking for years. Approximately 20 million gallons of petroleum distillate was estimated to be under 70 acres of industrial and residential property[2]. During the first year of cleanup 95,000 gallons were recovered. Oil recovery will take years. An estimated $3 to 4 million will be spent on recovery and cleanup[3].

Small spills can also influence groundwater use until the oil product has been removed. This section will discuss groundwater oil movement, groundwater monitoring, oil containment and oil recovery techniques.

OIL ON GROUNDWATER

When oil penetrates the subsoil to the groundwater or aquifer, the oil can move on top of the groundwater by spreading and by groundwater flow. The water table is that level of the water observed in wells. However, in soils, water can rise above the water table due to capillary action. Just as the liquid level will appear higher in a straw or the corner of a towel will transport water into a towel, water sill fill spaces in the soil above the water table. Oil entering this water will spread and move on the capillary fringe (**FIGURE 1**). The capillary fringe can vary from three to 72 inches, depending on soil pore geometry. Permeability indicates a soil's ability to allow fluids to pass from one space in the soil to other spaces in the soil. Larger spaces due to large soil particle size have higher permeability; therefore, low permeability may be one-half inch per year and high permeability several feet per year.

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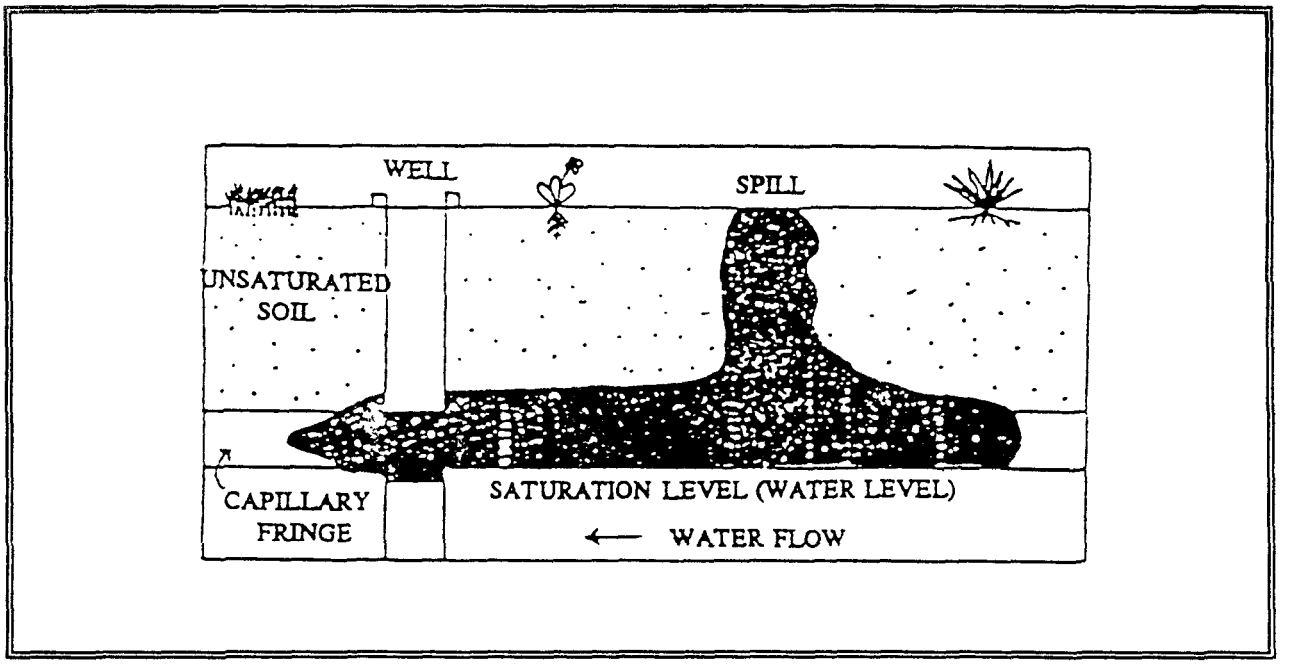

FIGURE 1
OIL ENTERING GROUNDWATER (horizontal view)

At first, oil thickness increases under the influence of continued descending oil. The force or pressure exerted by the accumulation of oil will displace water in the capillary fringe and possibly in the groundwater. As gravity influences the oil to spread and the pressure is released, the groundwater returns to its former level. In a uniform soil (all gravel, sand or silt) oil will spread and move with water flow and form an egg-shaped oil plume (**FIGURE 2**).

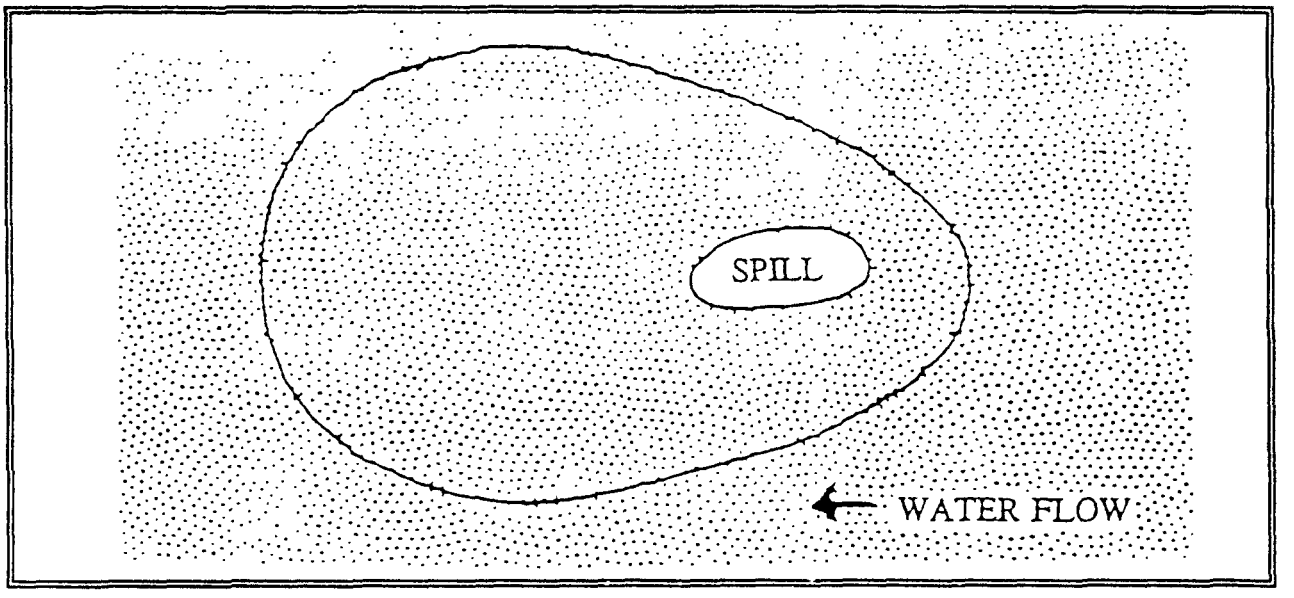

FIGURE 2
OIL ON GROUNDWATER (tangential view)

If the oil comes into contact with a different size soil particle layer or rock fissure, it will change the oil spreading pattern. An impermeable layer would not only change the shape of the plume, but also change the direction of oil flow as shown in **FIGURE 3.**

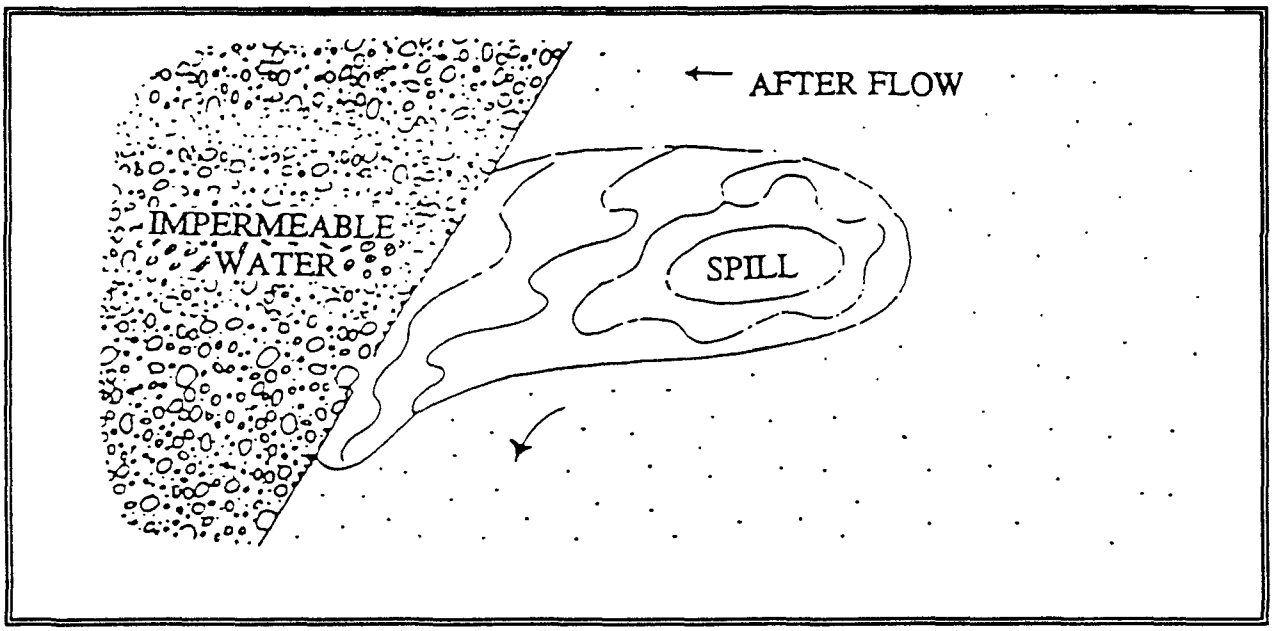

FIGURE 3
OIL ON GROUNDWATER WITH IMPERMEABLE LAYER

As oil flows come oil (25 to 40 percent) will fill pore spaces, adhere to soil particles and rock surfaces and become immobile[4], while soluble oil components can mix into the groundwater. If enough oxygen is available slow bacterial and/or chemical decomposition can occur. In some cases decomposition increases water soluble components up to 10 times[5]. Although the factors which affect oil movement on groundwater are many and often interact with each other, spreading can be estimated using the following formula[6]:

$$S = \{(1000)(V) - [(A)(R)(D)(K)]\}/F$$

Where:

S	=	maximum spread of oil on the water table in m^2
V	=	volume of infiltrating oil in m^3
A	=	area of infiltrating at surface in m^2
R	=	retention capacity of soil above water table in liters/m^3
D	=	depth of water table
F	=	oil contained above capillary fringe in liters/m^2
K	=	the approximate correction factor in various oil viscosities

K for gasoline = 0.5
K for kerosene = 1.0
K for light fuel oil = 2.0

"R" and "F" values are in **TABLE 1**

TABLE 1 "R" and "F" VALUES FOR VARIOUS SOIL TYPES		
SOIL	**R**	**F**
Stones, course gravel	5	5
Gravel, coarse sand	8	8
Coarse sand, medium sand	15	12
Medium sand, fine sand	25	20
Fine sand, silt	40	40

In using this formula, inherent errors in data can result from water table fluctuations (rises or falls with the season) and by underestimating or overestimating "D" (the depth of groundwater). Also, oil thickness on the water table is not the same as oil thickness measured in wells. In some find sand or silt soils, oil in a well might be lower than oil on the groundwater. This is due to a break in the capillary fringe caused by the well.

However, the thickness of the product in a well is more of an indication of the rate the product moves through the soil or the position of the well in the plume[7].

The movement of oil due to groundwater flow can be estimated by the following equation[8].

$$Q = 1/2\ P\ \{(h_2^2 - h_1^2)/L\}$$

Where:

Q	=	flow rate of groundwater in m^3/day/m
P	=	permeability in m/day
h^1	=	height of groundwater
h^2	=	height of groundwater
L	=	length or distance between h_1 and h_2

Both of the estimates are usable for shallow groundwater problems or initial planning for deep groundwater problems. However, in deep groundwater problems, before time and money are spent on containment and recovery techniques a monitoring system should be initiated to delineate plume characteristics and to aid in effective containment and recovery[9].

OIL IN GROUNDWATER MONITORING

The first step in successful groundwater monitoring is the preliminary investigation. Information sources such as U.S. Geologic Survey maps and tables, Soil Conservation Service maps and tables, state geologic surveys, water resource personnel, university geology departments, city water department maps and personnel, past oil company personnel or companies that have drilled in that area and consultants can be used. The information gathered can help you determine:

1. groundwater flow characteristics
2. aquifer to surface water boundaries
3. recharge areas
4. local abstraction points (i.e., city groundwater wells)
5. flow mechanisms through fissured or highly permeable zones

The second step in field investigation. Such an investigation may include soil samples, water samples or other hydrogeologic tests. Soil samples may be examined for grain size in order to accurately define the nature and location of the soil horizons. From core samples one may also determine the porosity of each soil horizon. The boreholes may be used for water permeability measurements. In addition, hydrocarbon percolation tests may be made. The groundwater head distribution may be studied by inserting standpipes (for monitoring he water level) into the completed boreholes. Ground penetration radar can be used for defining geologic sequences, investigating fractures and locating buried objects. Electromagnetic frequency techniques can graphically show horizontal and vertical characteristics such as aquifer boundaries and geologic interfaces[10]. Both of these latter methods can improve mapping of oil plumes over plume estimates from just drilling wells. In fact, using these methods, in some rare cases, may prevent unnecessary drilling.

With some highly volatile products, the spread of the plume can be monitored by the vapors migrating through the soil surface. Although its presence in basements, oiled wells, trenches and along disturbed soils (i.e., buried pipelines) can indicate where the oil is, its absence does not indicate that the oil is not present. Shallow boreholes and hydrocarbon monitors or explosimeters can help identify vapor penetration[5]. Field investigation may include choosing a water sampling program. A water sampling program may involve drilling wells, water and soil analysis and/or mathematical modeling to estimate plume size and oil movement.

Generally, monitoring wells can be classified into three types: a piezometer, observation well and a pumping well. A piezometer is a small diameter well that is tightly sealed so that detection of static pore water pressure can be used to determine the true direction of groundwater flow measured. More than one piezometer can be installed in a well boring by sealing piezometers at different depths from each other. Piezometers can be either pneumatic or electric[11].

An observation well is larger in diameter than a piezometer well and is used to measure oil/water levels. Observation wells have been used to determine the direction of groundwater flow by injecting a tracer such as fluorescein, Rhodamine WT or salt water among a number of observation wells[12].

While a pumping well is the largest in diameter of all, it is used for the introduction of pumps or other equipment. Water samples can be obtained from observation and pumping wells. However, certain problems may arise in each well type.

Not only is the type of well important but also where one drills a well. Permission must be obtained from those individuals or companies that have surface and mineral rights. The location of underground structures such as gas, petroleum, or water pipelines, powerlines, telephone lines, sewer lines and storm sewer lines should be identified and visibly marked.

Monitoring wells should be placed in a down gradient direction to the flow of groundwater and spaced far enough apart to determine plume size. At least one well should be drilled up gradient to ensure that oil was not missed. Monitoring wells should be used to confirm the preliminary findings. Some situations can complicate groundwater monitoring and oil recovery. One of the more difficult situations involves a land spill on or into bedrock[13]. The oil moves into fissures and crevices and along joints of bedded rock and bedding planes. The upper layers of limestone, basalt and sandstone usually show pronounced fissuring, especially if the area is in a zone of tectonic disturbance.

Predicting the underground movement of oil in such areas is quite difficult. Spilled oil may follow fault lines in the direction of their dip. Sometimes recovery wells may be drilled along a fault line to intercept the spilled oil (**FIGURE 4**). This technique in particular requires sound geological information before attempting any drilling operations.

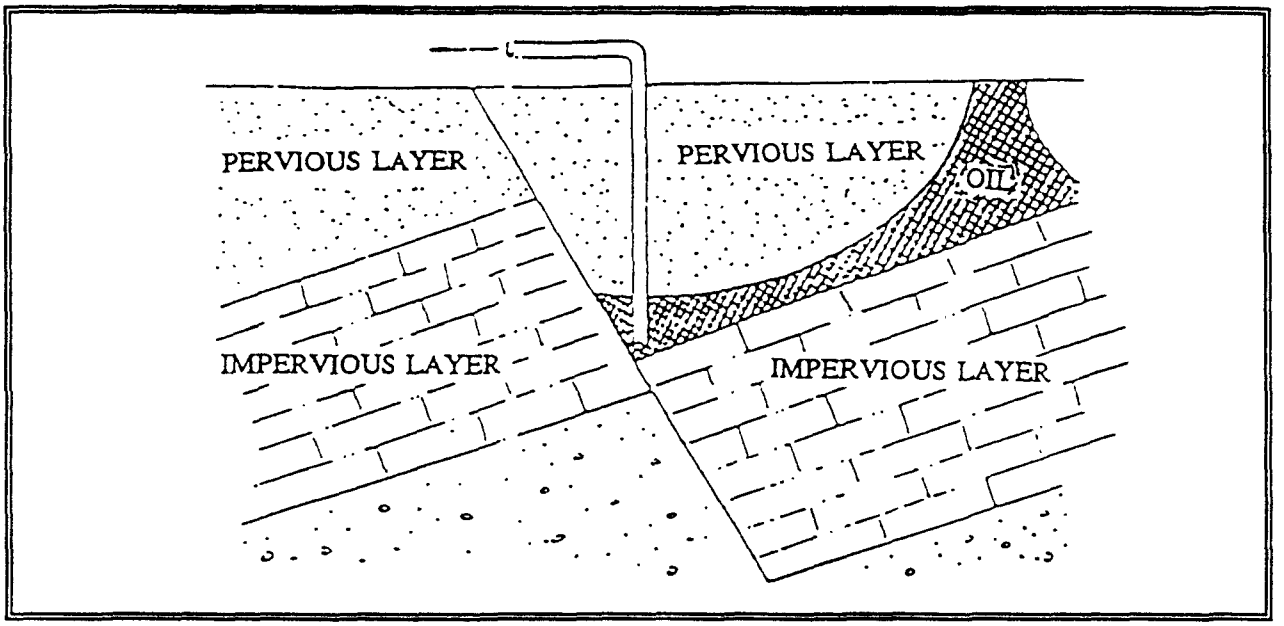

FIGURE 4
RECOVERY WELL ALONG FAULT LINE

In limestone, gypseaous and saliferous rock, wide fissures, crevices and solution channels may be present (**FIGURE 5**). This represents a most difficult case, as solution cavities may hold hydrocarbons for years, releasing them only in time of drought or flood. In central Pennsylvania in 1958, 50,000 gallons of crude oil were lost in a limestone terrain honeycombed with solution channels. Recovery wells were drilled and much of the product was retained on the site. However, in the mid-1960's a drought caused the water table to drop and oil stored in the limestone was released, causing water well contamination. The problem persists today[14].

One method used in such areas to trace dispersion direction is fracture trace analysis. Air photo interpretation is used to find the major fractures which could be transporting the spilled product[14]. Observation wells may then be drilled in order to locate the oil.

These combined data offer a working knowledge of[15].

1. the amount of hydrocarbon that must be spilled in order to reach the groundwater.
2. the direction and rate of migration of the product once the groundwater is contaminated,
3. the geological or hydrogeological boundaries that exist, and
4. the rate at which the product may be extracted from the ground.

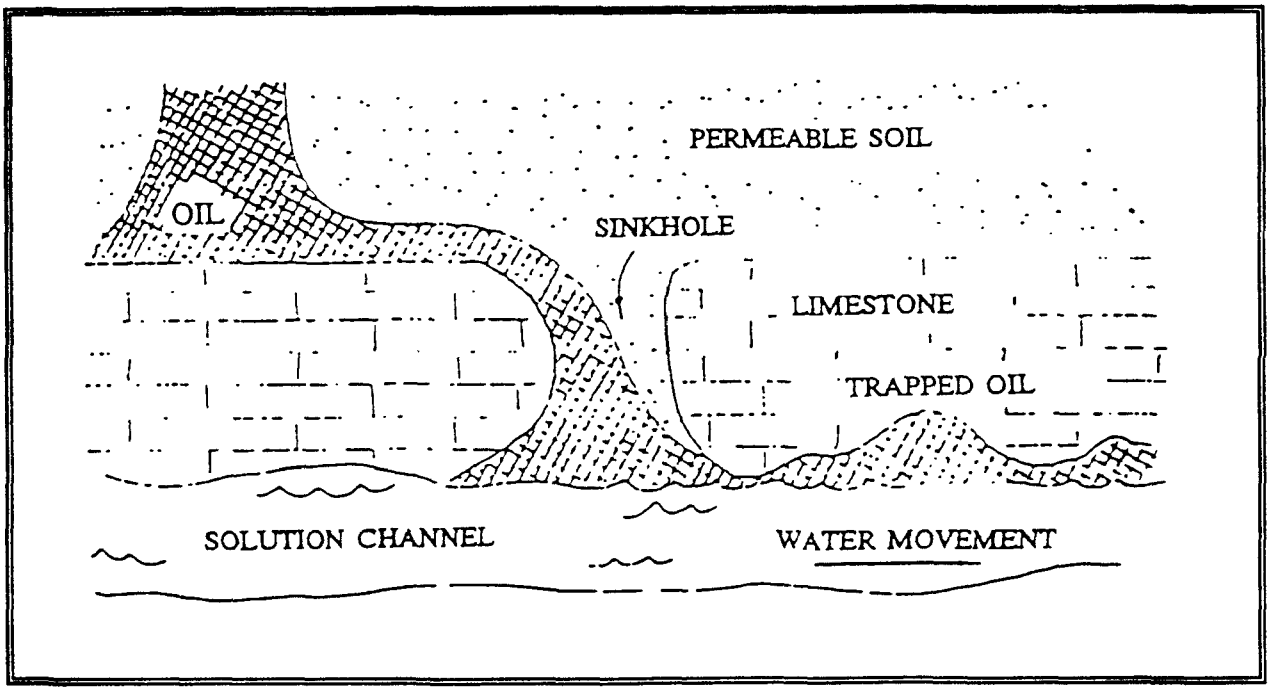

FIGURE 5
SOLUTION CHANNELS IN LIMESTONE

This information can be translated into a cross-sectional map showing the probable direction of travel of the oil as it follows the groundwater system (**FIGURE 6**).

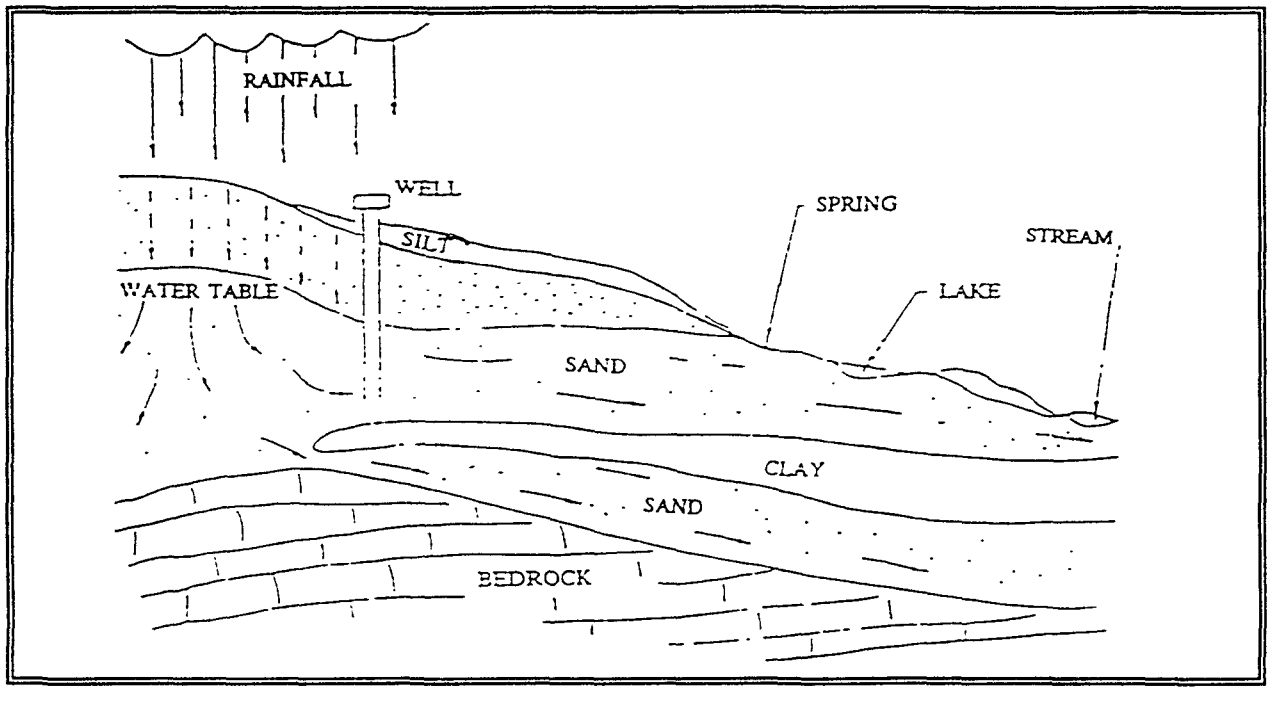

FIGURE 6
SAMPLE GROUNDWATER SYSTEM

SAMPLING DEVICES FOR MONITORING WELLS

Sampling devices may be as simple as an observation well with oil finding paste on a stick or as complex as intricate well casings which are designed to take samples and pressure readings at various depths. Although existing wells may be used, date analysis can become complicated. Drilling fluids can change the chemical or biological well environment, water from several aquifers can flow into a single well, surface contamination into a well can occur, and casing materials and pumping equipment can contaminate sampled water[16]. High concentration of oil in groundwater may not require great accuracy in measurements so that polyethylene pipe casings can be used. However, when accurate samples are needed, a number of problems exist on choosing materials.

1. metal surfaces can catalyze certain chemicals (i.e., iron),
2. lubricants from pumps, oils on pipes, and glues from pipe joints can contaminate samples, and
3. plastics in pipes, transfer hoses, or sample bottles can absorb some organic contaminants or bleed contaminated elements, affecting samples[17].

To avoid problems, metal or plastic materials should be soaked and washed before use in boreholes and glues should not be used in joining well casings. In constructing sampling wells for trace concentrations of some oils, glass or teflon materials may be needed in well casings or sampling apparatus[16].

Sample devices vary with the number of samples per well and with well depth. In the past, obtaining multiple samples at various depths has required sampling in different wells. Recently a single well with a multiple sampler has been used to obtain the same results[11].

Shallow aquifer sampling (less than 30 feet from surface) will allow the use of vacuum pumps to transport samples out of wells. However, deep aquifers (greater than 30 feet from surface) will necessitate submerged pumps or air-lift systems. The air-lift system is a pressurized inert gas system with chambers and check valves to force samples to the surface. The advantage of an air-lift system is that samples are not oxidized since it does not contact any oxygen in the air. Several air-lift systems can be used within a single well if separated by seals. They become increasingly cost effective with increasing depths. The major problem with the air-lift system is that the check valves used in sample transfer can become clogged with soil particles if samples are not screened properly[17].

For deep wells, changes in pressure can cause chemical changes such as precipitation in the sample[17]. With the additional data from samples, accumulation of oil and direction of flow can be confirmed and recovery devices can be placed for the most cost effective program.

PRODUCT RECOVERY

Some of the oil on groundwater can be removed three ways:

1. Open trenches
2. Back filled trenches with recovery crocks
3. Extraction wells

Water table depth and embankment slumping are the primary factors in selecting a recovery device.

When water table depth is less than nine feet (3m) from the surface, trenching can be an economical method in oil removal. The depth of the trench should be about three feet (1m) below the groundwater level and the width no more than six fee (2m). Where possible the trench should span the entire down gradient edge of the oil plume (**FIGURE 7**).

Oil skimmers or vacuum lines can be lowered into the trench to recover oil and a groundwater depression pump used to increase the rate of oil and water flow to the trench. If the trench cannot be extended along the length of the oil plume, an impermeable barrier can be installed to divert liquid flow towards the trench. For example, bentonite clay slurry can be pumped into narrow slots in the ground or sheet pilings can be inserted or driven into the groundwater or aquifer base[10].

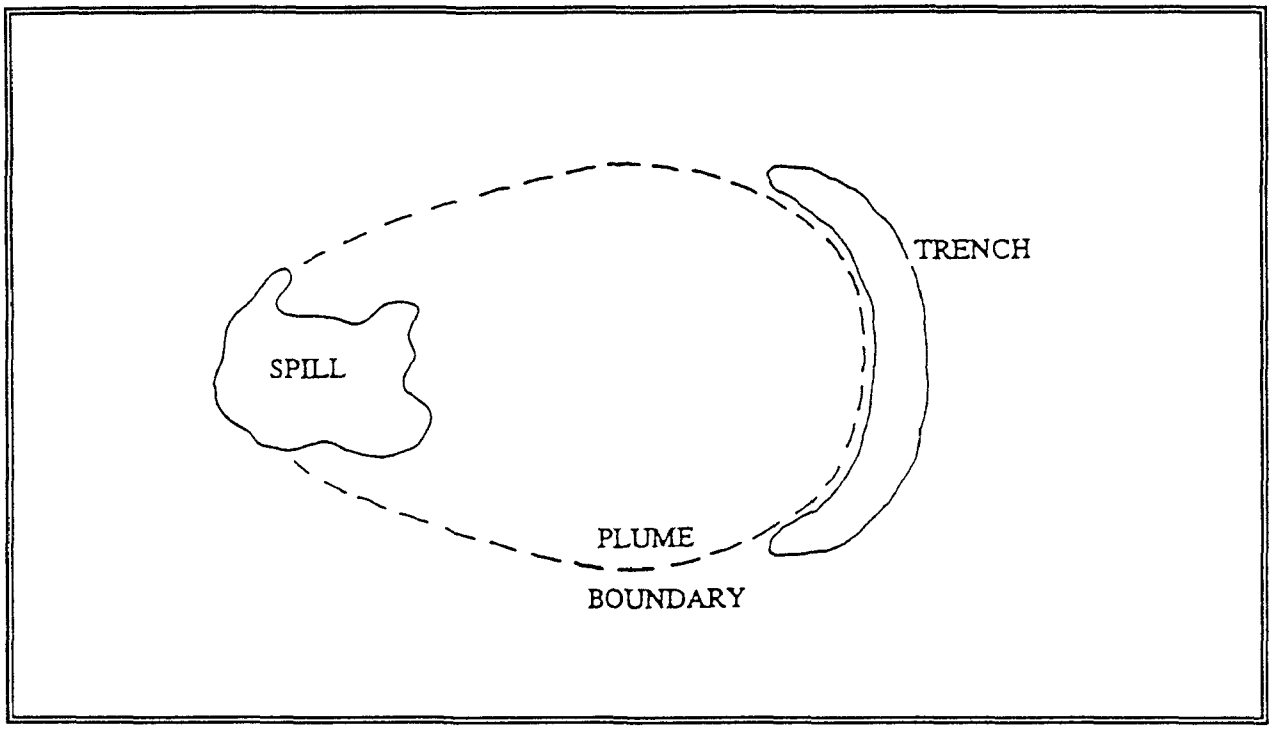

FIGURE 7
AERIAL VIEW OF TRENCHES

When open trenches cannot be maintained because they rapidly fill with mud or if freezing weather would freeze water in/on open trench, a recovery crock can be used. A recovery crock consists of a pipe that reaches from the surface to about six feet (2m) below the water table. Some pipes can be up to six feet in diameter. The pipe is perforated with slots or holes (2.5 inches) to allow oil and water to enter. After a hole is dug larger than the diameter of the pipe, pea-gravel is placed in the bottom of the hole to decrease turbidity by limiting soil particle movement as water levels change. Next, the crock (pipe) is lowered into the trench so that the end stands on the gravel bed. Before the trench is filled in with a porous material (gravel, sand), a plastic lining or other impermeable barrier is used to line the down gradient side of the trench above and especially below the water table to guide oil to the crock and halt oil plume migration (**FIGURE 8**). A variation of this system is to have radiating interconnecting perforated pipe at the water table to guide the product to the crock.

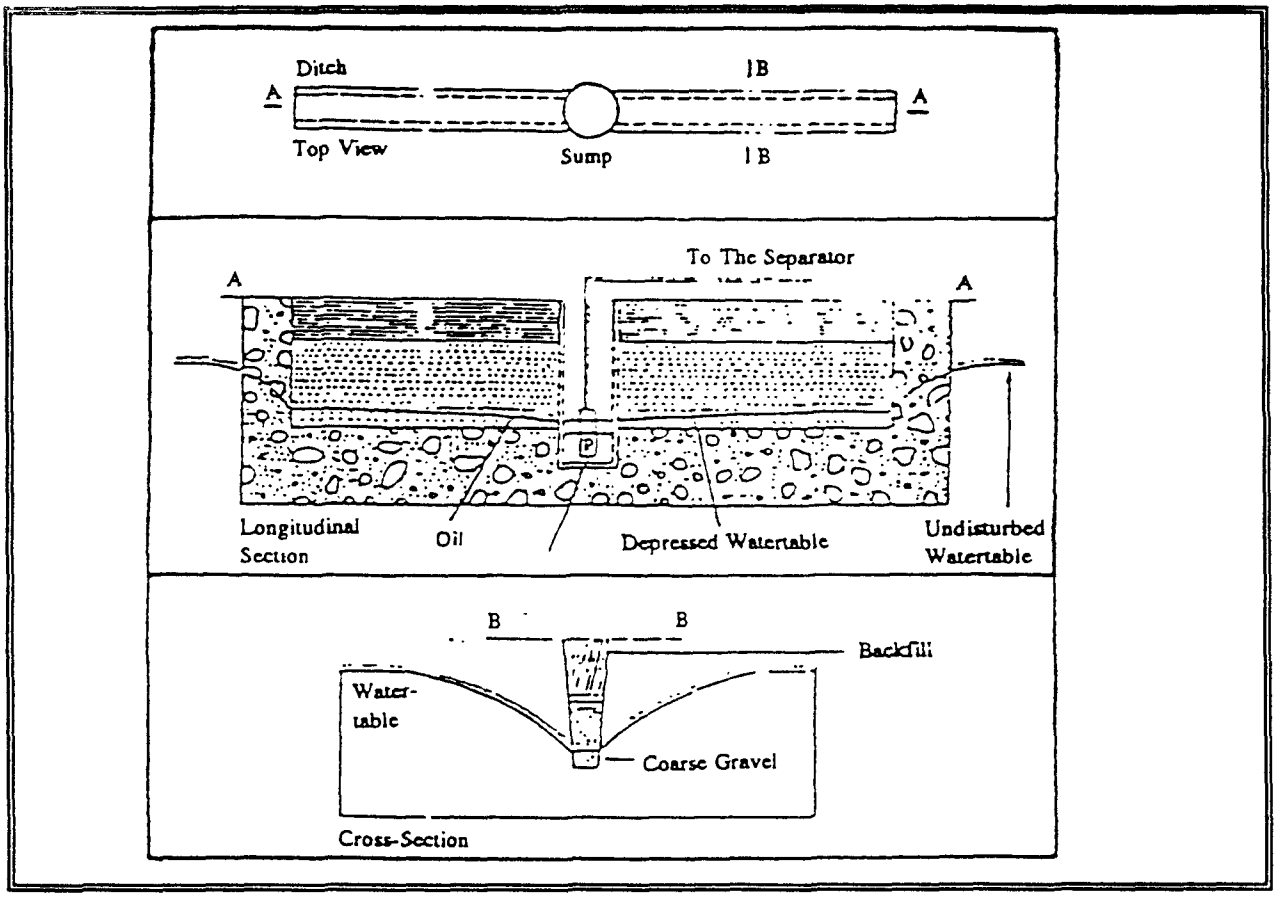

FIGURE 8
RECOVERY DITCH WITH SUMP[6]

Product in crocks can be removed with skimmers or vacuum devices. Further, a groundwater depression pump can be used to create a cone of depression to encourage liquid flow toward the crock and increase oil recovery rates (**FIGURE 9**).

For deeper water tables, augers, water jets, driven well points and rotary rigs can be used to dig a recovery well (**TABLE 2**). Wells should be dug deep enough below the water table to allow for any groundwater depression techniques used. Auger types vary. Hand held power augers with six inches outside diameter can drill to eight feet. Truck mounted augers with two inches outside diameter can drill to 120 feet. Hollow stem augers may be used to take undisturbed soil samples. Rotary rigs can be used for sampling soil when drilling and for sampling water upon completion of the observation well. Depths of 1500 feet can be drilled.

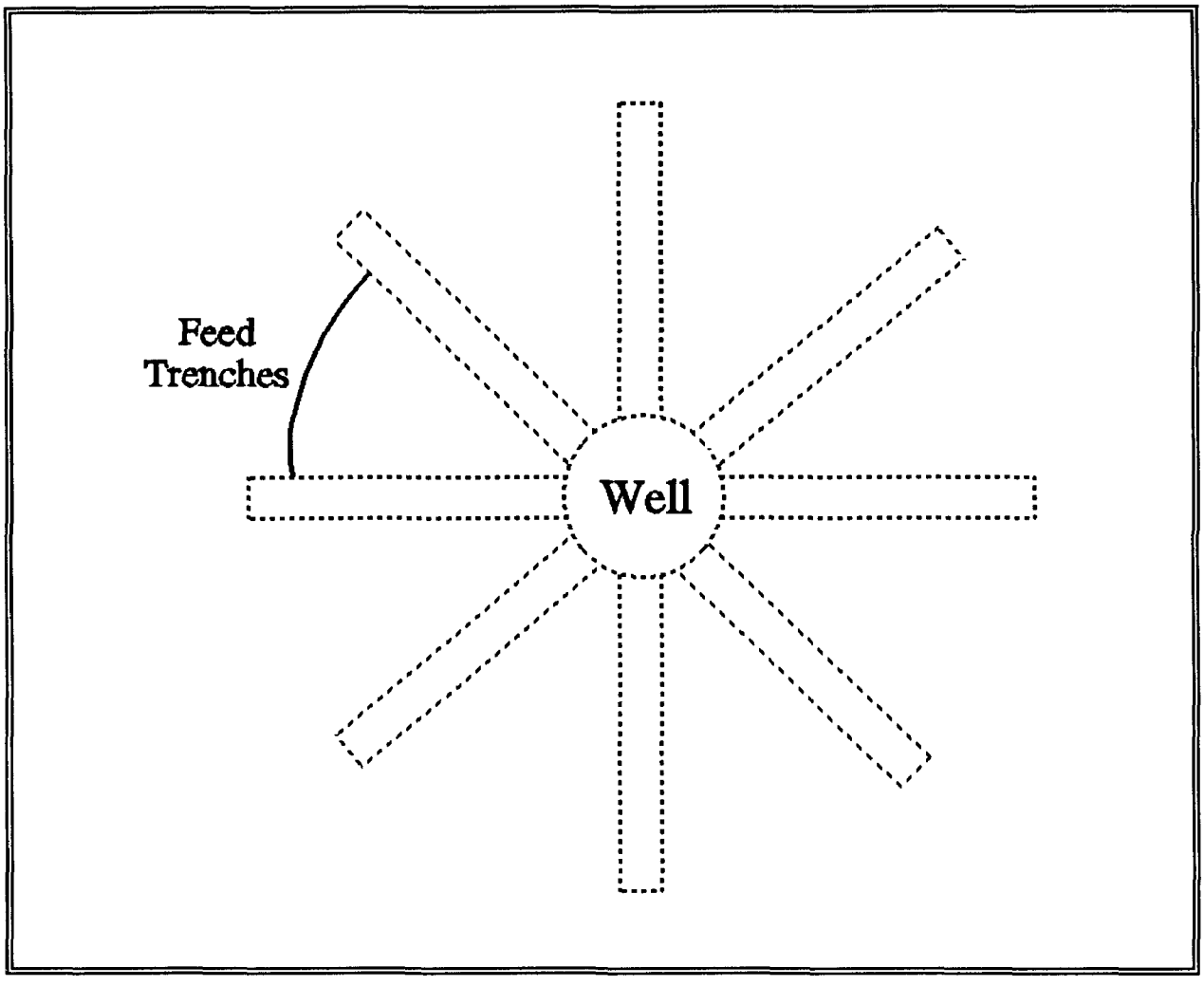

FIGURE 9
COLLECTION WELL WITH FEEDER TRENCHES[6]

TABLE 2
BASIC WELL-DRILLING METHODS[17]

Drill Type	Normal Diameter Hole	Maximum Depth	Average Time per Hole	Normal Expense	Advantages	Disadvantages
1. Rotary	4" - 20"	Unlimited	Fast	Expensive	1. Good for deep holes 2. Can be used in soils and relatively soft rock 3. Widely available 4. Control caving	1. Need to use drilling fluid 2. Potential bore hole damage with drilling fluid 3. Requires drilling water supply
2. Stem Auger	4" - 8"	30 - 50 ft.	Fast under suitable soil conditions	Inexpensive to moderate	1. Widely available 2. Very mobile 3. Can obtain dry soil samples while drilling	1. Difficult to set casing in unsuitable soils (caving) 2. Cannot penetrate large stones, boulders, or bedrock
3. Hollow stem auger	4" - 8"	30 - 50 ft.	Fast under suitable soil conditions	Inexpensive to moderate	1. Good for sandy soil 2. Can set casing through hollow stem 3. Very mobile 4. Can obtain dry soil samples and split spoon samples 5. Controls caving	1. Casing diameter normally limited to 2" - 3" o.d. 2. Cannot penetrate large rock boulders or bedrock 3. Limited availability 4. Normally cannot be used for recovery wells
4. Kelley auger	8" - 48"	90 ft.	Fast	Moderate to expensive	1. Can install large diameter recovery wells 2. Drills holes with minimum soil wall disturbance or contamination 3. Can obtain good soil samples	1. Large equipment 2. Seldom available in rural areas 3. May require casing while drilling

TABLE 2
BASIC WELL-DRILLING METHODS[17]

Drill Type	Normal Diameter Hole	Maximum Depth	Average Time per Hole	Normal Expense	Advantages	Disadvantages
5. Bucket auger	12" - 72"	90 ft.	Fast	Moderate to expensive	1. Can botain good soil samples 2. Can install large diameter recovery wells	1. Hard to control caving 2. At times must use drilling fluid 3. Normally very large operating area required
6. Cable tools	4" - 16"	Unlimited	Slow	Inexpensive to Expensive	1. Widely available 2. Can be used in soil or rock	1. Slower than other methods 2. Hole often cracked 3. May require casing while drilliong
7. Air hammer	4" - 12"	Unlimited	Fast	Expensive	1. Fast penetration in consolidated rock	1. Inefficient in unconsolidated soils 2. Very noisy 3. Control of dust/air release 4. Excessive water inflow will limit use
8. Casing driving	2" - 24"	60 ft.	Slow to moderate	Inexpensive	1. Very portable 2. Readily available	1. Limited to uncon-solidated soil - cannot penetrate large rocks, boulders, bedrock. 2. Difficult to obtain soil samples 3. Generall inefficient method to install recovery well
9. Dug wells	Unlimited	10 - 20 ft.	Fast	Inexpensive	1. Readily available 2. Very large diameter hole easily obtained	1. Caving can be severe problem 2. Limited depth 3. Greater explosive hazard during excavating into hydrocarbons

Basically, wells can be classified into three types:

1. Single pump well
2. Double pump well
3. Double shaft well

Single pump wells use one device to remove oil and contaminated water such as a skimmer or vacuum device (**FIGURE 10**). The major problems with single pump wells are: large volumes of oil and water require large capacity storage, separators are needed to treat oil/water mixtures, some pumps emulsify water with oil and the pump must be able to handle air, liquid and debris. The advantages for the single pump well are: they can be less expensive to install and operate than other recovery wells (especially when needed for a short time) and they are effective when low oil/water recovery rates are expected.

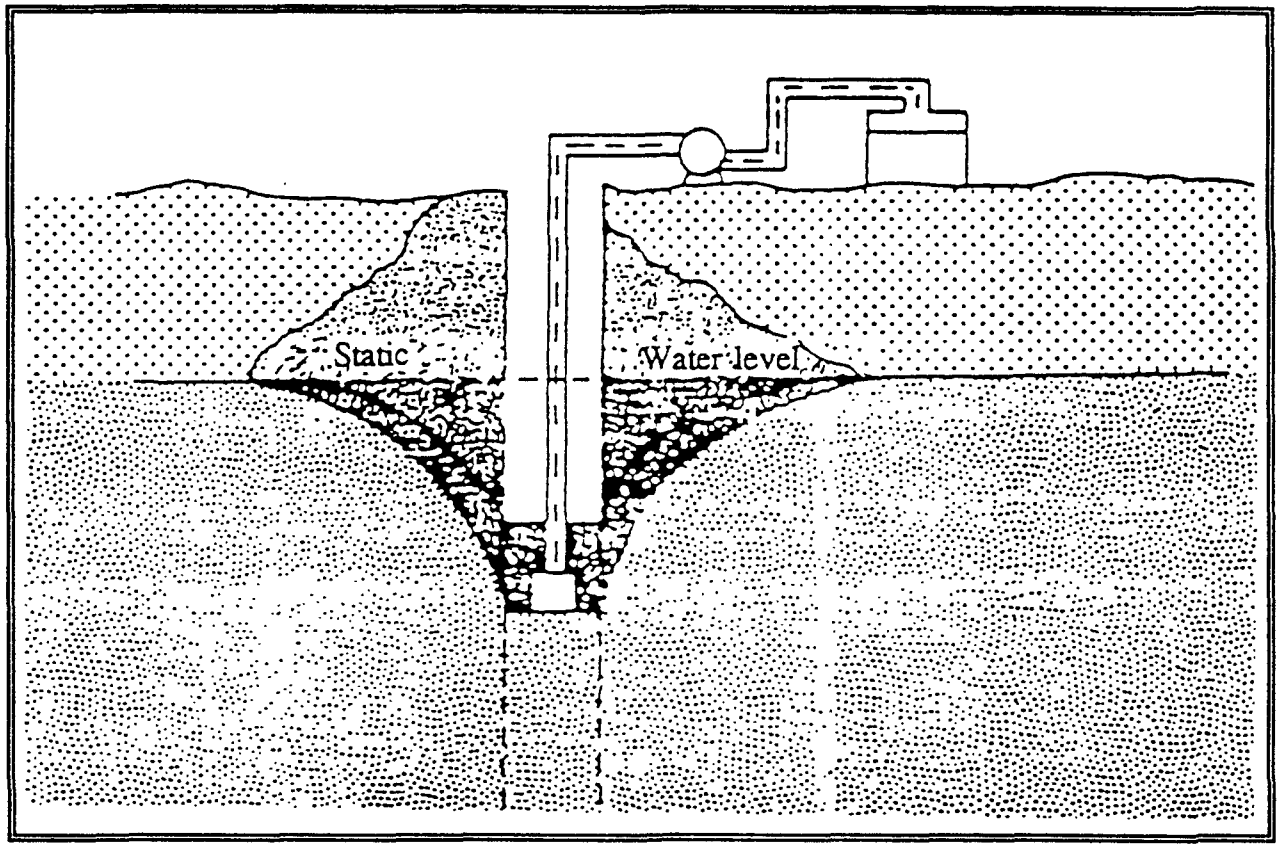

FIGURE 10
SINGLE PUMP RECOVERY SYSTEM[6]

The double pump well combines a product recovery device and a groundwater depression device into a single well (**FIGURE 11**). The double shaft well is similar to the double pump well except the oil recovery device and the groundwater depressing devices are in separate well casings (**FIGURE 12**). The separation of devices allows better regulation of water level and flow within the well. The main advantages of double pump and double shaft wells are: they are cost effective for large spill volumes, they can recover relatively pure products and they can be made fully automatic[6].

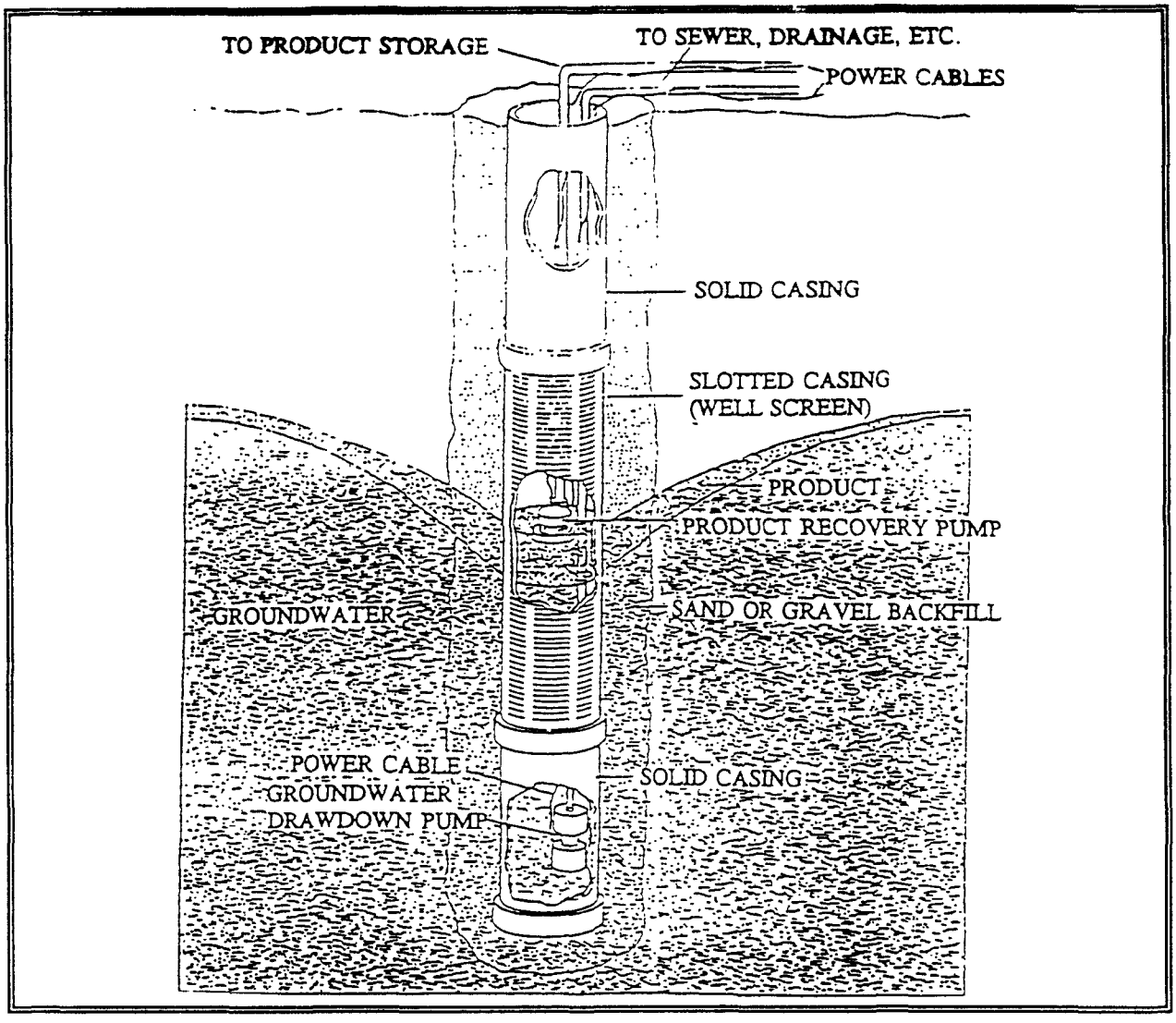

FIGURE 11
DOUBLE PUMP RECOVERY WELL

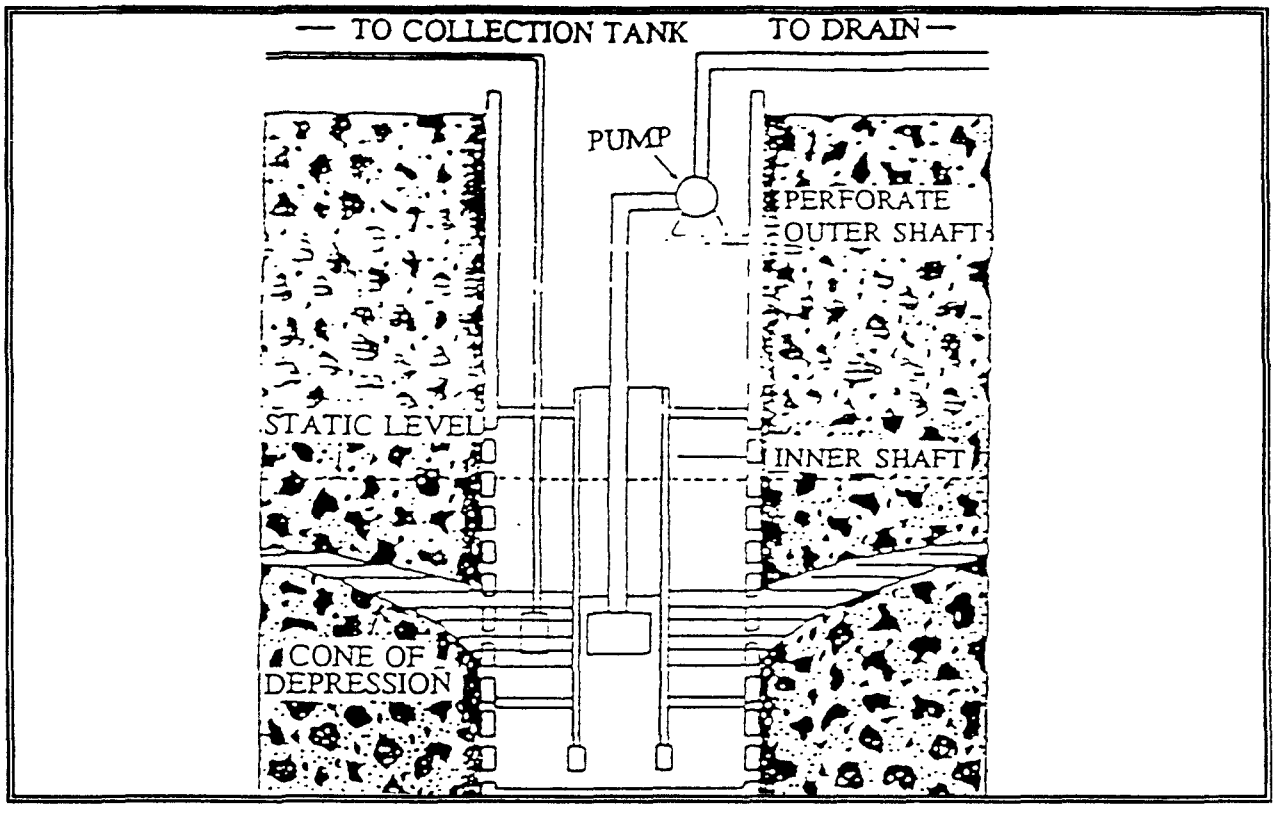

FIGURE 12
DOUBLE SHAFT WALL

When the groundwater depression device creates a cone of depression, care must be taken to avoid pumping the well dry or severely lowering the water level around any one well. Past problems with this technique include: oil displacing water in the soil and causing additional contamination and surface subsidence by collapse of geologic structures[6].

In using groundwater depression pumps, provisions must be made to handle large volumes of water pumped from a well. Oil-water separation should be used before water is either transported to a waste handling facility or discharged onto the land. In some cases water can be reinjected into the ground to increase the recovery rate by flushing oil to the recovery point. In some cases, water has been added to the surface at the spill location to flush oil through the soil and to increase recovery rates. The non-residual oil droplets and soluble oils will be moved. It is most effective with light products such as gasoline, diesel and kerosene. In applying large volumes of water to the spill site, the cone of depression must be maintained to keep flowing oil within the recovery area. If government regulations require purification before discharging water in or on the ground, several methods are available for treatment[18].

Reverse osmosis uses high pressure to force a solvent (i.e., water) through a membrane but not the solute (i.e., oil). It is used primarily for removing dissolved organic chemicals. Ultrafiltration is similar to reverse osmosis but can remove larger organic molecules. Aeration with the use of air, ozone or hydrogen peroxide oxidizes dissolved hydrocarbons. Biological treatment uses bacteria to

break down organic molecules on specially prepared carbon particles. Some other techniques such as ion exchange and chemical treatment are usually not as effective as previously mentioned techniques. Where high quality water is required, a combination of techniques can be devised, such as an oil-water separation, followed by aeration and activated carbon filtration.

SAFETY

When flammable materials are being recovered, fire prevention should be considered. Be sure submersible pumps are explosion proof and be sure pumps, engines and other igniting sources are kept at least five feet from recovery wells. Electric underground cables should always be protected.

SUMMARY

Oil on groundwater can be a serious problem. It can contaminate water used for drinking, irrigation or industrial processes. Characteristics such as oil volume, oil viscosity, land area contaminate, depth to water table and soil permeability will influence the amount of oil reaching the groundwater. The hydrogeologic factors within the aquifer will influence oil migration on the groundwater. Therefore, groundwater monitoring is necessary to have effective location and recovery of product.

Monitoring should include thorough preliminary investigation and field investigation. Field investigations require sampling that does not contaminate soil and groundwater samples. Sampling devices vary from sample probes to complicated well borings with intricate sample casings and sample pumps. Also, complications can arise in sampling due to highly fissured bedrock, solution channels in limestone and irregularities in bedding planes.

Products can be recovered using open trenches, filled trenches with recovery cracks or extraction wells. A properly constructed well can recover oil from a large area surrounding the well. Care must be taken in pumping large quantities of water from an aquifer. Water recovered may be required to be treated before discharge. Well types used are simple pump, double pump and double shaft wells. Well choice will depend on the situation.

Safety precautions must be taken when dealing with volatile products.

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SECTION 11

PART II

OIL SPILLS IN THE ENVIRONMENT

WHY PROTECT THE ENVIRONMENT

Our natural environment is a dynamic and constantly changing system. In addition to providing the basic needs of man, such as food and oxygen, our environment offers recreation, aesthetic beauty, and a laboratory for studying the living world.

One reason that biologists are concerned with the fate of plants and animals that have no apparent value is that living organisms form complicated and often delicate units that can become unbalanced by outside influence. Damage to a seemingly insignificant part of the chain can result in the eventual reduction in valuable species.

Our environment is quick to respond to new influences, such as an oil spill. The extent of the damage (often it cannot be measured) and the period of recovery depend on a number of actors that will be covered in this section. One role of the cleanup supervisor is to be alert to environmentally sensitive areas and know how to minimize damage from a spill.

THE MARINE ENVIRONMENT

The marine environment can be divided into several zones (**FIGURE 13**). The zones of most concern are the intertidal and subtidal zones to a depth of 50 feet because these zones are most likely to be affected by oil spills. Each of these zones has a characteristic plant and animal association that is often described as being in balance. Many of the organisms have a very limited ability to cope with changes in their environment and will die if an extreme change occurs. Since many numbers and types of organisms exist in the intertidal zone, it is important to keep spills from reaching shoreline areas.

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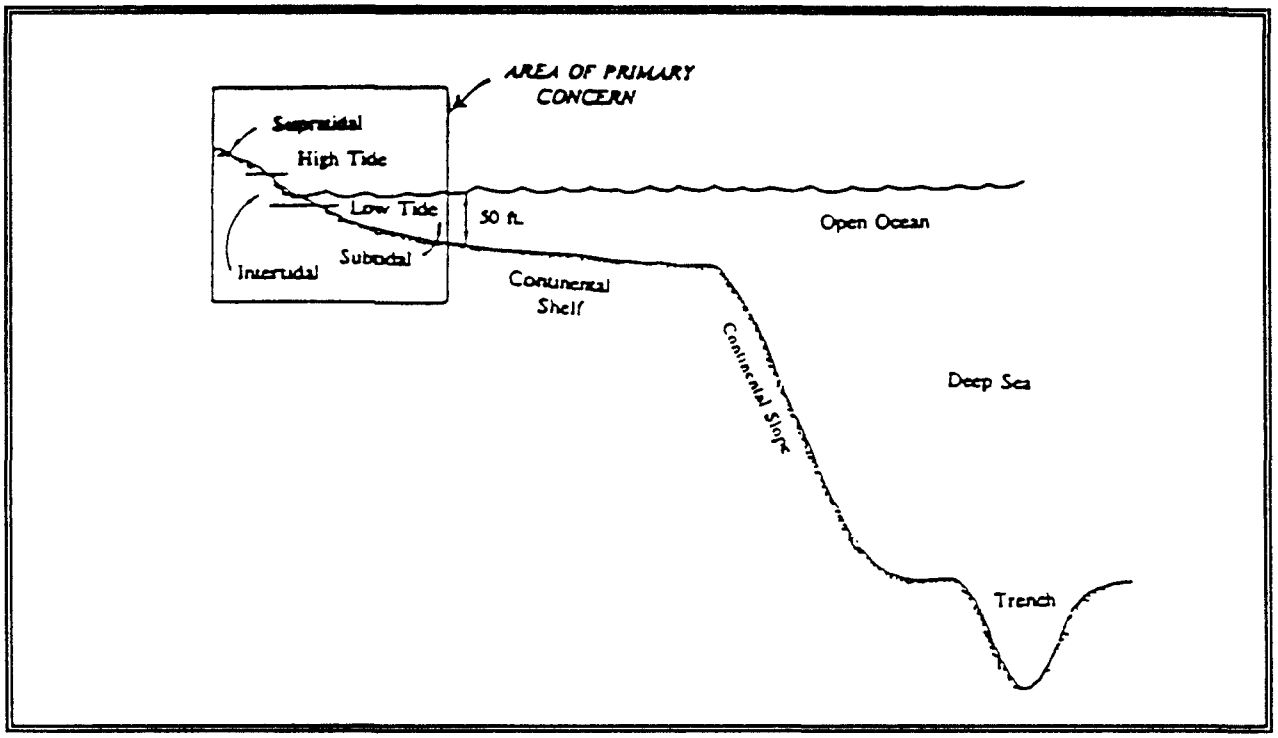

FIGURE 13
ZONATION IN THE MARINE ENVIRONMENT

The intertidal zone is the part of the marine environment that lies between the high and low tide marks (**FIGURE 14**). This zone is generally exposed to air at least once a day and the organisms living there must endure very harsh conditions such as drying, freezing, heating, wave shock, bird predation, etc.

Intertidal habitats include three basic types: rocky, sandy, and muddy. The intertidal zone, as demonstrated by the rocky shore (**FIGURE 14**), is divided into upper, mid, and lower intertidal areas. The upper intertidal becomes wet when the tide is high and dries at low tide. Oil splattered on warm, dry substrate sticks readily and thick accumulations of oil can occur. Fortunately, the upper intertidal zone also has smaller plant and animal populations than the zones below.

The mid intertidal zone generally stays moist when the tide is out and oil has less chance to adhere. This zone has larger populations of organisms than the upper intertidal. Common rocky mid intertidal organisms are barnacles and mussels.

The lower intertidal zone stays wet even at low tide because of wave action. Oil generally has the least chance of sticking, and if is does, it forms fairly thin layers. However, because the organisms in this zone are submerged much of the time, they have a better chance of being affected by toxic oil fractions dissolved in the water. In the lower intertidal are numerous types of seaweeds, clams, worms, starfish and small crustaceans. The richness of marine life increases greatly with increase in depth in the lower portion of the intertidal zone.

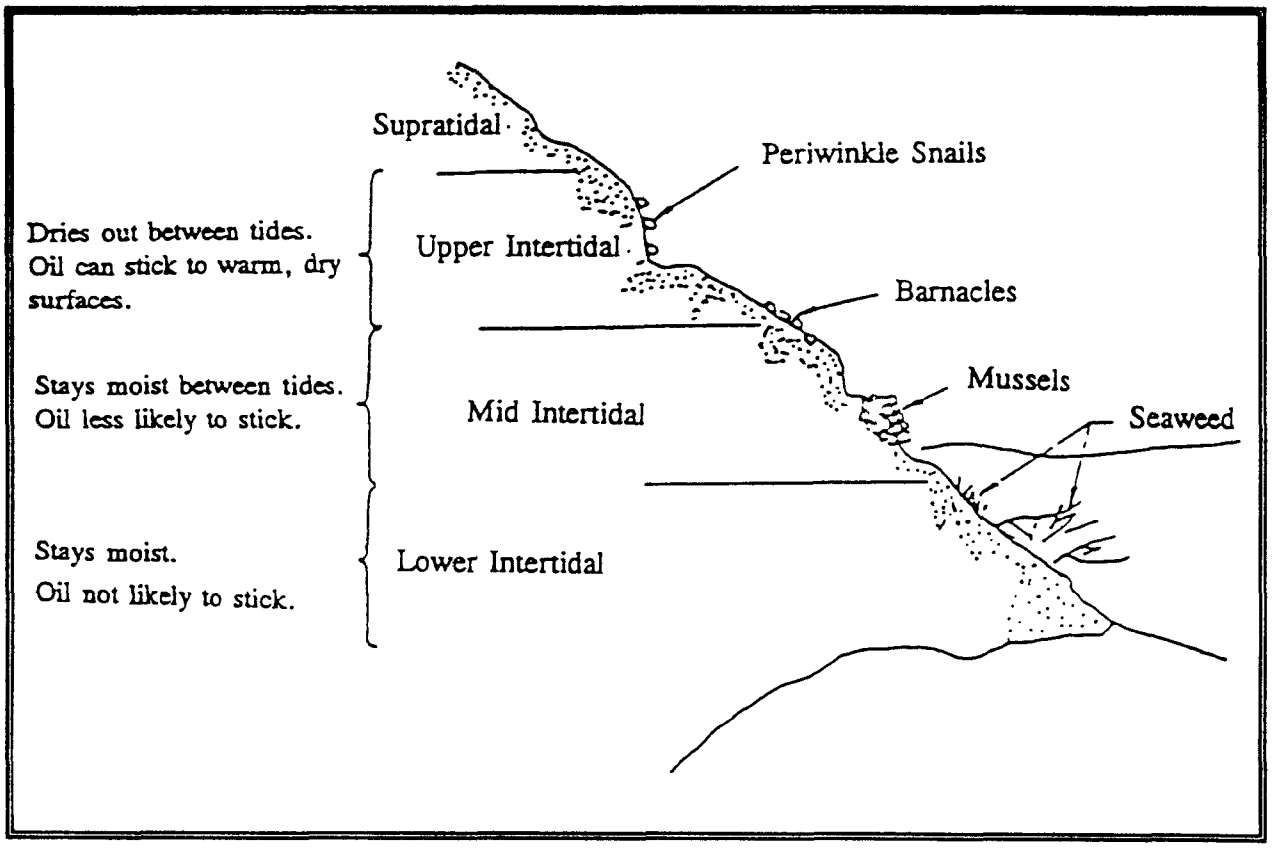

FIGURE 14
ZONATION OF ORGANISMS ON ROCKY SHORES

Sandy and muddy intertidal habitats usually appear barren when compared to rocky habitats where the organisms can be easily seen. This is deceptive because the majority of animals live beneath the surface, either burrowing through the substrate or living in tubes. Sandy habitats occur when wave action keeps clay particles from settling and allows only heavier sand grains to remain on the beach. Muddy habitats occur where wave action is absent or very slight.

Sandy mid intertidal organisms include burrowing shrimps, mole crabs and several types of worms. The lower intertidal harbors clams, snails and worms (**FIGURE 15**).

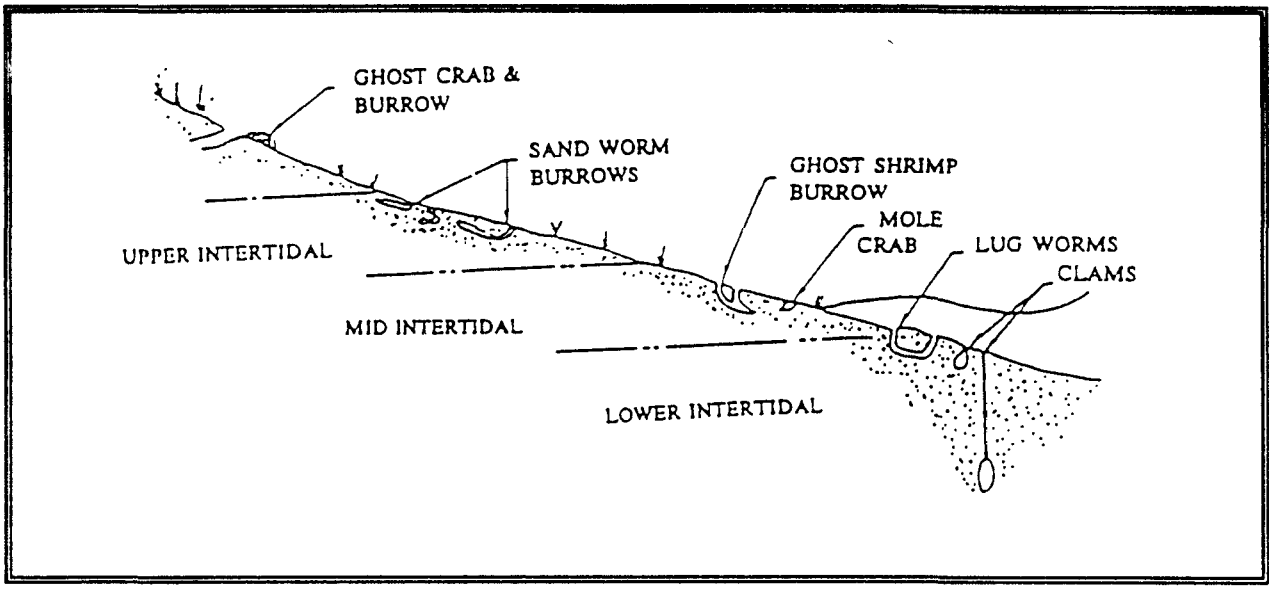

FIGURE 15
ZONATION OF ORGANISMS ON SANDY BEACHES

Muddy areas usually have numerous tidal channels and extensive grass or mangrove flats. These areas are often called marshes. They are characteristic of many asterion shores and are dominated by grasses in the temperate climates and mangrove trees in the tropics. Marshes are very important in the marine ecosystem (**FIGURE 16**). Marshlands serve as nursery areas for many commercial as well as non-commercial species. There is a great amount of plant production which furnishes food for the organisms living in the marsh and in the adjacent estuary. Marshes also support an abundant variety of wildlife and are important in shoreline stabilization to prevent erosion.

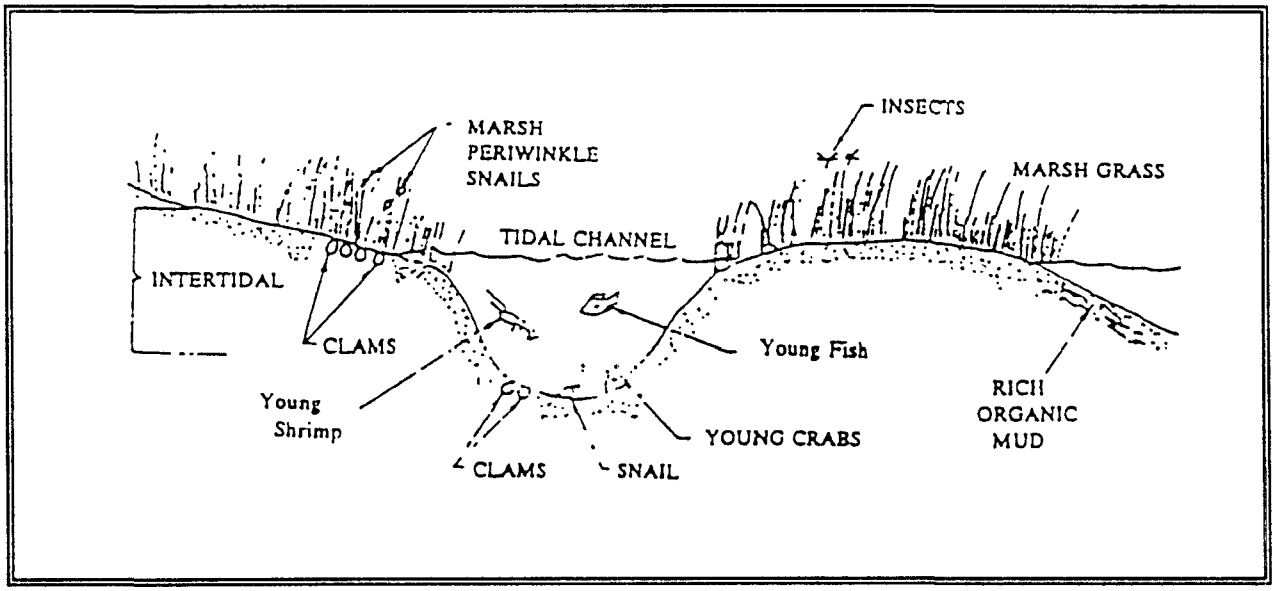

FIGURE 16
TYPICAL MEMBERS OF A MARSH ECOSYSTEM

The subtidal zone is always under water (**FIGURE 17**). As such, it will be affected by the oil fractions which can dissolve in water. This zone is inhabited by many different types of plants and animals.

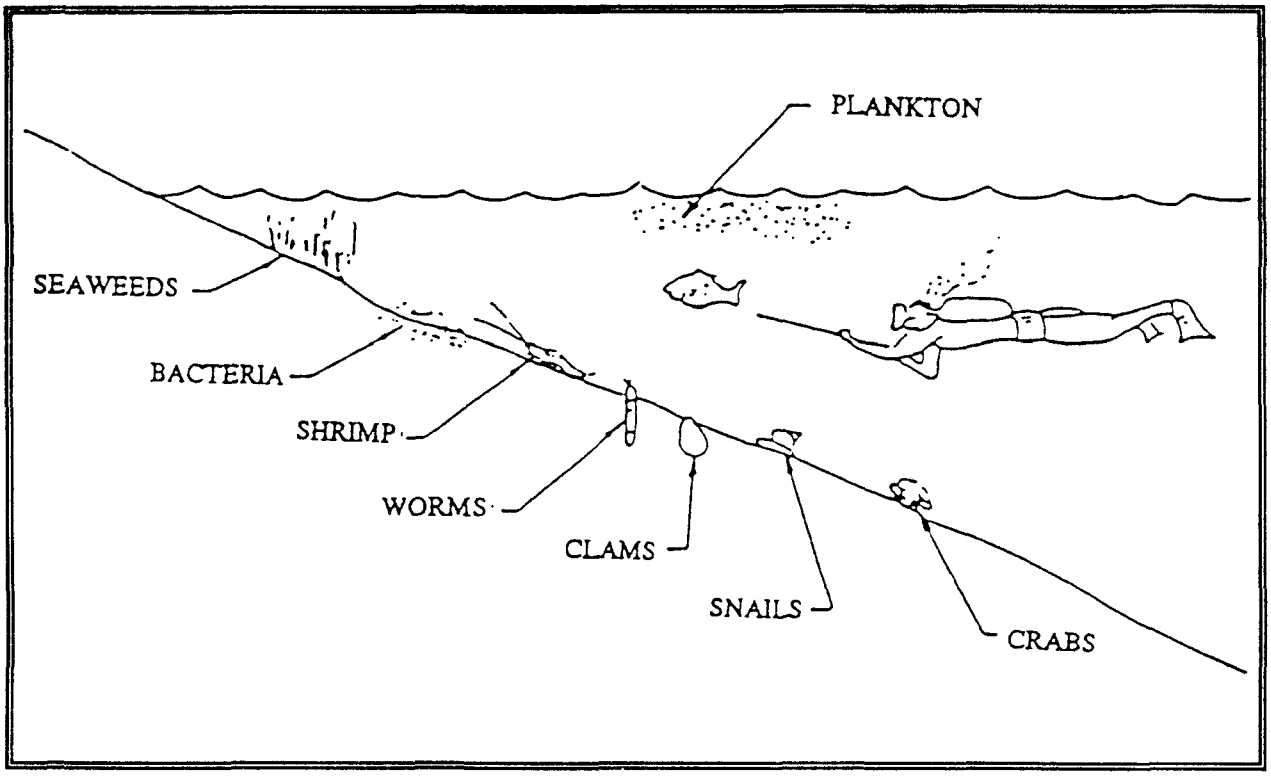

FIGURE 17
ORGANISMS OF THE SUBTIDAL ZONE

Plankton consists of the mostly microscopic plants and animals that possess little or no power of locomotion and are carried about by water masses or currents. Phytoplankton (plants) are very important producers of food and oxygen. These small organisms trap sunlight and use it to convert chemicals in the water to living plant material. They release oxygen in the process. Since light intensity decreases as light penetrates the water column, most phytoplankton are located near the ocean surface.

Zooplankton (animals) feed on living and dead phytoplankton and in turn are eaten by other organisms. Some zooplankton are immature stages of ocean floor animals and fish, while others pend their lives in the plankton.

Very small organisms such as bacteria live in and on the ocean floor and constitute a major food source for many animals. Many feed on waste matter and the remains of dead animals and plants. Larger animals (crabs, shrimp, clams, snails, worms, etc.) also live in and on the ocean floor. In many cases an ocean floor that appears lifeless on casual inspection, actually harbors a great variety of animals.

These bottom dwelling organisms have many ways of feeding such as filtering the sediments and digesting the organic matter and bacteria; eating plankton; eating dead organisms; or eating other ocean floor animals. The seaweeds living on the sea floor also contribute to the food available in the ocean and release oxygen.

The various types of fish display a number of feeding habits. They feed on intertidal organisms, on bottom dwelling animals, on plankton, on seaweeds and on other fish. The fish are eaten in turn by larger marine mammals (seals, sea lions, whales, etc.) and by man.

All these plants and animals are interdependent on each other, and the relationships can be quite complicated. **FIGURE 18** shows a generalized way in which the various types of animals relate to each other in the food chain. The interdependence can be delicate, and if a disruption occurs, the system is thrown out of balance. This disruption can be caused by oil spills. Under natural conditions, population numbers for any given organism fluctuate on a regular basis. As reproduction occurs, the population rises, and when individuals are weeded out by death or by being eaten, the population falls. because of the interdependence between organisms, a second organism may have a population cycle which is the opposite of the first (**FIGURE 19**).

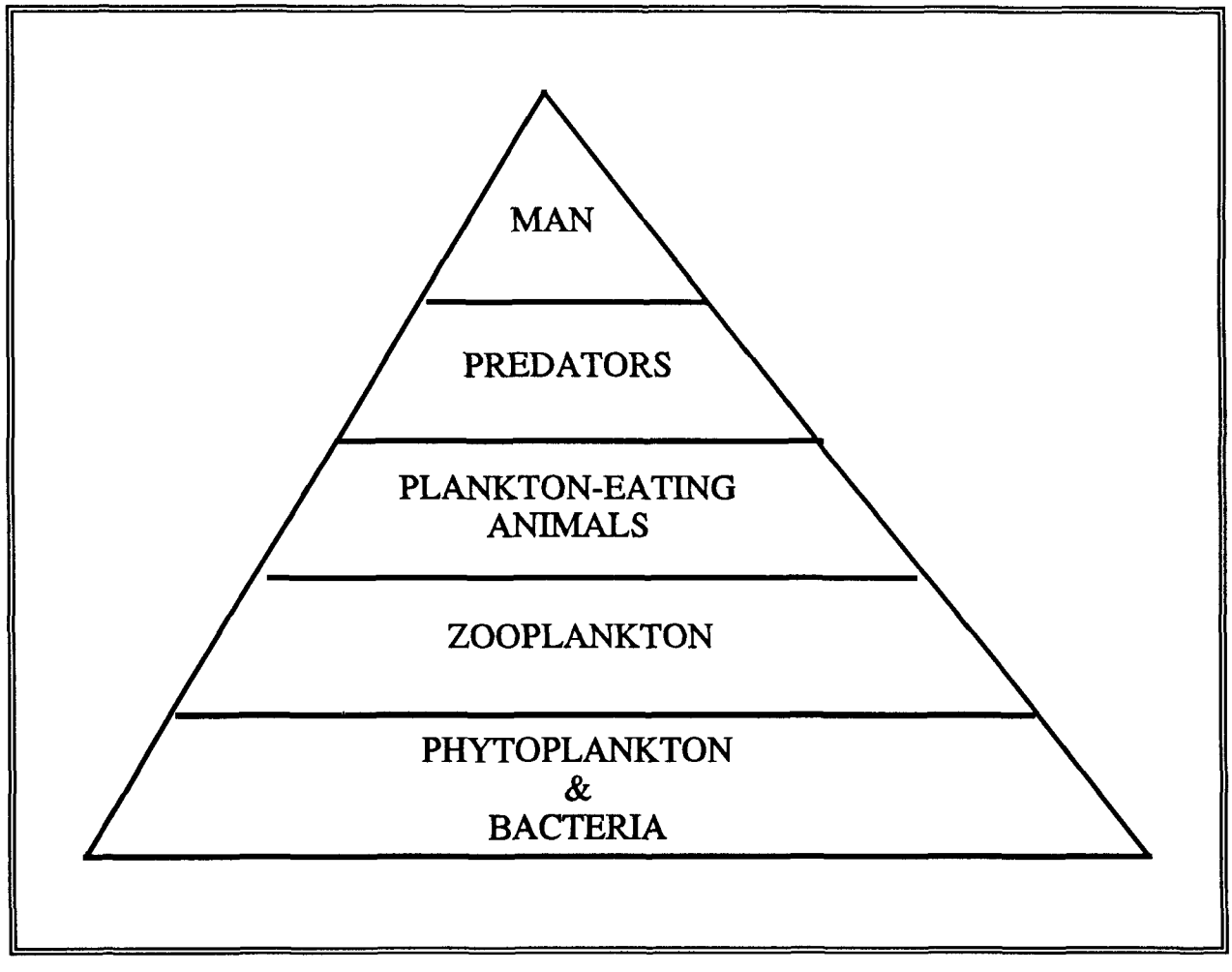

FIGURE 18
GENERALIZED FOOD CHAIN IN THE OCEAN

If organisms are killed or damaged by oil in their environment, the most sensitive are likely to feel the oil's effects first. This unbalances the environment because the population density will shift, favoring the hardier organisms. If the sensitive and hardy types are in competition for living space, the hardy types usually take over (**FIGURE 19**). An example of this is the relationship between seaweed and seaweed-eating algae. Both are injured by an oil spill, but seaweed recovers faster and will form dense mats on intertidal surfaces or dense canopies in the subtidal zone. This makes it more difficult for the algae to increase their population, and the seaweed overruns the area.

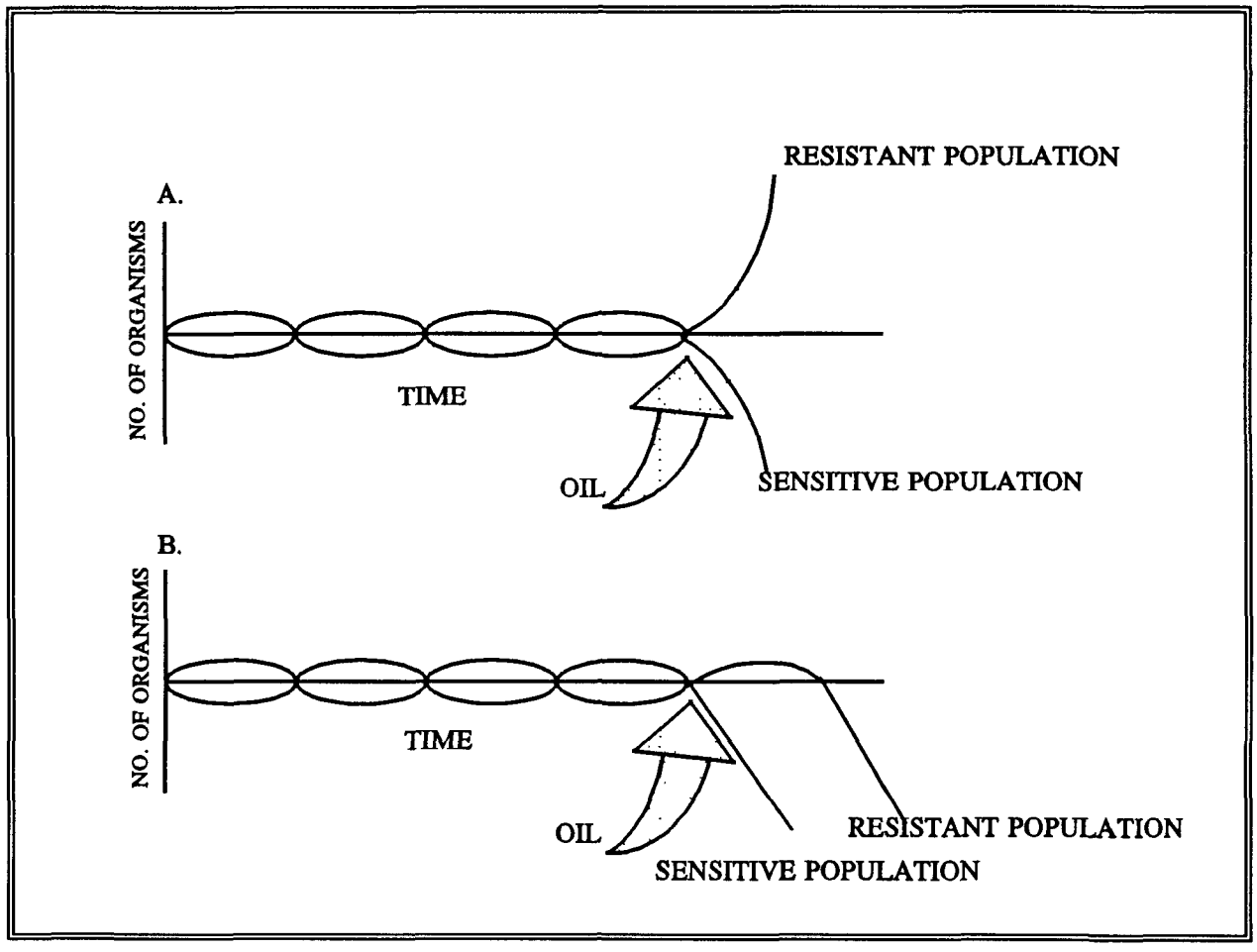

FIGURE 19
INTERRELATION OF SENSITIVE LAND RESISTANT TYPES OF ORGANISMS WHEN EXPOSED TO OIL

It is true that natural disruptions occur in the environment from floods, hurricanes, etc. However, this in no way lessens the necessity for man to exercise every precaution to keep his activities from having a major impact on the environment. Many organisms are living naturally near the limit of their tolerance to many environmental factors, and additional stress by manmade pollutants may have drastic effects.

OIL IN THE LAND ENVIRONMENT

The effect from large ocean spills on chemical, physical and biological processes have been well published and documented[1, 2, 3], yet the effects from inland spills are not as well known. Although some experiments on inland organisms have demonstrated physiological stress induced by hydrocarbons, dynamic spill induced changes in organism populations are only beginning to be understood.

AREAS TO PROTECT

It will be up to you to become acquainted with the area in which you work and to determine, with the help of local engineers and biologists, the most vulnerable sites in case of an oil spill.

It is somewhat difficult to arrange a list of priorities, and the following should not be considered as absolute. The two most important areas to protect are drinking or cooling water intake structures and marsh lands. The negative public reaction to contaminated drinking water or the shutdown of industrial plants could be disastrous, and the biological damage from a contaminated marsh could be significant. In the Gulf of Mexico, about 89% of the volume (lbs.) of commercial sport fisheries is dependent on species which spend part if not all of their life history in estuaries. You should protect the mouths of tidal rivers to prevent oil from being carried upstream during flood tide and contaminating greater areas. Shorelines should be protected as should oyster and coral reefs. Lowest on the list of priorities from a biological standpoint are marinas and similar structures. While oiled boat hulls and marina walls are ugly to the public and difficult (and expensive) to clean, there is usually far less biological damage done in marinas than elsewhere.

EFFECTS ON HUMANS

Crude oil may not be thought to be highly toxic to humans, but the major chemicals that make up a crude oil can be harmful (gasoline, benzene, phenols, cresols). The harmful effects can vary from chronic to acute.[4] The problems arise from those hydrocarbons that are distilled from crude. A major problem with short carbon chained alkanes, such as those hydrocarbons which make up gasoline, is flammability, but these vapors can also exert a slight anesthetic and depressant effect on the central nervous system at concentrations from 5 to 10,000 parts per million (ppm) (up to 1 percent of air volume). Larger concentrations (up to 4 percent air volume) may induce narcosis and convulsions leading to death. At extremely high concentrations, these products can displace inhaled oxygen and cause anorexia and asphyxiation. A more common problem with alkanes is irritation of skin and mucous membranes. Carcinogenic, teratogenic or mutagenic effects have not been found in humans or other mammals.

The aromatics are ringed hydrocarbons such as benzene, toluene and xylene. Although benzene has been recognized as a toxic substance (as low as 0.7 percent air volume), lower concentrations can affect the central nervous system (respiratory paralysis, mucous membrane irritation with pulmonary edema, gastrointestinal irritation, skin blistering, and paraesthesia - loss of tactile sense). The effects of toluene and xylene are not as extreme. Toluene effects are documented by painters and "glue sniffers" habituation. Both chemicals can cause fatigue, mental confusion, loss of coordination, severe nervousness and insomnia as well as skin and mucous membrane irritation. Although benzene can occur in crude and gasoline, toluene and xylene are not as common.

Other aromatics such as phenols and cresols occur in some crudes. Since phenolic compounds (phenols) are acidic, they can be corrosive to skin, eyes, and membranes. They can also induce nausea, vomiting, difficult breathing, pulmonary edema, headache, visual disturbance, convulsions and partial paralysis. Many phenolic compounds are readily absorbed into the blood stream and have acted as carcinogens and co-carcinogens in animals. Cresols also cause skin and mucous membrane irritation and corrosive tissue burns, especially tissues of the kidney and liver. The microbicidal effects have long been known, as cresol-treated posts resist the attack of bacteria and fungi.

Crude oils may contain metals which can be carcinogenic, mutagenic or teratogenic. Lubricants usually contain metals. The effects vary from skin irritation, kidney or liver damage and cumulative poisons to death.

Generally, the effects by hydrocarbons can be categorized into five classes:

1. Direct lethal toxicity (death)
2. Sublethal disruption of physiological activities (depression, nausea, narcosis, convulsions, fatigue, insomnia, pulmonary edema, gastrointestinal irritation, paraesthesia)
3. Direct physical coating (mucous membrane irritation, skin blistering, death)
4. Incorporation of oil in organisms' body (carcinogenic, teratogenic, mutagenic, death)
5. Alteration of habitat (acidity, heavy metals accumulation, death)

Studies of these effects during actual spills have been limited. Furthermore, many of the acute effects may require prolonged exposure or heavy doses. However, the chronic effects can bring about poor worker performance and/or damage claims. Therefore, personal and public safety should be a primary consideration.

SPILLS ON LAND

When oil is spilled on land, some oil will evaporate, some oil will stay on the surface, and some oil will penetrate into the soil. Oil that evaporates generally does little harm, as the vapors disperse below harmful limits. However, accumulated vapors in low lying areas (stream bottoms) or highly flammable products can ignite and cause thermal damage (burn scars, dehydration, and/or death) to both plants and animals.

Oil that stays on the land surface can coat plants and animals with varying effects. Total coating can smother an organism. The effects of partial coating will vary with the season. Generally, plants coated during the non-growing season (due to cold temperatures, extremely hot temperatures, or dry season) are affected less than during growing seasons. Plants coated with oil during the growing season (especially early in the growing season) may cease photosynthesis due to the oil limiting light from reaching the leaves. The complete or partial oil coating on plant leaves can also be toxic to the plants[7], can reduce seed production[8], or can reduce germination[9].

Generally, plants that live only one year or less (annual plants) are not as tolerant of oiling as plants that live more than a year and that can regenerate from roots (perennial plants). This trend has been found in the tundra where mosses, lichens, and liverworts are affected more than dwarf and woody shrubs[10], in grassland with annual and perennial grasses[11], in forests with various trees[12, 13], and in marshes with annual and perennial grasses[14, 15].

When plants are not tolerant of oil, elimination of plant species can be as high as 90 percent during the first year after the spill. One the other hand, light oiling has been found to stimulate some plants[5, 6]. If the number of plants is reduced, the spill can contribute indirectly to soil erosion.

Oil that seeps into the ground can have direct effects on plants (**FIGURE 20**) and other organisms that may affect plants or animals. Besides direct toxicity to roots, oil can decrease oxygen in soil by filling air-filled pores. Kerosene based jet fuels are particularly resistant to oxidation due to the addition of oxidation inhibitors. Generally, oil oxidation is highest for crude followed by leaded gasoline, kerosene, motor oils and diesel fuel.

With an increase in oil, some decomposing micro-organisms can increase, which can decrease or stop plant growth. Oil can reduce nutrient availability and increase toxic elements to plants[8, 9, 18]. Oil has been shown to interfere with root uptake of water[19].

Changes in microorganisms' numbers (bacteria and fungi) can occur after an oil spill (**FIGURE 21**). Since bacteria and fungi are necessary for the breakdown of organic matter, including oil, and the recycling of nutrients, changes in their numbers can affect their ability to degrade organic matter and supply plants and other organisms with nutrients (**FIGURE 22**). Oil can change the numbers of a species by death of microorganisms[20] and/or by stimulating growth of other microorganisms[21]. For example, a microrhizal fungus (root fungus) aids plants in acquiring nitrogen. Crude oil is known to decrease these fungi, thereby decreasing plant growth[22].

Other problems may result from the fact that some species that degrade oil change an insoluble hydrocarbon into a more soluble hydrocarbon, such as naphthalene, xylene or benzene, that can dissolve into the groundwater and cause pollution of potable waters[25]; also, some species of microorganisms which may increase after a spill are known to be pathogenic[23, 24].

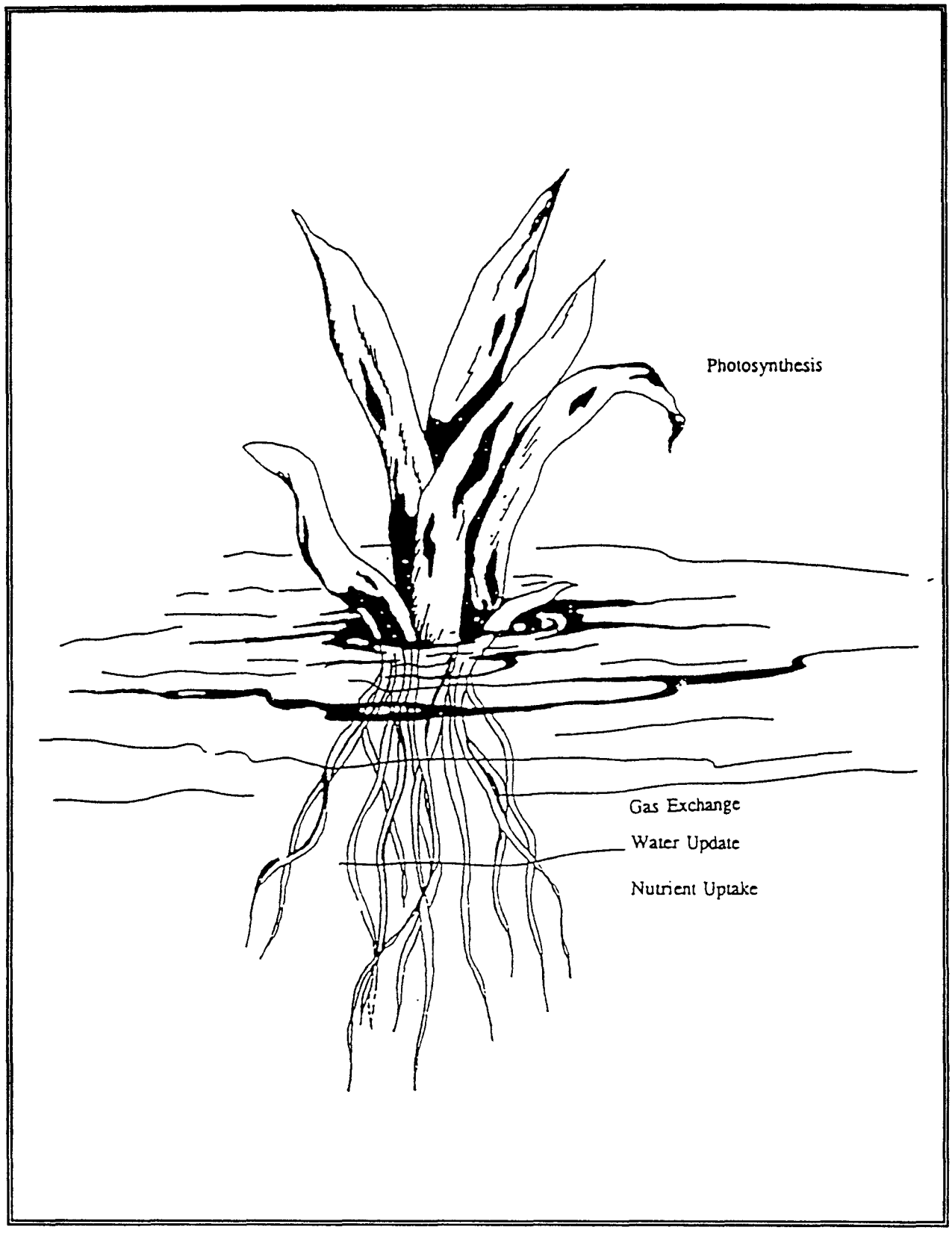

FIGURE 20
OIL COATING ON PLANTS

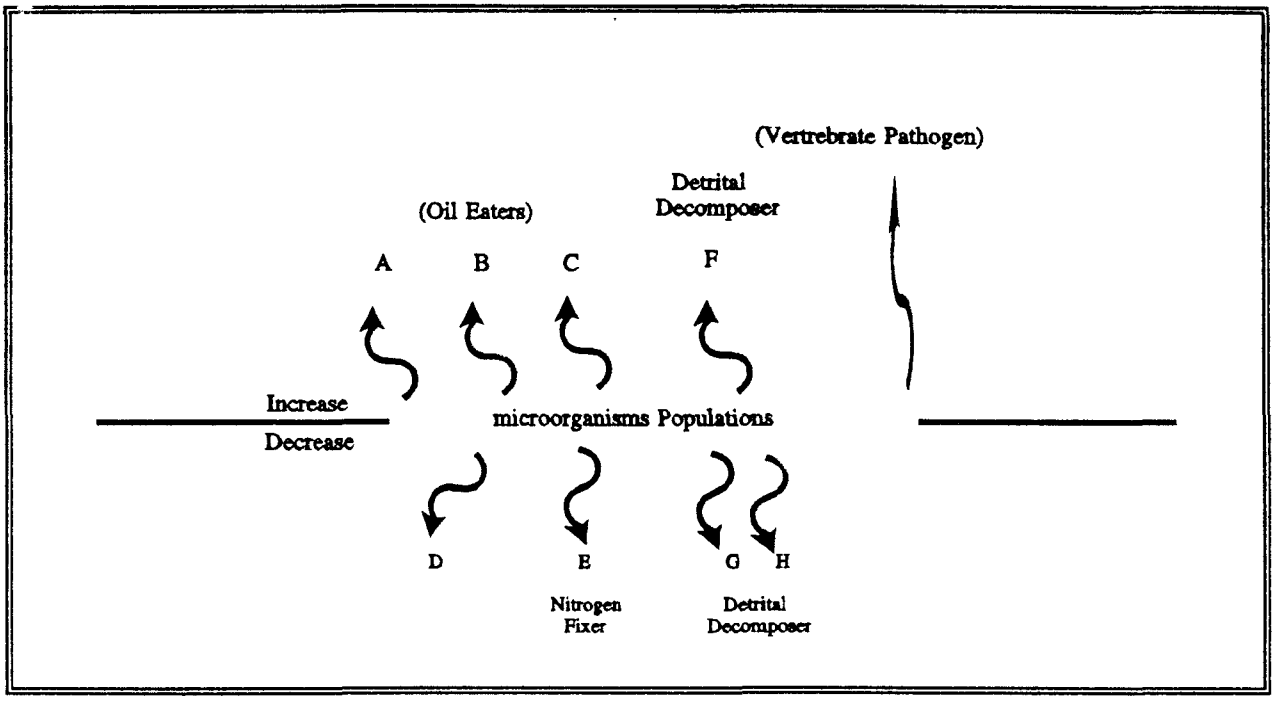

FIGURE 21
EFFECTS OF OIL ON BACTERIA

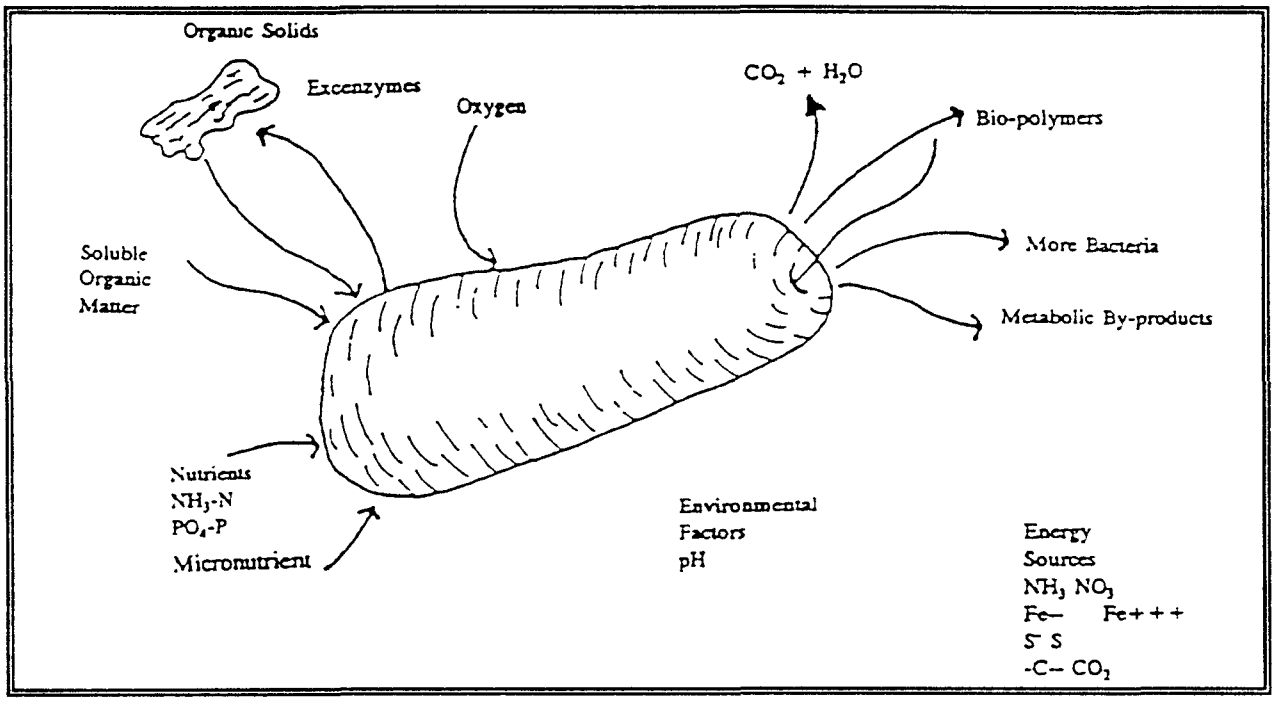

FIGURE 22
BACTERIA ARE THE PRIME DEGRADERS

The effects of land spills on animals generally are a problem more to small animals with little mobility than larger animals with greater mobility. Most mammals and bird will avoid oil

contaminated land unless they are incapable of leaving. For example, two dead sheep were found after consuming oiled seaweed which was their main winter food source[26]. Small animals such as worms, spiders and insects contacting oil can die from oil toxicity or from physical restraint of highly viscous oils. For example, experimental populations of crickets were reduced by as much as 70 percent due to oil ingestion and integument absorption[27].

OILS ON WATER

Oils can enter marshes, lakes, streams or rivers by surface runoff, subsurface oil spreading, oil in underground water flow or spills on water. Its effects can be toxic enough to cause death or physiological stress; or it can have few observable effects on plants and animals. Phytoplankton production (microscopic plants) has declined following exposure to crude[28, 29] or has remained unchanged after crude exposure[30]. This same variability in response has been found for algae[31] and marsh grasses[7, 32]. This variability may be caused by the type of oil, the amount of time an organism is exposed to oil, and the physiological condition of the organism. Although the reduction in productivity may be caused by many factors, a few possibilities are: reduced bicarbonate uptake, which affects photosynthesis[33], and inhibition of DNA and RNA biosynthesis[34]. The problem with reduction in production in productivity is a change in population of organisms. In an experimental benthic algae community, the use of No. 2 fuel oil, Nigerian crude or used crankcase oil depressed the green algae and diatom production[35]. Furthermore, this condition allowed blue-green algae to develop. A reduction in plant productivity will require its predators (animals) to change diet, reduce growth rate, move to an unaffected area or face starvation.

Oil effects on animals have resulted in wildlife losses as dramatic as some marine oil spills. A crude pipeline leak under river ice resulted in the death of 10,000 ducks, muskrats and beavers[36]. Following an aviation gasoline spill in a stream, 2,500 fish and macroinvertebrates (insects, crustaceans, snails, worms) died within the first tow miles of the spill[37]. A diesel spill in a creek resulted in an estimated 90 percent fish loss and the death of many macroinvertebrates. After a No. 2 fuel oil spill in a creek, 20 carp, a turtle, a beaver and a wood duck died[39]. Runoff from a gasoline tank truck collision into a pond resulted in the death of three wood ducks and an undetermined number of snakes[40].

One reason for spill related death to animals is hydrocarbon toxicity. Although freshwater organisms have not been as extensively studied as marine organisms, oil can cause death or physiological stress in an animal (**TABLE 3**). In marine environments, hydrocarbon toxicity can result in individual death, physiological stress in body organs, behavioral changes and teratological effects[41, 42]. Physiological stress includes lesions in veins, intestines, gills, kidneys, and increased respiration rates. Behavioral changes include reduced chemotactic perception (antenna reception in invertebrates) which can affect food locating behavior, predator perception, the finding of sexual partners, aggression and grooming. Teratological effects (especially in birds) include inhibition of gonadal development, reduced egg production and embryo or young malformations (**TABLE 4**).

The chance of an organism being affected by a spill will depend on the type of oil (particularly those with soluble aromatics), time exposed to oil and the physiological condition of the organism. Generally, those organisms that live at the water's surface or frequently visit the water's surface (high concentration of soil) will be affected more than organisms deeper in the water column (low concentration of oil) (**FIGURE 23**). However, shrimp, a water column species, have been shown to survive toxicity experiments; yet during spills massive die-offs have occurred as shrimp obtain

lethal doses by surfacing at night and contacting slicks[60]. The surfacing behavior is also known for zooplankton. Although after a spill zooplankton were not affected by oil, they contributed an estimated 20 percent or more of oil volume to the bottom fecal droppings[61].

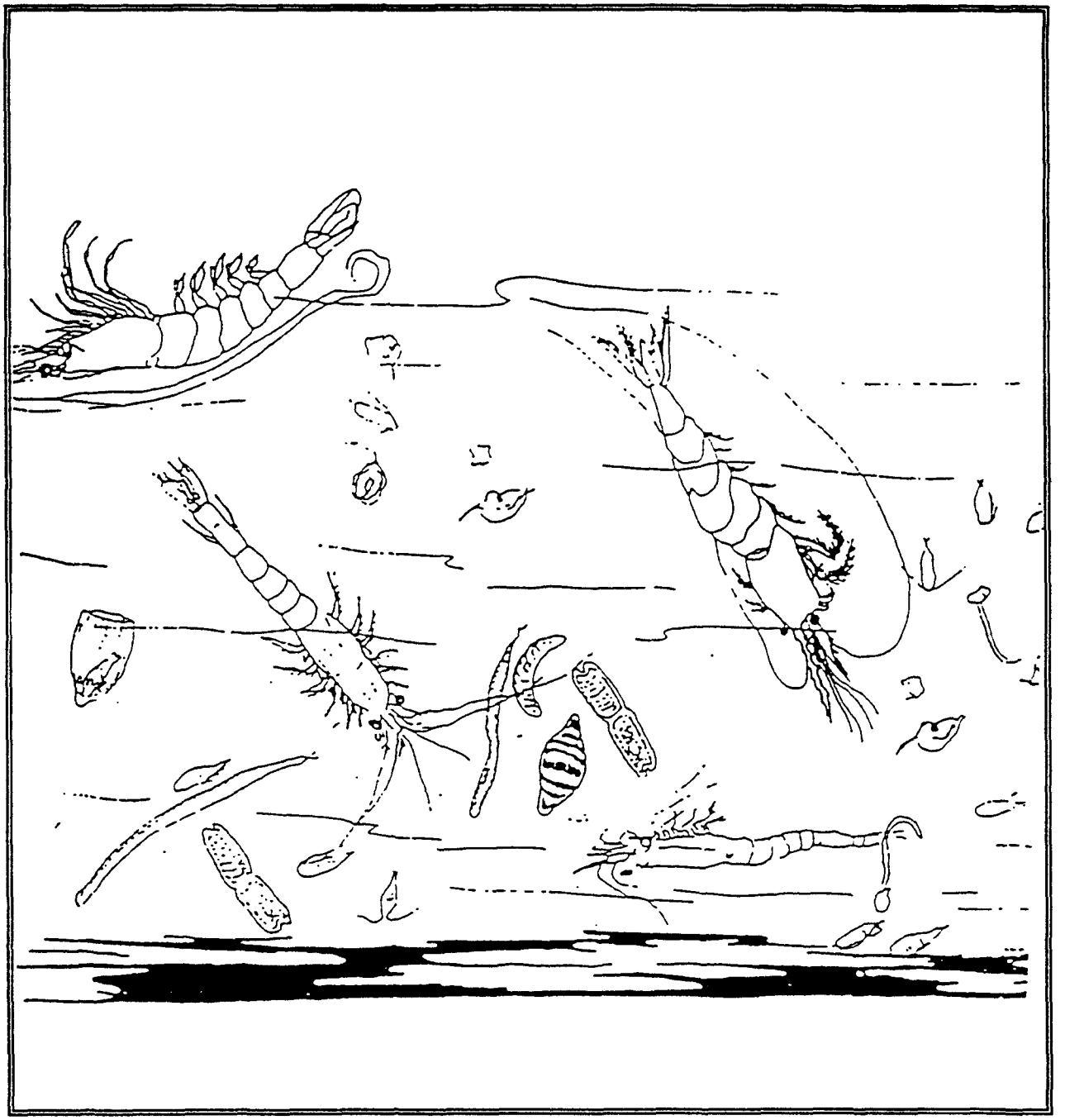

FIGURE 23
SHRIMP AND ZOOPLANKTON SURFACE AT NIGHT TO FEED

TABLE 3
HYDROCARBON TOXICITY

Organisms	Oil Type	Reported Toxicity	Remarks	Reference
Asplanchne Sieboldi (rotifer)	10 crude oils		Crude oils were toxic to rotifers. Stress in surviving rotifers showed reduced consumption and productivity rates. Oil had no effect on longevity.	43
Dapnicmagma (dapnia)	Naphthalene	13.2 mg/l 24 hr LC_{50}	Dapnia showed sluggish behavior and decreased hemoglobin concentration.	44
Procambarus acutus P. clarkii (crayfish)	Water soluble fractions of No. 2 fuel oil		Crayfish took up naphthalene upon exposure and excreted naphthalene when placed in oil free environment.	45
Cipangopalundine chineasis (freshwater Mollusea)	Poly-nuclear aromatic hydrocarbons		Bioaccumulation concentrations were 15 to 200 times higher in mullusea than in sediments	46
Jordanella floridae (American flagfish larvae)	Waste crank case oil		Oil affected 30-day and 100-day old larvae survival due to metals in oil.	47
Salmotrutta (brown trout)	2,4-dichlorophenol 2,6-dichlorophenol 2,3,5-trichlorophenol 3-chloro-o-cresol 4-chloro-m-cresol	1.7 mg/l 4.0 0.8 2.0 1.3	24 hr LC_{50}	48
Lepomis machrochirus (blue-gill sunfish)	Benzene Cyclohexone Phenol Toluene	22.49 mg/l 34.72 23.88 24.00	90 hr TL_{50}	49

TABLE 3
HYDROCARBON TOXICITY

Organisms	Oil Type	Reported Toxicity	Remarks	Reference
Hydranassa tricolor (Louisiana heron)	No. 2 fuel oil			
Hdranassa tricolor (Louisiana heron)	Weathered Libyan crude		Weathered oil applied to water bird eggs caused embryo mortality.	58
Aras platyrhyuchus (mallard)	Weathered and unweathered aviation kerosene		No toxicity of kerosene to eggs attributed to absence of high molecular weight aromatics in kerosene.	59
Carassius auratus (goldfish)	Benzene Cyclohexone Phenol Toluene	34.42 mg/l 42.33 44.49 57.68	96 hr TL_m	
Lebistes reticulatus (guppies)	Benzene Cyclohexone Phenol Toluene	36.60 mg.l 57.68 39.19 59.30	96 hr TL_m	
Pimpephales promelas (fathead minnow)	Phenol	8.3 mg/l 29.0 23.0	48 hr LC_{50} 96 hr LC_{50} 192 hr LC_{50}	50
Lepomis machrochirus (blue gill sunfish)	Benzene Kerosene Phenol	20 mg/l 2,990 19	24 hr TL_m	51

TABLE 3
HYDROCARBON TOXICITY

Organisms	Oil Type	Reported Toxicity	Remarks	Reference
Gambusia affinus (mosquito fish)	Cyclohexone Heptane Naphthalene Cresol	15,500 mg/l 4924 220 24	24 hr TL_m	51
Xenopus lacuis (African clawed frog)	Naphthalene	2.1 mg/l	96 hr LC_{50}	52
Rana catesbeiana (larval bullfrog)	Bunker C	0.13-10%	Within 7½ hours, 72.8% of the number of frogs floated to the surface regardless of concentration compared to 4.9% of control group. Latter larval stages more susceptible to mortality, larvae had high accumulation of oil in buccal cavity and intestinal tract.	53

Another reason for spill related death is oil coating an organism. Although low viscosity oils (gasoline, diesel) are usually more toxic than highly viscous oils (bunker C, heavy crude, weathered crude), highly viscous oils usually cause more damage by coating organisms. The highly viscous oils can physically entrap insects, worms, and mollusks[62, 63], or reduce the insulation ability of mammal hair or of bird feathers[64, 65, 66]. Oiled birds and mammals would need to increase body heat 1.7 to 2.5 times greater than normal to maintain body warmth. This would require an increase in food intake and/or increase body fat metabolism. Failure to do so can result in pneumonia, starvation and death (**TABLE 2**). Birds most often affected in inland waters are the following:

1. divers (loons, grebes, cormorants, pelicans)
2. waterfowl (ducks, geese, swans, mergansers)
3. waders (herons, egrets, sandpipers, plovers, gulls and terns)
4. hawks (peregrine falcon, osprey, bald eagle)

Birds affected least are most land birds (quail, pheasant, jays, starlings, woodpeckers and sparrows).

Marine mammals generally have insulation of fat and hair which provides them protection from loss of body heat when coated with oil. Except for a few hair seals, marine mammals have few problems with spills other than eye irritation. However, freshwater mammals, many being small, can have problems. After the Sullom Voe oil spill[13], otters (Lutra lutra) were dead apparently due to oil coating[26]. Other evidence from oil sludge pits, tar pits, and oil field spillage pits demonstrates oil's ability to entrap wildlife, as shorebirds, numerous ducks, herons, mockingbirds, crows, hawks, owls, cottontails, rats, skunks, toads, grasshoppers, beetles, dragonflies, moths, and butterflies were found trapped in the oil[67].

TABLE 4
SUMMARY OF OIL EFFECTS ON BIRDS

Oil on Birds 1. Pneumonia 2. Starvation 3. Death
Oil in Birds 1. Inhibition of gonadal development 2. Reduced egg production in hens 3. Embryo malformation 4. Chick malformation 5. Reduced growth rate in ducklings
Oil on Eggs 1. Embryo death 2. Embryo malformation

DETERRING WILDLIFE

When wildlife (primarily birds and mammals) can be harmed by a spill, a natural consideration would be to keep the oil away from the wildlife or the wildlife away from the spill. Although deterring wildlife can be accomplished, a single technique will not work on all birds or mammals. Furthermore, deterrent devices may be useless where breeding wildlife have nests, dens or young.

Deterrent techniques have been developed to encourage birds and mammals to stay away from airports, oil ponds, oil lagoons and other areas[68]. They use sound stimulus, visual stimulus, or both stimuli to scare wildlife. Wildlife responses to a stimulus vary. Diving birds, such as loons, grebes, cormorants, and anhingas will usually dive in response to danger, while non-diving birds, such as dabbling ducks, gulls and coots, will take flight in response to danger. Molting birds may be incapable of leaving an area. Wildlife will become habituated to a deterrent device with time. Therefore, deterrent devices should be used only where wildlife is threatened and should not be deployed due to its availability. Also, birds tend to contact oil more often at twilight and at night when cleanup operations are few. Many water birds roost in ponds, lakes, marshes and rivers. Therefore, a good wildlife deterrent must be mobile, effective over a large area, effective for wildlife threatened at day and night.

Some examples of sound deterrent devices are distress calls, predator sounds, Av-Alarms, pyrotechnics and gas exploders. Distress calls are recorded calls of a species that when broadcast cause the species and possibly closely related species to disperse. Although most species are slow to habituate to their own distress call, some species do not or rarely give a distress call. Predator sounds have been used in marine environments by using killer whale sounds to disperse seabirds and on land to remove flocks of birds from trees[69]. Their use in inland areas has not been tested thoroughly. The Av-alarm is a proprietary device that produces loud sounds in the frequencies of the species to be dispersed. The sounds are thought to interfere with the communications of the flock, therefore creating stress in the species which causes them to disperse. The sounds from one of these devices are also effective on people. Pyrotechnique devices make a loud noise and/or light flash to scare wildlife, although the stimuli does not mimic any naturally occurring experience. Some examples are shell crackers, verey flares, rockets, mortar shells and dynamite. Shell crackers are used in a shotgun. Shell crackers are commonly used at airports with bird problems. Verey flares shot from a hand gun produce a trail of smoke, a flare, and a loud pop. When choosing pyrotechniques, oil flammability and operating aircraft should be considered. Gas exploders use propane or acetylene gas to ignite and produce a loud pop somewhat similar to a shotgun shell being fired. They have been widely used in agricultural areas to disperse seed eating birds and in grasslands to disperse coyotes.

Devices that use visual stimuli include scarecrows, dyes, lights, reflectors, hawks and falcons and food lures. Scarecrows are generally of limited value because wildlife becomes habituated to the device and it only works during the daytime. However, human effigies in small boats that rock with wave action have shown some success[70]. Dyes producing colored water or colored oil could be quickly applied by aircraft but would be only effective during the day. The testing of eight colors has shown orange to be the best deterrent with black being the worst deterrent[71]. Search lights and flashing lights have been successful at dispersing feeding and flying waterfowl at night. However, search lights may attract some birds, especially during rain, fog, or heavy cloud cover. This phenomenon is particularly noticeable at inland areas adjacent to the Gulf of Mexico from the end of March to the middle of May, when billions of small birds migrate across the Gulf and are attracted to light. In using strobe or flashing lights, the optimal color tends to be red with a flashing rate of 6 to 12 seconds. However, this rate can stimulate epileptic seizures in susceptible people. Reflectors such as aluminum pie tins have shown only limited

success. However, their success has been increased by allowing tins to move. Aluminum tins work best on sunny days. Similarly, hawks and falcons work well on fair weather days. They require extensive care and training, and work best over inland areas. Food lures may attract birds away from a spill or may attract more than a normal number of birds to a spill area. Since a food lure would need to be placed near the spill to be effective, it may attract high numbers of birds upon continuous use for several days.

The use of aircraft and model aircraft use both sound and visual stimuli to scare wildlife. Although aircraft can quickly scare birds away from a large area, some water birds will dive from the stimuli. Also, many birds will be reluctant to leave wildlife sanctuaries, especially after the start of hunting season.

SAVING OILED WILDLIFE

When oiled birds or mammals are observed, one may be inclined to "rescue" the oiled animal. Before an animal is subjected to this stressful situation, a few questions should be answered.

1. Would the animal be better off without being cleaned?
2. Are there nearby facilities for cleaning the animal?

Generally, a light amount of oil may not hinder an animal's daily activity. If an animal is moderately or heavily coated the animal may be saved if cleaned. However, if cleaning cannot be initiated quickly (within one day of capture) the changes for the animal's survival diminish.

Another consideration is the legal aspect. Although it is illegal to capture and hold a migratory bird (includes ducks, geese, swans, cormorants, loons, grebes, herms, egrets and pelicans) without the appropriate U.S. Fish and Wildlife Service and state permits, the law may be relaxed during an emergency. Also, a person cannot capture and hold migratory birds until after permits have been received.

If the animal would be more likely to survive after being cleaned, the first step is to capture the animal. Depending on the animal type, the rescuer should wear gloves, clothes to cover the body, including the arms and goggles. These coverings will reduce personal injury from animals that scratch or birds that attack the eyes. Remember, animals can inflict painful injuries by biting or scratching. Some oiled animals can be easily caught with a long handled net. However, animals should not be chased until they collapse due to exhaustion. After an animal is captured, sometimes struggling can be reduced by covering its eyes with some object to shut out light. Each animal should be placed in a separate container for transportation. Boxes with lids work well for birds, and garbage cans with lids work well for smaller mammals.

Ideally, animals should be transported to a rehabilitation center within one hour. Therefore, it is imperative that rescue operations be preplanned. Even though publications can describe what needs to be done[72, 73], without proper training, cleaning efforts can be futile. Trained personnel can be found through the state agency that issues bird handling permits, the fish and wildlife service, zoos or other wildlife exhibiting organizations. Organizations that clean oiled animals are:

International Bird Rescue Research Center
Aquatic Park
Berkeley, CA 94710

Wildlife Rehabilitation Center
84 Grove Street
Upton, MA 01568

Overall, capturing and rehabilitating wildlife should be a planned operation to minimize stress to the animals. Cleaning wildlife can be successful[74, 75]. In some cases, oiled animals are more likely to survive without cleaning.

1. Capture
2. Confinement
3. Transportation
4. Cleaning
5. Rehabilitation
6. Release

FACTORS AFFECTING THE SEVERITY OF OIL SPILLS

The effects of an oil spill on the environment are determined by the interaction of several biological and non-biological factors. These factors include:

1. The type of oil spilled (chemical and physical nature)
2. The amount and rate of oil spilled
3. Length of time allowed to weather
4. Geographic locality
5. The size of the area affected
6. Meteorological and oceanographic conditions
7. The season
8. The type of biota present in the affected area
9. The cleanup technique used
10. The physical nature of adjacent shoreline, and
11. The occurrence of special biological events such as migrations, mass spawning, egg laying, etc. which render biota especially susceptible.

These factors vary considerably from spill to spill and therefore the immediate and long-term effects will vary considerably. As a result, the ecological effects following a spill may range from nil to very severe (Ocean Affairs Board, 1974).

TYPE OF OIL SPILLED

Oils vary considerably in chemical and physical characteristics. The most toxic components of oil are the aromatic fractions, most abundant in lighter refined products. Aromatics are quite volatile and readily lost by evaporation, but they are also the most soluble in water and can be lethal to some organisms in dilute quantities. Gasolines and naphthalenes are generally more toxic than refined oils (No. 2 fuel oil, Bunker C), which are usually more toxic than crude oils (Southern Louisiana, Kuwait), as shown in **TABLE 1** (Anderson, et. al., 1974).

Thick weathered oil is much less toxic, but causes much greater mechanical damage. Heavy coats of oil can incapacitate and smother intertidal animals, or cause them to be dislodged by the excess weight, which is also fatal to them. Studies have shown that dark soils absorb heat and can cause deaths by heat exhaustion several months after a spill.

WEATHERING

The means of weathering oil include evaporation, oxidation, dissolving in water, and biological degradation. From the moment oil is spilled it begins to evaporate. Most toxic constituents are lost in this way, an with most crude oils about 20 percent is lost in the first 24 hours by evaporation (IMCO, 1973). Heavy fuel oils and lubricating oils lack significant volatile components and are not generally subject to significant loss by evaporation (Nelson-Smith, 1970). When the spill creates a blanket of oil, appreciable quantities of these components can come into contact with marine life in the subtidal zone. The amount dissolved in water is dependent on the status of the oil slick and the amount of weathering. Studies have shown that water under a thick oil spill may contain 5 - 10 ppm of oil, but as soon as the spill breaks up the level drops to about 1 ppm or less. On the other hand, sea water under a blanket of

benzene may have about 1500mg/L benzene in solution that is highly toxic to many marine organisms. However, benzene evaporates rapidly and should be completely evaporated in a day or so.

Biological or microbial degradation results in the breakdown and elimination of oil from the environment. More than 100 types of bacteria, yeasts and fungi have been found which attack hydrocarbons, breaking them down to obtain energy for their own needs. Recent research has centered on the use of microbial seeding to clean up oil spills, which has resulted in the introduction of NOSCUM.

GEOGRAPHIC LOCALITY

The locality of a spill will sometimes determine how rapidly the area recovers. In temperate regions, where the biota is relatively short-lived and produces many young, recruitment may occur faster than it would occur in polar regions, where the animals are long-lived and do not reproduce as rapidly. The rate at which biodegradation occurs is also reduced in colder climates.

SIZE OF THE AREA AFFECTED

All conditions being equal, it is to be expected that large spills will cause more biological damage than small spills. The amount of oil spilled is important, but effects are dependent upon the area covered by the spill. For example, a 50-barrel spill confined to a small cove covering a few acres has more potential to do biological damage than a 50-barrel spill or larger in the open ocean.

METEOROLOGICAL AND OCEANOGRAPHIC CONDITIONS

Existing meteorological conditions (winds, storms) and oceanographic conditions (waves, currents) are very important in determining the extent of damage from a spill. Storm winds and waves can be determined if they blow an open water spill onshore, but may be advantageous in the open water by mixing the oil into the water and dispersing it. The Council on Environmental Quality in an environmental impact study for the Outer Continental Shelf has reported that oil spills tend to break up when wave heights reach 10 feet or higher.

SEASON

If a spill occurs at a time when newly settled young are in the area, a much higher mortality rate is likely. This is because the young are more sensitive to toxic fractions and mechanical damage than adults. The annual migrations of mammals and birds to and from breeding grounds often take them through areas of potential spills. During the winter season, colder temperatures will slow biodegradation of the oil.

TYPES OF BIOTA

Different types of plants and animals show different levels of reaction to oil. Some types are extremely sensitive to low levels of toxic fractions, while others appear to be unharmed by high concentrations. Some types are more prone to mechanical damage than others. Seaweeds generally have a mucous coating that prevents oil from adhering unless the plant is dead and dried. Marsh plants, however, do not have a protective coat and are susceptible to oil contamination. In order to determine which plants

and animals in an area are most susceptible to oil, a local biologist (resource agency or academic) should be consulted.

Oil may affect marine life both directly and indirectly. Direct effects (suffocation, killing young, etc) have been discussed. Oil may be harmful indirectly through:

1. elimination of food sources,
2. reduction of resistance to other stresses (for example, exposure to oil might lower the temperature necessary to kill an organism),
3. disruption of chemical clues necessary for survival, and
4. disruption of the ecological balance.

CLEANUP-OPERATION

A considerable amount of damage can be done to the environment by the use of dispersants to clean oil from intertidal structures. From a biological point of view, it may be better for the animals and plants to naturally rid themselves of the oil than to introduce a dispersant or mechanical cleanup. Sometimes bioremediation or dispersants can be better. In the open ocean, dispersants may be used to prevent the spilled oil from impacting the shoreline or damaging the intertidal zone.

PLANKTON

It is difficult to detect effects of oil spills on plankton in the ocean. Plankton samples taken during the Torrey Canyon spill appeared normal except for 50 to 90 percent mortality of floating fish eggs and larvae. Plankton samples taken during the Santa Barbara blowout showed a normal level of plankton for that time of the year. During the Amoco Cadiz spill, zooplankton biomass was severely reduced in some areas which resulted in a delayed spring zooplankton bloom (Samian et.al., 1979). Contrarily, some planktonic animals have been seen eating droplets of crude and Bunker C oil without harm. Because planktonic communities are constantly being moved by currents, an area affected by an oil spill is likely to have a normal planktonic community a few days after the spill.

PLANTS

Many seaweeds on exposed shores lose most of their blades each year to rough water conditions and regrow new parts from their bases. A concentrated oil spill can produce a similar effect. However, when seaweeds are killed, seaweed eaters are usually killed too. The algae recover more quickly and take over a habitat.

Damage to marsh plant is most severe in the growing season when new shoots, seeds and flowers are exposed. Shallow-rooted plants that live only one year are more susceptible than those that live two or more years. Severe contamination of a marsh could permit erosion to occur if the plants are killed. The ecology of the surrounding area could be affected by killing the more sensitive young forms.

In marshes, root systems are mostly underground and usually not exposed to oiling. However, in mangroves, root systems are exposed to oiling, and oiling has shown to act severely on mangroves, resulting in defoliation or death of the plant.

SUMMARY

Plants and animals that inhabit the marine environment are in a state of balance under natural conditions. The introduction of oil into the environment can and does disrupt the balance.

It is vital to protect certain areas from oil contamination. These include water intake structures, tidal marshes, bird feeding grounds, oyster and coral reefs, river mouths and areas of high visibility (marinas, sea walls, beaches, etc.).

In preparing a contingency plan it is important to remember the following points:

1. Plants and animals vary widely in resistance to toxic fractions and mechanical damage of oil. Young and eggs are generally more sensitive than adults. Marine birds, especially those which spend most of their lives on water, are very susceptible to the physical effects of floating oil. Fish, plankton and mammals are probably least affected. Seaweeds possess a mucous coat which sheds oil. Marsh grasses lack a mucous coat and are greatly affected by oil.
2. The season in which a spill occurs is important. When the temperature is low, toxic fractions persist longer in the water due to reduced evaporation rate. Some animals migrate during specific seasons and may pass through potential spill areas. If a spill occurs during the reproductive season, the more sensitive young may be affected.
3. Oil is generally not harmful in small quantities or in open areas. A large spill in a small, enclosed area is potentially more destructive biologically than a similar sized spill at sea. Most areas affected by spills are well on the way to recovery within a year. However, under unfavorable circumstances, high mortalities can result from a spill and complete recovery could require several years.
4. The types of oil spilled will be major factor in the amount of biological damage. Gasolines and naphthalenes are more toxic than refined oils which are more toxic than crudes.
5. Maintain contacts with biologists in your area. They can be very helpful in providing advice on the relative ecological sensitivity of specific localities. It would be wise to include a biologist in an oil spill cleanup operation.

Oil in the environment can follow many pathways (Appendix I). It may kill organisms, or stimulate other organisms. The major problems with oil are:

1. Direct lethal toxicity
2. Sublethal disruption of physiological activities
3. Direct physical coating
4. Incorporation of oil in an organisms body
5. Alternation of habitat

Although preventing oil from entering an area of high wildlife value is the best way to reduce the impact of a spill, wildlife deterrent devices can help reduce oil induced problems, particularly for birds and mammals. Multiple techniques are suggested for deterring wildlife. When wild animal rehabilitation is considered, an organized plan for capture, cleaning and rehabilitation should be administered with trained personnel.

APPENDIX I

BIOLOGICAL IMPACTS

Direct Kill
- Coating/asphyxiation of animals and organisms
- Direct contact poisoning

Delayed Kill
- Lethal dose of toxic soluble portion results in death at some other location
- Food chain interference
- Reduced resistance to subsequent infection
- Possible incorporation of carcinogen into the affected species and human food chain

BIOLOGICAL

Salability or Population Density
- Kill of sensitive young of the species
- Food chain interferences requiring migrations to less desirable areas
- Tainting (taste/odor) to destroy food value
- Degradation of breeding/feeding areas

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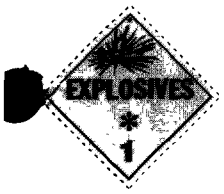
HM 181 HAZARDOUS MATERIALS PLACARDING CHART

LASS 1



PLOSIVES 1.1, 1 2, & 1.3
ne Division number 1 1, 1 2 or 1 3 and mpatibility group are in black ink
icard any quantity of Division number 1 1, 1 2 1 3 material

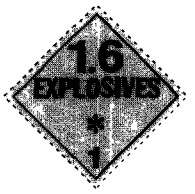
CLASS 1

EXPLOSIVES 1 4
*The compatibility group is in black ink
Placard 454 kg (1001 lbs) or more of 1 4 Explosives

CLASS 1

EXPLOSIVES 1.5
*The compatibility group is in black ink
Placard 454 kg (1001 lbs) or more of 1 5 Blasting Agents

CLASS 1



EXPLOSIVES 1 6
*The compatibility group is in black ink
Placard 454 kg (1001 lbs) or more of 1 6 Explosives

CLASS 2

OXYGEN
Placard 454 kg (1001 lbs) or more aggregate gross weight of either oxygen compressed and oxygen, refrigerated liquid See 172 504(f)(7)

LASS 2 Division 2 1

AMMABLE GAS
acard 454 kg (1001 lbs) or more of flammable s See DANGEROUS

CLASS 2 Division 2 2

NON-FLAMMABLE GAS
Placard 454 kg (1001 lbs) or more aggregate gross weight of non-flammable gas See DANGEROUS

CLASS 2 Division 2 3

POISON GAS
Placard any quantity of Division 2 3 material

CLASS 3

FLAMMABLE
Placard 454 kg (1001 lbs) or more gross weight of flammable liquid See DANGEROUS

CLASS 3

GASOLINE
May be used in the place of FLAMMABLE on a placard displayed on a cargo tank or a portable tank being used to transport gasoline by highway See 172 542(c)

LASS 3

OMBUSTIBLE
acard a combustible liquid when transported in ilk A FLAMMABLE placard may be used in ace of a Combustible placard on a cargo tank ble tank or a compartmented tank car tains both flammable and combustible ee 172 504(f)(2)

CLASS 3

FUEL OIL
May be used in place of COMBUSTIBLE on a placard displayed on a cargo tank or portable tank being used to transport by highway fuel oil not classed as a flammable liquid See 172 544(c)

CLASS 4 Division 4 1

FLAMMABLE SOLID
Placard 454 kg (1001 lbs) or more gross weight of flammable solid See DANGEROUS

CLASS 4 Division 4 2

SPONTANEOUSLY COMBUSTIBLE
Placard 454 kg (1001 lbs) or more gross weight of spontaneously combustible material See DANGEROUS

CLASS 4 Division 4 3

DANGEROUS WHEN WET MATERIAL
Placard any quantity of Division 4 3 material

LASS 5 Division 5 1

XIDIZER
lacard 454 kg (1001 lbs) or more gross weight oxidizing material See DANGEROUS

CLASS 5 Division 5 2

ORGANIC PEROXIDE
Placard 454 kg (1001 lbs) or more gross weight of organic peroxide See DANGEROUS

CLASS 6 Division 6 1 Packing Groups I & II

POISON
Placard 454 kg (1001 lbs) or more gross weight of Packing Groups I & II See DANGEROUS
Placard any quantity of Inhalation Hazard 6 1, PGI

CLASS 6 Division 6 1 Packing Group III

KEEP AWAY FROM FOOD
Placard 454 kg (1001 lbs) or more gross weight of Packing Group III See DANGEROUS
A POISON placard may be used in place of a KEEP AWAY FROM FOOD placard

CLASS 7

RADIOACTIVE
Placard any quantity of packages bearing the RADIOACTIVE YELLOW III label Certain low specific activity radioactive materials in "exclusive use" will not bear the label, but the RADIOACTIVE placard is required

LASS 8

ORROSIVE
lacard 454 kg (1001 lbs) or more gross weight corrosive material See DANGEROUS

CLASS 9

MISCELLANEOUS
A Class 9 placard is not required However, you may placard 454 kg (1001 lbs) or more gross weight of a material which presents a hazard during transport, but which is not included in any other hazard class See DANGEROUS

DANGEROUS

DANGEROUS
Placard 454 kg (1001 lbs) gross weight of two or more categories of hazardous materials listed in Table 2 A freight container, unit load device, transport vehicle or rail car which contain non-bulk packagings *with two or more categories of hazardous materials* that require different placards specified in Table 2 may be placarded with DANGEROUS placards instead of the separate placarding specified for each of the materials in Table 2 However, when 2,268 kg (5000 lbs) or more of one category of material is loaded therein at one loading facility, the placard specified in Table 2 for that category must be applied

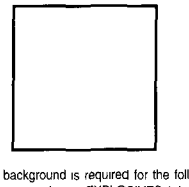
- Division 1 4 (explosives)
- Division 1 5 (blasting agents)
- Division 1 6 (explosives)
- Division 2 1 (flammable gas)
- Division 2 2 (non-flammable gas)
- Class 3 (flammable liquid)
- Combustible liquid
- Division 4 1 (flammable solid)
- Division 4 2 (spontaneously combustible)
- Division 5 1 (oxidizer)
- Division 5 2 (organic peroxide)
- Division 6 1, PG I & II, other than PG I INHALATION HAZARD (poison)
- Division 6 1, PG III (keep away from food)
- *Class 8 (corrosive)*
- Class 9 (miscellaneous)

SUBSIDIARY RISK PLACARD

Class or division numbers do not appear on *subsidiary risk placards*

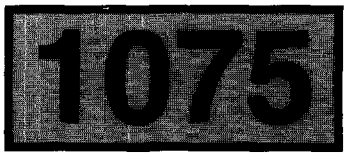
UMIGATED
'lacard motor vehicle, freight container or rail ar on or near each door when fumigated with)ivision 6 1 (Poison) or Division 2 3 (Poison as)

RAIL
Placard empty tank cars for residue of material last contained



The square background is required for the following placards when on rail cars EXPLOSIVES 1 1 or 1 2, POISON GAS or POISON GAS-RESIDUE (Division 2 3, Hazard Zone A), POISON or POISON-RESIDUE (Division 6 1, PGI, Hazard Zone A) The square background is required for placards on motor vehicles transporting highway route controlled quantities of radioactive materials (Class 7)

DISPLAY OF IDENTIFICATION NUMBER WHEN TRANSPORTING HAZARDOUS MATERIALS IN PORTABLE TANKS, CARGO TANKS AND TANK CARS.



ORANGE PANEL

PLACARD

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HM 181 HAZARDOUS MATERIALS PLACARDING CHART

§172.502 Prohibited and permissive placarding.

(a) Prohibited placarding. Except as provided in paragraph (b) of this section, no person may affix or display on a packaging, freight container, unit load device, motor vehicle or rail c
(1) Any placard described in this subpart unless —
(i) The material being offered or transported is a hazardous material,
(ii) The placard represents a hazard of the hazardous material being offered or transported, and
(iii) Any placarding conforms to the requirements of this subpart.
(2) Any sign or other device that, by its color, design, shape or content, could be confused with any placard prescribed in this subpart
(b) Exceptions. (1) The restrictions in paragraph (a) of this section do not apply to a bulk packaging, freight container, unit load device, transport vehicle or rail car which is p
conformance with the TDG Regulations the IMDG Code or the UN Recommendations
(2) The restrictions of paragraph (a) of this section do not apply to the display of an identification number on a white square-on-point configuration in accordance with §172 336(b) of t
(c) Permissive placarding Placards may be displayed for a hazardous material, even when not required, if the placarding otherwise conforms to the requirements of this subpart

§172.504 General placarding requirements.

(a) General Except as otherwise provided in this subchapter, each bulk packaging, freight container, unit load device, transport vehicle or rail car containing any quantity of a hazard
must be placarded on each side and each end with the type of placards specified in Tables 1 and 2 of this section and in accordance with other placarding requirements of this subpc
the specifications for the placards named in the tables and described in detail in §§172 519 through 172 558
(b) DANGEROUS placard A freight container, unit load device, transport vehicle or rail car which contains non-bulk packagings with two or more categories of hazardous materials
different placards specified in Table 2 may be placarded with DANGEROUS placards instead of the separate placarding specified for each of the materials in Table 2 However, when 2,2
pounds) or more of one category of material is loaded therein at one loading facility, the placard specified in Table 2 of paragraph (e) of this section for that category must be applied
(c) Exception for less than 454 kg (1,001 pounds). Except for bulk packagings and hazardous materials subject to §172 505, when hazardous materials covered by Table 2 of this
transported by highway or rail, placards are not required on—
(1) A transport vehicle or freight container which contains less than 454 kg (1001 pounds) aggregate gross weight of hazardous materials covered by Table 2 of paragraph (e) of this se
(2) A rail car loaded with transport vehicles or freight containers, none of which is required to be placarded
The exceptions provided in paragraph (c) of this section do not prohibit the display of placards in the manner prescribed in this subpart if not otherwise prohibited (see §172 502) on tran
vehicles or freight containers which are not required to be placarded.
(d) Exception for empty non-bulk packages. A non-bulk packaging that contains only the residue of a hazardous material covered by Table 2 of paragraph (e) of this section need not
included in determining placarding requirements
(e) Placarding tables Placards are specified for hazardous materials in accordance with the following tables:

Table 1

Category of material (Hazard class or division number and additional description, as appropriate)	Placard name	Placard design section reference (§)
1.1.	EXPLOSIVES 1.1	172 552
1.2	EXPLOSIVES 1.2	172.522
1.3	EXPLOSIVES 1 3	172.522
2 3	POISON GAS	172.540
4.3	DANGEROUS WHEN WET	172.548
6.1 (PG I, Inhalation hazard only)	POISON	172 554
7 (Radioactive Yellow III label only)	RADIOACTIVE [1]	172 556

[1] RADIOACTIVE placard also required for exclusive use shipments of low specific activity material in accordance with §173 425(b) or (c) of this subchapter

Table 2

Category of material (Hazard class or division number and additional description as appropriate)	Placard name	Placard design section reference (§)
1 4	EXPLOSIVES 1 4	172 523
1.5	EXPLOSIVES 1.5	172 524
1.6	EXPLOSIVES 1.6	172 525
2.1	FLAMMABLE GAS	172 532
2.2	NON-FLAMMABLE GAS	172 528
3	FLAMMABLE	172.542
Combustible liquid	COMBUSTIBLE	172 544
4.1	FLAMMABLE SOLID	172.546
4.2	SPONTANEOUSLY COMBUSTIBLE	172.547
5.1	OXIDIZER	172.550
5.2	ORGANIC PEROXIDE	172.552
6 1 (PG I or II, other than PG I inhalation hazard)	POISON	172 554
6.1 (PG III)	KEEP AWAY FROM FOOD	172 553
6 2	(None)	
8	CORROSIVE	172.558
9	CLASS 9	172.560
ORM-D	(None)	

(f) Additional placarding exceptions (1) When more than one division placard is required for Class 1 materials on a transport vehicle, rail car, freight container or unit load devic
placard representing the lowest division number must be displayed.
(2) A FLAMMABLE placard may be used in place of a COMBUSTIBLE placard on —
(i) A cargo tank or portable tank
(ii) A compartmented tank car which contains both flammable and combustible liquids
(3) A NON-FLAMMABLE GAS placard is not required on a transport vehicle which contains non-flammable gas if the transport vehicle also contains flammable gas or oxygen and it is
with FLAMMABLE GAS or OXYGEN placards, as required
(4) OXIDIZER placards are not required for Division 5.1 materials on freight containers, unit load devices, transport vehicles or rail cars which also contain Division 1.1 or 1 2 materials anc
placarded with EXPLOSIVES 1.1 or 1 2 placards, as required
(5) For transportation by transport vehicle or rail car only, an OXIDIZER placard is not required for Division 5 1 materials on a transport vehicle, rail car or freight container which also conto
1.5 explosives and is placarded with EXPLOSIVES 1 5 placards, as required
(6) The EXPLOSIVE 1.4 placard is not required for those Division 1 4 Compatibility Group S (1.4S) materials that are not required to be labeled 1 4S.
(7) For domestic transportation of oxygen, compressed or oxygen, refrigerated liquid, the OXYGEN placard in §172.530 of this subpart may be used in place of a NON-FLAMMABLE GAS p
(8) Except for a material classed as a combustible liquid that also meets the definition of a Class 9 material, a COMBUSTIBLE placard is not required for a material classed as a combu
when transported in a non-bulk packaging For a material in a non-bulk packaging classed as a combustible liquid that also meets the definition of a Class 9 material, the CLASS 9 placc
substituted for the COMBUSTIBLE placard
(9) For domestic transportation, a Class 9 placard is not required A bulk packaging containing a Class 9 material must be marked on each side and each end with the appropriate id
number displayed on an orange panel or a white-square-on-point display configuration are required by subpart D of this part
(10) For domestic transportation of Division 6 1, PG III materials, a POISON placard may be used in place of a KEEP AWAY FROM FOOD placard
(g) For shipments of Class 1 (explosive) materials by aircraft or vessel, the applicable compatibility group letter must be displayed on the placards required by this section

§172.505 Placarding for subsidiary hazards.

(a) Each transport vehicle, freight container, portable tank and unit load device that contains a poisonous material subject to the "Poison-Inhalation Hazard" shipping description of §17
must be placarded with a POISON or POISON GAS placard, as appropriate, on each side and each end, in addition to any other placard required for that material in §172 504. Duplicc
POISON or POISON GAS placard is not required
(b) In addition to the RADIOACTIVE placard which may be required by §172.504(e) of this subpart each transport vehicle, portable tank or freight container that contains 454 kg (1001
more gross weight of fissile or low specific activity uranium hexafluoride shall be placarded with a CORROSIVE placard on each side and each end.
(c) Each transport vehicle, portable tank, freight container or unit load device that contains a material which as a subsidiary hazard of being dangerous when wet, as defined in §173
subchapter, shall be placarded with DANGEROUS WHEN WET placards, on each side and each end, in addition to the placards required by §172 504
(d) Hazardous materials that possess secondary hazards may exhibit subsidiary placards that correspond to the placards described in this part, even when not required by this par
§172.519(b)(4) of this subpart)

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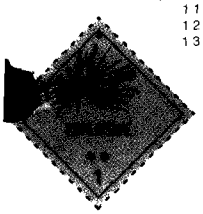
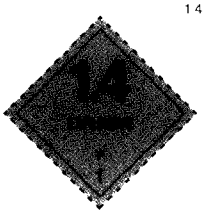
HM 181 HAZARDOUS MATERIALS LABELING CHART

CLASS 1 Explosive 1.1 1.2 1.3



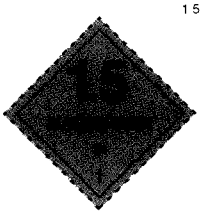
Include appropriate division number and compatibility group

CLASS 1 Explosive 1.4



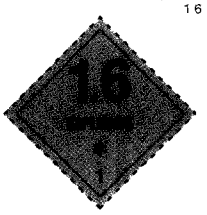
*Include appropriate compatibility group

CLASS 1 Explosive 1.5



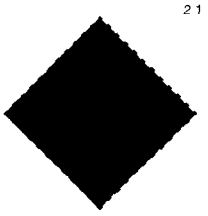
*Include appropriate compatibility group

CLASS 1 Explosive 1.6



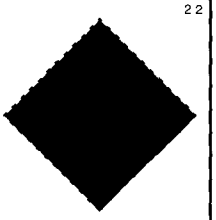
*Include appropriate compatibility group

CLASS 2 Division 2.1



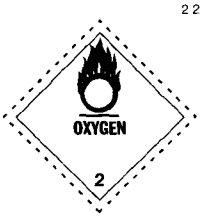
Flammable gas

CLASS 2 Division 2.2



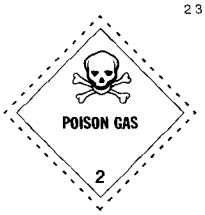
Non-flammable gas

CLASS 2 Division 2.2



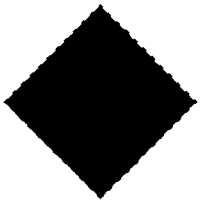
Oxygen

CLASS 2 Division 2.3



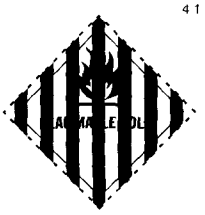
Poison gas

CLASS 3



Flammable liquid

CLASS 4 Division 4.1

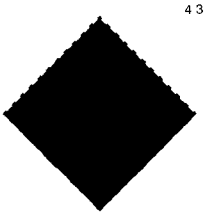


Flammable solid

CLASS 4 Division 4.2

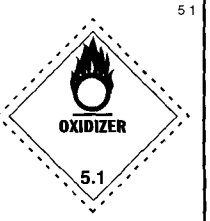
Spontaneously combustible

CLASS 4 Division 4.3



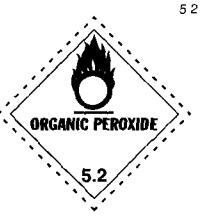
Dangerous when wet

CLASS 5 Division 5.1



Oxidizer

CLASS 5 Division 5.2



Organic peroxide

CLASS 6 Division 6.1

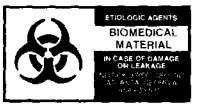
Poison-Packing Groups I and II

CLASS 6 Division 6.1

Poison - Packing Group III

CLASS 6 Division 6.2

Infectious substance

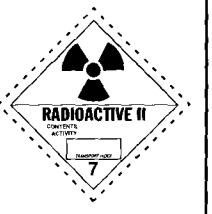


The Etiologic Agent label may be required (42 CFR 72.3)

CLASS 7

Radioactive I

CLASS 7



Radioactive II

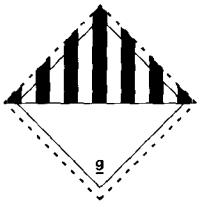
CLASS 7

Radioactive III

CLASS 8

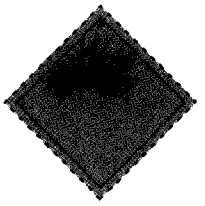
Corrosive

CLASS 9



Miscellaneous

SUBSIDIARY RISK LABELS



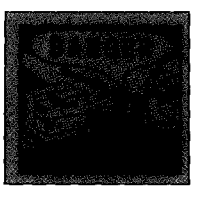
Explosives
Flammable Gas
Flammable Liquid
Flammable Solid
Corrosive
Oxidizer
Poison
Spontaneously Combustible
Dangerous When Wet

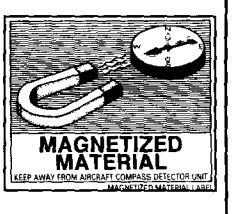
The hazard class or division number may not be displayed on a subsidiary label

EMPTY

Empty

FOR AIRCRAFT





D.O.T. GENERAL GUIDELINES ON USE OF WARNING LABELS

1. Shipper must furnish and attach appropriate label(s) to each package of hazardous material offered for shipment unless exempted from labeling requirements.
2. If the material in a package has more than one hazard classification, the package must be labeled for each hazard. (Ref. Title 49, CFR, Sec. 172.402)
3. When two or more hazardous materials of different classes are packed within the same packaging or outer enclosure, the outside of the package must be labeled for each material involved. (Ref Title 49, CFR, Sec. 172.404).
4. Radioactive materials requiring labeling, must be labeled on two opposite sides of the package. (Ref. Title 49, CFR, Sec. 172.403(f)).
5. Labels must not be applied to a package containing only material which is not subject to Parts 170 - 189 of this subchapter or which is exempted therefrom. This does not prohibit the use of labels in conformance with U.N. recommendations ("Transport of Dangerous Goods"), or with the IMO requirements ("International Maritime Dangerous Goods Code"), ICAO Technical Instructions, or TDG Regulations (Ref. Title 49, CFR, Sec. 172.401).

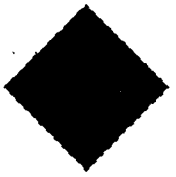
HAZARDOUS MATERIALS PACKAGE MARKINGS

SAMPLE PACKAGING MARKING

Proper Shipping Name ACETONE

UN I.D. Number UN 1090

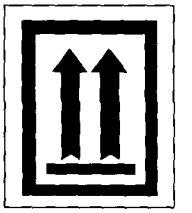
[redacted]ARD WARNING LABEL



CONSUMER COMMODITY
ORM-D

CONSUMER COMMODITY
ORM-D-AIR

INHALATION HAZARD



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HM 181 HAZARDOUS MATERIALS LABELING CHART

§172.400 General labeling requirements.

(a) Except as specified in §172.400a, each person who offers for transportation or transports a hazardous material in any of the following packages or containment devices, shall label the package or containment device with labels specified for the material in the 172.101 Table and in this subpart:
(1) A non-bulk package;
(2) A bulk packaging, other than a cargo tank, portable tank, or tank car, with a volumetric capacity of less than 18 m^3 (640 cubic feet), unless placarded in accordance with subpart F of this part;
(3) A portable tank of less than 3785 L (1000 gallons) capacity, unless placarded in accordance with subpart F of this part;
(4) A DOT Specification 106 or 110 multi-unit tank car tank, unless placarded in accordance with subpart F of this part; and
(5) An overpack, freight container or unit load device, of less than 18 m^3 (640 cubic feet), which contains a package for which labels are required, unless placarded or marked in accordance with §172.512 of this part.
(b) Labeling is required for a hazardous material which meets one or more hazard class definitions, in accordance with Column 6 of the §172.101 Table and the following table:

Hazard class or division	Label name	Label design or section reference (§)
1.1	EXPLOSIVE 1.1	172.411
1.2	EXPLOSIVE 1.2	172.411
1.3	EXPLOSIVE 1.3	172.411
1.4	EXPLOSIVE 1.4	172.411
1.5	EXPLOSIVE 1.5	172.411
1.6	EXPLOSIVE 1.6	172.411
2.1	FLAMMABLE GAS	172.417
2.2	NON-FLAMMABLE GAS	172.415
2.3	POISON GAS	172.416
3 (flammable liquid) Combustible liquid	FLAMMABLE LIQUID (none)	172.419
4.1	FLAMMABLE SOLID	172.420
4.2	SPONTANEOUSLY COMBUSTIBLE	172.422
4.3	DANGEROUS WHEN WET	172.423
5.1	OXIDIZER	172.426
5.2	ORGANIC PEROXIDE	172.427
6.1 (Packing Groups I and II)	POISON	172.430
6.1 (Packing Group III)	KEEP AWAY FROM FOOD	172.431
6.2	INFECTIOUS SUBSTANCE [1]	172.432
7 (see §172.403)	RADIOACTIVE WHITE-I	172.436
7	RADIOACTIVE YELLOW-II	172.438
7	RADIOACTIVE YELLOW-III	172.440
7 (empty packages, see §173.427)	EMPTY	172.450
8	CORROSIVE	172.442
9	CLASS 9	172.446

[1]The ETIOLOGIC AGENT label specified in regulations of the Department of Health and Human Services at 42 CFR 72.3 may apply to packages of infectious substances.

§172.400a Exceptions from labeling.

(a) Notwithstanding the provisions of §172.400, a label is not required on -
(1) A cylinder containing a Division 2.1 or Division 2.2 gas that is
(i) Not poisonous;
(ii) Carried by a private or contract motor carrier;
(iii) Not overpacked; and
(iv) Durably and legibly marked in accordance with CGA Pamphlet C-7, appendix A.
(2) A package or unit of military explosives (including ammunition) shipped by or on behalf of the DOD when in —
(i) Freight containerload, carload or truckload shipments, if loaded and unloaded by the shipper or DOD; or
(ii) Unitized or palletized break-bulk shipments by cargo vessel under charter to DOD if at least one required label is displayed on each unitized or palletized load.
(3) A package containing a hazardous material other than ammunition that is —
(i) Loaded and unloaded under the supervision of DOD personnel, and
(ii) Escorted by DOD personnel in a separate vehicle.
(4) A compressed gas cylinder permanently mounted in or on a transport vehicle.
(5) A freight container, aircraft unit load device or portable tank, which —
(i) Is placarded in accordance with Subpart F of this part, or
(ii) Conforms to paragraph (a)(3) or (b)(3) of §172.512.
(6) An overpack or unit load device in or on which labels representative of each hazardous material in the overpack or unit load device are visible.
(7) A package of low specific activity radioactive material, when transported under §173.425(b) of this subchapter.
(b) Certain exceptions to labeling requirements are provided for small quantities and limited quantities in applicable sections in part 173 of this subchapter.

§172.401 Prohibited labeling.

(a) Except as provided in paragraph (c) of this section, no person may offer for transportation or no carrier may transport any package bearing a label specified in this subpart unless —
(1) The package contains a material that is a hazardous material, and
(2) The label represents a hazard of the hazardous material in the package.
(b) No person may offer for transportation and no carrier may transport a package bearing any marking or label which by its color, design, or shape could be confused with or conflict with a label prescribed by this part.
(c) The restrictions in paragraphs (a) and (b) of this section, do not apply to packages labeled in conformance with —
(1) Any United Nations recommendation, including the class number (see §172.407), in the document entitled *"Transport of Dangerous Goods."*;
(2) The International Maritime Organization (IMO) requirements, including the class number (see §172.407), in the document entitled "International Maritime Dangerous Goods Code";
(3) The ICAO Technical Instructions, or
(4) The TDG Regulations.

§172.402 Additional Labeling requirements.

(a) Subsidiary hazard labels. Each package containing a hazardous material —
(1) Shall be labeled with primary and subsidiary hazard labels as specified in Column 6 of the §172.101 Table; and
(2) For other than Class 2 or Class 1 materials (for subsidiary labeling requirements for Class 1 materials see paragraph (e) of this section), if not already labeled under paragraph (a)(1) of this section, shall be labeled with subsidiary hazard labels in accordance with the following table:

SUBSIDIARY HAZARD LABELS

Subsidiary hazard level (packing group)	Subsidiary Hazard (Class or D				
	3	4.1	4.2	4.3	5.1
I	X	•••	•••	X	X
II	X	X	X	X	X
III	•	N	X	X	N

X — Required for all modes.
•— Required for transport by vessel only
••— Required for transport by aircraft and ves
•••— Impossible as subsidiary hazard.
N — None required

(b) Display of hazard class on labels. The app hazard class or, for Division 5.1 or 5.2 the number, shall be displayed in the lower cor primary hazard label and may not be display subsidiary label.
(c) Cargo Aircraft Only label. Each pers offers for transportation or transports by ai package containing a hazardous material w authorized on cargo aircraft only shall label th age with a CARGO AIRCRAFT ONLY label s in §172.448 of this subpart.
(d) Radioactive Materials. Each package cont radioactive material that also meets the defin one or more additional hazards, except Class be labeled as a radioactive material as requi §172.403 of this subpart and for each additior ard.
(e) Class 1 (explosive) Materials. In addition label specified in Column 6 of the §172.101 each package of Class 1 material that also me definition for:
(1) Division 6.1, Packing Groups I or II, sh labeled POISON; or
(2) Class 7, shall be labeled in accordanc §172.403 of this subpart.

§172.403 Contains special requiremen RADIOACTIVE materials. See regulations.

§172.405 Authorized label modifications.

(a) For Classes 1, 2, 3, 4, 5, 6, and 8, text indica hazard (for example FLAMMABLE LIQUID) required on a primary or subsidiary label when
(1) The label otherwise conforms to the provisic this subpart, and
(2) The hazard class or, for Division 5.1 or 5. division number, is displayed in the lower corn the label, if the label corresponds to the primary ard class of the hazardous material.
(b) For a package containing Oxygen, compre or Oxygen, refrigerated liquid, the OXIDIZER specified in §172.426 of this subpart, modified to play the word "OXYGEN" instead of "OXIDIZ and the class number "2" instead of "5.1", ma used in place of the NON-FLAMMABLE GA OXIDIZER labels. Notwithstanding the provisio paragraph (a) of this section, the word "OXYG must appear on the label.

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