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REPORT BY THE

Comptroller General

OF THE UNITED STATES

Coast Guard Response To Oil Spills-- Trying To Do Too Much With Too Little

Approximately 10,000 and 10,600 oil pollution incidents occurred in American waters during calendar years 1975 and 1976. These incidents resulted in 14.3 and 23.1 million gallons of oil being spilled, respectively, during these years. One spill of about 7.3 million gallons was the major cause for the increase between the years.

GAO reviewed Coast Guard effectiveness in containing and cleaning up oil spills at five of its districts encompassing the Atlantic and Gulf coasts from Eastport, Maine, to Brownsville, Texas. The Great Lakes, Pacific, and inland Coast Guard districts were excluded from the review because of the relatively small volume of spills reported in those areas for 1976.

Although overall the Coast Guard did an effective job in responding to most oil pollution incidents, there were opportunities for the Coast Guard to have been more effective in 38 percent of the oil pollution incidents GAO examined.

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Staff shortages have resulted in (1) some reported oil spills not being investigated and (2) some other marine safety office responsibilities not being met in order to make staff available to investigate oil spills. Although staffing shortages cannot be overcome immediately, the Coast Guard should make a comprehensive and systematic study of its staffing needs to effectively administer its marine environmental program.

The Coast Guard needs to maintain a staff well trained in pollution expertise. To accomplish this, the Coast Guard needs to establish a job specialty classification as a means of maintaining continuity in its marine safety offices and strike teams--its primary groups responsible for responding to oil spills. In addition, the staffs need better marine environmental program training to adequately safeguard the environment from oil pollution. The Coast Guard should also make sure that all strike teams have adequate diving capability, as required, and that--to protect the environment--the teams are used on all potentially serious spills. (See p. 27.)

The Coast Guard's equipment development policy also needs improvement. The marine safety offices and strike teams do not have adequate equipment for their respective responsibilities. The offices specifically need transportation and containment equipment to respond to oil pollution incidents, if they are to take oil containment action. The strike teams' effectiveness would be improved if they had a better variety of oil transfer equipment, additional transportation handling equipment, oil waste receptacles, and commercially available oil skimmers like the Navy's.

The Coast Guard also should improve its research and development program for oil spill containment and cleanup equipment by

--formalizing input from field units for their equipment needs on a regular basis,

--responding to field input for equipment needs, and

--using a systematic approach in developing equipment. (See p. 43.)

One of the best opportunities for improving response effectiveness would be for the Coast Guard, after arriving at the scene of a spill, to take immediate "first aid" action to contain and clean up the spill.

Of the 21 marine safety offices visited by GAO, only 3 indicated that they initiated such first aid action. (See p. 8.)

The Coast Guard has recognized the need to determine its equipment needs and research requirements, using acceptable operation research techniques, and has undertaken several studies designed to provide information for decision-making in this area. (See p. 43.)

In responding to oil spills, the Coast Guard should use regional contingency plans as coordinating documents directing Federal, State, and local agency efforts. For regional plans to serve better as regional coordinating documents, however, they should meet the requirements set forth in the Commandant's instructions. This has not always been the case. The marine safety offices need properly developed, local contingency plans to assist them in responding to pollution incidents, but many of the local plans that have been developed need improvement to reduce complexity, to provide current and complete data, and to set forth action plans which include identification of oily waste disposal sites.

The Coast Guard has recognized that deficiencies exist in the contingency plans and has drafted instructions which could remedy most of the problems that GAO identified in the plans, if properly implemented.

There is a continuing need for the Coast Guard to require its "onscene coordinators" to prepare reports on all major oil spills and to disseminate such reports to appropriate units as required by instructions. The report could serve as a valuable learning document for all concerned with oil spill containment and cleanup operations. (See p. 51.)

RECOMMENDATIONS

The Coast Guard should investigate all oil spills, insure that containment and cleanup action is taken, direct local units to be prepared to take first aid action when onscene, monitor spill cleanup action, and assume Federal responsibility for cleanup on a more timely basis. (See p. 14.)

The Coast Guard should also improve its personnel resources for dealing with oil spills by

--determining and reducing staff shortages,

--establishing a position classification (specialty rating) for the marine safety area so that personnel will have promotional opportunity in this area,

--improving the marine safety training programs, and

--increasing the diving capabilities of strike teams). (See p. 28.)

The Coast Guard should also provide adequate transportation, such as vans and trucks, and containment and deployment equipment for the marine safety offices. The Coast Guard should also provide a better variety of oil transfer equipment, such as oil pumps, and additional transportation loading equipment, oil waste receptacles, and commercially available oil skimmers, like the Navy's, for the strike teams.

Likewise, the Coast Guard should improve the process for carrying out its research and development program. Arrangements should be formalized for obtaining information regarding priority research requirements and equipment-operating constraints from program personnel and for providing feedback to them. (See p. 43.)

The Department disagrees with some of these recommendations. (See pp. 14, 18, 22, and 26.)

The Department believes that its research program has been effective, although it expects

to prepare a new master research and development plan. (See p. 41.)

The Coast Guard recognizes a need to establish new goals for its oil pollution response program, including equipment requirements, so the Coast Guard has begun several studies to develop a position on future oil pollution policy and requirements. (See p. 41.)

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ABBREVIATIONS

ADAPTS	air deliverable anti-pollution transfer system
COTP	captain of the port
EPA	Environmental Protection Agency
FWPCA	Federal Water Pollution Control Act
GAO	General Accounting Office
MEP	marine environmental protection
MES	marine environmental systems
MSO	marine safety office
OSC	onscene coordinator

CHAPTER 1

INTRODUCTION

The series of oil tanker accidents in and near American waters is a grave reminder of the risks in marine transportation of oil. Oil spills can, among other things, destroy wildlife and marine life, foul beaches and water intake systems, and damage marshlands. Though the United States can never entirely eliminate accidents, the risks can be reduced.

In conjunction with actions to reduce oil spills, the President announced on March 17, 1977, improvements to be made in the Federal ability to respond to oil pollution emergencies. He directed the appropriate Federal agencies, particularly the Coast Guard, the Department of Transportation, and the Environmental Protection Agency (EPA), in cooperation with State and local governments, to improve their abilities to contain and minimize damaging effects of oil spills. The goal is an ability to respond to a spill of 100,000 tons (31 million gallons) within 6 hours. While oil spills of such size accounted for less than 1 percent of all calendar year 1976 incidents, these spills accounted for 79 percent of all the gallons spilled.

During calendar years 1975 and 1976, 14.3 and 23.1 million gallons of oil were spilled in 10,141 and 10,660 oil pollution incidents, respectively. One spill of about 7.3 million gallons was the major cause for the increase between the years. The following table shows the percentage of oil spills and gallons spilled, by source, for 1976.

Source of spills	Percent of incidents	Percent of gallons spilled
Vessels	29.1	45.9
Land vehicles	3.9	2.0
Nontransportation-related facilities	26.8	29.5
Pipeline	5.0	18.9
Marine facilities	4.8	1.4
Land facilities	1.6	1.5
Miscellaneous or unknown	27.9	0.8
Total	100.0	100.0

As oil imports increase, the threat of oil spills also increases. U.S. petroleum product imports have risen from 2.7 million barrels a day in 1970, to over 7.5 million barrels in 1976. The 1980 estimate is 12.8 million barrels. The number of oil tankers entering U.S. waters increased an estimated 89 percent during these years.

FEDERAL WATER POLLUTION CONTROL ACT

The Federal Water Pollution Control Act (FWPCA), as amended, prohibits, among other things, discharge of oil (or hazardous substances) into or upon U.S. navigable waters or adjoining shorelines (33 U.S.C. 1321(b)(1)). When an oil spill occurs, the spiller is responsible for cleanup. The act authorized designated agencies to begin cleanup when the spiller either refuses cleanup responsibility, does not clean up adequately, or is unknown. The act also established a Coast Guard-administered oil pollution fund for use by designated Federal agencies, such as the Coast Guard or their agents for cleanup (33 U.S.C. 1321(k)). The size of the fund has been increased from its original $25 million to $45 million. As of January 31, 1978, the unobligated balance was $13.8 million. In addition, the act established penalties for spilling oil into U.S. waters and for not reporting spills. These penalties, as well as the reimbursement to Federal agencies (or their agents) for their cleanup costs, replenish the fund. The act, however, limits the amount of penalties and cleanup costs that the spiller can incur. 1/

The act requires that a national contingency plan be published to assist Federal removal efforts (33 U.S.C. 1321(c)(2)). The Council on Environmental Quality has responsibility for preparing the national contingency plan. Through the plan--officially entitled "National Oil and Hazardous Substances Pollution Contingency Plan"--the Council delegates enforcement responsibilities for coastal waters to the Coast Guard through its designated onscene coordinator (OSC). The coordinators are responsible for coordinating and directing Federal pollution control efforts at the pollution incident (or at a potential incident). Generally,

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1/When the spillers are guilty of willful negligence, they pay full cleanup costs.

OSCs are captains of the port (COTP) or the marine safety officers. Regional response teams, composed of representatives from certain Federal agencies (see p. 45), advise and assist the OSC. States in each region are invited to provide liaisons to such teams.

COAST GUARD

The Coast Guard responds to pollution incidents through an organizational structure involving headquarters, districts, and marine safety offices (MSOs). 1/ The Office of Marine Environment and Systems, Marine Environmental Protection Branch, at headquarters administers the oil pollution response program. The fiscal year 1979 estimated program obligations for the Marine Environmental Protection (MEP) program are $60.2 million. This branch develops program policies and procedures and provides guidance to the 12 Coast Guard districts on response to spills. Each district office administers response programs within its district. In addition, the districts are responsible for all penalties against spillers and for recovery of cleanup costs when a Federal agency incurs them. The MSOs that generally provide the OSCs, are responsible for oil spill removal and cleanup.

Headquarters issues guidance and policy instructions to the districts. Many of the instructions specify information in the act and the national contingency plan. The instructions state that the Coast Guard is to investigate every reported pollution incident. The instructions also specify that Coast Guard policy is to insure timely, effective action to control and remove all oil discharges. The MSOs are to carry out the Coast Guard responsibilities regarding marine environmental protection.

According to the instructions, the MSO (the OSC) should consider deployment of Coast Guard pollution control equipment when this will be more effective or quicker than other

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1/The MSO is a combination of COTP and marine inspection office functions. One function is marine environmental protection. According to Coast Guard officials eventually all COTPs and marine inspection offices will be merged. In this report we have used the designation "MSO" in referring to the local units responsible for oil spill investigation, monitoring, containment, and cleanup.

locally available equipment. Currently most MSOs rely on commercial contractors to clean up spills. In hiring particular contractors, the Coast Guard considers the equipment they have and their charge for it.

The OSC is authorized to insure proper oil spill containment and removal if the spiller refuses to accept responsibility or is unknown. Coast Guard procedures for responding to spills include locating its source and having the spiller--if known--accept responsibility for the cleanup. Photographs and oil samples are also taken.

If the spiller refuses to clean up or does not clean up adequately, the Coast Guard begins a "Federal cleanup." Federal funds are used for cleanup by the Coast Guard or contractors it has hired. The Coast Guard relies on contractors when possible because it does not want to compete with private industry. No one contractor can totally clean up all types of spills, so the Coast Guard employs more than one contractor for some spills. The OSC supervises containment and cleanup and directs the contractor(s)'s action during a Federal cleanup.

The OSC also monitors containment and cleanup for non-Federal spills. (Spill cleanup is not financed by the Coast Guard.) The monitoring is to insure that the spiller or contractor cleans up quickly and effectively. The Coast Guard determines when a spill is properly being cleaned, avoiding prolonged and expensive cleanup actions, and when cleanup is completed.

National strike force

The national contingency plan requires establishment of a national strike force. The Coast Guard formed such a force by establishing strike force teams on the gulf, east, and west coasts. They are the primary Coast Guard response organizations for large or significant oil spills (or hazardous substance spills). They respond to MSO requests for assistance. The teams are designed to facilitate rapid responses to oil spills. They support the OSC by providing

--communications;

--advice and assistance for oil and hazardous substance removal;

--containment and countermeasures;

--cleanup, mitigation, and disposal of oily wastes; and

--documentation and cost recovery.

The strike teams have expertise in ship salvage, diving, and removal techniques and methodology.

SCOPE OF REVIEW

We reviewed Coast Guard effectiveness in containing and cleaning up oil spills at 5 Coast Guard districts during 1976--the First, Third, Fifth, Seventh, and Eighth Districts, and 21 MSOs within those districts. To a limited degree, we reviewed the Twelfth District. The districts encompass the Atlantic and Gulf coasts from Eastport, Maine, to Brownsville, Texas. The Great Lakes, Pacific, and inland Coast Guard districts were not reviewed because of the relatively small quantities of oil spills reported for these areas in 1976.

We analyzed the Coast Guard response to all major and medium oil spills plus a sample of minor spills that occurred in the five districts during calendar year 1976. We made our analysis at the district, headquarters, and appropriate MSOs. We developed a chronology of events for each spill using Coast Guard, cleanup contractor, and spiller records and interviews with officials.

A panel of experts--William L. Berry, John J. Gallagher, Jerome H. Milgram, Glenn E. Moore, Paul Preus, William P. Searle, and Dale G. Uhler--helped us analyze the major and medium oil spills. The panelists have diverse backgrounds (see app. III), and each is familiar with oil spill containment and cleanup. The experts--five regulars, two alternates--are academicians, cleanup contractors, industrial representatives, and State and Federal agency representatives. To avoid conflict of interest, we selected alternates to allow sitting panelists to abstain from evaluating cases in which they had been involved.

In addition to reviewing oil spill documents, we examined Coast Guard policies and procedures, training programs, personnel practices, contingency plans, and pollution equipment capabilities.

We visited the Office of Research and Development (Coast Guard headquarters) and the Coast Guard Research and Development Center, Groton, Connecticut, to determine what the Coast Guard is doing to improve its response efforts. We contacted EPA, the U.S. Navy, and private industry to ascertain the research and development programs they are implementing.

CHAPTER 2

COAST GUARD COULD BE MORE EFFECTIVE IN RESPONDING TO OIL SPILLS

On the basis of our analysis of 137 1/ oil spill cases which occurred in calendar year 1976, the Coast Guard had opportunities to be more effective in one or more aspects of 38 percent of the cases (16 major or medium and 36 minor). It could have

--responded faster,

--monitored the cleanup better,

--taken effective actions on arrival at the spills,

--attempted to remove minor spills before they dissipated in the water, and

--investigated reported minor spills.

The following table summarizes cases when the Coast Guard needed to improve its effectiveness.

Types of improvements needed	Major and medium spills (note a)		Minor spills (note a)	
	number	percent	number	percent
Faster response	6	16	3	3
Better monitoring	5	14	3	3
Take effective action once on scene	11	30	7	7
Preventing minor spills from dissipating	b/N/A		c/13	c/13
Investigating minor spills	N/A		17	17

a/Some cases are counted more than once because more than one type of improvement was needed.
b/In 4 cases oil was allowed to dissipate but cleanup was not feasible.
c/In 28 additional cases cleanup was not feasible. (See p. 12.)

1/100 oil spills were minor--less than 10,000 gallons--and 37 were over 10,000 gallons. These 37 spills accounted for about 11.6 million gallons of oil spilled during 1976.

Although our analysis indicated that the Coast Guard needs to improve its effectiveness in responding to oil spill incidents, we believe that, overall, the Coast Guard creditably operated its oil pollution containment program, considering the limited resources available to it. We believe that increased program effectiveness can be obtained by increasing staff, improving training programs, retaining experienced personnel, and providing additional equipment. (See chs. 3 and 4 for a detailed discussion of personnel and equipment needs.)

Since the Coast Guard relies on contractors to contain and cleanup oil spills, it usually does not initiate "first aid" action itself. Of the 21 MSOs we visited, however, 3 advised us that they do initiate such first aid action. In our opinion, such initial action by the Coast Guard--since it generally is the first to arrive at the scene of a spill--could reduce an oil spill's adverse environmental impact. The Coast Guard's initial response to reported oil spills should consider such factors as reported spill size, spill location, environmental sensitivity of the location, response time needed, contractor availability, prior experience of spiller, and reported cleanup and containment actions being taken.

The Coast Guard actions and responsibilities, discussed above, should be designed to assure that oil spill containment and cleanup are done as efficiently and economically as possible. As stated previously, however, we believe that there are opportunities for improvements in the Coast Guard's response to oil pollution incidents.

UNTIMELY RESPONSES TO SPILLS

According to Coast Guard policy, MSOs are to respond in a timely manner to oil spills. Timely response, which means getting to the spill in a reasonable time after it has been reported to the appropriate Coast Guard unit, is critical because quick action can lessen the severity of an oil spill. Factors, such as distance from a Coast Guard unit to the spill, weather, and time of day, can influence the response time required. We considered these factors in our timeliness assessment.

We believe that the Coast Guard was not timely in responding to 16 percent of the major (over 100,000 gallons) and medium (between 10,000 and 100,000 gallons) and 3 percent of the minor oil spills reviewed.

A pipeline oil spill, for example, was reported to the Coast Guard at 11 a.m. The Coast Guard requested an overflight of the spill area by the Coast Guard air station at the station's convenience. The station did not report the spill situation to the MSO until 2 p.m. The MSO then dispatched investigators, who arrived on the scene at 9:15 p.m. This was 9 hours after the spill was first reported. The spill was a long distance (about 60 miles) from the MSO and before sending investigators, the MSO wanted to verify, by an overflight, the severity of the spill. In this incident, which was initially reported as a 126 gallon spill, over 10,000 gallons were actually spilled. The MSO should have ascertained how quickly the air station could make an area overflight and if not immediately, should have made other arrangements. The spiller did not hire a cleanup contractor until after the Coast Guard arrived onscene.

In another incident a pipeline spill was reported to the Coast Guard at 1:25 p.m. on July 12. Investigators were not sent to the scene until the next day, arriving at 2:35 p.m., 25 hours after the initial report. The spiller reported that about 700 gallons had been spilled and that a cleanup contractor had been on the scene at the time he notified the Coast Guard on July 12. The amount actually spilled was 39,000 gallons. Although the spill was cleaned up, the Coast Guard got there too late to monitor the adequacy of initial containment and cleanup.

INEFFECTIVE MONITORING OF CLEANUP

The Coast Guard is responsible for monitoring cleanup in all non-Federal oil pollution incidents in its jurisdiction as well as for determining when cleanup is completed. The objective is to insure the environment is protected and returned to its natural condition. The Coast Guard could have been more effective in monitoring 14 percent of the major and medium, and 3 percent of the minor spills reviewed.

For example, in a medium pipeline spill, a Coast Guard monitor made an aerial survey of the spill site during cleanup and saw no pockets of oil or heavy accumulation remaining. On the basis of this survey the Coast Guard declared the cleanup complete despite observing a visible oil sheen on the water. Several days later, State personnel found oil hidden in grasses and reeds and determined

additional cleanup was needed. Had the Coast Guard monitored the cleanup contractor's action by surveying the area by boat and on foot, the oil would initially have been seen and could have been completely cleaned up. Because the contractor had to be called back, additional costs were incurred. The cleanup required an additional week.

In another case the Coast Guard arrived on the scene shortly after being notified of an oil storage tank collapse. When the Coast Guard arrived, the major portion of the oil was contained within a dike area and the spiller was not taking aggressive preventive actions to insure that the dike did not collapse. The dike collapsed about 4 hours after the initial rupture of the tank and about 2 hours after the Coast Guard arrived, spilling about 2 million gallons on the land. Of this oil, 150,000 gallons entered a nearby river, contaminating marshlands, shorelines, and marinas and endangering sewage treatment facilities. Cleanup took 3 months. The severity of this spill may have been lessened if the Coast Guard had activated the strike team immediately instead of waiting until the second day, directed immediate deployment of available boom to protect environmentally sensitive areas such as a sewage treatment plant and marshlands, pumped the oil from behind the dike area to relieve pressure, and declared this a Federal spill sooner so that Navy equipment could have been used (e.g. MARCO skimmer). Boom deployment was not started until about 7 hours after the spill occurred.

Another example of the need for more effective monitoring occurred on a medium barge spill when the Coast Guard allowed inadequate cleanup by the spiller to continue for several weeks before declaring the spill a Federal cleanup and, thus, taking charge. Inadequate cleanup operations by the spiller, such as poor labor supervision and lack of equipment, were noted by the Coast Guard monitors as early as the second day. The Coast Guard should have taken over the spill immediately instead of waiting 20 days to do so. This delay lengthened the period required to do the cleanup.

INEFFECTIVE ACTION ON ARRIVAL AT SPILLS

Prompt and effective Coast Guard action after arriving at a spill can minimize environmental damage. The most

important action to take after arrival at the spill is to get the spill contained and get a contractor to start cleanup.

Eighteen of the 21 Coast Guard MSOs visited do not, as a matter of policy, initiate prompt first aid action to contain and remove the spilled oil. They rely upon the spiller or the contractor to do this or permit the spill to dissipate naturally. We believe that in 30 percent of the major and medium spills and 7 percent of the minor spills reviewed, the Coast Guard could have been more effective if it had been prepared to take initial first aid action when it arrived or taken more decisive action once there. Examples follow.

On a major spill involving a tanker leaking oil in a river, the Coast Guard allowed 2 hours to elapse before cleanup and containment actions were begun because of a dispute among the two contractors and the spiller over which would be the prime contractor. While the dispute took place, the oil was being allowed to continue to enter the water. The Coast Guard should have requested the spiller to take immediate action, or the Coast Guard should have declared this a Federal spill and hired a contractor to immediately begin containment and cleanup.

In another case a vessel went aground just outside a harbor on March 3, 1976, and leaked 80,000 gallons of oil over a 3 month period. The Coast Guard only monitored the spill until March 16, when it then designated it a Federal spill. At that time, the owner and insurer verbally stated that they were abandoning the vessel because its salvage was hazardous due to surf conditions. On March 19, the strike team surveyed the situation and concluded that the fuel could be removed. While the owner continually indicated that he would have the vessel lightered--remove the oil--he never did. The Coast Guard did not make plans to lighter the vessel until April 1. On April 2 the Coast Guard determined that lightering would be unsafe. The vessel subsequently was abandoned, and in August 1977 the vessel was still aground.

The Coast Guard should have initiated action to lighter the vessel as soon as possible when the owner did not promptly respond. From March 4 until March 12 weather conditions permitted lightering. Using its own pumping equipment the Coast

Guard could have removed the fuel in 2 to 3 days. After the strike team reviewed the situation on March 19, the Coast Guard still had sufficient time (until April 2) to lighter the vessel.

On another occasion the Coast Guard arrived late one afternoon to investigate an oil spill. About 20 gallons of oil was observed in the water at a marina. The Coast Guard tried, without success, to contact someone from the marina. Coast Guard investigators then photographed the pollution and about 3 hours later left without taking any action to contain or remove the oil. The next morning the Coast Guard returned and observed about 10 gallons of oil in the water. They met with a marina representative and informed him of the marina's responsibility to clean up the oil. According to Coast Guard records, this spill was not cleaned up but was allowed to dissipate in the water. The Coast Guard should respond with sufficient equipment to begin or complete containment and cleanup.

ALLOWING MINOR SPILLS TO DISSIPATE IN THE WATER

As mentioned previously, the Coast Guard is responsible for ensuring that oil spills are cleaned up. However, this is not always feasible, according to the Coast Guard, because the oil dissipates rapidly or is of such a small amount as to make cleanup too costly. In the cases we analyzed, 41 percent of the minor and 11 percent of the medium and major spills were not cleaned up. Cleanup was not feasible in some of these spills for the above reasons. However, in 13 of the minor spills reviewed, cleanup was feasible and should have been done.

For example, a 42-gallon spill of light oil was reported to the Coast Guard by an oil company, and the oil apparently had drifted into the company's dock area. The Coast Guard responded to the spill and immediately began looking for the pollution source; however, a source was never found. The Coast Guard did not begin containment or cleanup because the company has a good reputation for cleaning up oil spills. However, the Coast Guard does not know if the oil was cleaned up because it did not check back to see. The Coast Guard should have determined if the company was taking effective

action and, if not, should have been prepared to begin cleanup itself.

One of our panelists suggested that Coast Guard pollution investigators sent to oil spills take with them a boat trailer containing a small boat and an outboard motor, some 5-foot lengths of filter boom, and a 50-foot section of harbor boom lashed down under a boat cover so that containment and cleanup can be started, if necessary. We believe this would be one of the most effective improvements in Coast Guard procedures to minimize the adverse effects of minor and medium oil spills.

NOT ALL REPORTED MINOR SPILLS ARE INVESTIGATED

The Commandant of the Coast Guard issued an instruction on October 10, 1974, stating that "the Coast Guard is responsible to insure that every report of a violation of Section 311 (of the Federal Water Pollution Control Act) is investigated." According to our analysis this requirement is not always complied with because of personnel shortages, the simultaneous occurrence of spills, and the inaccessibility of some spill locations.

Seventeen percent of minor spills reported were not investigated. Reported amounts spilled for these non-investigated spills ranged from one-fifth of a gallon to 100 gallons. Most of these uninvestigated spills occurred in one MSO area.

Coast Guard failure to investigate oil spills also precludes it from enforcing the FWPCA. In one spill, penalty actions failed because the Coast Guard did not investigate or take samples needed to identify the spiller. Other examples of oil spills not responded to nor investigated were an 84-gallon gasoline spill from a leaking check valve during unloading operations and a 50- to 100-gallon spill of diesel and industrial essence from dumping contaminated materials into ditches. Since the Coast Guard did not investigate these spills, it does not know whether the quantity of the spill reported was accurate.

Spills in inaccessible areas could be investigated by aerial survey. In several of the uninvestigated cases, the MSO did request aerial surveys but the Coast Guard air station did not make them.

The Coast Guard is responsible for investigating reported violations of section 311 of the FWPCA. If the Coast Guard does not have the personnel and equipment to investigate such reported spills, then it should request such resources from the Congress or else specifically advise the Congress each year of the number of uninvestigated minor oil spills.

CONCLUSIONS AND RECOMMENDATIONS

Although the Coast Guard does an effective job overall in responding to the majority of oil spills, there were opportunities for the Coast Guard to have been more effective in 38 percent of the oil pollution incidents we examined. Therefore, we recommend that the Secretary of Transportation direct the Coast Guard Commandant to

--investigate all oil spills and insure that containment and cleanup are done when possible,

--direct each MSO to be prepared to do first aid containment and cleanup when it arrives at an oil spill,

--monitor every non-federally funded spill cleanup to insure timely and effective action, and

--be quicker in declaring some spills as Federal.

Effectiveness can be increased by increasing staff, improving training programs, retaining experienced personnel, obtaining additional equipment, and improving contingency plan preparation, as discussed in the following chapters.

AGENCY COMMENTS AND EVALUATION

In commenting on our draft report the Department of Transportation agreed that the effectiveness of the Coast Guard oil spill response program can be improved. The Department disagreed with the conclusion that as many as 38 percent of oil spill cases required actions other than those taken. The Department also said that there appeared to be a number of differing viewpoints concerning the evaluations made by the GAO panel. Since many of the decisions are

subjective, this is not surprising. Further, the Department added that the decisions were made by the OSC, or his representative, based on the best information available without advance knowledge of the outcome of the incident. However, the Department agreed that opportunity exists for improvement in the Coast Guard's oil spill response programs. During recent testimony before the Senate Subcommittee on Transportation and Related Agencies, Committee on Appropriations, the Coast Guard said that it could have improved its response in about 25 percent of the cases.

We recognize that subjective evaluations are involved in ascertaining the percent of cases in which the Coast Guard could have improved its response to oil spills. However, whether opportunity existed for improvement in 38 percent of the cases as concluded by our panel of experts or in about 25 percent of the cases, as estimated by the Coast Guard, there are a substantial number of cases where the Coast Guard's response to oil spills could be improved by implementing our recommendations.

CHAPTER 3

NEED TO INCREASE STAFFING AND IMPROVE TRAINING

The Coast Guard controls and removes oily discharges from coastal waters and shorelines through its 53 MSOs and 3 strike teams. In addition to marine environmental protection (MEP), MSO responsibilities include port safety operations, inspection of vessels and facilities, and licensing of American ships and their officers.

If the Coast Guard is to improve its oil pollution response capabilities, staffing shortages, rotation of experienced personnel, inadequate training, and a lack of diving capabilities will need additional attention.

NEED TO DETERMINE AND REDUCE MEP STAFF SHORTAGES

Coast Guard headquarters and district officials, and MSO records indicate that insufficient staff were assigned to the MEP area and, as a result, that

--some reported oil spills are not being investigated, although Coast Guard policy requires that all such spills be investigated, and

--oil spill investigations that were done reduced the effort that could have been devoted to surveillance and prevention of spills and to adequate monitoring of spills.

Although MOSs had not systematically determined all their additional MEP staffing needs, officials of most MSOs visited provided us the following estimates.

MSO location	Present number dedicated to MEP	Additional personnel needed
New London, Connecticut	6	3
New Haven, Connecticut	5	15
New York, New York	16	9
Philadelphia, Pennsylvania	22	15
Hampton Roads, Virginia	a/16	30
Wilmington, North Carolina	a/25	(b)
Charleston, South Carolina	9	1
Miami, Florida	9	(b)
San Juan, Puerto Rico	6	(b)
Mobile, Alabama	a/14	(b)
New Orleans, Louisiana	a/38	c/40

a/Includes persons at the MSO who could work on oil spills.

b/Coast Guard officials stressed personnel shortages as a hindrance to performing the MEP mission but did not estimate the number of additional personnel needed.

c/Based on an Eighth Coast Guard District planning document citing the need for additional pollution incident investigators only.

The head of the Office of Marine Environment and Systems estimated that the MEP field was at least 50 percent under staffed. An Eighth Coast Guard District official estimated that to improve oil spill investigating and monitoring functions the Eighth District needs perhaps double or triple the present number of MEP personnel.

According to quarterly MSO "Environmental Protection Activities Reports," generally the MSOs did not meet the minimum Coast Guard standards for MEP mission performance. The MSOs attributed this to personnel shortages. The Coast Guard recognizes that the MEP mission is presently manned to meet 54 percent of its program standard.

Attempts made to determine the need for and obtain additional MEP personnel were not based on comprehensive studies and generally were unsuccessful. For example, in 1973 the Eighth Coast Guard District sent a planning proposal to headquarters. This document indicated a need for 48 additional pollution incident investigators; of these 48 investigators, 40 are needed in New Orleans. Headquarters indicated the document would be maintained and used for continual planning, so the

District has not made subsequent personnel requests. According to a District official, the District needs two or three times the current number of MEP personnel.

In another case an MSO official advised us he had tried for 2 years to get an additional MEP person. The employment authorization was recently received but the position has not been filled. Even if the position is filled, the official said that the existing staff would have to more than double before the personnel shortage would be solved.

On July 18, 1977, the Commandant of the Coast Guard issued an overview statement discussing external changes which will have a bearing on the Coast Guard in carrying out its missions. The Commandant stated that Coast Guard headquarters and field personnel will need to use advanced forecasting techniques "while relying less on intuitive forecasts and trend extrapolation." He concluded that "Consideration of alternatives and balances among programs, supported by cost-benefit analysis, will be required."

We believe that the Coast Guard needs to undertake a comprehensive and systematic study of the staff needed for the MEP activities, including oil spill investigations, containment, and cleanup. Such a study should consider the results of an on-going Coast Guard funded study, designed, in part, to identify the resources available from other Federal agencies and contractors.

In the interim, the Coast Guard could use two of its three strike teams more effectively by having them assist the MSOs. Oil spill response, training of MSO personnel, and other MEP duties of two of the three strike teams accounted for less than one-third of their time. The teams must use some time for internal training and equipment maintenance but additional capability exists which could alleviate the staffing shortages.

Agency comments and evaluation

In commenting on our draft report, the Department stated that the ability to respond to pollution incidents will improve as additional staff is added to the program. The Coast Guard said it has studied this matter and is continually

evaluating its personnel requirements to improve its ability to accomplish its mission but requests for additional personnel are submitted each fiscal year through the normal budgetary process. The Department considered the staffing study to be unnecessary.

We agree with the Commandant's views and we believe that the Coast Guard should use the type of considerations he set forth--various alternatives and balances among programs, supported by appropriate cost-benefit analyses--in making a comprehensive study of its staffing needs for the MEP program. Such studies become even more important when total available funds are limited and when priorities must be established between competing programs as occurs during the budgetary process. In the absence of such studies, we believe that the Coast Guard will not be in a position to adequately justify its MEP program staffing needs to the Department, Office of Management and Budget, or to the Congress.

Presently, a number of studies are being performed by the Coast Guard (see p. 41) to determine future oil pollution response system requirements so that goals can be established. We believe that the results of these studies will affect staffing needs and, therefore, accentuate the need for a comprehensive staffing study by the Coast Guard.

NEED TO ESTABLISH AN MSO POSITION CLASSIFICATION

The Coast Guard has a rotation policy for its staff among various duty stations (e.g. search and rescue, buoy tenders, high and medium endurance cutters) every 2 to 3 years. Staff are trained to perform specialized jobs (e.g. boatswain mate, machinery technician), so that as members rotate trained and experienced individuals will be available as replacements. Promotions are based on experience, performance, and expertise in a specialized job.

The Coast Guard normally uses rotation to an MSO as a shore assignment for persons who have been on sea duty or at an isolated location (e.g. LORAN 1/ station). Because the functions and work at the MSO and strike teams are generally much different than the individual's previous assignments, the Coast Guard must train MSO and strike team personnel. Coast Guard officials estimated that the individuals usually

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1/Long range aid to navigation.

spend the first 12 to 18 months of an MSO or strike team tour training in pollution abatement. This training represents about one-half of their MSO or strike team assignment time.

The Coast Guard has not established a specialized job classification for MSO activities. As a result, the Coast Guard has not been able to keep experienced and trained staff in the MSO area. Because promotions are based on expertise, performance, and experience in areas other than MSO, MSO duty can be detrimental to staff members' Coast Guard careers. MSO staff often rotate to other duty which does not effectively use their MEP experience and training.

When Coast Guardsmen complete tours of duty at MSOs or strike teams, they should be well trained in oil pollution abatement. Logically this expertise should be used when the person is reassigned. But persons who have rotated from the strike teams where they have received extensive oil pollution abatement training for their entire tours have normally not been reassigned to units where the experience can be used. The following schedule shows that from 1973 until July 1, 1977, only 5 of 33 persons went to units dealing with oil pollution abatement.

Unit to which reassigned (note a)	Strike team			
	Atlantic	Gulf	Pacific	Total
Nonrelated:				
Buoy tender	5	2	2	9
Cutter	2	2	5	9
Coast Guard base	1	2	2	5
Patrol boat	0	1	0	1
Isolated duty	0	1	0	1
Other nonrelated	1	0	2	3
Total	9	8	11	28
Related:				
MES School (note b)	0	1	0	1
MSO	0	2	1	3
Other related	0	0	1	1
Total	0	3	2	5
Total	9	11	13	33

a/Transfer of three was unknown.

b/Marine Environment Systems.

Statistics on transfers from the MSOs were not readily available. However, officials at the MSOs said the same situation as applies to the strike teams exists when their people transfer.

The Coast Guard has recognized the advantages of a specialized MSO classification in its reserve component. It has established a Port Security Man reserve classification which performs many functions similar to those of regular duty MSO personnel, including oil pollution abatement. Although there are differences between active duty and reserve staff, a similar rating for active duty personnel should be established to maintain a well-trained MSO staff for dealing with oil spills. We recognize that all MSO staff will not need such a rating.

While reviewing oil spill case files, members of our panel expressed concern that the Coast Guard was not maintaining experienced personnel in the oil abatement program. One panelist stated:

> "A difficulty with the existing Coast Guard pollution control program, at least with respect to oil spill control operations and monitoring, is that the personnel in the billets charged with the responsibility rotate to other duty stations on a regular basis. This effectively precludes individual Coast Guard personnel from acquiring the necessary familiarity with local conditions and peculiarities which would normally accrue in personnel operating in these areas over a period of time. Usually, just when Coast Guard personnel are acquiring sufficient knowledge of an area to render them capable of effective supervision and direction of operations in a given area, they are transferred and the process must begin all over with new, inexperienced replacements."

Another panelist stated that the Coast Guard needs to change its procedures regarding the time a person spends in this area if the response to oil spills is ever to become as good as it could be.

Some Coast Guard officials, some oil spill cleanup contractors, and some industry officials indicated that inexperienced MSO personnel impede oil spill cleanup operations. These persons said that a specialized rating (i.e., job specialty) was needed for enlisted men in the marine safety

field because well-trained and experienced personnel for MSO duty would increase Coast Guard effectiveness in oil spill abatement, as well as other MSO functions.

Agency comments and evaluation

In commenting on our draft report the Department stated that there is a need to identify personnel having marine safety expertise. The Coast Guard has accomplished this identification process by developing a special billet qualification system. Through this system the Coast Guard can keep track of individuals who develop expertise in a special marine safety area and the various billets requiring such expertise. According to the Department, people are now being transferred under this new system. The Department recognizes that a new program has to develop a base of qualified personnel, and the period of development should soon be complete. The Department believes that a sufficiently large pool of qualified personnel will be available for MSO assignments in 2 to 3 years.

We recognize that there are alternative approaches for retaining qualified personnel in the MEP program. We believe improvements should be realized from the new system now in use to (1) keep track of qualified personnel who develop expertise in a special area of marine safety and (2) use such information to reassign personnel to billets needing marine safety expertise. We believe our proposal of establishing a separate enlisted rating for the MSO position, however, would be a more effective method in retaining experienced personnel for MEP activities because the individuals would have (1) professional advancement opportunities in their specialty and (2) incentive to maintain job knowledge even when on non-MEP assignments.

Under this approach we also believe that individuals with this speciality rating--when reassigned to an MSO or strike team--would provide continuity of required skills as others leave and would provide such continuity without additional training.

NEED TO IMPROVE MSO TRAINING

The Coast Guard needs to improve its personnel training to effectively respond to pollution incidents. The Coast Guard MES School should be expanded so it can devote more

time to oil pollution abatement and more MSO personnel should attend the school. The Coast Guard also needs to improve in-house training and on-the-job training for the MSO staff working on oil spills.

Training of personnel in MEP is critical because the people in these units are generally inexperienced in MEP. MSO and strike team personnel training varies somewhat because they perform different missions.

Coast Guard training consists of training at the Coast Guard MES School, in-house training at the MSOs, on-the-job training, strike team conducted seminars at the MSOs, and external training. The strike teams take advantage of all of the training programs and emphasize in-house and on-the-job training. Although, the MSOs do not generally send their personnel to external training, strike team personnel are sent to outside courses and seminars, such as the Navy diving school, private and military special training programs, and university oil spill control courses.

The following describes and evaluates various Coast Guard training programs.

MES School should devote more time to oil pollution abatement

The MES School at Yorktown, Virginia, is a 5-week course for enlisted personnel and a 5-1/2-week course for officers. The course for enlisted personnel devotes 40 hours to oil pollution abatement and only 1 day (7-1/2 hours) to "hands-on" training with oil spill cleanup and containment equipment. 1/ The officers' course devotes more time to pollution abatement (86 hours) but it emphasizes management and reports. The Coast Guard has a 12-week school for port security reservists which provides MEP training and other port operations training.

1/Also, techniques for distribution, recovery, and disposal of sorbents are discussed for 2 hours which the Coast Guard considers hands-on training.

The MES School is available to MSO personnel. A significant number of MSO personnel involved in pollution abatement, however, have never completed the school. The following table indicates, by district, the number of MSO personnel who had been to the MES school as of September 1, 1977.

Coast Guard District	Personnel available for pollution abatement	Number who have completed MES School	Percent of total
1st	46	24	52
3d	53	31	58
5th	63	39	62
7th (note a)	27	22	81
8th	167	72	43
Total	356	188	53

a/Includes only those MSOs reviewed.

Coast Guard officials noted that the MSO enlisted personnel monitoring and supervising a cleanup, who had attended the MES School, felt that the school had not prepared them to deal with major spills. They suggested that the MES courses be expanded to include intensive studies, preparing students for oil spill monitoring and for supervising cleanup.

Strike team personnel attend the same courses even though the majority of the courses for both the officers and enlisted personnel are devoted to port safety/port security. Strike team officials felt that the MES courses devoted too little emphasis to pollution control. These officials felt other Federal agencies and private sources offered more appropriate courses, so most strike team members took external training courses. MSOs, however, did not offer their staff external training courses.

In-house and on-the-job training varies at MSOs and is not adequate

In-house training at the MSOs varies not only between districts but also within districts. Training varies from very limited to structured training. Most in-house training consists of 1-day seminars several days per year augmented by

annual 2- to 7-day training seminars conducted by the strike teams. Some MSOs have no in-house training other than what the strike teams provide.

Most MSOs rely on on-the-job training. However, the districts do not have structured on-the-job training to ensure that MSO personnel qualify in a diversity of assignments enabling them to become familiar with various aspects of MSO duties.

Only the MSO at Hampton Roads, Virginia, has a structured training program for enlisted personnel. This program consists of approximately 6 months of exercises, tests, practical experience and the 5-week MES course. New staff members were required to complete this course for qualification in port security/marine environmental programs. Further, qualified persons accompany those who are not qualified on all but the more routine MSO duties. Oil spills are generally not considered routine. Some of the training program elements are

--completion of a number of routine harbor patrols, including at least one oil pollution patrol;

--participation in the inspection boarding of a variety of vessels, including tank vessels and barges;

--participation in an oil spill investigation;

--participation in the inspection of an oil terminal; and

--successful completion of an internally prepared test on MSO operations.

Some elements can be waived if the individual has had previous experience. Of the 16 people in the port security/MEP area, only 5 were qualified at the time of our review. Several others had completed most of the program and would probably be qualified within 3 or 4 months.

Other Coast Guard officials endorsed the use of a qualifications program for MSO personnel. These officals stated that because the nature of the Coast Guard MEP program

requires technical knowledge of law, investigation, and response, qualifications should be established to insure the individual's ability to perform. They noted that documentation of achievement should be maintained to insure all personnel assigned become well-rounded in all aspects of the program. They added that the Yorktown MES School and the strike team training program cannot relieve the MSO from conducting in-house training for spill response for all personnel because the demand of oil spill response may require any or all personnel to become involved. They believed that MSOs should conduct regular in-house training with a qualification program. At the time of our review, none of the MSOs visited had a training program or planned a program similar to the one at Hampton Roads.

Agency comments and evaluation

The Department said that the curriculum at the MES School is designed to be well balanced and suited to Coast Guard needs. The Department said that the school provides sufficient hands-on training. The Department believes that a dynamic, adequate formal training program exists; however, it agreed that additional headquarters guidance and assistance in unit training will generally result in better unit training programs. The Department said that the school is taking such initiatives to accomplish this.

We believe that these initiatives are responsive to the intent of our proposal; however, we believe that the MES School should be expanded to give additional emphasis to the MEP program. The Coast Guard should also require that MSOs establish a personnel qualifications program for the MEP activity and should provide uniform program requirements and criteria.

NEED FOR STRIKE TEAMS TO INCREASE DIVING CAPABILITIES

The Gulf and Pacific strike teams do not have adequate diving capabilities despite the national contingency plan and Commandant instructions, requiring them to have such capabilities. Diving is important to the teams' oil pollution investigations and in minimizing the environmental damages of oil spills.

Current Coast Guard instructions require four divers on all diving operations. The Gulf strike team had only two qualified divers and one scuba outfit. Coast Guard officials

in this team's response area stated that they would use the strike team for diving operations. Although the Pacific strike team had four qualified divers, adequate diving equipment for them was not available. For example, neither the Gulf nor Pacific teams had surface air-supplied diving equipment.

Because of its role in protecting and restoring the environment after an oil spill the Coast Guard should use its own strike team divers to investigate all potentially serious oil spills. For example, a commercial diver did not report that the hatch covers on a sunken barge were open and that he had secured them. Because the diver had not reported his action, the Coast Guard was unaware that a large volume of oil escaped from the sunken barge until it came ashore 5 days later. If the Coast Guard had used its own divers, the environmental consequence of the open hatches would have been recognized. The District Commander, citing Coast Guard pollution responsibility, said he would definitely use Coast Guard divers on similar incidents.

CONCLUSIONS

Generally, the Coast Guard personnel working in pollution abatement are dedicated to keeping our Nation's waters free of oil and other hazardous substances. However, dedication alone will not compensate for staff shortages and inadequate training.

Some reported oil spills have not been investigated, and some other MSO responsibilities have not been met because of staff shortages. Although staffing shortages cannot be overcome immediately, the Coast Guard should undertake a comprehensive and systematic study of its staffing needs to effectively administer its MEP program. Meanwhile, the Coast Guard should make more use of its strike teams to assist the MSOs.

MSOs and strike teams need to maintain well-trained personnel with pollution expertise. To accomplish this, the Coast Guard should establish a job specialty classification. The staffs also need better MEP training. In addition, the Coast Guard should insure that all strike teams have adequate diving capability, as required, and that they use the teams on all potentially serious spills.

RECOMMENDATIONS

We recommend that the Secretary of Transportation instruct the Commandant of the Coast Guard to:

--Undertake a comprehensive and systematic study of the staffing needed to carry out the various activities in its MEP program, including oil spill investigations, containment and cleanup. Such a study should consider the results of an ongoing Coast Guard-funded study to identify available resources. In the interim, the Commandant should use strike teams more effectively.

--Establish an MSO job specialty classification. Use of the existing reserve classification should be considered.

--Increase in-house training for MSO personnel through expanding the MEP aspects of the MES School.

--Establish criteria for on-the-job training and a standard for personnel qualifications in the MEP area.

--Insure that (1) all strike teams have adequate diving staff and equipment necessary to fulfill the requirements of the national contingency plan and Commandant instructions and (2) strike team divers are used for all potentially serious oil spills.

CHAPTER 4

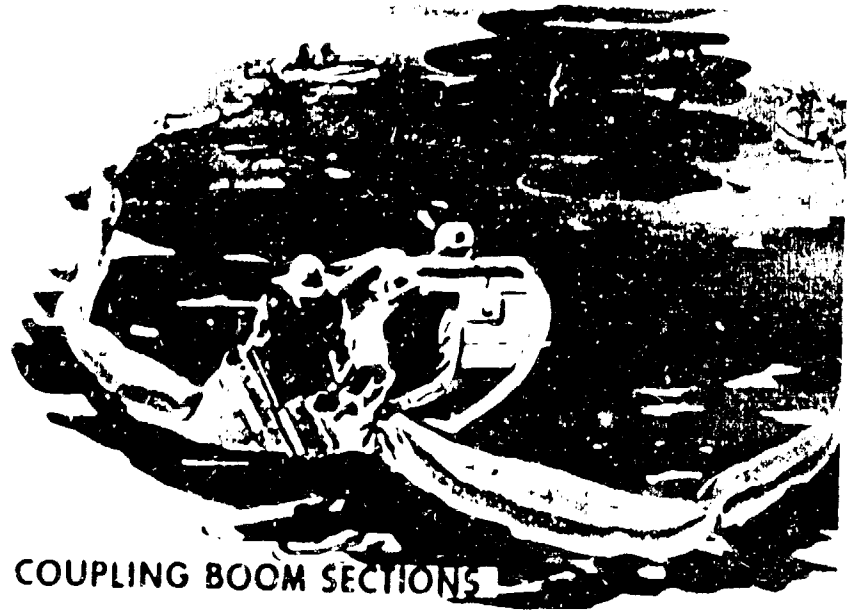
NEED FOR ADDITIONAL EQUIPMENT AND FOR IMPROVEMENT IN RESEARCH AND DEVELOPMENT PROGRAM

The Coast Guard needs additional equipment to improve its ability to respond to oil spills. Such equipment includes adequate transportation (e.g. trucks) and deployment equipment (e.g. trailerable boats) for MSOs. A better variety of oil transfer equipment (e.g. oil pumps); additional transportation-handling equipment; oil waste receptacles; and commercially available oil skimmers for strike teams, similar to those the Navy owns, are also needed. In addition, the Coast Guard needs to improve its equipment research and development program. It needs to formalize the process of obtaining input from personnel engaged in oil spill containment and cleanup, to respond to their input, and to develop such equipment on a systematic approach rather than on a piecemeal basis which has resulted in the development of equipment which is not as useful as it might otherwise be.

When an oil spill occurs, equipment or material must be used to contain or remove the oil from the water or shoreline. A boom consists of a barrier, usually in sections which join together, to encircle an oil spill to prevent or control movement of the oil. Basically, the boom resembles a floating dam. (See pp. 30 and 31.) There are two boom types. Harbor booms are used for calm water, and open-water booms are used for 1- to 5-foot seas. When the boom has contained the oil, the oil must be removed.

Many types of oil removal equipment are available. This equipment ranges from sorbents, which act like blotters to absorb oil from the water, to complex mechanical skimmers which transfer the oil from the water to a storage device. (See p. 32.) Skimmers also collect oil in different ways using belts, ropes, drums, or discs or using suction. Various small skimmers are also manufactured. These are used primarily from the shore or dock and can recover small volumes of oil. (See p. 33.) Appendix I discusses containment and cleanup equipment in detail. In order for containment and removal equipment to be used it must be transported and deployed.

DEPLOYMENT

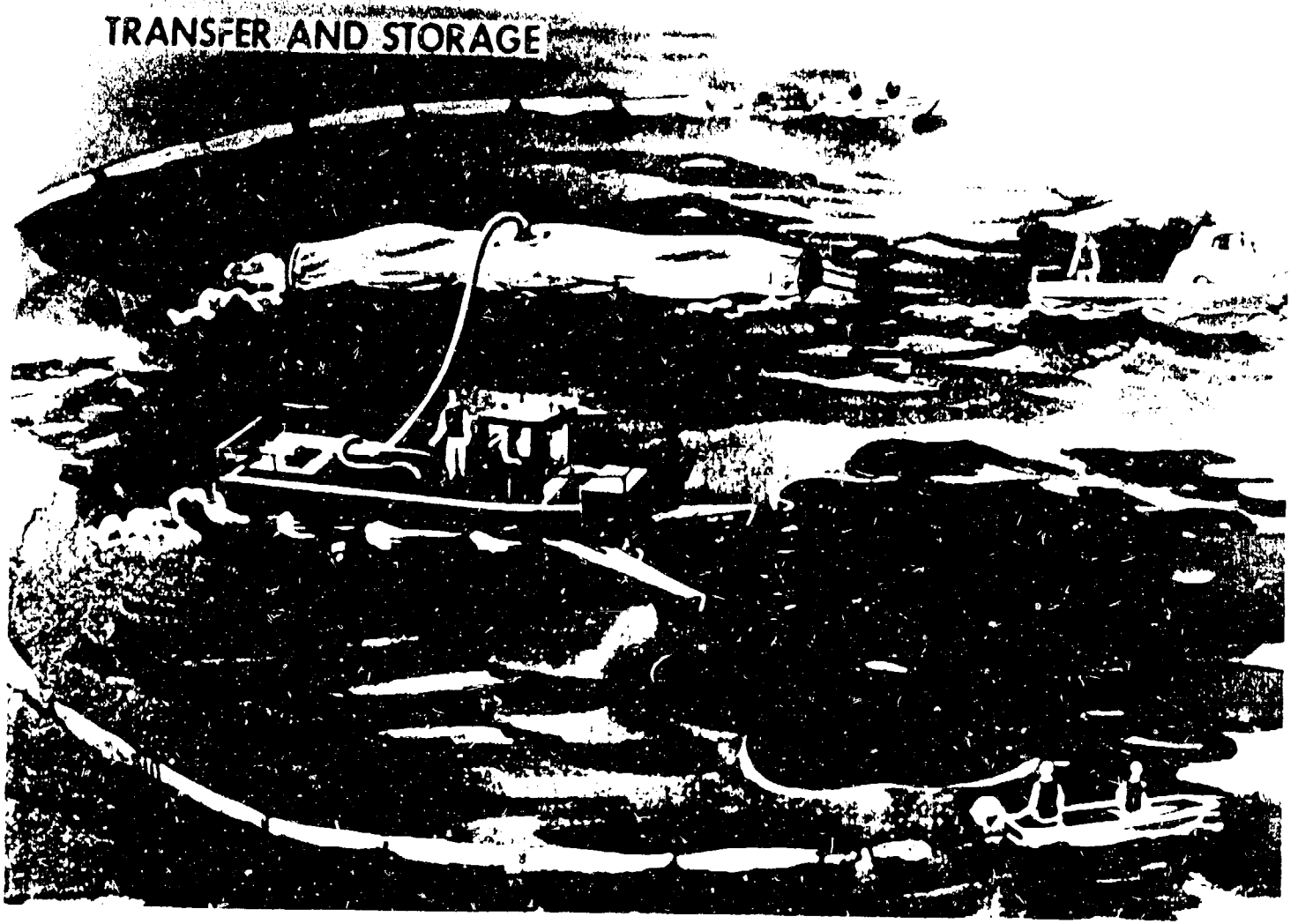


COUPLING BOOM SECTIONS

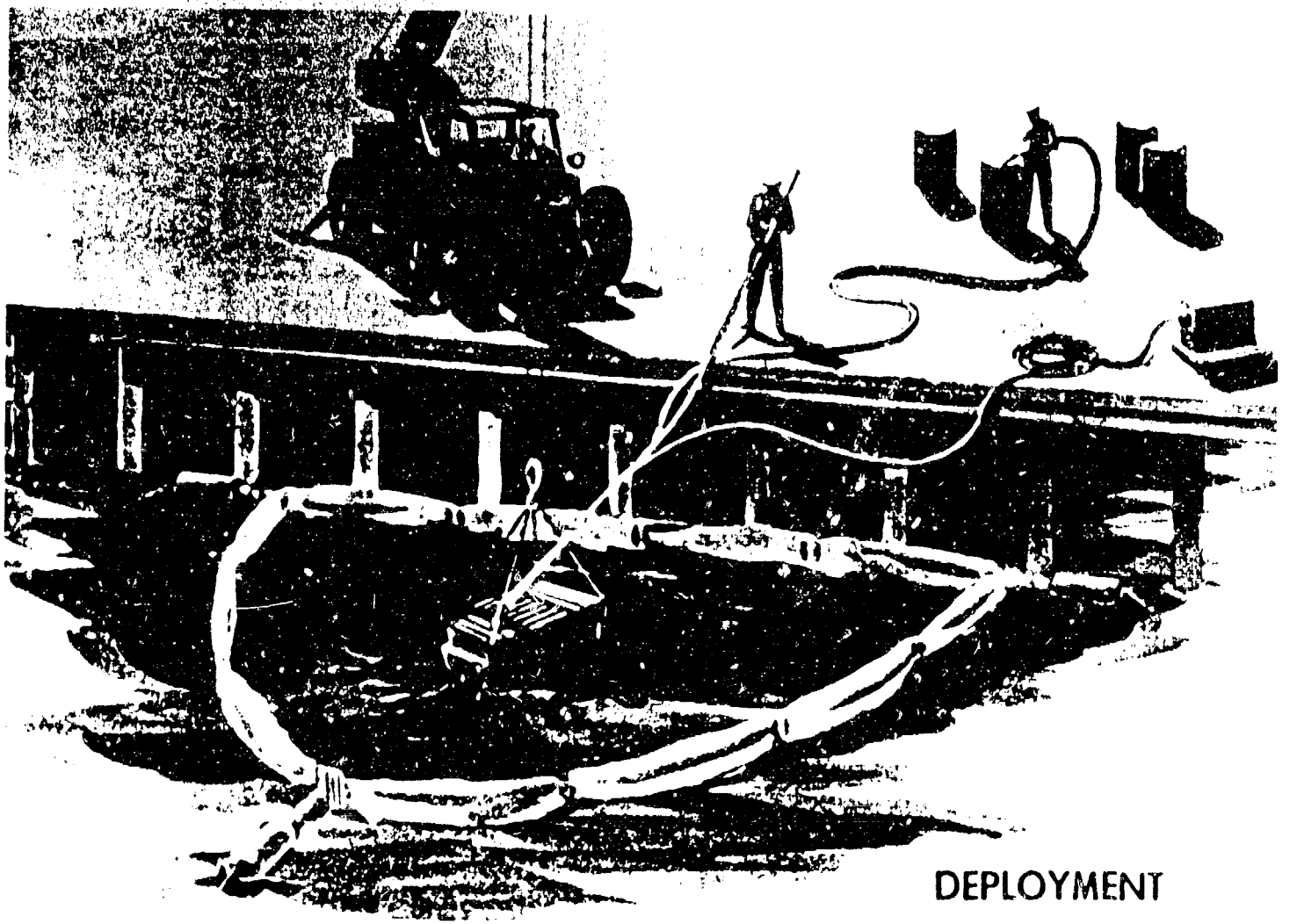
CONTAINMENT

SOURCE DEPARTMENT OF THE NAVY

TRANSFER AND STORAGE



SOURCE DEPARTMENT OF THE NAVY



DEPLOYMENT

SOURCE: DEPARTMENT OF THE NAVY

ADDITIONAL TRANSPORTATION AND DEPLOYMENT EQUIPMENT NEEDED FOR MSOs

Although MSOs generally have equipment to contain and clean up small oil spills, they do not have transportation vehicles for boom and cleanup equipment or trailerable boats to deploy such equipment. As discussed in Chapter 2 MSOs need this transportation and containment equipment if they are to take an active role in containing a spill as soon as they arrive at the scene. The actual deployment of such equipment would probably not be required for every reported oil spill; however, headquarters should establish factors to be considered by MSOs in deciding the type of equipment to send initially to a reported spill. We believe that such factors should include those cited on page 8 of this report.

One MSO wanted to take a more active role in containment and cleanup but did not have adequate transport vehicles for booms and removal equipment and trailerable boats. This MSO in San Juan, Puerto Rico, had only one operable vehicle--a pickup truck--that was unsafe because it had been wrecked. In addition, the Eighth District MSOs stressed vehicle shortages as a major problem in performing their pollution abatement function. In a 1973 proposal to headquarters, the District identified a need for 66 additional vehicles and 31 trailerable boats for its 6 MSOs. Headquarters had not acted upon the request. While the Fifth District MSOs had 33 vehicles, only 1 vehicle could transport cleanup equipment.

ADDITIONAL EQUIPMENT NEEDED FOR STRIKE TEAMS

The strike teams have the most extensive oil pollution equipment in the Coast Guard, but these teams need a better variety of oil transfer equipment (e.g. oil pumps); additional transportation-handling equipment; oil waste receptacles; and commercially available oil skimmers similar to the Navy's.

All strike teams have ADAPTS 1/ pumping systems. The ADAPTS is an air-cooled diesel-powered hydraulic submersible pump, capable of pumping 1,000 gallons of low or medium viscosity oil per minute. The ADAPTS has been successfully used in several major oil spills. However, the system has limitations in that it cannot pump high viscosity (thick, sticky)

1/Air Deliverable Anti-Pollution Transfer System.

oil such as Number 6 oil once it has cooled and solidified. For example, in a recent Number 6 oil spill a strike team could not use this system effectively to remove the oil without auxiliary heating equipment and receptacles for oil. The present 1,000 gallons per minute pumping capability would require from 42 to 84 days using only one pump, to offload a large tanker with a capacity of 200,000 to 400,000 tons of oil. While this time could be shortened by using more pumps, the number of pumps is limited by the number of pumping systems that can be effectively placed on the deck of a vessel. The Coast Guard recognizes the problems that exist with the ADAPTS and is considering the development of larger capacity pumps capable of pumping more viscous oils.

Strike team officials stated they needed additional equipment to augment the ADAPTS so as to more efficiently respond to different types and sizes of spills such as

--pumps capable of handling a wider variety of pumping situations for larger and smaller spills and

--heating equipment to facilitate pumping of viscous oils in cold temperatures.

Another strike team equipment problem is the lack of equipment to load and unload aircraft. Most major strike team equipment was designed to be air deliverable by C-130 aircraft or by helicopter so that teams could respond to spills promptly. However, the strike teams do not have adequate equipment for loading and unloading the C-130 (e.g. hydraulic crane and large capacity forklift). These problems increase strike teams response time.

Also, the strike teams do not have containers readily available in which to pump oily wastes recovered from vessels. This can impact on the amount of oil that enters the water from a spill. For example, a large tanker which went aground could have been refloated if containers, such as inflatable oil storage bags, were available to transfer the oil from the tanker. This tanker spilled its entire cargo into the sea. The strike teams should have such equipment readily available.

The Coast Guard needs adequate commercially available oil skimmers, like the Navy's, capable of handling significant oil spills. Most cleanup contractors do not have such skimmers. Large oil companies, individually or as cooperatives, and Navy own such large skimmers. Navy equipment may be

available to the Coast Guard only after a spill is declared a Federal spill. For example, during one spill the Coast Guard was using Navy equipment but Navy requested that it be returned before final oil cleanup. This required additional negotiations between the Coast Guard and Navy. While the Navy authorized continued use of the skimmer, this emphasizes the problems that the Coast Guard can have in obtaining large skimmers. Also, the Navy MARCO skimmers are not located where they are mainly needed by the Coast Guard.

One strike team requested a large commercially available oil skimmer from Coast Guard headquarters. At the time of our review the team had not received the skimmer. The teams need such skimmers when they are not readily available from other sources.

IMPROVEMENT NEEDED IN RESEARCH AND DEVELOPMENT PROGRAM

The Coast Guard needs to improve the process for carrying out its oil spill research and development program. Arrangements should be formalized for obtaining information regarding priority research requirements and equipment operating constraints from personnel engaged in oil spill containment and cleanup operations and for providing appropriate feedback to such personnel. This input should relate to operating requirements and constraints, and should be obtained on a regular basis so that equipment problems can be identified and corrected during the entire developmental process. The Coast Guard approach has resulted in the development of equipment which is not as useful as it could be.

The Coast Guard research and development program develops techniques and equipment primarily for offshore operations. The following table shows equipment developed and placed in operation since July 1967.

Title	Development began	No. of units (or feet) in operation
High Capacity Pumping System (ADAPTS)	Unknown	18
High Seas Oil Containment Barrier (Johns-Manville boom)	FY 1968	9,180 feet
High Seas Oil Recovery System (Lockheed skimmer)	FY 970	1
Arctic Water Oil Recovery System (Lockheed skimmer modification for use in cold water)	FY 1973	2
Fast Surface Delivery System (Sea sled)	FY 1974	1

The Coast Guard is also developing the following equipment and techniques:

--Fast current oil removal system (zero relative velocity skimmer)--a self-propelled belt-type skimmer designed to pick up 200 to 400 gallons of oil a minute in currents up to 8 knots.

--Sorbent harvester system--to spread, retrieve, and recycle sorbent material.

--Flaring techniques--to burn oil on water as a means of removal.

Research and development by EPA, Navy, and private industry are discussed in appendix II.

Coast Guard headquarters officials do not formally request field unit input regarding the oil spill equipment needed by the units nor provide response to such input. The project manager in the Coast Guard Marine Environmental Protection Division of headquarters submits projects in the marine environmental protection area to the office of research and development for project development. A strike team official stated that the teams' input had been limited to testing prototype equipment. In addition, district officials stated that their participation is generally limited to commenting on equipment after it is developed. They said that they are not asked to comment on proposed research and development plans in advance or to provide input on areas in need of research and development.

According to Coast Guard officials, field personnel are required to test prototype equipment so that they become familiar with it or its concept, and can provide assessments of it.

Field personnel involved with oil pollution activities are likely to be aware of the equipment needs as well as operating constraints which must be met. Although we noted some input was voluntarily provided by a strike team concerning needed equipment and research effort, there was no formal headquarters response to such input and such information was not regularly requested. Some of the equipment developed by the Coast Guard has had limitations reducing its effective use.

The Coast Guard developed some equipment which (1) was ineffective in actual spill conditions, (2) had characteristics negating its usefulness, or (3) has never been used in actual spills.

1. The Arctic Water Oil Recovery System was developed to recover oil from water containing ice. It has been used on two spills--one in Buzzards Bay, Massachusetts, and one 40 miles north of New York City, on the Hudson River. In neither instance was the skimmer effective in removing oil from the water where ice was present. The skimmer was only able to pick up negligible amounts of oil in each instance.

2. The High Seas Oil Containment Barrier, a type of boom, effectively contains oil in seas to 5 feet, according to tests. However, this boom has not been used on actual spills because it is extremely cumbersome. The boom is packed in aluminum boxes designed for C-130 aircraft transport. Each box contains 612 feet of boom and weighs 15,600 pounds. Two boxes of boom can be transported at a time on a C-130, but only if the strike team members use other transportation. Strike team and State officials criticized the boom because of its extreme weight, its transporting difficulty, and its repacking difficulty. In fact, a recent spill entailed the use of an open-water boom and the Coast Guard used a different type of inflatable open-water boom rather than the one it had developed.

The Coast Guard recognizes that the barrier is difficult to repack but stated that recently it has been shown to be possibly the best design available for oil retention performance, strength, and reliability. The Coast Guard also noted that Norway, the only other country truly active in the design

of open water equipment, has recently developed two disc type skimmers and a boom, very similar to the first generation Coast Guard barrier. The Coast Guard also recognizes that the open water equipment (barrier and skimmer) has not been used during a spill because the only true open water incident that has occurred in some time was the Argo Merchant. No containment or recovery equipment was used in that incident because on-scene conditions exceeded state of the art capabilities.

3. The High Seas Oil Recovery System, though it has not been used on actual spills, will remove oil from water surfaces according to tests. We obtained generally negative opinions on the effectiveness of the skimmer. One Coast Guard official thought the skimmer was unseaworthy in rough water and would be hazardous to the operators. If so, the skimmer would be ineffective for its designed purpose. Other officials noted that the skimmer must be towed by large boats, must be towed at such slow speed (1 knot) that it is difficult to maintain steerage, and that it does not have internal storage capacity for recovered oil.

The Coast Guard said that, at the time of their design, the barrier and recovery system represented the best available technology for attainment of specified design goals.

The Coast Guard's research and development program should formally solicit input on a regular basis from its operational units as a means of timely identification of equipment needs and for periodic evaluations of equipment being developed so that equipment problems can be identified and corrected.

Another problem is that oil pollution response equipment has been developed on a piecemeal basis, not always recognizing operational constraints to its use. A systematic approach to equipment development should be used to combat oil spills in the open ocean. Various oil spill situations should be devised. Equipment and techniques to fully cope with these situations should be developed and the equipment procured. One senior Coast Guard official said this approach would be preferable to the present approach. One pollution expert concurred. The expert stated that removing oil from offshore spills requires a total spill cleanup system. Removal requires (1) barriers--boom--to contain and concentrate the oil, (2) skimmers for removing the oil, (3) vessels

into which the oil can be pumped, and (4) vessels that can deploy this equipment. High speed delivery systems which can get the cleanup equipment to the spill scenes in minimum time are also critical. All these items should be an integrated system. The Coast Guard high seas barrier and high seas skimmer were not developed as a system, and this fact might account for some of the problems noted with this equipment as discussed previously.

In addition, the Coast Guard's research and development budget was reduced about 58 percent for fiscal years 1977 and 1978. The Office of Management and Budget and the Department of Transportation were responsible for these reductions. For example in fiscal year 1978, the Coast Guard proposed a budget request of $5.3 million to the Department of Transportation for research and development. The Department proposed only $4.9 million to the Office of Management and Budget. That Office, in turn, reduced the amount to $2.2 million, and that amount was appropriated by the Congress. Coast Guard officials told us that research projects will not be eliminated as a result of budget reductions. The time needed for their development, however, will be extended.

Agency comments and evaluation

In commenting on our draft report, the Department took strong exception to the comments concerning the Coast Guard's pollution response research and development program and pointed out that the program has not been run in a piecemeal manner. A master development plan of response equipment to meet all aspects of a response scenario was developed in 1971. This plan has served as the basis for the program since that time. Members of the first strike team and those who followed in these positions have had major impact on detailed design decisions from initial, conceptual design to the development of final specifications. A strike force conference was held in December 1977 to solicit strike team needs for new equipment and ideas for new research.

The Department stated that current strike team members did not have input to the design of the ADAPTs, open water recovery system, or open water containment barrier because major research and development takes 3 to 4 years to complete, while the following procurement cycle for operational equipment takes 2 to 3 additional years if budget delays are not encountered. Thus, the input of day's strike team will primarily influence their successors' equipment.

The Department said that the Coast Guard research and development program contributed significantly to advancing the state of the art and is not in need of modification. It expects that a new master research and development plan will result from study efforts now underway.

The Department added that while the Coast Guard would like additional funds for research and development, it recognizes the need for limited government spending and will continue to run the most effective research program available for the authorized funding level provided.

We recognize that field input is informally provided on the research and development program. Such input, however, is not requested on a regular or formal basis from field personnel who will be the ultimate equipment users, nor is there feedback to them on the information that they supplied. We believe that formalizing this process of obtaining input and providing feedback will identify possible operating requirements and constraints, and that if such a process is done regularly equipment problems could be identified and corrected. Identification and resolution of such constraints could overcome the problems we identified with certain equipment. Any systematic approach to equipment development must deal with the eventual users. For example, the Coast Guard stated that the barrier is effective in 5 foot seas, but has not been used because it is cumbersome. Using a systematic approach could have identified this constraint earlier and highlighted the need to develop a solution to overcome it.

Although we agree with the Coast Guard's proposed action to develop a new master research and development plan, we believe that the Coast Guard should update such a plan on a more regular basis than once in 7 years. As part of its development we believe the Coast Guard should systematically obtain input from and provide feedback to field personnel on a formal basis.

ACTIONS BEING TAKEN TO DETERMINE EQUIPMENT NEEDS

Because of the complexity and extent of the expansion which has occurred in the oil transportation system in recent years, the Coast Guard has recognized a need to establish new goals for oil pollution response, including equipment requirements. As a result, the Coast Guard signed an agreement on June 17, 1977, with the Transportation Systems Center,

Department of Transportation, to have that Center (1) select the optimum number of strategically located equipment-staging sites and (2) determine future Coast Guard pollution response requirements by analyzing historical spill data, projected offshore development plans, changes in tanker traffic, and the current state of the art in pollution response systems.

The equipment-siting study will first attempt to estimate geographic spill potential. After identifying the potential response assistance available from Coast Guard and other sources and logistical implications, the Center will recommend optimum types, locations, and amounts of equipment needed. The Center also will develop a series of massive spill situations (100,000 tons), and estimate the additional staff and equipment needed to respond effectively. These studies are to be completed by September 1978.

The Coast Guard advised us that the Center's study is one of several which will be combined into one report, presenting the executive branch position on future oil pollution program policy and requirements. According to the Coast Guard, the other studies relate to development of a national equipment inventory, vessel surveillance and control system, ships' construction and crew qualification standards, and equipment and techniques that must be developed to be effective in adverse weather and rough seas.

Agency comments and evaluation

In commenting on our draft report, the Department said the Coast Guard is conducting a series of studies to improve the service's overall ability to respond to pollution incidents. These studies may result in recommendations for additional equipment and corresponding personnel. For this reason, the Department considered that at this time comment is premature on future equipment needs.

These studies are timely and are needed. As part of these studies the Coast Guard should consider the need for the additional types of equipment and for improvements in the research and development program discussed in this chapter.

CONCLUSIONS

The Coast Guard equipment management development policy needs improvement. The MSOs and strike teams do not have adequate equipment. Specifically MSOs need transportation and containment equipment to respond to oil pollution incidents. If MSOs are to begin oil containment, additional equipment will be needed. The strike teams need a better variety of oil transfer equipment, additional transportation-handling equipment, oil waste receptacles, and commercially available oil skimmers like the Navy's.

The Coast Guard should improve its research and development program for oil spill containment and cleanup equipment by formalizing, on a regular basis, input from field units as to their equipment needs, as well as responding to such input, and should use a systematic approach in developing equipment. Such communication should improve their research and development program by increasing its responsiveness to the operating units who will ultimately use the equipment.

The Coast Guard has recognized the need to determine its equipment needs and research requirements using acceptable operation research techniques, and has undertaken several studies designed to provide information for decisionmaking in this area.

RECOMMENDATIONS

We recommend that the Secretary of Transportation require that the Coast Guard Commandant, in connection with other studies being made to determine equipment and research needs of the pollution response program, provide adequate transportation and containment equipment for MSOs and a better variety of oil transfer equipment, additional transportation-handling equipment, oil waste receptacles, and commercially available oil skimmers for its strike teams.

In addition, we recommend that the Secretary require the Coast Guard to improve the process for carrying out its oil spill research and development program. Arrangements should be formalized for obtaining information from personnel engaged in oil spill operations regarding priority research requirements and equipment operating constraints and for providing appropriate feedback to such personnel. This input should be obtained on a regular basis so that equipment problems can be identified and corrected during the entire development process. We also recommend that a more systematic approach be used in carrying out the program.

CHAPTER 5

DEFICIENCIES IN CONTINGENCY PLANNING NEED CORRECTING

Regional and local contingency plans for responding to oil spills often were inadequate and did not conform to Coast Guard requirements. These plans either were not prepared in a uniform manner, were outdated, did not include pertinent information, were unduly complex, or were not developed with the assistance of and reviewed by the Coast Guard strike team as required by instructions. In addition, required reports on each federally funded major oil spill cleanup were not always prepared. If prepared, the reports were not always distributed properly. As a result, the staff did not use the plans and reports as much as possible to assist them in their role to insure that oil spills were quickly and properly cleaned up, with the minimum environmental damage. Although action still has not been taken to insure that reports are prepared and distributed on each major oil spill, the Coast Guard has drafted instructions which, if properly implemented, could correct deficiencies in the plans.

The Federal Water Pollution Control Act, as amended, requires development of a national contingency plan for removal of oil and hazardous substances and provides general guidelines to draft the plan. The February 10, 1975, National Oil and Hazardous Substances Pollution Contingency Plan is the Federal Government's current nationwide plan. The Council on Environmental Quality, with input from various Federal agencies, developed the plan. The plan's purpose is to provide guidance for efficient, coordinated, and effective action to minimize damage from oil and hazardous substance discharges. According to the act, the plan should include

--assignment of duties and responsibilities among Federal agencies and coordination with State and local agencies;

--identification, procurement, maintenance, and storage of equipment and supplies;

--development of procedures and techniques to identify, contain, disperse, and remove oil and hazardous substances; and

--establishment of a national center to provide coordination and direction to carry out the plan.

To implement these provisions, the plan established several advisory groups composed primarily of Federal agency representatives. These groups, which provide expertise and assistance in responding to oil spills, are the national response team, the regional response teams, and a national strike force. (The national strike force is composed primarily of the three Coast Guard strike teams previously discussed.)

The national response team consists of representatives from the national level of several Federal agencies. The primary agencies represented are the Departments of Transportation--U.S. Coast Guard--Commerce, the Interior, and Defense and EPA. The advisory agencies represented are the Departments of Health, Education, and Welfare; Housing and Urban Development; State; Justice; and Energy. The national response team is responsible for (1) planning and preparing actions before a pollution discharge, (2) providing coordination and giving advice during a pollution emergency, and (3) acting as an emergency response team when an incident occurs. The team has established a national response center in Washington, D.C., which serves as headquarters for coordinating pollution response activities.

The regional response teams are established within each Federal region and consist of regional representatives from the primary and selected advisory agencies, as appropriate. State Government agencies within the region are also invited to furnish liaison to the regional team for planning and preparedness activities. The Coast Guard is responsible for developing and implementing regional contingency plans for its areas of responsibility. Duties of the regional teams, as stated in the plan, are to develop regional contingency plans and to act as regional emergency response teams for pollution incidents--being activated for all major or potentially major spills. Each team must establish a regional response center to provide communications, information storage, and other necessary support for regional pollution emergency response operations.

To deal with pollution incidents at the local level, the Coast Guard requires each unit responsible for pollution response to develop a local plan. Generally, each MSO within a district develops a local plan for its geographic area of responsibility.

The national contingency plan provides only generalized guidance concerning the content of regional plans. However, the Coast Guard Commandant's Notice 5922, dated May 19, 1976, provides more detailed guidelines, requiring that regional plans contain

--analysis of probable spill situations and the development of specific action plans;

--identification of highly environmentally vulnerable areas, such as wildlife refuges;

--identification of Federal, State, and local agencies having pollution control responsibilities and mechanisms to notify them of a spill and coordinate their response; and

--a list of available pollution control equipment, its location, and procedures to obtain it.

Another Commandant instruction requires that the Coast Guard strike teams participate in the development and review of regional plans. Such strike team participation is desirable because of their expertise in oil spill containment and clean up.

In addition to providing guidance for preparing regional plans, the Coast Guard Commandant has provided guidelines which require that local plans contain identification of environmentally vulnerable areas, location of pollution control equipment, mechanisms to notify and coordinate those agencies having pollution control responsibilities, and analysis of the local area to identify sites where spills are most likely to occur and develop specific action plans to respond to such incidents.

OUTDATED, DIVERSE, AND INCOMPLETE PLANS

The regional plans reviewed varied in the amount and type of information they contained. Some plans did not comply with the Commandant's notice since they neither listed cleanup contractors and pollution control equipment nor identified environmentally sensitive areas. One plan had not been updated since 1973 and, as a result, did not contain an equipment inventory or identify resources of cleanup contractors in the region. Several other plans were out of date

and needed revision. In addition, two of the strike teams were not involved in the development and review of the regional plans as required by instructions.

The local MSO plans reviewed varied in substance and content from one MSO to another, both within the same district and between districts. Some plans did not contain information on cleanup contractors' capabilities and equipment while others did not identify environmentally sensitive areas, as required by the Commandant notice.

The most serious problem we observed in our review of local plans was the lack of specific action plans for particular geographic areas where spills are most likely to occur. Such plans, required by the Commandant notice, are especially important when critical areas, such as wildlife refuges, water supply intakes, or other vulnerable resources, may be affected by an oil spill.

Only two local plans actually attempted to provide this type of action plan. The plan for the MSO at Monterey, California, provided information on spill movement projections, amounts of boom needed and its deployment patterns, and other information of use to the onscene coordinator (OSC) for specific locations. The Philadelphia MSO developed the Delaware Valley contingency plan, which includes (1) most probable pollution sources, (2) natural aids to containment, (3) staging areas, such as directions, marshalling points, and boom deployment plans, (4) estimated reaction time to a spill, (5) waste oil disposal areas, and (6) special areas to be protected. Although some Coast Guard officials told us this type of plan cannot be realistically drafted in advance because too many variables are involved, we believe such plans can be developed as evidenced by the Monterey and the Delaware Valley plans.

The need for action plans was apparent in a spill of 2 million gallons of oil. (See p. 10.) The OSC report for the spill stated that lack of knowledge on the impact of the oil in the area and cleanup methods had severely hampered the planning process. Such knowledge should be contained in local contingency plans so that spill response can be effective and quick.

Disposal of recovered oil is not fully discussed in some local plans, and disposal of oily waste without adequate planning can damage the environment. For example, a medium spill occurred in August 1976 when heavy rains washed away the

earthen walls of an oil disposal pit. The oily wastes leached into a swamp area and from there into a creek. The owner of the land on which the pit was located (who was also involved with a tank cleaning firm) said that he used the pit to contain waste oil from spills he had cleaned up over a period of about 7 years. In addition to insuring that oil spills are cleaned up, the Coast Guard is responsible for insuring that disposal of recovered oil is environmentally proper.

UNDULY COMPLEX PLANS

Data bases, supplementing and supporting some local plans, are overly complex. Because of this complexity, the MSOs do not fully use the local plans.

At two different MSOs we were told that very few personnel were familiar with their local plans, including the data bases. For example, at one MSO the data base was contained in eight filing cabinet drawers and required an understanding of a complex alpha-numerical code for use in obtaining the data.

Officials at the various MSOs told us that, although local plans are considered valuable, they did not use the plan because of the complex data bases and because of outdated material. They also said that relevant information was easily obtainable from other sources, such as telephone directories and personal knowledge. While over a period of time staff may become familiar with response information without continued reference to the plans, such plans need to be developed in a readily usable format so that new staff can become quickly familiar with local resources and sensitive areas.

ACTIONS TO IMPROVE CONTINGENCY PLANS

Coast Guard officials stated that regional and local contingency plans which they reviewed were not sufficiently detailed to support operations required in response to one of the spills they reviewed. Additionally, one of the plans received limited use because it lacked information on availability of resources needed to respond to the spill. They suggested that the Commandant provide MSOs with methodologies for accumulating accurate and usable contingency plan data.

The Commandant issued draft instructions for preparing regional and local plans. The instructions will require revising all regional contingency plans and updating local plans. Regional plans will be required to

--define properly the role of the regional response team in responding to spill situations;

--assign specific responsibilities to regional response team members;

--adhere to the standard format for the organization of regional plans outlined in the draft instruction; and

--establish a regular schedule of regional response team meetings, at least quarterly.

Local plans will be required to

--have members of the regional team designate representatives of their organizations to assist each OSC in developing local plans and arranging for onscene assistance;

--conform to a more standardized format (as outlined in the draft instruction);

--identify areas where pollution incidents are most likely to occur; and

--contain specific action plans to deal with such incidents.

The draft instructions also would require that each regional response team meet quarterly to discuss its regional plan and annually to review the regional and local plans it oversees.

We believe the draft instructions are a step in the right direction. If the Coast Guard properly implements the draft instructions we believe that such action could remedy most of the problems that we identified in the plans. Developing specific action plans to respond to spills in particular geographic areas and identifying oily waste disposal sites are especially important. If much of the response can be preplanned, then the Coast Guard may improve its effectiveness in cleaning up oil spills and possibly mitigate the environmental damage caused by spills. The requirements in the draft instruction could help make the local plans more uniform, less complex, and more likely to be used.

In commenting on our draft report the Department stated that Coast Guard response will become more effective when the contingency planning procedures contained in the Coast Guard instructions are implemented.

COAST GUARD REQUIREMENTS FOR OSC REPORTS NOT BEING MET

The national contingency plan requires that the OSC prepare a report for each federally funded spill cleanup of over 100,000 gallons of oil (major spills). The report should include (1) a description of the cause of the spill, (2) organization of response action and resources committed, (3) an evaluation of the effectiveness of response actions conducted by the spiller, State and local forces, Federal agencies, and other participants, and (4) discussion of unique problems or recommendations for improving response actions or changes to the national or regional contingency plans. These reports are to be submitted within 60 days after a cleanup action is completed to the national response team and the appropriate regional response team. These reports are important because they can provide information to other OSCs who must deal with a spill having similar characteristics. They can also be extremely valuable when they discuss unique problems or recommendations which can be useful to another OSC.

We found that, in many cases, OSCs did not prepare the required reports. Reports that were prepared were not always distributed to the regional teams. Team members told us they believed such reports would be very useful in evaluating OSC effectiveness in responding to a particular spill.

We believe the OSC reports that are prepared contain valuable information on approaches to spill cleanup but that they are not being fully used. Better dissemination of information in the reports could enable Coast Guard OSCs to discharge their responsibilities more effectively and minimize the environmental damage of oil spills through lessons learned on other significant spills.

CONCLUSIONS

The regional contingency plans should serve as coordinating documents directing Federal, State, and local agency response to oil spills. For regional plans to serve better as coordinating documents, however, they should meet the requirements set forth in the Commandant's instructions--which has not always been the case. Also, MSOs need properly developed local contingency plans to assist them in responding to pollution incidents but many of the local plans that have been developed need improvement to (1) reduce complexity, (2) provide current and complete data, and (3) set forth action plans which, among other things, identify oily waste disposal sites.

The Coast Guard has recognized that deficiencies exist in the contingency plans and has drafted instructions which, if properly implemented, could remedy most of the problems we identified in the plans.

There is a continuing need also for the Coast Guard to require OSCs to prepare reports on all major oil spills and to disseminate them to appropriate units as required by instructions. The reports could serve as valuable learning documents for all concerned with oil spill containment and cleanup operations.

RECOMMENDATIONS

We recommend that the Secretary of Transportation require the Coast Guard Commandant (1) to finalize and issue his draft instructions for revising regional and local contingency plans and (2) to insure that the instructions are implemented. Particular attention should be directed to insuring the implementation of those instructions concerning needed improvements

--to reduce complexity and obtain uniformity,

--to provide current and complete data, and

--to set forth action plans which, among other things, identify oily waste disposal sites.

We also recommend that the Secretary instruct the Commandant to require the Coast Guard OSCs to prepare required reports on all major oil spills and to disseminate them to all personnel concerned with oil spill containment and cleanup operations. These reports should contain detailed information on lessons learned so that they can better serve as training documents for these personnel.

APPENDIX I

STATE OF THE ART OF OIL SPILL CLEANUP

Although each spill is unique due to the numerous variables such as type of product spilled, geographic location of spill, weather conditions, availability of equipment, etc., there are 4 basic steps that should be taken in responding to any spill.

1. The continued flow of oil should be shut off or stopped, if possible.

2. The spill must be contained to prevent further spreading and to lessen environmental damage.

3. The oil should be removed from the water.

4. The oil should be properly disposed of.

This appendix elaborates on these steps and briefly describes the status of current cleanup techniques which are most commonly used when responding to oil spill situations. The majority of information presented is taken from a Texas A & I University manual entitled, "Spill Training and Educational Program" which is used in a University oil spill control course.

STOPPING THE SOURCE OF A SPILL

When responding to any spill the continued entry of oil into the water should first be stopped. This action may require that plugs or patches be made to cover holes, simply shutting off valves, or pumping cargo from holed tanks into sound tanks or barges. In some cases the sources of spills are unknown. In these cases, when personnel arrive on scene, the immediate action should be to contain the oil.

CONTAINMENT OF SPILL

The next action is containment, to prevent the spill from spreading further. The primary means of containing a spill is use of a boom. Although there are many different types and configurations of boom, all boom share the following characteristics:

--Float--This is a buoyant material, usually encased in a protective rubber or shield, which keeps the boom afloat. It may also keep oil from being splashed outside the contained area by wave or wind action.

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--Skirt--This is the part of the boom which, along with the float, serves as a dam to keep the oil contained. Important factors in determining the effectiveness of the different types of skirts are the material it is made of, the depth of the skirt, the tensile strength--ability to withstand pulling pressure--and the flexibility of the skirt.

--Tension member--This member controls the deployable length of a boom. Its purpose is to evenly distribute the horizontal load across the entire length of the boom.

--Ballast or weighting member--The ballast consists of weighting along the bottom edge of the skirt to keep it in a vertical position to better contain the oil.

--Couplings--Boom generally comes in sections of 50, 100, 200 feet each, and couplings allow sections to be joined so that greater lengths of boom can be deployed. Couplings vary in ease of use, strength, and rigidity.

Regardless of the type of boom used, certain factors affect its capability to contain oil, primarily (1) the current of the water in the spill area, (2) the wind direction and speed, (3) the physical and chemical properties of the oil, and (4) water and air temperature.

The circumstances of a particular spill dictate the way boom is deployed and the type of boom that should be used. In areas having little or no current, the boom may be used in a stationary configuration. When a spill occurs in a river or stream having a slow current, the boom may be towed in a "U" configuration against the current to contain the oil. Alternatively, the boom may be placed at an angle from the shore toward the center of the stream to channel the oil toward the shore, where it can be removed. Boom can also be used to divert a moving spill away from environmentally sensitive areas and into other shoreline areas, where it can be removed. (See figures 1, 2, and 3.)

OIL REMOVAL

Once the oil has been contained, removal can begin. There are a number of methods for removing oil, each having benefits and limitations depending on the location or size of the spill.

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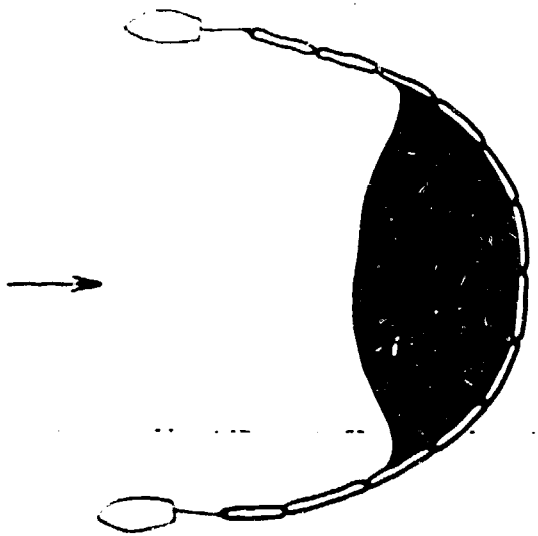

FIGURE 1 Moving deployment. A boom is held in a catenary between two boats, which move downwind (down current) at or near the speed of the wind (current).

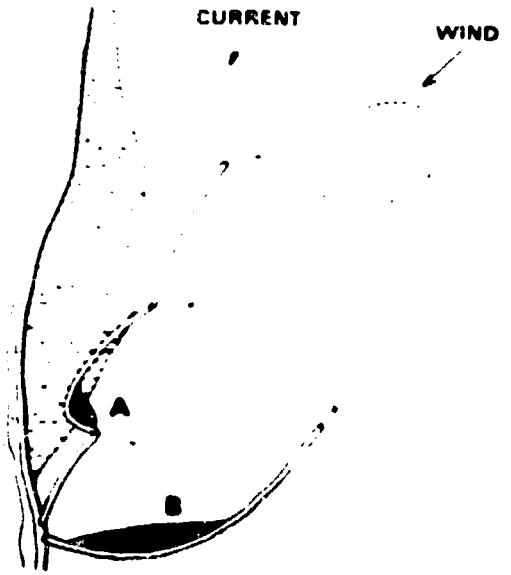

FIGURE 2: Possible problems caused by improper boom anchoring. If a deflection boom is allowed to form a deep catenary configuration between anchoring points, as at A, some of the oil will remain trapped in these pockets. If a containment boom is allowed to form a catenary, as at B, the oil will collect in the catenary, rather than move to the shore. In either case, recovery of the oil is much more difficult.

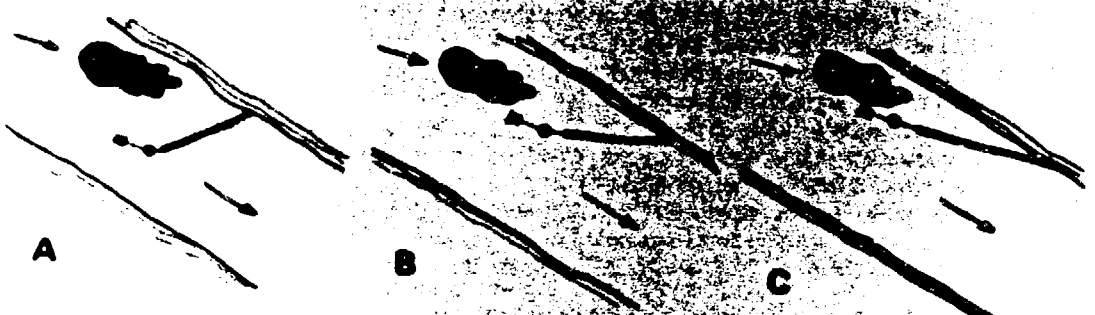

FIGURE 3 Suggested boom-to-shoreline angles for different current velocities. A) With a current of about 0.85 MPH, the angle can be 90°. B) A current of 1.5 MPH requires a 70° angle. C) A current of 2.75 MPH can be handled with a 15° angle. When stream current velocity exceeds 3 MPH, seek out bends or other places where the current naturally slows down to a more reasonable speed.

A contained spill near a pier or dock can often be cleaned up using a skimming or vacuum device. Vacuum trucks are one of the most commonly used devices for cleaning this type of spill. Such units generally consist of a vacuum unit and storage tank mounted on a flatbed truck.

Skimmers

Small skimmers can also be deployed from a pier to clean up a contained spill. Larger skimmers are used for offshore spills. There are two basic types of skimmers--suction units and oleophilic units. While suction units vary greatly in design and purpose, all require some type of suction device to remove the oil. Oleophilic units use a type of material to which oil will adhere, the oil is then removed from the material by various systems. The following paragraphs provide brief descriptions of the most commonly used skimmers.

Suction units

There are generally four categories of suction units currently used. They are:

--Enlarged suction head (figure 4)--Simply widening the head attached to the end of a suction hose increases the area over which suction is exerted.

--Floating weir (figure 5)--These are mechanical devices which float on the water allowing oil to pass over an adjustable weir plate into a collection area from which the oil is pumped off.

--Dynamic inclined plane (figure 6)--This type of skimmer collects oil by forcing it under the surface of the water by means of a conveyer belt. The oil follows the surface of the belt downward into a collection unit, where buoyant forces cause the oil to separate naturally from the water.

--Cyclone (figure 7)--This type of skimmer uses rotation to separate the oil from the water. The skimmer is attached to the side of a craft and as it moves through the water, oil and water are drawn into it. The entire contents of the skimmer rotate causing the lighter oil to move inward and upward where it is pumped out to a holding tank, while the water flows

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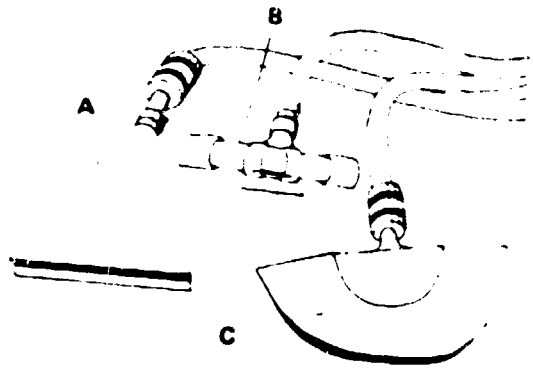

FIGURE 4: Three types of enlarged suction heads A) Duck-bill B) Pipe extension, C) Flexible

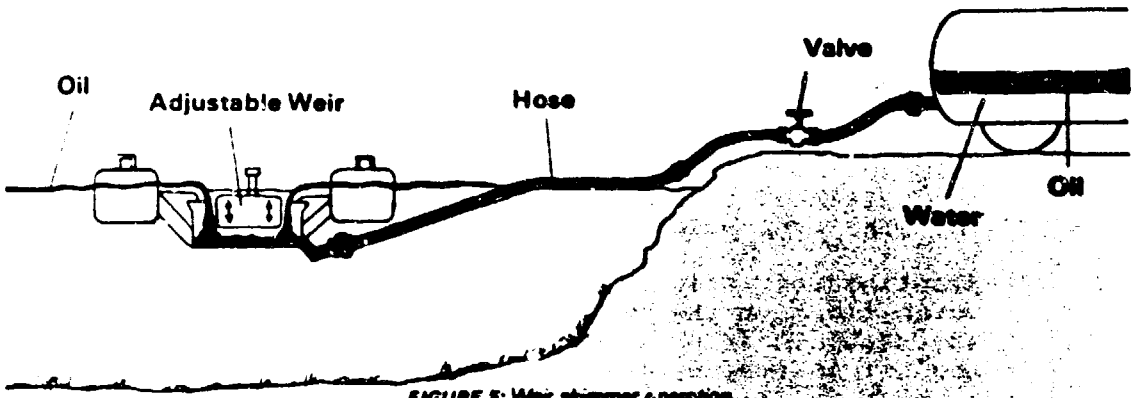

FIGURE 5: Weir skimmer operation

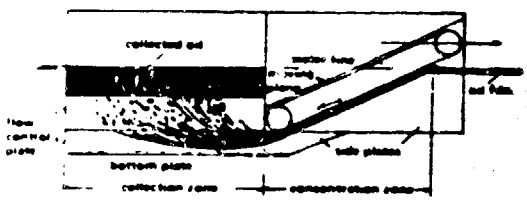

FIGURE 6: Operation of dynamic inclined plane skimmers.

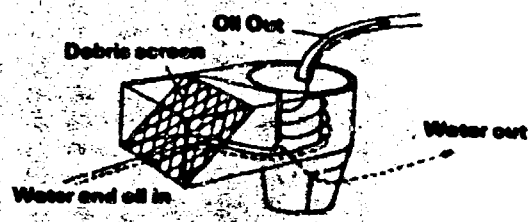

FIGURE 7: Operating principle of the Cyclonet skimmer.

downward and outwards and is discharged through a slip at the bottom.

Oleophilic units

All oleophilic skimmers operate on the principle that oil rather than water will adhere to the oleophilic part of the unit when it is immersed in oil. The oleophilic part is then removed from the oil and wiped, scraped, or squeezed to remove the oil. There are currently four general types of oleophilic skimmers in use. They are:

--Belt skimmers (figure 8)--This type is the most commonly used. The belt is in a continuous loop and is inclined so that the leading edge can be immersed in the oil. As the belt moves, oil and debris are carried upward. At the top of the incline, as the belt begins to move downward the oil and debris are removed by a belt and roller system.

--Drum units (figure 9)--In this type of skimmer, the oleophilic material is attached to a drum mounted horizontally to the water. The drum is rotated through the oil and as it moves upward the oil is scraped off by a wiper blade and moved into a collection trough.

--Disc units (figure 9)--These units are similar to the drum type and can be used in more situations than the drum types. The discs are rotated through the oil and scraped clean by wiper blades. The oil removed in this manner is collected in a tank, where it can be pumped off.

--Rope units (figure 10)--This type of skimmer consists essentially of dragging a rope, interwoven with oleophilic material, through the oil and then running the rope through a wringer assembly to remove the oil.

Sorbents

Once the majority of the oil has been removed by a skimmer, the remaining oil can be removed by using sorbents. Sorbents can also be used on small spills when it would not be feasible to deploy a skimmer. Sorbents are various types of materials which are oleophilic and hydrophobic, having a high capacity for adsorbing or absorbing oil and tending

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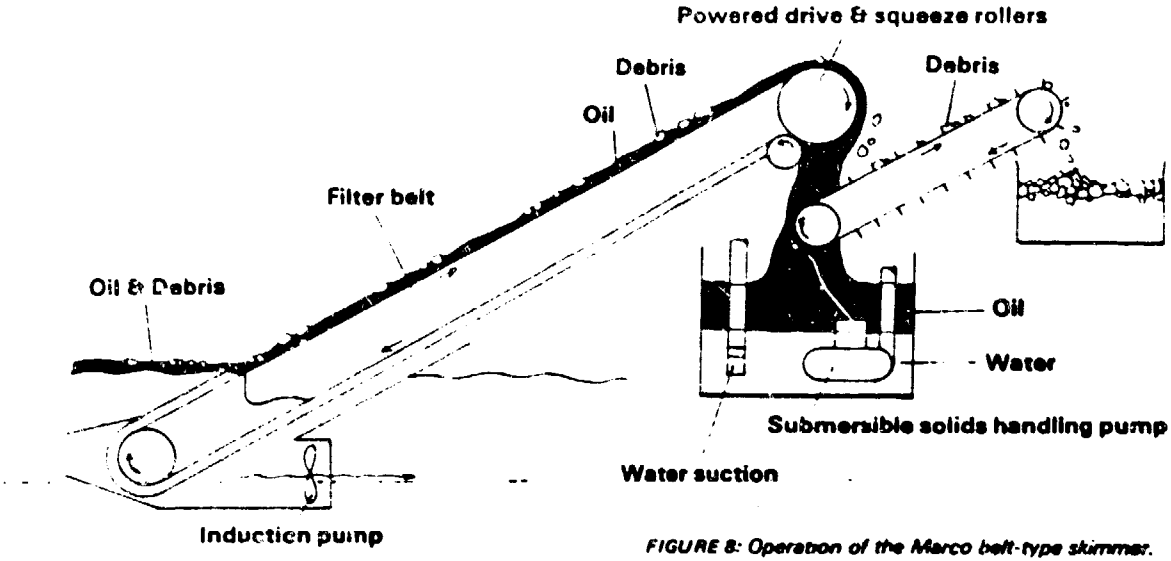

FIGURE 8: Operation of the Marco belt-type skimmer.

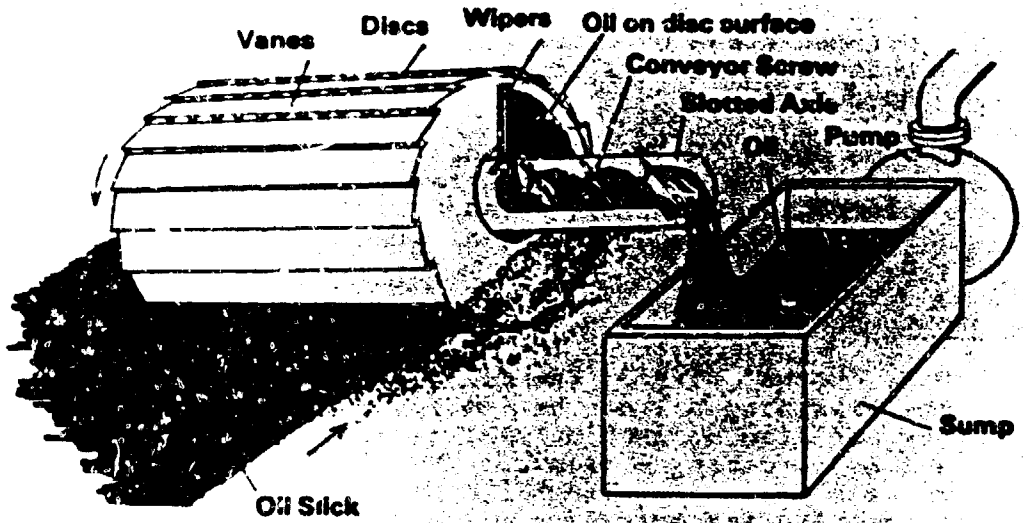

FIGURE 9: Operating principle of the Lockheed disc[illegible] skimmer.

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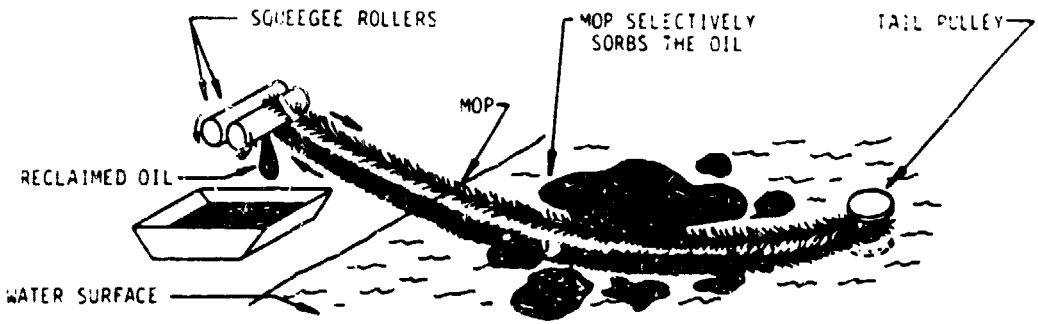


FIGURE 10: Rope Unit

Sorbents are spread on the water, allowed to soak oil, and removed, usually manually. The three general classifications of sorbents are mineral, natural, or manufactured products. Mineral products include such materials as volcanic ash, vermiculite, and some chalks. Natural products include various types of straw, such as rice, oat, or wheat straw; hay; or cottonseed hulls. Synthetic products are generally manufactured from high molecular weight polymers, such as polypropylene, and in a variety of forms. Some common forms of synthetic sorbents are pads, sorbent boom, or sorbent mops.

Final cleaning of a spill area may require restoration of beaches, rocky areas, and/or marshes. When beaches are only lightly oiled, they can be cleaned by spreading sorbent in the area and than raking it up. If cleanup response to a beach oil spill is delayed and oil soaks deeply into the sand, it may be necessary to physically remove the contaminated sand and replace it. EPA, however, has developed a prototype machine which can clean beach sand onsite. The machine uses the froth-flotation process--the bubbling of air through a suspension of oil-contaminated sand in water. This process, long used in mining operations, is also used to clean optical sand and sand used in golf course traps.

Cleaning of rocky areas is tedious and expensive. If not done properly, it can damage marine life in the area and may also require a repeat cleaning, which could cause

additional damage. The initial cleaning may be done by using low-pressure water hoses, after which the area should be examined to determine if additional work is needed. Secondary cleaning, if necessary, can be done by using high-pressure water hoses, high-pressure steam, or a chemical high-pressure wash.

Marshes are possibly the most difficult to clean. An initial step should be to quickly move the oil out of the marsh using pressure hoses. Sorbents can be spread and picked up manually, and the marsh plants and grass can be cut down to the water line.

Other methods of oil removal

In addition to the oil removal methods previously discussed, other options may be considered in dealing with an oil spill. These alternatives are discussed below.

--Biological degradation--Many species of microorganisms exist in the seas, bays, and estuaries of the world that have a great capacity to consume oil. This process, however, is very slow and cannot be depended upon to deal with a large spill which may be driven to shore by wind and waves.

--Chemical dispersion--There are numerous chemical products which can be used to disperse an oil spill. These chemicals, however, may prove more toxic to marine life than the oil. The decision to use dispersants must be made in consultation with EPA and appropriate State agency officials under current provisions of the national contingency plan.

--Combustion--The burning of oil on water is the most inexpensive method of removing oil but it is also the most hazardous. Wicking agents are spread over the spill and set on fire, which in turn act to start the spilled oil burning. There are numerous problems with this method, including heat loss due to the cooling effect of water and wind, excessive heavy smoke, and possible damage to containment equipment.

--Physical sinking--This method simply consists of covering a spill with a hydrophobic material, such as sand, which becomes coated with oil and sinks in the water. There are also problems with this method because the oil is carried deeper into the water where it may be even more toxic to the ecology of the area.

DISPOSAL

After spilled oil has been contained and removed, it must be disposed of in a satisfactory and approved manner. There are four basic disposal methods which can be used singly or in combination.

1. Reclamation--Recovered oil is taken to facilities capable of processing it so that it can be used for its original purpose. Reclamation is not always feasible if a facility is not close by or if the oil is very contaminated with debris. Alternative disposal techniques are burning or burial.

2. Burning--Oil can be disposed of either by open pit burning or incineration. Open pit burning produces very heavy black smoke and is often prohibited by State or local governments. Incineration is the least polluting method of burning, but it is the most costly.

3. Burial--Several factors must be considered before a decision is made to bury oily wastes. The type of soil in the disposal area must not allow the buried oil to become a source of ground or surface water pollution. Normally, approval for burial of oily wastes must be granted by State and local authorities. The burial site must be compatible with surrounding land uses. If adjoining land is for residential or recreational use, it may be difficult to get approval to use the site for oily waste disposal. Disposal of substantial amounts of oily wastes by burial, in the opinion of many groups, should be done only as a last resort.

4. Landspreading (landfarming)--This disposal method involves the mixing of oily debris with soil to promote aerobic biodegradation. This practice has been used successfully only in limited cases for disposing oily wastes from refineries. Landspreading is not commonly used for disposing of debris from large oil spills. Additional research may lead to broader use of this method.

APPENDIX I

While much progress has been made in oil spill containment and removal technology, most cleanup operations become labor intensive pick and shovel efforts. Dealing with all aspects of an oil spill, especially deploying and using the equipment described in this appendix requires capable, trained personnel. Even the least complex containment or removal devices must be used by people properly trained in equipment operation.

APPENDIX II

RESEARCH AND DEVELOPMENT BY EPA, NAVY, AND PRIVATE INDUSTRY

We obtained information on two other Federal agencies involved in oil spill cleanup and containment and research and development by industry.

Navy is responsible for containment and removal of oil spills caused by Navy ships worldwide. EPA is responsible for oil spills in inland waters. These agencies have research and development programs for oil spill cleanup and removal equipment but they are primarily programs of testing various commercially available products. This is not to say Navy and EPA have not developed new equipment but only that current research and development programs are geared more toward testing of existing equipment.

Both Navy and EPA, for example, funded research and development of a dynamic inclined plane skimmer which is now produced commercially, and many of these skimmers have been acquired by the oil industry. This skimmer has been used on many Navy spills and has also been used by the Coast Guard.

EPA has also developed beach-cleaning equipment and has been active in testing and developing oil-water separators and other methods of disposing of oil once it has been removed from the water, testing of oil dispersants for use on oil spills in accordance with the FWPCA and the national contingency plan, and for funding research on determining effects of oil spills on the environment.

EPA is responsible for research and development relating to spills in inland waters, as well as shoreline protection and restoration and environmental damage assessment. The EPA's program is aimed at developing and demonstrating a capability to respond to a large variety of oil spills. EPA spill containment and removal projects are concentrating on spills which occur in rough waters and in currents exceeding 2 knots and spills in ice-infested waters. EPA is primarily developing or modifying off-the-shelf equipment, developing techniques, and writing manuals of practice which will advance the state of the art in containing and removing oil spills under such conditions.

APPENDIX II

Navy research and development on oil pollution control equipment which began in 1970 ended in 1976. During that time, Navy research and development consisted of evaluating existing equipment and selecting and testing the best for Navy needs. As stated earlier, Navy research and development did help develop the specifications for the dynamic inclined plane skimmer and Navy spent about $2 million on its development. Current Navy research and development is devoted to oil-water separators, oil-water monitors, and oily waste reclamation.

Private industry has been very active in developing oil spill containment and removal equipment. A large diversity of products exists ranging from complicated, expensive mechanical skimmers to manually deployed sorbents. The market for this equipment is primarily the oil industry, oil spill cleanup contractors, Navy, and the Coast Guard. Unfortunately, most equipment developed by private industry is not practical for open-water spills. A major reason why such equipment has not been developed by industry, according to a member of our panel of experts, is that the limited market does not justify the high cost involved.

APPENDIX III

BACKGROUND ON OIL POLLUTION

EXPERTS RETAINED BY GAO

Mr. William L. Berry is a chemical engineer and has been a senior staff environmental specialist for Shell Oil Company since 1970. Mr. Berry has been with Shell Oil for 22 years. He is currently the vice chairman of the American Petroleum Institute's oil pollution prevention and control committee; a past chairman of the technical subcommittee of Clean Gulf Associates, an industry cooperative which responds to pollution incidents of its members; a member of the 1977 Oil Spill Conference Program Committee; and a point contact, through an industry committee, with U.S.S.R. specialists in the area of containment, removal, and cleanup of oil spills.

Mr. John J. Gallagher, an engineer and attorney, is currently executive director of Clean Venture, Inc., an oil pollution control company. Mr. Gallagher has been a legal and an engineering consultant for a leading company in the field of marine pollution control services and products; has actively supervised operations in more than 50 major pollution incidents; and has designed, developed, and produced oil pollution equipment. He is a consultant to the Whittaker Corporation, which, among other things, manufactures recreational power and sail boats, fishing trawlers, and marine survival devices used on offshore drilling rigs and platforms and on ships. Mr. Gallagher holds a patent on an oil containment barrier connector. He has also written three publications on pollution control and tank vessel casualties.

Dr. Jerome H. Milgram is a professor in the Department of Ocean Engineering at the Massachusetts Institute of Technology. Since 1968 Dr. Milgram has been involved in studying the basic hydrodynamic and mechanical problems involved in containing and collecting oil at sea and the design, construction, and testing of equipment for cleanup of oil spills. Dr. Milgram has also written 40 articles on hydrodynamics and the containment of oil spills. Dr. Milgram is a majority stockholder of his own consulting firm, Marine Professional Services, Inc. He holds one patent jointly for the general principles of an offshore oil containment barrier developed by Johns-Manville Products Corporation, while under contract to the Coast Guard. Later, as a consultant to Offshore Devices, Inc., he designed the final

APPENDIX III

production high seas barriers made by Offshore Devices under contract to the Coast Guard. This led to a patent for which Dr. Milgram is the sole inventor; the patent is assigned to Offshore Devices.

Mr. Glenn E. Moore is director of the Surveillance Division of the Virginia State Water Control Board. In this capacity, Mr. Moore manages the State pollution response program, investigates oil and hazardous material spills, and supervises the agency's laboratory inspection program. Mr. Moore also has been the State representative on a number of Federal oil spills.

Mr. Paul Preus is chairman of the board, president, and managing owner of Clean Water, Inc., a major pollution control and cleanup company. Mr. Preus has been involved in marine salvage and major oil spill cleanup for over 30 years. Since Mr. Preus established Clean Water in 1968, the firm has been involved in the control and cleanup of over 250 oil spills involving ship casualties, storage and refinery accidents, pipeline and ground transport mishaps, and industrial discharge problems. Mr. Preus is also owner and president of two other pollution control and equipment-manufacturing firms--Uncle Paul's Pollution Control and the Toms River Marine and Industrial Equipment Co., Inc. He is the holder of 14 patents including patents on oil containment barriers, oil and water separators, a petroleum absorbent type material, and gravity flow filter boxes, and has 4 additional patents pending.

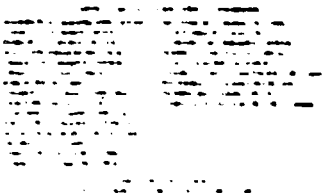
Mr. Willard F. Searle, Jr., is president of Searle Consultants, consultants in ocean engineering, towing, salvage, and diving. He serves as a consultant to firms in the field of ocean mining submersible operations, deep ocean search and recovery, and offshore oil drilling and servicing. He also acts as a principal surveyor in North America in behalf of the London underwriting community (Lloyds) for ocean engineering and subsea systems. Mr. Searle is a visiting professor of ocean engineering at both the Massachusetts Institute of Technology and the Maine Maritime Academy; he also lectures on ocean engineering at the Webb Institute of Naval Architecture, the University of California at Berkeley, and the Scripps Institute of Oceanography. He serves on various committees dealing with ocean engineering and subsea matters. He is a member of a committee on the safety of outer continental shelf petroleum operations for the marine board of the National Academy of Engineering. As a former Navy

APPENDIX III

Supervisor of Salvage, he performed overall management of the first U.S. major oil pollution incident, codesigned oil containment equipment used by Navy, was instrumental in initiating many Navy oil pollution schemes, and served on the interagency committee that developed the first national oil and hazardous material pollution contingency plan.

Mr. Dale G. Uhler is chief of the Operations Division in the Office of the Director of Navy's Ocean Engineering/ Supervisor of Salvage. The Division is directly responsible for the abatement of all Navy-originated open sea oil spills, all major Navy spills, and all salvage-related spills and also providing pollution abatement assistance to any requesting Federal agency. Before obtaining his present position, Mr. Uhler was responsible for the formulation and implementation of the Navy's open sea pollution abatement procurement program, which included the development, evaluation, and initial procurement of Navy pollution abatement equipment.

APPENDIX IV



United States Senate

April 6, 1977

The Honorable Elmer Staats
Comptroller General
Washington, D.C. 20548

Dear Mr. Staats:

The recent rash of oil spills in the U.S. Coastal waters has refocused our attention on the important role the Coast Guard has in protecting the environmental quality of our shoreline. We are particularly concerned with the ability of the Coast Guard to respond to present and future incidents that pose an imminent threat to the environment.

The availability of Coast Guard personnel, equipment, contract or industry support, and the deployment of such resources are of special concern to us.

The Committee, therefore, is interested in having GAO assist them in evaluating the Coast Guard's ability to respond to an oil spill and the effectiveness of their efforts to limit the impact of the spill.

An initial step would be to determine what the Coast Guard currently does when an oil spill occurs. This would include describing the current state of the art regarding containment and cleanup equipment and techniques, and identifying the limitations under which the Coast Guard must perform and any other impediment to their effective performance.

A second part would involve a determination of the Coast Guard's ability to meet future emergencies. In order to accomplish this task you would have to estimate the level of tanker activity, the location of such activity and the likelihood and severity of incidents. A five-year time frame is considered adequate for this purpose.

It is recognized that you may need to rely on the expertise of other Federal and non-Federal sources and that your ability to accomplish this task will depend on the availability of information from these sources.

We would like to be periodically briefed on your efforts. The subcommittee, however, would need to know the results of the first part of GAO's study by January, 1978 for consideration in the fiscal year 1979

APPENDIX IV

budget process and would like to receive a formal report no later than mid-May, 1978. The completion of the second part of the study will be somewhat contingent on the progress made in part one and, therefore, we would recommend that a formal reporting date be determined in December, 1977.

Sincerely yours,

Birch Bayh
Chairman
Subcommittee on Transportation
and Related Agencies

Clifford P. Case
Ranking Minority Member

Edward W. Brooke

Warren G. Magnuson

John C. Stennis

J. Bennett Johnston

Lowell P. Weicker, Jr.

Thomas F. Eagleton

Charles McC. Mathias, Jr.

Robert C. Byrd

OFFICE OF THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

ASSISTANT SECRETARY FOR ADMINISTRATION

March 27, 1978

Mr. Henry Eschwege
Director
Community and Economic
Development Division
General Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege:

We have enclosed two copies of the Department of Transportation response to the General Accounting Office (GAO) draft report "Coast Guard Response to Oil Spills -- Trying to Do Too Much With Too Little."

In GAO's opinion the Coast Guard has generally conducted its oil pollution response program in a creditable manner, considering its limited resources. However, its effectiveness could have been improved in about 32 percent of the oil spill cases GAO reviewed by either faster responses to reported oil spills, better monitoring of cleanup operations, taking immediate containment or cleanup actions upon arrival at the scene of a spill, attempting to remove spilled oil before it dissipates in the water, or investigating reported minor oil spills.

The Department of Transportation agrees that the effectiveness of the Coast Guard's oil spill response program can be improved. However, we take exception to the inference that 32 percent of oil spill cases required action other than those taken. The specific findings and recommendations are addressed in the enclosed statement.

If we can assist you further please let us know.

Sincerely,

for Edward W. Scott, Jr.

Enclosure

GAO note: The 32 percent was in the draft report and has been changed to 18 percent.

DEPARTMENT OF TRANSPORTATION REPLY

TO

GAO DRAFT OF A PROPOSED REPORT

ON

COAST GUARD RESPONSE TO OIL SPILLS -- TRYING TO DO TOO MUCH WITH TOO LITTLE

SUMMARY OF GAO FINDINGS AND RECOMMENDATIONS

The series of pollution incidents and tanker accidents that occurred in and near U.S. coastal waters during the winter of 1976-77 precipitated an interest in evaluating the Coast Guard's ability to respond to present and future pollution incidents.

In investigating this program the GAO has found that the Coast Guard generally has performed its oil response program in a creditable manner considering its limited resources. However, its effectiveness could have been improved in about 32 percent of the oil spill cases GAO reviewed by either faster response to reported spills, better monitoring of cleanup operations, taking immediate containment or cleanup actions upon arrival at the scene of a spill, attempting to remove spilled oil before it dissipates in the water, or investigating reported minor oil spills.

To increase its effectiveness the Coast Guard needs to improve its contingency planning, reduce staffing shortages, establish a marine safety job classification, improve training programs, obtain additional equipment, and improve its research and development program.

GAO specifically recommends that the Secretary of Transportation instruct the Commandant of the Coast Guard to:

a. Undertake a comprehensive and systematic study of the staffing needed to carry out the various activities in its Marine Environmental Protection (MEP) program, including oil spill investigations, containment and cleanup. Such a study should consider the results of an on-going Coast Guard funded study to identify available resources. In the interim, the Commandant should make more effective use of its strike team personnel.

b. Establish a Marine Safety Office (MSO) job specialty classification. Consideration should be given to using the already existing reserve classification.

c. Increase formal in-house and on-the-job training for MSO personnel through expanding the MEP aspects of the Marine Environment Systems (MES) school.

[See GAO note, p. 70 regarding the 32 percent in paragraph 2.]

d. Establish criteria for on-the-job training and a standard for personnel qualifications in the MEP area.

e. Insure that all strike teams have adequate diving staff and equipment necessary to fulfill the requirements of the National Contingency Plan and Commandant Instructions, and that strike team divers are used for all potentially serious oil spill incidents.

f. Investigate all oil spills and ensure that containment and cleanup is taken when possible.

g. Direct each MSO to be prepared to take initial first aid containment and cleanup action when it arrives at the scene of an oil spill.

h. Monitor every non-Federal spill cleanup operation to insure timely and continued effective action, and

i. be more timely in declaring some spills as Federal.

GAO further recommends that the Secretary of Transportation require that the Coast Guard Commandant:

a. Finalize and issue his draft instruction for reviewing regional and local contingency plans and take all needed actions to insure that the instructions are implemented.

b. In connection with other studies being made to determine equipment and research needs of the pollution response program, provide adequate transportation and deployment equipment for MSOs and a better variety of oil transfer equipment, additional transportation handling equipment, oil waste-receptacles, and large commercially available oil skimmers for its strike teams. In addition, that formal input to the research and development program should be obtained from personnel engaged in oil spill containment and cleanup and a systematic approach be used in carrying out the program.

DEPARTMENT OF TRANSPORTATION POSITION

The Department of Transportation agrees that the effectiveness of the Coast Guard's oil spill response program can be improved. While it can be said that almost anything can be improved upon, exception is taken to the inference that 32 percent of oil spill cases required actions other than those taken. Although our review of GAO statements on this matter is not complete, and only involves the medium and major cases, there appear to be a number of differing viewpoints concerning the evaluations made by the GAO panel and the statements provided us by commands involved.

[See GAO note, p. 70 regarding the 32 percent in last paragraph.]

APPENDIX V

That this would be the case should not be surprising as many of the decisions are of a subjective nature. Further they were made by the On-Scene Coordinator, or his representative, based on the best information available at the point in time at which the decision had to be made and not with the advance knowledge of the outcome of the incident. For example, one of the response operations evaluated as untimely involved a sunken barge where there was no initial evidence that a spill had occurred. Weather conditions, sea state and the physical characteristics and behavior of the oil precluded visual detection of the pollutant. The apparent absence of oil combined with a diver's report that the barge was intact lead the OSC's representative to initially conclude that a spill had not occurred. Soundings of the barge after it had been raised two days later revealed that a substantial amount of oil had been lost, which subsequently washed up on several miles of beach. Analysis of the incident indicates that, had the OSC's representative initially concluded that a spill had occurred and mounted a more prompt response effort, the ultimate outcome of the incident would have been essentially the same since the oil had been already dispersed over a wide area at the time the incident was initially reported. For these reasons, judging this response as untimely from hindsight is considered inappropriate.

It is agreed that the effectiveness of Coast Guard responses will improve when the procedures for contingency planning contained in the Coast Guard instructions referred to in the report are implemented. The ability of the service to respond to pollution incidents will also improve as additional staff is added to the program. The Coast Guard has studied this matter and is continually evaluating its requirements for additional personnel to improve its ability to accomplish its obligations in this mission area. Requests for additional program personnel are submitted each fiscal year through the normal budgetary process. The suggested study is therefore not considered necessary.

The statements regarding the need for a marine safety job classification are taken to mean that GAO believes that a new enlisted rating should be established. This recommendation is not concurred with. It is agreed that there is a need to identify personnel with expertise in the area of marine safety. This has been accomplished by developing a billet special qualification system. Through this system assignment personnel are able to keep track of individuals who develop expertise in a special area of marine safety and with the various billets requiring such expertise. People are now being transferred under this new system. Prior to the establishment of the system, difficulty was encountered in tracking qualified personnel so that they could be reassigned to the program. Another thing which must be realized is that a new program has to develop a base of qualified personnel from which to draw people. The marine safety program is relatively new and has been in the process of developing this base. The period of development should soon be complete. There is also a need at field units for personnel with various specialized skills, e.g. boat operators or boat engineers, which

As stated in the draft report a series of studies is being performed by the Coast Guard to establish ways to improve the service's overall ability to respond to pollution incidents. These studies may result in recommendations for additional equipment and corresponding personnel. For this reason it is considered premature to comment on future equipment needs at this time.

Strong exception is taken to the comments made in the draft report concerning the Coast Guard's pollution response research and development program. Initiated in 1968, the program has resulted in developments that are a credit to the individuals who have been involved with it. Contrary to what is suggested in the GAO report the program has not been run in a piecemeal manner. A master plan for development of response equipment to meet all aspects of a response scenario (prevention and mitigation, detection and identification, containment, recovery, disposal, and peripheral areas such as transportation of equipment and oil/water separation) was developed in 1971. The plan has served as the basis for the program since that time. Since the beginning of the program operational input has been actively sought and included. It should be recognized that in the late 60's and early 70's there were no operational experts (as the state of the art was straw and telephone pole booms). Nevertheless, members of the very first Strike Team participated in development efforts and worked very closely with the project staffs. Their input as well as that of those who followed in these positions have had major impact on detailed design decisions from the period of initial conceptual design to the development of final specifications. As stated in the current National Strike Force directive, Strike Team personnel are required to participate in the testing of R&D prototype equipment when requested so that they may gain familiarity with the equipment and concepts and to provide an assessment of the equipment or concept based on experience. A strike force conference was held this past December 1977 to solicit Strike Team needs for new equipment and ideas for new research. A member of the Strike Team is also designated to the group that will evaluate the various previously mentioned studies that may result in equipment procurements.

It is also true as stated in the draft report that current members of the Strike Teams did not have input to the design of the ADAPTs, Open Water Recovery System, or Open Water Containment Barrier. It is a fact of life that a major R&D development takes 3 to 4 years to complete while the following procurement cycle for operational equipment takes 2 to 3 additional years, provided budget delays are not encountered. Thus, the input of today's Strike Team will primarily influence the equipment that their successors will see. While the Coast Guard would like additional funds for R&D the service recognizes the need for limited governmental spending. The service will continue to run the most effective research program available for the authorized funding level provided.

are provided by utilizing the existing specialty rate structure. During actual spills, a variety of skills are also needed. The creation of a dedicated classification will not provide the broad response capabilities which exist at Coast Guard units today.

Petty officers are now being assigned to a second tour at MSOs and new people are getting more training. It is presently believed that the service will have a sufficiently large pool of qualified personnel to draw from for MSO assignments in 2 to 3 years.

Many changes have been made to the Coast Guard's marine safety training program over the past year. One of the changes was to increase the size of classes at the MES school so as to increase the number of personnel trained. In the past year the Coast Guard MES School has trained 240 to 280 petty officers for MSOs. This compares favorably with the number of new personnel being assigned into the program on an annual basis. The curriculum offered is considered to be well balanced and most suited to the needs of the service. The criticism that the school does not provide sufficient hands-on training is not concurred with. The GAO investigators' definition of hands-on appears to mean time actually out of the classroom. The Coast Guard also considers time spent in class on the use of sorbents, and surfactants including demonstrations in an aquarium to be hands-on." Time spent on the Federal Water Pollution Act as well as instruction on tank vessel design, construction and operation and the like, as well as time spent on how to respond to discharges of chemicals is also considered essential if personnel are to effectively respond to pollution incidents.

Exception is also taken to the inference in the report that the M S school is the only formal training given MSO personnel. The Strike Teams are tasked with delivering, as a minimum, an extensive annual training program to all units within their geographical area having a marine environmental protection responsibility. While the MES school is intended to plant the seed of knowledge in pollution response techniques the annual visit of the Coast Guard's pollution response experts is expected to nurture and expand the individuals' abilities in pollution response. The visit is also required to cover an extensive list of topics which was recently expanded to better address present needs. This formal training must be supplemented by an adequate unit training program. While the Coast Guard recognizes a need to better define requirements and to provide assistance to MSOs in improving their unit training program it is not felt that the report accurately portrays the number of units having established an adequate unit training programs.

In summary it is felt that a dynamic and adequate formal training program exists. It is acknowledged however, that additional headquarters guidance and assistance in the area of unit training will in general result in better unit training programs. Initiatives are presently on going to accomplish this.

APPENDIX V

Contrary to what is stated in regard to ADAPTs, the Coast Guard barrier and recovery system, they represented, at the time of their design, the best available technology for attainment of specified design goals. The Coast Guard barrier, although admittedly difficult to repack has recently been shown to be possibly the best design available today in terms of oil retention performance, strength, and reliability. It is further interesting to note that Norway, the only other country truly active in the design of open water equipment has recently developed two disc type skimmers, and a boom which is very similar to the first generation Coast Guard barrier.

That the Coast Guard open water equipment (barrier and skimmer) has not been used during a spill is true. It should be noted however, that the only true open water incident that has occurred in some time was the ARGO MERCHANT. No containment or recovery equipment was used in the incident because on-scene conditions exceeded state-of-the art capabilities.

In summary the Coast Guard research and development program is considered to have contributed significantly to advancing the state-of-the-art and is not considered to be in need of modification. It is, however, expected that a new master R&D plan will result from the study efforts previously mentioned.

In general the GAO report is considered to be fair review of a complex, dynamic, and expanding program.

(34452)

COMPTROLLER GENERAL'S REPORT
TO THE CHAIRMAN, SUBCOMMITTEE ON
TRANSPORTATION AND RELATED AGENCIES,
COMMITTEE ON APPROPRIATIONS
UNITED STATES SENATE

COAST GUARD RESPONSE TO OIL SPILLS--TRYING TO DO TOO MUCH WITH TOO LITTLE

D I G E S T

The Coast Guard generally has performed its oil pollution response program in a creditable manner considering its limited staffing and equipment resources. GAO's analysis of 137 cases--with a panel of experts' assistance--however, indicates that the Coast Guard had opportunities to be more effective in about 38 percent of the cases in one or more of these areas

--faster responses to reported spills (see p. 8),

--better monitoring of cleanup operations (see p. 9),

--more effective action upon arrival at spills (see p. 10),

--attempting to remove spilled oil before it dissipates into the water (see p. 12), and

--investigating reported minor oil spills of less than 10,000 gallons. (See p. 13.)

The Federal Water Pollution Control Act requires the Coast Guard to (1) contain and clean up oil spills in coastal waters, (2) minimize the environmental damages, and (3) prepare regional and local contingency plans for responding to oil spills.

Generally, Coast Guard personnel who work in pollution abatement are dedicated to the task of keeping the Nation's waters free of oil and other hazardous substances that destroy wildlife and marine life, foul beaches, and damage marshlands. Dedication alone, however, will not compensate for staff shortages and inadequate training in the Coast Guard's pollution abatement program.

CED-78-111

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-146333

The Honorable Birch Bayh
Chairman, Subcommittee on Transportation
and Related Agencies
Committee on Appropriations
United States Senate

Dear Mr. Chairman:

As requested in a joint letter dated April 6, 1977, from you, Senator Case, Ranking Minority Member, and Senators Brooke, Magnuson, Stennis, Johnston, Weicker, Eagleton, Mathias, and Robert C. Byrd, we have reviewed the Coast Guard's response to oil spills.

We obtained written comments from the agency and have incorporated them in the report.

Copies of this report are being sent today to Senator Case, and to the other Senators. As arranged with your office, we are also sending copies to interested parties. Copies will also be made available to others upon request.

Sincerely yours,

Comptroller General
of the United States

Enclosure