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COAST GUARD

Adequacy of Preparation and Response to Exxon Valdez Oil Spill



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**Resources, Community, and
Economic Development Division**

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Congressional Requesters

On February 6, 1989, we were requested by the House Committee on Merchant Marine and Fisheries to evaluate how well the Coast Guard was carrying out its environmental responsibilities. After the Exxon Valdez oil spill occurred on March 24, 1989, the Committee requested us to redirect our efforts and review various issues related to the spill. Subsequently, we received several other similar congressional requests to review spill-related issues.

This report responds to all of these requests. The spill released more than 10 million gallons of crude oil into Alaska's Prince William Sound. As requested, we (1) evaluated how well industry and government were prepared to respond to the spill and (2) examined measures that can be taken to help prevent similar situations from occurring in the future. We initially reported our results in testimony before the Subcommittee on Coast Guard and Navigation of the House Committee on Merchant Marine and Fisheries on August 10, 1989.

Results in Brief

The response to the Exxon Valdez grounding was clearly inadequate to contain and recover the spilled oil. Major problems were encountered because no one had realistically prepared to deal with a spill of that magnitude in Prince William Sound, and we may be similarly unprepared elsewhere in the nation. One important reason for this state of national unpreparedness is that there is no single designated leader or authority to ensure that preparations are adequate. The Exxon Valdez and other recent spill experiences have also raised concern about the capability of current oil spill containment and recovery technology. Attention needs to be drawn as well to the risks associated with transporting other types of hazardous cargo over water. Furthermore, the nation's limited ability to deal with a spill of the Exxon Valdez magnitude indicates a need for greater emphasis on the prevention of such spills. Therefore, the improvement of prevention measures needs to be a priority.

The multitude of options for preventing and responding more effectively to oil spills that are surfacing since the Exxon Valdez and other recent spills seems to indicate a strong desire to reduce the risks associated with oil spills. As the nation decides on the best course of action, it will be important to provide leadership to avoid a scattered approach that

leaves the nation little better than it was before. It will also be necessary to consider various options to increase funding if the nation's level of protection is, in fact, to be raised. (See app. I for detailed information on results of our review.)

Background

The Clean Water Act provides for a national contingency plan to achieve efficient, coordinated, and effective action for minimizing damage from oil spills. The plan, put forth in regulations, defines an organizational structure that ranges from a national response team to on-scene coordinators that must ensure coordination of oil spill contingency plans and response actions from the national to the local levels of potential spill areas. The success of this endeavor depends on the combined efforts of all concerned organizations working together at the national, state, and local levels. The federal coordinators and their state and local counterparts are key parties responsible for ensuring quick and efficient responses to oil spills.

Except under certain conditions, the owner or operator of a vessel that discharges oil in violation of the Clean Water Act is responsible and liable for removal costs, with the on-scene coordinator monitoring the removal operation to ensure it is being done properly. However, whenever a polluter is unknown or its removal effort is insufficient, the coordinator may assume total or partial control of response activities. This is done by "federalizing" the spill, activating a fund provided under the act to cover expenses and taking whatever actions are necessary to ensure proper cleanup.

Improvements Are Needed in Response Capabilities, Preparations, and Authority

One reason for the inadequate response to the Exxon Valdez spill was that preparations had been made for dealing with a much smaller spill by the Alyeska Pipeline Service Company (Alyeska), the terminal operator who prepared the primary plan for direct spill cleanup. Alyeska officials said that under their plan, the company assembled equipment and personnel only for what it considered would be a "most likely" spill of an estimated 42,000 to 84,000 gallons—less than 1 percent of the oil that spilled from the Exxon Valdez. Further, according to Coast Guard officials, recovery efforts were also hampered by breakdowns in equipment and by techniques rendered ineffective by such factors as weather and water conditions.

Although planning and preparing for a larger spill might have resulted in more oil being contained and recovered, current recovery technology could not have effectively addressed an Exxon Valdez size spill. Coast Guard officials told us that with current technology, the best that can typically be expected after a major spill is to recover 10-15 percent of the oil. According to an expert in oil spill recovery who assisted us in our evaluation, even if all the increased equipment levels available in August 1989 to combat spills in Prince William Sound had been available at the time of the Exxon Valdez spill, and even if conditions for using the equipment were ideal, only about 35-45 percent of the oil could have been recovered.

While concern exists that response technology has not changed much since the 1970s, federal funding for research and development has been substantially cut back in recent years. For example, the Coast Guard's 1988 budget for research, development, testing, and evaluation within the Marine Environmental Protection Program, which includes oil spill response, was \$1.6 million, an amount \$7.2 million less than expended in 1983.

That Alyeska had a spill response plan at all appears atypical of the national situation. According to the Coast Guard, the state of Alaska required Alyeska to have a plan for tankers transiting the area, but other states often leave such planning to be done by industry on a voluntary basis. At the federal level, once a coastal oil spill occurs, the Coast Guard asserts it has authority to (1) monitor the response or (2) assume partial or total control of the response by "federalizing" it. However, the Coast Guard believes it does not have the necessary authority to ensure beforehand that there has been adequate preparation to deal with a potential spill. Coast Guard officials believe this lack of authority is the most significant limiting factor in the contingency planning process.

Priority Needs to Be Given to Spill Prevention

While the nation's limited ability to deal with a spill of the magnitude of the Exxon Valdez demonstrates the importance of preventing such spills from occurring in the first place, experiences at Valdez and elsewhere have shown that prevention measures need to be improved. They have also shown that the system of prevention may need to incorporate a degree of back-up, or "redundancy," so that a failure of one prevention measure can be compensated for by another measure.

Methods for preventing oil spills include monitoring and directing ship movements and using harbor pilot or tug escort assistance. The use of these methods in Prince William Sound, however, was limited. For example, when the Exxon Valdez ran aground, Coast Guard officials have said it had passed the limits of reliable radar coverage for the Vessel Traffic Service System—a system used for, among other things, guarding against vessel groundings. Although consideration was given to providing system coverage throughout the sound when the Alaska pipeline was built, according to the Coast Guard this consideration was rejected in part as too costly. Limitations in other prevention mechanisms, such as Coast Guard licensing and industry training procedures, have also become a concern since the spill.

The extent of prevention measures in use prior to the Exxon Valdez spill seemed acceptable to the Coast Guard and others because nothing major had gone wrong in the 12 years that the pipeline had been operating. Since the spill, concerns have been raised that prevention systems should be expanded. Although expanding prevention measures will require up-front costs, these expenditures could well be less in the long run and more effective than the cost of containing oil spills and mitigating their environmental impact. For example, Exxon has recently stated that it is reserving \$880 million for spill-related costs through mid-September 1989. This amount does not include potential costs of future industry and government cleanup, long-term restoration, or environmental impacts on the wildlife, shores, and livelihood of the people in the area.

Risks Associated With Transporting Hazardous Cargos by Water

While the Exxon Valdez and other recent spills have called attention to the risks associated with the water transportation of oil, there are also risks associated with the water transportation of other types of hazardous cargoes. Over the past 20 years, there has been an average of 80 accidents a year involving the approximately 900 tankers that transport other types of hazardous cargo, such as liquified petroleum gas. An average of six of these accidents each year has resulted in the release of hazardous cargo into the water. While the number of accidents involving hazardous cargo tankers is small compared to the number of accidents involving oil tankers, the accident rate is proportionally about the same, given the total number of tankers involved.

Spill Has Generated Many Recommendations That Will Require Focused Action and Greater Funding

The Exxon Valdez spill has generated many recommendations for improving prevention and response in Prince William Sound as well as throughout the nation. A joint report to the President by the Department of Transportation and the Environmental Protection Agency identified many nationwide efforts needed in prevention, contingency planning, readiness of response resources, roles and responsibilities of parties involved in a response, and research and development. Similarly, an American Petroleum Institute report included specific recommendations for improvements in prevention, response, and research and development. In addition, the Coast Guard recently completed a comprehensive evaluation of alternatives for preventing oil spills and many other activities are still under way that will add to possible nationwide actions.

Although the many recommendations are positive signs, unless the approach to improve the nation's level of protection is unified, these actions may not be as effective as intended or may conflict with one another. To this end, it may be appropriate to establish a single entity or leader for recommending the specific actions that are likely to achieve a higher level of protection.

Clearly, achieving greater protection will require greater funding. Several funding sources can be considered. Options that have already surfaced since the Exxon Valdez spill would include allowing direct industry funding, user fees (a per-barrel tax on oil), direct appropriations, or a combination of these three.

Conclusions

The Exxon Valdez spill has generated many recommendations for improving oil spill prevention and response—a sign of the government's and the oil industry's desire for improved safety in tanker movements. However, a unified approach when considering the recommendations is needed. Otherwise, the actions adopted may not be as effective as desired, or they may conflict with each other. We believe a single entity or leader could help ensure that the specific actions chosen to improve spill prevention and response are likely to achieve a higher level of protection. We also believe that as a plan of action is developed for increasing levels of prevention and response to oil spills, planners should consider what should be done about the water transportation of other hazardous cargo. Clearly, achieving greater protection will require greater funding.

In addition, once the course of action for improving the nation's ability to deal with spills is developed, leadership will be needed to ensure that adequate plans and resources are in place to respond to major spills and that such resources are properly tested to ensure a smooth response. Because state involvement in ensuring adequate preparations appears to vary, we believe the federal government should be the leader.

Matters for Congressional Consideration

To help ensure that an effective course of action is developed for improving the nation's capabilities for preventing and responding to oil and other hazardous cargo spills, the Congress may wish to consider legislation designating a single entity or leader for developing an action plan. Alternatives for filling this role include a federal agency, such as the Coast Guard, or commission comprised of representatives from industry, federal agencies, states, and other groups that play key roles in spill prevention and response.

To help ensure that sufficient funds are available to support improved prevention and response capabilities, the Congress may wish to consider establishing a fund, or modifying existing funds, to finance the improvements. Funding options include allowing direct industry funding, user fees (a per-barrel tax on oil), direct appropriations, or a combination of these three.

Because the Coast Guard does not now believe it has the necessary authority to ensure that adequate response preparations have been made, the Congress may wish to consider providing the Coast Guard with explicit authority to carry out this role. The Congress may also wish to consider allowing the Coast Guard to delegate this responsibility to states demonstrating an ability to effectively carry out this role.

Objectives, Scope and Methodology

Our objectives were to evaluate how well industry and the government were prepared to respond to the Exxon Valdez oil spill and to examine measures that can be taken to help prevent similar situations from occurring in the future. We conducted our work from April through July 1989 at the Coast Guard Headquarters in Washington, D.C.; Alyeska offices in Anchorage and Valdez, Alaska; the Alaska Department of Environmental Conservation in Valdez, Alaska; Coast Guard Marine Safety Offices in Valdez, Alaska and in Seattle, Washington; and Exxon corporate offices in Houston, Texas.

We interviewed Coast Guard, Alyeska, state of Alaska, and Exxon officials. We prepared questions for and received written responses from the Alaska Department of Environmental Conservation, Exxon, and Alyeska. To assist in our evaluation, we contracted with Engineering Computer Optecnomics, Inc., of Annapolis, Maryland, a firm with expertise in oil spill contingency planning, response, and prevention. We attended hearings of the National Transportation Safety Board in Anchorage, Alaska, and we made field visits to the spill site and affected areas. We also reviewed relevant reports and legislative documents.

Because this report is based on the testimony we delivered on August 10, 1989, we did not obtain official agency comments. We did, however, discuss our findings and conclusions with Coast Guard, state of Alaska, Alyeska, and Exxon officials prior to the hearings. We performed our work in accordance with generally accepted government auditing standards under the direction of Kenneth M. Mead, Director of Transportation Issues, who can be reached at (202) 275-1000. Appendix I of this report discusses our findings and conclusions in further detail, and appendix II shows other major contributors to the report.

As arranged with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 5 days after the date of this letter. At that time, we will send copies to the Secretary of Transportation, the Commandant of the Coast Guard, and to other interested parties.



J. Dexter Peach
Assistant Comptroller General

List of Requesters

The Honorable Walter B. Jones, Chairman
The Honorable Robert W. Davis, Ranking Minority Member
Committee on Merchant Marine and Fisheries
House of Representatives

The Honorable W. J. Tauzin, Chairman
The Honorable Don Young, Member
Subcommittee on Coast Guard and Navigation,
Committee on Merchant Marine and Fisheries
House of Representatives

The Honorable Frank R. Lautenberg, Chairman
Subcommittee on Transportation and Related Agencies,
Committee on Appropriations
United States Senate

The Honorable Bennett Johnston, Chairman
Committee on Energy and Natural Resources
United States Senate

The Honorable George Miller, Chairman
Subcommittee on Water, Power and Offshore Energy Resources,
Committee on Interior and Insular Affairs
House of Representatives

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Exxon Valdez Oil Spill Provides Lessons for Future Response Preparations and Oil Spill Prevention

Shortly after midnight on March 24, 1989, the oil tanker Exxon Valdez ran aground on Bligh Reef in Prince William Sound, Alaska, spilling more than 10 million gallons of Alaska's North Slope crude oil. We believe the problems arising from the response to this largest oil spill in U.S. history provide lessons for the nation to apply to large oil spills in coastal waters throughout the country. The inability of industry and government to effectively respond to such a large spill demonstrates the need for improvements in the nation's spill prevention and response capabilities and the need for adequate funding to support these efforts. We believe these demonstrated needs highlight three areas warranting Congressional consideration.

- First, the response to the Exxon Valdez oil spill was clearly inadequate. Major problems were encountered because no one had realistically prepared to deal with a spill of this magnitude in Prince William Sound. Further, we may be similarly unprepared elsewhere in the nation. One important reason for this state of national unpreparedness is that there is no single designated leader or authority to ensure that preparations are adequate. We believe the federal government should perform this leadership role.
- Second, even with a substantially greater commitment of resources to improve response capabilities, the nation's ability to deal with a spill of the Exxon Valdez magnitude is limited at best. Thus, the nation's priority for dealing with such spills should be to prevent them from occurring in the first place. The experience at Valdez and elsewhere has shown that much needs to be done to improve our prevention measures.
- Third, the nation's reaction to the Exxon Valdez and other recent spills seems to indicate a strong desire to reduce the risks associated with oil spills. While the many recommendations surfacing as a result of the recent incidents provide good options for changing the nation's level of protection, a leadership role is needed to determine the best course of action for improving prevention and response capabilities. Further, it will be necessary to consider various options to significantly increase funding if the nation's levels of protection are, in fact, to be raised.

Background

The Clean Water Act requires the President to develop a national contingency plan to provide efficient, coordinated, and effective action for minimizing damage from oil spills and hazardous substance discharges.¹

¹The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 requires a national contingency plan to include a section for response to hazardous substance releases into the environment that may present an imminent and substantial danger to the public health and welfare.

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The Clean Water Act addresses the requirements for such discharges into or upon the navigable waters of the United States and the adjoining shorelines. The first national contingency plan was adopted in 1968, and the current plan appears as 40 C.F.R. part 300. The national plan provides for the following national response system organization:

- A national response team responsible for oil spill and hazardous substance release response planning and coordination. As presently constituted, this team is composed of representatives from 14 federal agencies.
- A national response center, which serves as a focal point for reporting spills. The center maintains a listing of available containment and cleanup equipment.
- Regional response teams, which provide planning and preparedness activities before, and coordination and advice during, response actions related to oil discharges and hazardous substance releases. There currently are 13 such teams.
- Regional contingency plans that are developed by the regional teams to provide coordination of a timely, effective response. To the greatest extent possible, these plans are to be coordinated with state and local federal plans for the same potential spill areas.
- Federal local contingency plans that are developed by predesignated federal officials called on-scene coordinators in consultation with the regional team, to identify (1) probable locations of discharges or releases, (2) available resources, (3) disposal methods and facilities consistent with local and state plans, and (4) a local structure for responding to discharges or releases.

Together these mechanisms constitute the national response system. As can be seen from the description of its components, the system's success depends on the combined efforts of all agencies and organizations working together at the national, regional, state, and local levels.

The Coast Guard is to provide on-scene coordinators for the coastal zone and the Environmental Protection Agency is to provide coordinators for the inland zone. The boundaries between coastal and inland zones are determined by agreement of the two agencies and the boundaries are designated in the regional plans. The Coast Guard's on-scene coordinators are responsible for ensuring proper pollution response and enforcement. They are required to use appropriate legislative and regulatory authorities, the national contingency plan, regional and local contingency plans, and actions relevant to the unique circumstances of the

incident to ensure that the response is carried out expeditiously and aggressively.

Except under certain conditions, the owner or operator of a vessel that discharges oil in violation of the Clean Water Act is liable for removal costs up to a statutorily established ceiling. The on-scene coordinator monitors the removal operation to ensure it is being done properly. When appropriate, the on-scene coordinator should guide the discharger on the preferred course of action. However, whenever a polluter is unknown or not acting responsibly, or when its removal effort is insufficient, the coordinator may assume total or partial control of response activities. This is done by “federalizing” the spill, activating a fund provided under the act to cover expenses, and taking whatever actions are necessary to ensure proper cleanup.

Improvements Needed in Response Preparations and Capabilities

The general consensus is that the initial response to the Exxon Valdez spill was inadequate to control and recover the spilled oil. Problems identified ranged from a shortage of equipment and skilled personnel to inadequate communications and organizational structures. We believe a number of conclusions can be reached from this experience related to the inadequacy of response preparations, the lack of a clear leadership role or authority for ensuring adequate preparations, the limited capabilities of response equipment under certain conditions, and the funding and procurement restrictions the federal government may face in responding to a major spill.

Improvements Needed in Planning and Resource Readiness

The government and industry clearly were not prepared from a planning, resource, or readiness perspective to deal with a spill of the Exxon Valdez magnitude. While federal, state, and industry contingency plans existed for dealing with an oil spill in Prince William Sound, the primary plan for direct spill cleanup was prepared by the pipeline terminal operator—Alyeska Pipeline Service Company (Alyeska). Alyeska officials said that under their plan, the company had equipment and personnel assembled only for what it considered would be the “most likely” spill—an estimated 42,000 to 84,000 gallons. This figure was less than 1 percent of the more than 10 million gallons that spilled from the Exxon Valdez. Alyeska’s plan included a scenario for how it would respond to a spill of about 8.4 million gallons. Its officials told us that this planned response was based on how Alyeska would use its existing equipment and personnel supplemented by outside resources. They also said this

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response would be inadequate to prevent limited environmental damages if such a very large spill were to occur. The 8.4-million-gallon scenario also indicated that using dispersants on the oil and burning it would be important in responding to a spill of this size and that long-term beach cleanup would be expected.

Along with having a response plan that was inadequate for a spill of the Exxon Valdez magnitude, field exercises had not been conducted, according to Alyeska and Coast Guard officials, to test the ability of resources and personnel to realistically respond to a major spill in Prince William Sound. According to an Alyeska official, Alyeska originally had a dedicated team of contractor personnel ready to respond to a spill. But in 1981 the team was disbanded, and responsibility for responding to spills was assigned to Alyeska personnel as an additional duty. In addition, at the time of the Exxon Valdez incident, Alyeska's response barge was undergoing repairs and was not loaded with needed equipment. Given this preparation, it is not surprising that major problems have been identified with the initial response to the Exxon Valdez spill.

The Exxon Valdez and other recent spills have heightened concern about whether the nation is adequately prepared for major oil spills elsewhere. For example, in the Delaware Bay area, we found that preparations are based on what is considered a likely or typical spill—generally up to 250,000 gallons. In a recent 307,000-gallon spill in that area, the response contractors could not initially obtain enough equipment or personnel to effectively contain the spill, and the Coast Guard had no available alternatives. Ultimately, the Delaware National Guard was called to assist in the cleanup. Furthermore, coordination, communication, and organization problems were apparent during the response.

On a broader scale, the American Petroleum Institute acknowledged in a June 1989 report that the oil industry lacks the equipment and personnel to deal with a spill of 9 million gallons or more anywhere in the coastal United States. Because of the President's concern about the nation's ability to respond to major spills, the Coast Guard initiated a nationwide study of contingency plans.

As this country moves forward in planning for higher levels of response capability, two questions emerge. First, what size spill should the nation be prepared to respond to? And, second, what criteria should be used to judge the adequacy of the response? These questions are important

because the nation seems to lack the ability to prevent major spills from causing environmental damage.

Leadership Authority Needs to Be Clarified

Improving this country's ability to respond to major oil spills will also require strengthening the federal leadership role in ensuring that preparations are adequate. That Alyeska had a spill response plan for Prince William Sound—albeit an inadequate one for the size of spill that occurred—appears atypical of the national situation. According to the Coast Guard, Alaska required Alyeska to have a plan for tankers transiting the area, but other states often leave such planning to be done by industry on a voluntary basis.

From the federal perspective, the Coast Guard believes it lacks authority to require private shippers or terminal operators, like Exxon or Alyeska, to have contingency plans for dealing with oil spills for vessels in transit. Furthermore, if the shipper or terminal operator has such a plan, the Coast Guard believes it cannot dictate the size of spill that the plan should address, ensure that the resources called for in the plan are in place, or ensure that the plans are tested for their effectiveness. Once a coastal oil spill occurs, however, the Coast Guard asserts that it has authority to (1) monitor the response or (2) assume partial or total control of the response by “federalizing” it. Thus, while the Coast Guard has played a major role in ensuring the effectiveness of a response, it believes it does not have the necessary authority to ensure that response preparations are adequate. Coast Guard officials believe this lack of authority is the most significant limiting factor in the contingency planning process.

According to the Coast Guard, state involvement in ensuring adequate preparations varies; therefore, we believe the federal government should be the leader for ensuring that adequate plans and resources are in place to respond to major spills and that such resources are properly tested to ensure a smooth response. This responsibility could be delegated to states that demonstrate an ability to effectively carry out this role.

Improvements Needed in Response Technology

Responses to the Exxon Valdez and other recent spills also indicate a need to improve technical capabilities for containing and recovering oil in varying environments. For example, according to Coast Guard officials, during the Exxon Valdez spill response, skimmers frequently

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broke down or were ineffective in dealing with oil that had become thick from weathering. At other times, high winds and seas prevented any recovery. Furthermore, the response techniques of dispersing or burning the oil, which Alyeska considered important in responding to a major spill, are controversial because of their potential environmental impact. Additionally, the effectiveness of these two techniques is highly dependent on the timeliness of their use and on weather and water conditions. A lesson learned in the recent Delaware River spill was that existing equipment normally used to contain and cleanup spills such as booms and skimmers could not effectively recover the type of oil that had been spilled. The only effective technique was to physically pick up the oil and place it in containers.

A consensus appears to be developing that considerable research and development is needed to improve spill response technology. In its June 1989 report, the American Petroleum Institute stated, "A realistic appraisal of U.S. and, in fact, worldwide response to major spills will recognize that no effective containment of such a spill has been accomplished." In addition, the cover letter to a May 1989 Department of Transportation and Environmental Protection Agency report to the President stated, "Oil spill cleanup procedures and technologies are primitive." Coast Guard officials told us that with current technology the best that can typically be expected after a major spill is to recover 10 to 15 percent of the oil.

Notably, however, while concern exists that response technology has not changed much since the 1970s, federal funding for research and development has been cut back in recent years. For example, an official of the Environmental Protection Agency stated that in fiscal year 1988 the agency suspended research and development in prevention and cleanup of oil spills in favor of higher priority topics. Also, in fiscal year 1988 the Coast Guard's budget for research, development, testing, and evaluation in its Marine Environmental Protection Program, of which oil spill response is only a part, was \$1.6 million—\$7.2 million less than had been expended in 1983.

Greater Funding and
Procurement Flexibility
May Be Needed

An important question emerging from the Exxon Valdez spill is whether the federal government would have the funds and flexibility to effectively respond to a spill of this magnitude. Had the Coast Guard been dissatisfied with industry's efforts and assumed responsibility for carrying out the response, it would have had to rely on the Clean Water Act

“311(k)” fund to pay for the costs. Although this fund is authorized at \$35 million, it had only \$6.7 million available when the spill occurred—enough to finance less than one week of response operations. In addition, the Coast Guard said it could also face problems in getting reimbursed for all of its costs because of the low liability limits established in federal legislation enacted in the 1970s for those causing spills. Furthermore, Coast Guard officials pointed out that because the government’s procedures for contracting and procurement are much more cumbersome than private industry’s, Exxon was able to obtain needed resources from around the world more quickly and efficiently than the government could have.

Priority Should Be Given to Preventing Spills

A greater commitment to response alone, even if substantial, will probably not fully protect the environment because the nation’s ability to deal with major spills, from the perspective of both preparation and technology, is limited at best. According to an expert in oil spill recovery who assisted us in our evaluation, even if all the equipment available in August 1989 to combat any future spills in Prince William Sound had been available at the time of the Exxon Valdez spill, and even if conditions for deploying all of the equipment were ideal, only 35-45 percent of the oil could have been recovered. Therefore, we believe priority should be given to preventing spills in the first place. However, the experience at Valdez and elsewhere shows that the nation’s prevention measures need to be improved, partly because past decisions on what should be done were based on the availability of funds and partly because of the inconsistencies in the use of these measures in different locales.

Although preventing spills will require up-front costs, these expenditures could well be less in the long run and more effective than the cost of containing oil spills and mitigating their environmental impact. For example, federal agency costs associated with the Exxon Valdez spill could be about \$120 million by the end of fiscal year 1989. Exxon has recently stated that it has reserved \$880 million for spill-related costs through mid-September 1989. It is important to note, however, that these costs do not include future industry and government cleanup costs or long-term restoration costs, which could be significant. Nor do these costs reflect the environmental impact on the wildlife, shores, and livelihoods of the people in the area.

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Methods for preventing oil spills include monitoring and directing ship movements and using harbor pilot or tug escort assistance. Although these methods were used in Prince William Sound, their use had been limited.

The Coast Guard administers a Vessel Traffic Service System in Prince William Sound and in four other areas of the nation's waterways to guard against vessel groundings or collisions. Although, according to the Coast Guard, this system is often considered analogous to the nation's air traffic control system, there are important differences. First, the Coast Guard advises ships of their position relative to other ships and navigational hazards, but generally it does not direct their specific movements, since the vessel's crew are considered in a better position to know what maneuvers are appropriate given existing weather and water conditions. Second, the current radar-based system is not as effective in identifying precise vessel locations as are other technologies, such as a radio navigation-based system. And third, while participation in the Prince William Sound system is mandatory, participation in the system at two other locations is voluntary, meaning that the ships do not have to notify the Coast Guard of their movements.

When the Exxon Valdez ran aground, according to the Coast Guard, there was no radar monitoring of the ship when it left the shipping lanes because it had reportedly passed the limits of reliable radar coverage for the Vessel Traffic Service System. At the time of the incident, the system covered less than half of the vessel's transit from Valdez through Prince William Sound. Although consideration was given to providing system coverage throughout the sound when the Alaska pipeline was being built, this consideration was rejected in part as too costly. The number of the vessel traffic systems in other parts of the country have also been cut back for budgetary reasons.

Tugs and harbor pilots can help lower the risks of accidents by assisting vessels and by providing them with more knowledge of local water conditions and hazards. According to the Coast Guard, at the time of the incident the use of tugs was limited to escorting tankers through the Valdez Narrows. Further, although Alaska initially required tankers to have a harbor pilot on board throughout Prince William Sound, the requirement was later scaled back because of the danger involved in having harbor pilots transfer between vessels in the frequently high seas at the sound's entrance.

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Our reviews at other locations show differences in the use of harbor pilots and tug escorts, largely due to federal and state requirements in local areas. For example, in Delaware and Pennsylvania, although harbor pilots remain on board vessels from the time they enter the Delaware Bay until they are docked, the states have different licensing requirements. Further, the Coast Guard requires vessels transporting liquified petroleum gas in the bay to have tug escorts but does not require oil tankers to use tug escorts.

Limitations in other prevention mechanisms have come to light since the Exxon Valdez spill. At the National Transportation Safety Board hearings, allegations of improper conduct and inadequate training of certain members of the Exxon Valdez crew have raised questions about the effectiveness of Coast Guard licensing and of industry training procedures. Similarly, because allegations have arisen that equipment inadequacies contributed to recent spills elsewhere, questions have been raised about whether improvements are needed in ship design, such as the need for double bottom construction or additional maneuvering mechanisms. Also, the aging of the tanker fleet and the impact that crossing high seas has on vessels has heightened the concern over the need for frequent, thorough inspections.

While cutbacks or limitations on prevention measures in Prince William Sound largely reflected funding or safety concerns, prevention measures prior to the spill seemed acceptable to the Coast Guard and others because nothing major had gone wrong in the 12 years since the pipeline began operations. For example, according to the Coast Guard, since the pipeline opened in 1977, about 8,700 oil tankers have safely transited the sound with only minor or manageable spills occurring. Now, since the Exxon Valdez spill, concerns have been raised that prevention systems should be expanded with some degree of redundancy built into them. This accident may have been prevented if the tug had continued to escort the vessel, or the harbor pilot had stayed on board, or the vessel-tracking system had been capable of monitoring the ship beyond the site of the accident.

Where Do We Go From Here?

The reaction to the Exxon Valdez and other recent spills seems to be that the nation must lower the risks of transporting oil by tankers by improving its prevention of and response to spills. Since the Exxon Valdez spill, the government and industry have done much to improve their prevention and response capabilities in Prince William Sound. The

spill has also stimulated numerous assessments of the lessons learned with nationwide implications. The multitude of options that are surfacing for preventing and responding more effectively to oil spills are a positive sign of the nation's desire to act boldly and quickly. However, as the nation decides on the best course of action, it will be important to avoid a scattershot approach that leaves it little better than it was before.

Spill Has Generated Many Recommendations for Improving Prevention and Response

The Exxon Valdez spill has generated many recommendations for improving prevention and response in Prince William Sound as well as throughout the nation. For example, under direction from the state of Alaska, Alyeska has taken several steps to ensure that equipment and personnel can respond quickly to spills. Alaska has also required escort vessels and harbor pilots to stay with tankers past the site of the grounding. The Coast Guard has told us they have made several procedural changes to strengthen the Vessel Traffic Service System's ability to monitor ship traffic.

From a national perspective, the Department of Transportation and the Environmental Protection Agency's joint report to the President identified many nationwide efforts needed in prevention, contingency planning, readiness of response resources, roles and responsibilities of parties involved in a response, and research and development. Similarly, the American Petroleum Institute report included specific recommendations for improvements in prevention, response, and research and development. In addition, the Coast Guard recently completed a comprehensive evaluation of alternatives for preventing oil spills.

Many other activities are still under way that will add to possible nationwide actions. The Coast Guard has a number of navigation initiatives underway such as a study of the Vessel Traffic Service System, including the number of new locations needed, the need to expand the scope of coverage at existing locations, and opportunities for using new technologies. Other recommendations on prevention are likely to stem from reports from National Transportation Safety Board and Coast Guard investigations of the causes of the Exxon Valdez accident.

On the response side, the Coast Guard's nationwide study of spill response plans and readiness, coupled with the President's report, are being used by the Coast Guard to recommend a new national policy on

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preparedness for oil spills. Also, the state of Alaska has created a commission to investigate the Valdez incident that will, among other things, recommend changes by government and industry that may be needed in both prevention and response.

Finally, in addition to the various industry and government studies and actions, many hearings have been held by different committees of the Congress on various issues related to the Exxon Valdez spill and oil spills in general. Legislation has been introduced regarding contingency planning, oil pollution and liability compensation, mariner licensing requirements, as well as other issues.

Need for Focused Action
and Greater Funding

Although the many recommendations are positive signs, unless the approach to improving the nation's level of protection is unified, these actions may not be as effective as intended, or may conflict with one another.

To this end, we believe it would be appropriate to establish a single entity or leader for recommending the specific actions that are likely to achieve a higher level of protection. This entity would sort through recommendations of current and forthcoming studies; establish priorities; and recommend to the Congress, the Administration, states, and others, the levels of prevention and response the nation should strive for and the steps necessary to achieve them.

There are alternatives for designating this single entity or leadership role. For example, a federal agency, such as the Coast Guard, could fill this role. Another approach could be to establish a task force or commission comprised of representatives from organizations that play key roles in spill prevention and response. These could include industry, federal agencies, states, and other groups. Each approach has advantages and disadvantages. For example, a commission approach may be less timely than using a federal agency. On the other hand, the recommendations of a federal agency working alone could be influenced by its own priorities among its various missions. If a federal agency is selected as the single entity, we believe it would be important to develop a mechanism for participation by other key organizations.

As a strategy is developed for improving oil spill prevention and response capabilities, it may be advantageous to consider at the same time the risks associated with the water transportation of other types of

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hazardous cargo. Over the past 20 years, there has been an average of 80 accidents a year involving the approximately 900 tankers that transport other types of hazardous cargo, such as liquified petroleum gas. An average of six of these each year resulted in the release of hazardous cargo into the water. While the number of accidents involving hazardous cargo tankers is small compared to the number of accidents involving oil tankers, the accident rate is proportionally about the same given the total number of tankers involved. We believe, therefore, that as an action plan is developed for increasing levels of prevention and response for oil spills, planners should also consider what should be done about transporting other hazardous cargos.

Clearly, achieving greater protection will require greater funding. We believe consideration should be given to establishing a fund, or modifying existing funds, to finance the improvements in the levels of both prevention and response, including any needed research and development. Several funding sources can be considered. Options that have already surfaced since the Exxon Valdez spill would include direct industry funding, user fees (a per-barrel tax on oil), direct appropriations, or a combination of these three.

Major Contributors to This Report

Resources,
Community, and
Economic
Development Division
Washington, D.C.

Victor S. Rezendes, Associate Director
Ronald J. Maccaroni, Assistant Director
Steven R. Gazda, Assignment Manager
Angelia V. Kelly, Evaluator

Office of the General
Counsel

Jackie A. Goff, Senior Attorney

Seattle Regional Office

Randall B. Williamson, Regional Management Representative
Gary E. Ziebarth, Evaluator-in-Charge
Dorlene R. Crawford, Evaluator
Brian A. Estes, Evaluator
Laurie M. Jones, Evaluator
Stanley G. Stenersen, Evaluator