Chapter 4

U.S. Oil Spill Response Policy Issues

INTRODUCTION

Prior to the *Exxon Valdez* spill, few saw U.S. oil spill policy as wanting. A seemingly sophisticated response system had been in place for almost 20 years. Even though there had not been a spill in U.S. waters that aroused similar national attention since the 1969 Santa Barbara well blowout, the system seemed to work well. On previous pages we have addressed some of the technology issues associated with responding to spills. However, use of better technology alone will not solve U.S. response problems. On the following pages we consider several aspects of U.S. oil spill response policy, identify some of the problem areas, and suggest some potential solutions. The section after this investigates how several European countries are organized to fight major spills.

TECHNOLOGY: WHICH CLEANUP METHOD?

Currently, the most likely oil spill countermeasures approach to be used in the United States for spills at sea is to rely on mechanical containment and cleanup methods, i.e., booms and skimmers. Even though available booms and skimmers are limited in capacity and capability, they can be deployed in almost any region without concern about additional environmental damage. Such is not the case for dispersants, however, where some limits on their use are usually considered. Modern dispersants are considered safe for many offshore regions, but up to now they have been seldom used. Questions about dispersant toxicity largely have been laid to rest by new formulations, but they do not remove the oil itself and thus many oppose their use. In addition, important questions about the effectiveness of dispersants have not been settled. Burning as a countermeasures approach has been the subject of experiments, and some believe it holds promise under certain favorable conditions.

There is no single or perfect solution to the general problem of dealing with oil on the water. As noted elsewhere in our report, each of several available methods has strengths and weaknesses. Each oil spill is unique, and the approach that works well or at least reasonably well in one situation may work poorly in another. Participants in OTA's oil spill workshop generally agreed that for the most effective response, all approaches must be available to those fighting the spill. This provides the ability to use whatever technique(s) are most appropriate in each case. In particular, better understanding of the conditions and locations under which dispersant use and burning would be appropriate and/or preferable to mechanical equipment is needed.

Related to this, a systematic approach is essential. It makes little sense to have skimmers and booms available but inadequate space for temporary storage of recovered oil or no plan for permanently disposing the oil. Hence, barges or other storage vessels, for example, are as important to the recovery system as skimmers. Similarly, it makes no sense to stock dispersants without an immediately available delivery system. One cannot neglect any element of a comprehensive plan and expect to mount effective oil spill countermeasures. Undoubtedly, the performance of an individual piece of equipment is less important than the overall performance of the system. Moreover, since all spills are different and since resources are usually limited, an integrated system that works reasonably well for several different types of spills (e.g., for viscous oil and for low viscosity oil) and as the physical properties of the spill change with time is preferable to one that works well in one situation but poorly in another.

DECISIONMAKING: DEMOCRATIC AND AUTHORITARIAN APPROACHES

The current U.S. approach to fighting major oil spills, unlike the approach of some European countries, is more democratic than authoritarian. Democratic decisionmaking, however, may not be as appropriate for making decisions in emergency situations where speed is essential.

Currently, the U.S. Coast Guard provides an on-scene coordinator (OSC) for most major spill responses in coastal waters and along adjacent shorelines. The OSC's initial responsibility is to determine whether the polluter can cope with the spill. If not, the OSC is empowered to take control of the spill response. In practice, however, his decisions are subject to the oversight of numerous interested parties. For example, a Regional Response Team, consisting of regional representatives of various Federal agencies, has considerable sway over the OSC's decisions. The OSC must also be mindful of legitimate State and local concerns. The interests of these groups may be in conflict. It is thus difficult, if not impossible, for the OSC to act quickly. Unfortunately, large spills not rapidly contained will soon be out of control.

It may be possible to devise a spill response policy that would enable decisions to be made quickly and effectively. It would have to minimize unnecessary and counterproductive interference by others, but at the same time take account of the legitimate concerns of those affected. In many European countries, it appears that the on-scene coordinator is in effect an on-scene commander, that is, someone who has the unquestioned authority to act quickly. Greater authority for U.S. on-scene coordinators could be coupled with a greater effort by all involved to determine, before a spill, what decisions will be made if a particular event occurs–what type response is acceptable, what is not, and when and where a particular response is acceptable. Agreement should be reached before the event, for example, about the circumstances under which dispersants may be used. Once the spill occurs, some decisions could be almost automatic. Planning of this nature should be addressed before spills in Regional Contingency Plans and in Federal Local Contingency Plans.

RESPONSIBILITY: THE POLLUTER OR THE GOVERNMENT?

The current practice in the United States is that the polluter is responsible unless he cannot cope with the situation, at which point the Federal Government – the Coast Guard in the case of offshore spills– will take charge.[1] Although a rather detailed organization – including a National Response Team, Regional Response Teams, on-scene coordinators, and a National Strike Force– has been established to support the Coast Guard, there are several problems with this approach, as illustrated by the Exxon *Valdez* spill. First, given the necessity of acting quickly, by the time the Coast Guard determines that the polluter is incapable of dealing with a spill, it may well be too late for anyone to mount a successful countermeasures effort. Second, the Coast Guard does not now have the resources to mount an effective response to a catastrophic spill, especially one that has not been quickly contained.

[1] The National Response Team, "A Report on the National Oil and Hazardous Substances Response System," Annual *Report*, March 1989, pp. 6-7.

Several critics of current U.S. response policy[2] have pointed out that although the polluter is initially *responsible* for the cleanup, he lacks the *authority* to respond as he thinks appropriate. The oil industry, and inparticular, the new Petroleum Industry Response Organization (PIRO), although willing to provide equipment and personnel to respond to a spill, argue that large spills should automatically be managed by the Federal Government.[3] Such an action would place both responsibility and authority for cleaning up a spill in the same hands and, theoretically, enable a clear and unambiguous command structure. Small spills which do not create special cleanup problems could still be handled with local spill resources.

As noted elsewhere in our report, virtually all European governments have assumed responsibility for responding to major vessel spills. Although operators of fixed installations, such as offshore platforms, are generally still responsible for oil spill cleanup, governments have generally concluded that it is unreasonable to expect the same degree of preparedness for a vessel spill that might occur anywhere at sea. The polluter, however, is still liable to pay all reasonable costs of the spill.

In the United States, the Federal Government could adopt a similar approach of assuming responsibility for large spills regardless of the polluter's capability. That approach would include a full evaluation of current Federal capabilities and abilities to marshal public and private resources quickly. The Coast Guard, or whatever agency is assigned responsibility for combating major spills, would have to be given the appropriate resources to do the job.

LOGISTICS: ESSENTIAL TO QUICK RESPONSE

A rapid response is essential for effective spill cleanup, so one must either have response equipment near a spill site or have the capability to get to a spill quickly. In a country the size of the United States, it is impractical to station equipment for fighting catastrophic spills every few miles along the coast. Clearly, it is also the case that the risk of oil spills is much greater in some areas than others—areas such as busy tanker lanes and ports.

An oil industry proposal indicates that it will establish, through its new Petroleum Industry Response Organization, five major regional oil spill response depots and a number of small "presaging" bases. The regional centers would be located in the Northeast, mid-SouthAtlantic, Gulf Coast, Pacific Southwest, and Pacific Northwest.[4] This is a more decentralized approach than the Navy's strategy. The U.S. Navy, a large amount of whose equipment was used to fight the*Exxon Valdez* spill, relies mainly on two equipment depots, one on the East Coast and one on the West. All Navy equipment is designed (or modified) and packaged so that it is capable of being trucked or airlifted anywhere in the United States. The U.S. Coast Guard currently has two Strike Teams, one in Mobile, Alabama and one at Hamilton Air Force Base in California. At the present time, the Coast Guard is better prepared to off-load stricken tankers than to fight major spills. It relies heavily on commercial contractors for spill responses.

Both centralized and decentralized logistics strategies may be effective. However, in either

[2]For example, the International Tankers Owners Pollution Federation.

[3]The American Petroleum Institute, "Task Force Report on Oil Spills," June 14, 1989. p. iv.

[4]Steering Committee Report and Recommendations on the Implementation of PIRO. Jan. 5, 1990, p. 54

case it is still necessary to have the capability to get to the spill site quickly, and not just with the appropriate skimmers and booms or dispersants, as the case may be, but also, as necessary, with barges to hold recovered oil, and with the other necessary equipment that would constitute a complete response system. The whole system will be ineffective as long as any element is missing. For instance, while dispersants and dispersant application systems are available, the timely availability of aircraft to apply dispersants has been a problem. This problem has been addressed in several European countries by having contract aircraft on call for emergencies (the U.S. oil industry would like to be able to use government-owned C-130s, e.g., National Guard aircraft, in the future.) Some European countries also have initiated "sleeping contracts" with local vessel owners to ensure that barges, towboats, and other ancillary equipment are available in emergencies.

Much improvement is obviously needed in the national capability to deliver response equipment to the scene of a spill quickly. Some combination of government and private resources will probably always be needed, and thus clear lines of authority and carefully coordinated plans for deploying these resources are essential.

Photo credit U.S. Coast Guard

Using hot water to "clean" the beaches of Prince William Sound

BEACH CLEANUP: HOW MUCH EMPHASIS?

In many cases, no matter how successful the response to a catastrophic oil spill at sea, a significant fraction of the spilled oil is likely to reach shore. The public was appropriately outraged when efforts to control the *Exxon Valdez* spill failed and a significant amount of oil from the spill contaminated hundreds of miles of Alaska's coastline. Although hundreds of millions of dollars were spent "cleaning" the shoreline, many scientists and oil spill professionals have concluded that, except for the benefit gained by appearing to be doing something useful, the money spent was largely wasted.

While considerable public pressure exists to take immediate action to restore polluted shorelines to prespill conditions, this inherently costly, labor intensive undertaking has seldom had more than modest success, particularly on rocky shorelines. Moreover, in some instances, shoreline cleanup has resulted in more damage than good. Marshes and other wetlands are particularly vulnerable to mechanical cleanup methods, but cleanup of sandy and rocky beaches can also cause additional damage. In some instances, the best course of action, although not a satisfying one, is to do nothing and let the beach slowly recover naturally.

It maybe possible to give greater attention to beach protection and beach cleanup, but the inherent limitations of the available equipment and methods should be made clear to all involved to eliminate false expectations. As noted elsewhere in our report, beach cleaning activities in Europe are usually the responsibility of local authorities. Local authorities in France, for example, have strategically placed stocks of everything from rakes and shovels and hot water pumps to booms. The

Norwegians have gone so far as to require a local response capability in each of the 52 areas that comprise the coastal zone. Where not already done, more attention to defensive booming may require that local and State authorities devise detailed plans and purchase equipment to protect the most sensitive and vulnerable areas.

Bioremediation--the application of nutrients to speed the degradation of oil – is emerging as one promising technique for future beach cleaning. Experiments are now being conducted in Alaska, and the results of these tests will be carefully evaluated over the next year. Nevertheless, effective application of this technique may also be quite limited. Research is being conducted on other chemical treatments as well.

FEDERAL REGULATIONS AND EMERGENCY SITUATIONS

There may exist some situations where what may be appropriate laws or regulations for normal situations unnecessarily hinder effective cleanup operations during emergency situations. Some OTA workshop participants noted, for instance, that the Federal Clean Water Act, in prohibiting oily discharges from tankers[5], makes no exception for the decanting of water collected with oil during skimming operations. Since a considerable amount of water may be collected with oil, the capacity of whatever storage vessel is used may be rapidly reached, unless water that has been or could be separated from the oil can be discharged. This may be accomplished with very little oil reentering the sea. If not done, once storage capacity is reached, skimming operations must cease until oil and water can be offloaded. This may result in far less oil being recovered, for example, as the skimmer sits idle and as the oil spreads further, weathers, and in general becomes more difficult to skim. Ordinary discharge permits may be granted, but may take up to 18 months to obtain. Thus, a general permit preapproving discharge of oily water during oil spill emergencies may be useful to consider.

Second, several foreign vessels were used in recovery operations during the Exxon *Valdez* spill. Such vessels may either be on the scene and therefore handy for mounting portable skimmers or in themselves specialized oil spill vessels. However, under U.S. law, foreign vessels cannot automatically be used in emergency situations as "vessels of opportunity. " The Jones Act prohibits foreign vessels from engaging in coastwise trade, and this act has been interpreted to apply to vessels that transport recovered oil from an offshore site to an off-loading terminal on shore[6]. Waivers to this regulation may be obtained only if a *national security concern can be demonstrated.* The *Exxon Valdez* spill was considered to fall into this category, and waivers were granted by the U.S. Customs Service without undue delay for about a dozen vessels to help in cleanup operations. National security concerns may sometimes be difficult to justify, however, so a general waiver of Jones Act restrictions may be appropriate for oil spill emergencies.

Third, U.S. customs regulations require that foreign equipment formally pass through customs and that duty be paid. Since customs delays are possible, some have suggested that these regulations could be a potential stumbling block to efficient cleanup operations. This concern appears to have little merit, as the Secretary of the Treasury has the authority to waive the regulation in connection with

[5]The "sheen rule" prohibits discharges that "cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines... " 40 Code of Federal Regulations, Sees. 110.2, 110.3, and 110.4.

[6]Paul Hegland, U.S. Customs Service, personal communication, Nov. 15, 1989.

emergency situations.[7] Waivers are usually obtained without undue delay.

Finally, the ultimate disposal of recovered oil and oiled articles from the *Exxon Valdez* spill proved contentious. The industry wanted to incinerate, and, in some instances, openly burn recovered material. It complained because it could not get permits to do so quickly enough. The State of Alaska hesitated in issuing permits because it wanted to be certain that this method of disposal would not cause an air quality problem. Permits took 2 to 3 months to obtain. Decisionmaking about final disposal of recovered material may not be as urgent as many other decisions that must be made, but when large amounts of oil and oily debris are being recovered by numerous recovery assets, temporary storage capacity may be quickly overwhelmed. In the future it would seem appropriate that contingency plans include plans for waste disposal, specifying for instance, what kind of incinerators are to be used and where they are located.

EQUIPMENT TESTING: HOW REALISTIC? HOW EFFECTIVE?

Equipment testing is an important element of any research and development program. Equipment testing in large tanks, such as in the now closed Oil and Hazardous Materials Simulated Environmental Test Tank (the OHMSETT facility), provides useful information – especially because variable factors such as wave height can be controlled-but is no substitute for testing at sea under realistic conditions. Currently, very little performance data exists on the open ocean, and few laboratory effectiveness tests have been correlated with real field conditions. In particular, no testing with oil has been conducted in recent years in U.S. waters.

There are, necessarily, safety limits to how realistic tests can be. Where safety is not a factor, however, oil spill researchers would like to be able to conduct occasional controlled offshore oil spills for scientific and equipment testing purposes. Such test spills have been conducted in Canada, Norway, the United Kingdom, and France, for instance, and have provided valuable data. While not strictly prohibited in U.S. waters, the "red tape" associated with obtaining permission from the Environmental Protection Agency has effectively blocked intentional spills, according to some OTA workshop participants. One participant noted that a minimum of 20,000 gallons (65 tons) would be needed for a realistic test. Testing at sea, while clearly useful, is also expensive, perhaps costing up to $1 million every time a test is conducted.

As an alternative or supplement to testing equipment offshore with intentionally spilled oil, some have suggested that U.S. Government personnel take advantage of so-called "spills of opportunity" for testing equipment and/or for providing occasions for response personnel to refine skills. The U.S. Government does have a formal program in place to take advantage of spills of opportunity to evaluate equipment, but spills of opportunity do not usually represent ideal test situations. For one, the control over environmental variables that is needed for scientific purposes is not possible during these spills. In addition, researchers may be perceived as being in the way of the cleanup operation.

A related testing issue is the measurement of effectiveness. For some types of equipment, e.g., containment booms, a standard test protocol has been developed to measure effectiveness.[8] It is still very difficult, however, to

[7] 19 CFR 10.107.

[8] Ed Tennyson, Minerals Management Service, OTA Workshop, Aug. 15, 1989.

measure quantitatively the effectiveness of skimmers and dispersants.[9] Lack of an adequate measure of effectiveness has much to do with the controversy over how effective dispersants are (and in what situations).

PERSONNEL, TRAINING, AND DRILLS

The availability of skilled personnel for fighting oil spills is possibly more important than having the ideal type of equipment for a particular spill. The objective of maintaining a work force of oil spill response experts has been frustrated on several counts, however, not least of which is because major oil spills have been rare events in the United States. In all, there exist too little knowledge and experience among those who may have some responsibility for fighting major spills.

The U.S. Coast Guard, which provides on-scene coordinators for spills and, if necessary, a strike team, does not have a career track for oil spill experts. Both the Captain of the Port, who would be designated on-scene coordinator in a spill, and strike team commanders rotate to other positions after 2 to 4 year assignments. Although they receive simulation and classroom training, few are able to acquire experience fighting major spills.[10] The U.S. Navy has contract personnel dedicated to oil spill response. The Navy may be called to provide equipment and help fight major U.S. oil spills (as in the case of the *Exxon Valdez* spill]; however, the primary responsibility of its oil spill unit is to support Navy operations worldwide. Would-be contractors find it difficult to stay in business given the rarity of major spills. Those that do exist largely to support industry cooperatives, and neither the cooperatives nor the contractors have much experience dealing with catastrophic spills.11

To remedy this situation, several OTA workshop participants suggested that the United States create a professional cadre, perhaps within the Coast Guard and/or within the private sector, whose entire career is dedicated to dealing with spills around the country. Such a group could be available to respond to all major U.S. spills as well as to provide advice and assistance for smaller spills. Rather than losing experience through rotation and reassignment, a group of oil spill professionals would retain and build experience. The skills and experience of such a group might be enhanced further by giving it the capability to advise or participate in responses to major spills elsewhere in the world, as needed. Moreover, it may be prudent (although more expensive at the time) to overrespond to certain types of spills. If a spill turns out to be less severe than initially thought, advantage may still be taken by using the response as a training exercise. (Funds spent when an overresponse proves not to be justified may be more than offset on those occasions when the initial response *is* justified). Oil spill experts must maintain skills that may not be required for long intervals. Notably, the petroleum industry, through its proposed Petroleum Industry Response Organization, has proposed to man each of its regional response centers with "dedicated, trained personnel" and to stress training and drilling of its personnel.[12]

Personnel training must include instruction about the capabilities and limitations of a range of countermeasures techniques and equipment. Most of the equipment on the

[9]Merv Fingas, OTA Workshop, Aug. 15, 1989.

[10]Mr. Jim O'Brien, OOPS, Inc., OTA workshop, Aug. 15, 1989.

[11]The American Petroleum Institute, "Task Force Report on Oil Spills," June 14, 1989. p. 10.

[12]Ibid. p. iv.

market is operator sensitive; hence, the performance of a given piece of equipment is directly related to the operator's knowledge of it. Also, contingency plans need occasional testing, preferably full scale testing of the complete containment, cleanup, and disposal system. With few major spills, complacency may easily become a problem unless steps are taken to counteract it. Contingency plan testing should involve State and local authorities who will have some responsibility in the event of a spill, as well as oil spill professionals.

The National Forest Service has developed one system for responding to natural disasters that may be worth emulating. Its Incident Command System for forest fire fighting is based on a complete training program for individuals within various separate organizations who can be called on in the event of a large fire. This system creates a management structure for responding to these rare events. This same approach could be applied to large oil spills.

RESEARCH AND DEVELOPMENT

Organizations and Programs

Several agencies within the Federal Government are engaged in oil spill countermeasures research and development. The three most important are the Department of the Interior (DOI), the Department of Transportation (DOT), and the Environmental protection Agency (EPA).

Within the DOI, oil spill research is conducted by the Technology, Assessment, and Research Branch of the Minerals Management Service (MMS). Among other things, MMS has plans to:

- finalize offshore equipment test procedures,
- continue field verification of in situ burning,
- continue refining airborne oil thickness sensors,
- conduct final testing of the high-speed water jet barrier boom,
- develop beach line cleanup techniques that are environmentally acceptable,
- continue to conduct research to improve the effectiveness of chemical treatment agents,
- continue developing a remote sensor for detecting oil in broken ice and darkness,
- finalize standard equipment and technique test procedures, and
- continue assessing the behavior of heavy oils.[13]

MMS would also like to reopen the Oil and Hazardous Materials Simulated Environmental Test Tank– the OHMSETT facility, located in New Jersey. OHMSETT was formerly operated as a cooperative interagency program to evaluate oil spill response equipment and procedures, but closed when funding dried up.

The Department of the Interior has increased funding for oil spill research in response to the Exxon *Valdez* spill. Notably, it has entered into an agreement with the American Petroleum Institute to jointly fund some research and development. Each will contribute $1 million per year for the next 3 years. The projects listed above are among

[13] Interagency Planning Workshop on Oil Spill Research and Development, Sep. 26-2'7, 1989, Groten, CT. Workshop report prepared by Decisions and Designs, Inc., Arlington, VA.

those being considered for funding. Some of the research may be done in cooperation with other agencies and with parallel Canadian efforts.

Oil spill research and development in the Department of Transportation is carried out by the U.S. Coast Guard. The Coast Guard proposes to spend about $4.1 million in fiscal year 1990 on oil spill response projects and about $1.8 million on prevention projects. It is considering allocation of funds for the following oil spill response projects:

- spill response information system development,
- spill response training aids development,
- surveillance systems development,
- satellite imagery for spill tracking,
- rapid deployment technology assessment,
- tanker salvage and countermeasures development,
- mechanical recovery systems development,
- OHMSETT support,
- Coast Guard countermeasures/equipment development,
- chemical countermeasures technology assessment,
- in-situ burning development,
- short term test and evaluation in Alaska, and
- spill response personnel health and safety.[14]

In the aftermath of the *Exxon Valdez* spill, the Coast Guard R&D center in Groten, Connecticut acted as a clearinghouse for proposals and suggestions concerning cleanup. As table 4-1 indicates, 139 of these proposals were considered to have immediate applicability for combating the *Exxon Valdez* spill. Although a significant number of proposals were rejected as not feasible, a still sizable number merit future investigation by government and industry researchers.

EPA plans to spend $1 million during 1990 for oil spill research. This funding will be largely devoted to the continuation of the shoreline bioremediation program started last year in Alaska. EPA and Exxon have signed a cooperative agreement to carry out the research. Exxon has provided a total of $3 million to date for this program. EPA is currently developing a 5-year research plan, which will be implemented if Congress passes the implementing legislation.

Several other agencies are also conducting important oil spill response research and development. The Army Corps of Engineers used two dredges to *recover* some of the oil spilled by the *Exxon Valdez,* and is now investigating how to use its dredges more effectively. The National Institute of Standards and Technology, in conjunction with MMS and the American Petroleum Institute, is conducting in situ burning research. And the National Oceanic and Atmospheric Administration is developing electronic communications for response situations and studying the fate and behavior of oil.

The Exxon *Valdez* spill also galvanized oil industry support for spill research and development. In April of 1989 the American Petroleum Institute created an oil spill Task Force to review industry operations in the areas of

[14]U.S. Coast Guard preliminary marine environmental protection research and development plan, fiscal year 1990. Nov. 18, 1989. (Draft).

Table 4-1 -Suggestions Received by the Coast Guard

category		Number
Proposals for future government investigation:		
Bioremediation		34
Chemical (dispersant, degreaser)		14
Physical (solidification, absorbent, etc.)		19
Collection - vessel		17
Collection - mechanical		17
Skimmer - booms		30
Hull patching		4
Oil movement		3
Wild-life cleanup		5
Incineration		4
Miscellaneous		1 3
25% of database	Total	160
Proposals forwarded to Exxon:		
Bioremediation		2
Chemical (dispersant, degreaser)		24
Physical (solidification, absorbent, etc.)		36
Collection - vessel		14
Collection - mechanical		19
Skimmer - booms		–
Hull patching		
Oil movement		–
Wild-life cleanup		–
Incineration		5
Miscellaneous		39
22% of database	Total	139
Other responses:		
● Previous research/application indicates method not feasible		
● Letters of general concern		
53% of database		

SOURCE: United States Coast Guard, 1990

oil spill prevention and response. As a result of the Task Force's deliberations, the industry created the Petroleum Industry Response Organization (PIRO). In addition to establishing the operational capability to respond to catastrophic oil spills, PIRO will design and manage a research and development program. The oil industry has pledged $30 million to $35 million to PIRO during its first five years for this purpose and expects to contribute $1 million to $4 million per year thereafter. Six major subject areas have been identified:

1. preventing loss of oil from or away from the ship,
2. on-water oil recovery and treatment,
3. preventing and mitigating shoreline impact,
4. fate and effects of oil in the environment,
5. wildlife preservation, and
6. health and safety.[15]

Among those projects on which PIRO would expend the most funds during the initial 5 year period are bioremediation of shorelines, development of chemical dispersants and skimmers for on-water recovery and treatment, and development of absorbents and absorbents for shoreline use.[16] In all, some 38 projects have been considered for funding. PIRO recognizes a need to coordinate with government agencies to avoid duplication of research.

Both Senate and House oil spill bills (S 686 and HR 1465, respectively) pending as of this writing provide for the establishment and funding of oil spill research and development programs. Among the priority research identified in the Senate bill are on-water oil recovery and treatment, prevention of loss away from vessels, and prevention and mitigation of shoreline impacts. The House bill specifies – among other things– research, development, and demonstration of new or improved systems of mechanical, chemical, biological,

[15]PIRO Implementation, Inc., draft statement of PIRO's proposed R&D program, Oct. 10, 1989.

[16]Ibid.

and other methods (including the use of dispersants, solvents, and bioremediation) for the recovery, removal, and disposal of oil. Both bills establish coordinating committees to oversee oil pollution research. The House bill would establish a minimum of six regional research centers at universities or other research institutions to address one or more of the research needs identified in the bill. The Senate bill would establish a Prince William Sound Oil Spill Recovery Institute to identify and develop the best technology for dealing with spills in arctic and subarctic marine environments.

Discussion

OTA's investigation of oil spill response technologies indicates that the country's ability to recover oil from large spills is inadequate. It can be improved, but a large technology research and development effort does not offer the promise of major breakthroughs. Although most of the R&D projects proposed by government and industry appear to be worthwhile, OTA's analysis shows that only *modest and gradual improvements* can be expected from most mechanical response technology R&D. And it is important to remember that technology is only one of many variables that can affect the recovery of oil from a spill. The benefits likely to result from improvements in technology alone may not be noticed in the ultimate amount of oil recovered from any major spill. An R&D program can be justified, however, on the basis of the need to maintain the best capability possible and to understand the most appropriate uses, capabilities, and limitations of all the systems that may be available in the future.

Creation of a program to test oil spill equipment under realistic, at-sea conditions — occasionally using real oil —is particularly desirable. OTA's analysis indicates that much equipment has mechanical deficiencies because it has never been field-tested. Testing has been conducted in the past at the now closed OHMSETT facility. Additional work at a reopened OHMSETT may be useful, but a bigger payoff would result by testing response technologies at sea. Although controlled spills have been allowed in many European countries (sometimes with U.S. observers present), it has been more than 10 years since an experimental offshore oil spill has been allowed in the United States. In light of recent events, it would be useful to allow occasional experimental spills to test equipment. Whatever U.S. testing is undertaken should be coordinated with similar efforts in other countries.

OTA's investigations also show that coordination of R&D efforts within the government, between the government and the private sector, and among the many other interests worldwide is essential to reaching desired goals with minimum waste of resources. The several Federal agencies with R&D programs have different purposes and perspectives, but there is considerable overlap as well. MMS, the Coast Guard, and EPA are all concerned with acceptable standards and evaluation of performance of cleanup systems. They must work together to agree on final results, but one agency could take the lead in major program funding for best efficiency.

It is also vital that the Federal Government coordinate its efforts with those of private industry, especially if a substantial R&D program by PIRO gets underway as planned. This is important for several reasons. First, the industry work may be directed at its own priorities; government priorities could be different and require additional work in areas not covered by industry. Second, the government must be completely knowledgeable about new technologies and techniques if it is to fulfill its role as principal coordinator and/or manager of future response efforts. Third, if the industry supports good, credible programs in certain areas, it would be wasteful for the government to duplicate the effort.

An area in which greater collaboration between the United States and other countries on oil spill issues could lead to a sizable payoff is research and development. The United States and Canada have long cooperated on oil spill R&D, and this relationship appears to have been profitable for both countries. However, aside from the biennial Oil Spill Conference meetings, at which research findings are often presented by foreigners, no formal forum exists for the exchange of information between the United States and other countries. OTA has observed that there appears to be a significant amount of overlap in the research of organizations like the French Center for Documentation, Research, and Experimentation on accidental pollution (CEDRE), the British Warren Springs Laboratory, and the Dutch State Waterways Board with oil spill researchers in the U.S. government. Greater coordination and/or collaboration could lead to less duplication, faster dissemination of research results, faster progress on problems of mutual concern, and a better use of limited R&D funds.

Table 4-2 displays a summary of R&D plans for the organizations that OTA has contacted and that have current plans for oil spill R&D expenditures over the next few years. The planned programs of PIRO, the Coast Guard, MMS (in cooperation with API), and the EPA are displayed and broken down into several research areas with notations of high, medium, low, or no priority under each. The total planned expenditures are about $10 million to $15 million per year in the near term. About two-thirds will be from industry and one-third from government. It can be seen that there are many areas of multiple interest that could lead to waste if not carefully coordinated. It can also be seen that some areas that seem to offer promise of future improvement may be neglected. For example, it appears that the engineering of complete systems for rapid deployment, recovery, handling, storage, and support for large operations— perhaps including vessels of opportunity– is one area where additional progress is needed. No group appears to be focusing on deployment systems as a whole (although PIRO has plans to do so). Another potential oversight is the needed development of more reliable and rugged components in mechanical recovery equipment to handle viscous oils, water emulsions, debris, etc.

In general, however, R&D attention by the several groups that have planned programs appears to be focused on important problems. If these plans are carried out, if they are well-coordinated, and if developments become the basis of a major expansion of equipment resources strategically deployed in high readiness condition — this would offer neededimprovements in national response capability.

Table 4-2-Selection of Planned R&D Efforts by Federal Agencies and Industry

Research area	PIRO	coast Guard	MMS (with API)	EPA
Surveillance/ data	-	H	H	M
Deployment systems	–	M	L	-
Source containment	L	H	–	–
Mechanical recovery	L	H	L	
Dispersants	H	L	M	M
Bioremediation	H	–	–	H
Burning	M	H	H	--
Other/ shoreline remediation	M	–	H	M
Fate and effects	H		–	H
Health and safety	L	M		–
Disposal	M	–	–	–
Training/ testing	–	H	M	Bio Test with Exxon ($3 million)
Proposed Budgets $ million/yr	$7	$3-$4	$2	$1

NOTE: Hi = High, M = Medium, L = Low
PIRO = Petroleum Industry Response Organization
MMS = Minerals Management Service
API = American Petroleum Institute
EPA = Environmental Protection Agency

SOURCE: Office of Technology Assessment, 1990