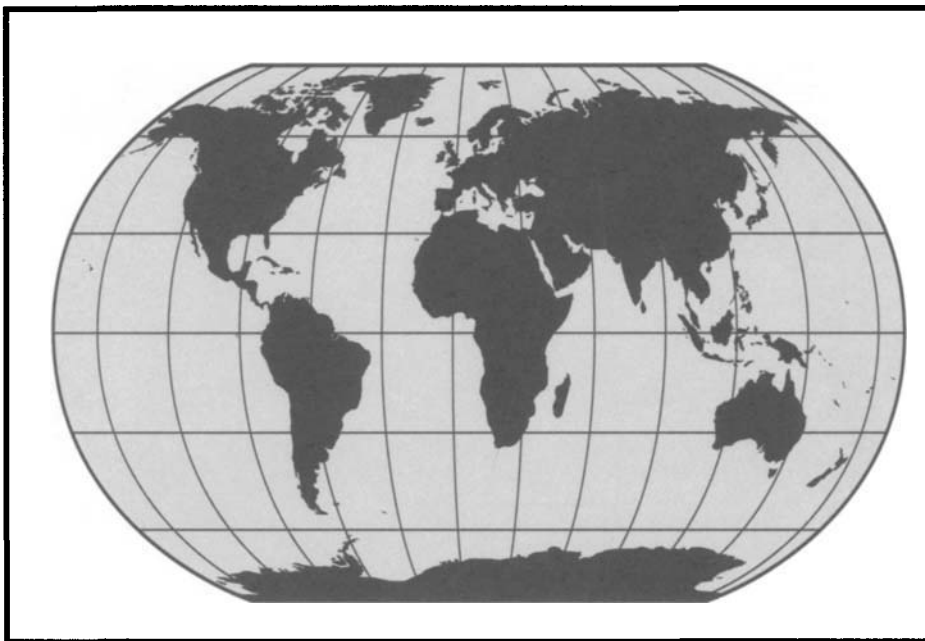


INTERNATIONAL RESPONSIBILITIES: ARE WE OUR BROTHERS' KEEPER?



Issue Papers Prepared for the 1997 International Oil Spill Conference

OIL SPILL PREPAREDNESS AND RESPONSE: THE ROLE OF INDUSTRY

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THE RESPONSIBILITIES OF SOVEREIGN NATIONS

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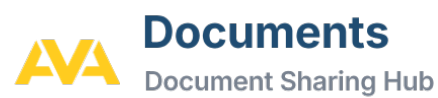
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PREFACE

The 1997 International Oil Spill Conference sponsors, American Petroleum Institute, US Coast Guard, US Environmental Protection Agency, International Maritime Organization, and International Petroleum Industry Environmental Conservation Association, commissioned issue papers covering three topics of special importance to the oil spill community. The sponsors assigned responsibility for general management and oversight, scope definition, peer review, and publication of these issue papers to the Program Committee.

The goals of these papers are to stimulate open discussion of complex and controversial issues, and balance diverse positions of stakeholders. Each topic addresses varying scientific/technical and sociopolitical concerns. Therefore, each paper differs as to depth of study and breadth of conclusions. The views and opinions presented are those of the authors solely and do not represent the views, opinions, or policies of the International Oil Spill Conference or its sponsors.

During the 1997 Conference, each of the three issue paper topics will be the subject of a special panel session. Publication of these issue papers as separate companion documents to the Conference Proceedings continues the International Oil Spill Conference Technical Report Series. The Technical Reports are published biennially in conjunction with the International Oil Spill Conference.

It is the Program Committee's hope that each issue paper topic furthers substantive discussion and serves as a catalyst for solutions to the topics discussed.



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FOREWORD

The papers contained in this volume examine two perspectives on the apportionment of government/industry responsibilities for and concern with the safe transport and use of oil throughout the world. First, T.H. Moller and R.S. Santner explore the views of tanker owners regarding *The Role of Industry*. Second, J. Wonham focuses on European governments' views of the *The Responsibilities of Sovereign Nations*.

Moller and Santner provide historical and practical views on the establishment and maintenance of industry capabilities and government and industry cooperation in preparedness and response. Their fundamental premise is that preparedness for response to spill emergencies is inherently a government responsibility as part of facilitating maritime trade. Only governments can establish the basic national contingency plan (NCP) structures necessary to identify response priorities and strategies. In countries where the political will to engage in NCP activities is absent, governments, by default, are relying on international spill response capabilities to do what is necessary. The authors surmise that those capabilities are adequate to the task.

If the disparities in preparedness among nations is a concern, then it is incumbent on more capable countries to assist their less capable neighbors. Moller and Santner argue that it does not require large stockpiles of equipment and manpower for a nation to effectively respond to an incident, that very low-technology response is often most effective, and that any nation can adequately prepare to carry out that response if they only have the political will to do so. The International Convention on Oil Pollution Preparedness, Response and Cooperation, 1990 (OPRC Convention) provides an internationally accredited mechanism for improving preparedness in countries adopting its provisions, because it promotes government-industry collaboration in supporting NCP activities in less capable nations.

Moller and Santner argue that industry's role is to cooperate with governments in preparedness planning, to fund the reasonable costs of government response, and to supplement government response resources using industry-owned or contracted local and regional equipment and personnel pools,

as well as draw from the major industry equipment stockpiles strategically located around the world. Regarding countries that do not participate in the oil trade but are located along tanker traffic routes and therefore may be subject to spills from "passing tankers," the authors contend that the "passing tanker" syndrome is much more an imagined fear than a reasonable possibility. Their analysis indicates that most major tanker incidents occur in or near the waters of the nation to which a vessel is bound and that the number of spills that might occur in or near the waters of an "innocent" country is very small. Therefore existing response capabilities and current international response and compensation mechanisms should be sufficient to ensure effective response to any reasonable major spill scenario, anywhere it might occur.

Wonham examines the responsibilities of individual countries and regional intergovernmental organizations in carrying out domestic and cross-boundary responses. He focuses primarily on northern Europe and the Mediterranean. Most countries in these areas have been participating in multilateral agreements covering response and mutual aid since as early as 1969. Most of them have national contingency plans and extensive response infrastructures as well as significant oil industries. Several offered and continue to provide extensive support to the new Baltic states. With the exception of Malta, all the countries or organizations asserted that they have no responsibility for supporting preparedness and response outside the geographic limits of their regional boundaries. Even Malta, which feels some global responsibility, has only limited personnel expertise to offer either during planning or response.

Wonham maintains that the "passing tanker" issue is significant. He argues that where governments have not taken adequate responsibility for preparedness, industry should be ready. He also discusses various International Maritime Organization initiatives designed to address disparities among nations. Wonham points out that such initiatives are reasonable, but they have engendered very little monetary support from any developed countries. He implies that this may be due to lack of confidence that such support would be used effectively for the intended purposes and that individual

nations prefer to offer such support directly to certain favored nations, based on potential economic, military or social advantages that would accrue in return for the investment.

The challenge facing both government and industry is to safeguard against spills while maintaining the capability for efficient and effective response worldwide. These papers provide the foundation for an expansion of the dialogue to other segments of the industry and to other parts of the world.

- Do cargo owners, oil producers, and oil consumers share the views expressed regarding industry's responsibilities to the world?

- Are the nations of Africa, the Americas, or the Pacific rim as committed to mutual aid regionally as are the nations of Europe?
- Are preparedness and response government functions?
- Should governments be relying on industry to fill the void where resources are deficient?

Note: Acronyms are used in both papers so as not to burden the text with numerous long names and terms. Readers are referred to an explanatory list of these acronyms provided at the end of this document.

OIL SPILL PREPAREDNESS AND RESPONSE: THE ROLE OF INDUSTRY

ABSTRACT

Government and the shipping and oil industries have invested heavily in creating and maintaining expensive oil spill response systems against a background of decreasing numbers of intermediate and major oil spills worldwide. This situation has generated a reappraisal of the optimum level of oil spill preparedness and how it should be funded.

The International Convention on Oil Pollution Preparedness, Response and Cooperation, 1990 (OPRC Convention) defines the basic elements for cooperation between government and industry in generating improvements in developing countries. This paper reviews the partnerships for dealing with spills arising from the transportation of oil by sea in the context of the Convention.

Areas of cooperation between government and industry cover both oil spill preparedness and response. The development of oil spill preparedness should reflect the degree of pollution risk. Analysis shows that most major incidents occur close to ships' destinations and that comparatively few

developing countries are in high-risk areas. Preparedness often is compromised through shortage of funds. Current international systems incorporate preparedness procedures, including equipment stockpiles, for oil spills in a variety of situations such as the passing tanker scenario.

In addition to underwriting the cost of oil spill response, industry has a role in maintaining trained personnel and stocks of equipment, but a realistic limit must be placed on such provisions. OPRC has created a framework for spill response, using existing resources, and ensuring that supplementary expertise and equipment are available.

A sustained commitment is required from both government and industry to support appropriate improvements in oil spill preparedness and response. Budgetary restrictions imposed on the International Maritime Organization (IMO) have curtailed some of these essential functions. As a result, industry has an opportunity to make a long-term contribution to safeguard them and thereby promote the development of an effective oil spill response capability in all countries.

OIL SPILL PREPAREDNESS AND RESPONSE: THE ROLE OF INDUSTRY

by T.H. Moller and R.S. Santner

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SECTION 1

INTRODUCTION

1.1 SCOPE

Few would disagree with the notion that prevention is better than cure. However, oil spills are an inevitable consequence of the need to produce, store, and transport oil by sea. The occurrence of major oil spills with costly and far-reaching effects has created the need for cooperation between different countries, and between government and industry. Collaboration and pooled resources have fostered an integrated approach extending from contingency planning to spill response and compensation.

Historically, most medium and large spills (over 50 bbl or seven tonnes) have involved ships. The aim of this paper is to review, from a shipping perspective, the role of industry in dealing with oil pollution incidents arising from the transportation of oil. In this context, the shipping community is represented by the ship owners and operators, including some of the major oil companies. The wider oil industry also has separate involvement as owners of oil tanker cargoes and as oil importers. As a whole, the oil industry is composed of a disparate group of private and public organisations ranging from major oil companies to very small operators of individual tank farms, jetties, and other oil-handling facilities.

Oil spills also occur in connection with offshore exploration and production activities, but the relationship between

government and oil industry in this type of spill response is less complex. Moreover, the salient points of such spills are similar to those discussed in this paper.

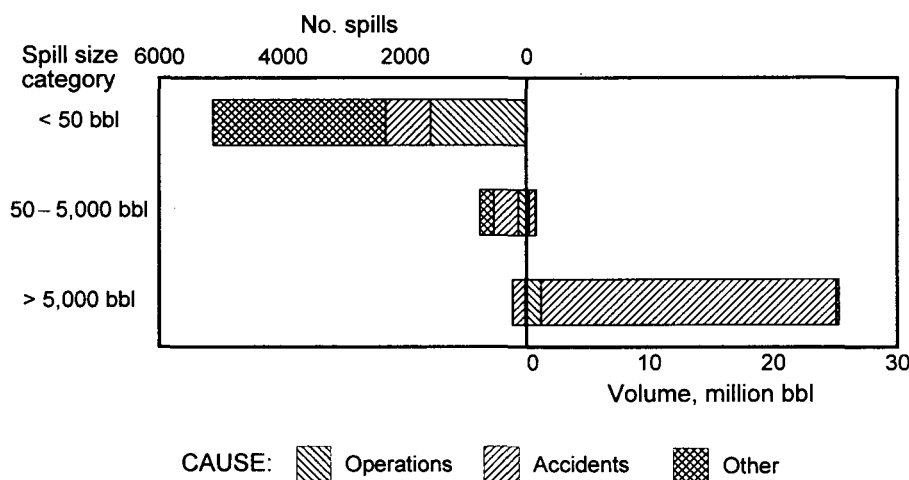
The title of the paper reflects the fact that oil spill preparedness and response are separate but inextricably linked issues. Conceptually, good preparation paves the way for an effective response; in an ideal world, both preparation and response aspects are given equal weight. In reality, however, preparedness activity often is compromised in countries with more pressing demands on finite funds and resources. Thus oil spill response alone must serve as the way of dealing with spills in countries that remain comparatively ill-prepared.

1.2 BACKGROUND

A few generic approaches to oil spills have evolved in the 30 years since the first major oil tanker spills. Response arrangements generally have been moulded by certain characteristics of spills, as well as by the culture and administrative fabric of different countries.

As shown in Figure 1, the overwhelming majority of marine incidents involve small spills during routine operations at terminals and other oil-handling facilities (ITOPF, 1996a).

FIGURE 1.
TANKER SPILLS, 1976–1995



Source: ITOPF, 1996a.

More than 80 percent of all recorded oil spills from tankers, barges, and combination carriers involved less than 50 barrels (seven tonnes). The responsibility for dealing with such small spills naturally has fallen to the operators of the oil-handling facilities. If ships are the source and/or the cause of the incidents, the costs involved are passed to the ship owners and their insurers.

Figure 1 also shows that major incidents are rare but involve considerably greater volumes of spilled oil. Past experience shows that most of the larger ship spills (more than 5,000 bbl or 700 tonnes) occur as a result of collisions, groundings, fires, explosions, and hull failures involving tankers. High-risk zones are characterised by high traffic density and the presence of navigational hazards (ITOPF, 1996b). Even so, the size, location, and circumstances of any major oil spill remain unpredictable.

Given this unpredictability, governments have largely accepted the need to take charge of the response to major shipping incidents. A review of oil spill response arrangements in 141 countries worldwide (ITOPF, 1996c) established that governments have accepted the primary role of dealing with ship-source oil pollution in well over 100 countries; the opposite approach, an active industry-led response, prevails in about 15 countries. There are good reasons that governments are best suited to take the lead in responding to oil spills from ships. Governments' acceptance of responsibility for oil spill response stems from a recognition of the complex nature of oil spills that affect coastal communities and the need to balance conflicting interests. Governments alone have the mandate to resolve contentious issues and implement an agreed policy for spill response.

Most governments have recognised that it is impractical and unsatisfactory to rely on ship/cargo owners to deal with pollution incidents because a large percentage of the ships adjacent to their coasts are in transit to a destination in another country. As with arrangements for emergency search-and-rescue, there is a clear advantage in developing solutions for such unpredictable events that do not depend primarily on the participation of the ship and/or cargo owner.

The opposite approach to a government-led response is one in which industry or the spiller plans and conducts all aspects of spill response. This approach has been adopted, with variations, by the USA, Canada, Australia, South Korea, and Japan; most ships in these countries' waters are approaching or leaving domestic ports.

Because these vessels are operating in territorial waters, it provides the opportunity for those governments to require more active participation from ship owners in both preparedness and response. In such countries, commercial cleanup contractors and industry cooperatives often are retained by the ship owners to provide equipment and personnel. Governments then focus primarily on monitoring and regulatory enforcement. Limited funding is less likely to impede effective spill response. On the other hand, there often is undesirable duplication of resources and high cost since the government must retain a spill response capability in case the primary

systems fail, such as if the spiller cannot or will not undertake the cleanup. Another consequence is a tendency toward polarisation between those perceived to be wholly responsible for providing resources and conducting the cleanup, and those solely exercising authority. This relationship can lead to a poor appreciation of the practicalities of spill response amongst those in charge, thereby breeding mistrust and detracting from the concept of an equal partnership between industry and government.

In the wake of the *Torrey Canyon* incident in 1969, governments largely accepted the need for their active participation in responding to major oil spills. It was recognised that an efficient mechanism was required for ensuring the reimbursement of reasonable costs incurred in the course of controlling oil spills. The International Convention on Civil Liability for Oil Pollution Damage (CLC) and the Convention on the Establishment of an International Fund for Compensation for Oil Pollution, 1971 (Fund Convention), as well as the interim voluntary schemes of Tanker Owners Voluntary Agreement Concerning Liability for Oil Pollution (TOVALOP) and Contract Regarding an Interim Supplement to Tanker Liability for Oil Pollution (CRISTAL) introduced by industry, have provided the means for compensation following incidents involving tankers. Given the wide acceptance of these Conventions, the two voluntary industry schemes have served their purpose and so expired in February 1997.

Compensation is provided by way of shipping insurance in the case of the CLC, and through oil importers' contributions under the terms of the Fund Convention. It is worth noting that these international arrangements for compensation for oil tanker spills also allow for the recovery of certain elements of spill preparedness costs that are attributable to specific tanker incidents. Thus, the "Polluter Pays Principle" continues to be upheld since the international compensation system is underwritten by the shipping community and the wider oil industry.

In the event of an incident threatening or leading to pollution, the primary financial responsibility in most jurisdictions lies with the ship owner. This responsibility extends to the liability for costs of response, cleanup, and damage caused by oil pollution. Ship owners normally meet their obligations with the help of their pollution liability insurers, called Pollution and Indemnity (P&I) Clubs, International Tanker Owners Pollution Federation Limited (ITOPF), and others. The oil cargo owner may have a secondary interest as charterer and as a contributor to supplementary compensation funds administered by the International Oil Pollution Compensation (IOPC) Fund under the terms of the Fund Convention. Although they do not usually face a direct liability from oil pollution incidents, cargo owners such as the major oil companies are exposed to indirect damage to their markets, and may seek to participate in spill response by contributing advice and resources. Attempts by cargo owners' response teams to take control can be viewed with unease by tanker owners and insurers, and such attempts usually are resisted by the government authority in charge of the spill response.

1.3 FRAMEWORK FOR INTERNATIONAL COOPERATION

The OPRC Convention was developed under the auspices of IMO and came into force in May 1995. The Convention draws attention to the special needs of developing countries, particularly small island states, and calls for cooperation between governments and the oil and shipping industries (IMO, 1991).

Section 2 of this paper focuses on one of the primary objectives of the OPRC Convention, which is to encourage government and industry cooperation in the following areas of spill preparedness:

- contingency planning and coordinated response procedures (Art. 6.2,d);
- establishment of equipment stocks sufficient to deal with oil pollution risks (Art. 6.2,a);
- research and development (R&D) programmes (Art. 8);
- training and exercise programmes to facilitate oil spill response (Art. 6.2,b); and
- Shipboard Oil Pollution Emergency Plans (SOPEPs), to be carried on board all vessels over a stipulated size (Art. 3.1).

For reasons of expediency, the specific requirements are set out in Regulation 26 in Annex 1 of the International Convention for the Prevention of Pollution from Ships, 1973, Protocol 1978 (MARPOL 73/78) (IMO, 1992), obliging ship owners to prepare SOPEPs.

Section 3 will address the OPRC Convention emphasis on government/industry collaboration in two areas related to spill response:

- technical cooperation (Art. 9); and
- international cooperation in oil spill control (Art. 7).

States are urged to adopt the Convention and its concept of collaboration. The IMO is encouraged to provide and maintain an institutional framework for international cooperation. A summary of the articles of the OPRC Convention is provided in the Appendix.

It is appropriate at this point to review the extent to which the spirit of cooperation embodied in the OPRC Convention has been realised in practice. Using the key points listed above as headings, we focus on the record of the shipping and oil industries in the partnership between government and industry. The implications of this review of OPRC Convention issues are discussed in the concluding section.

SECTION 2

OIL SPILL PREPAREDNESS

2.1 CONTINGENCY PLANNING AND COORDINATED RESPONSE PROCEDURES

Industry has embraced an integrated approach to oil spill preparedness and response. The idea is reflected in the “tiered response” concept, which makes it possible to escalate a response by calling on supplementary resources. Basic spill response capabilities at different oil-handling installations complement each other, as well as those of government. These individual resources can be combined for dealing with even the largest oil spills. Contingency planning is approached in the same vein (IPIECA, 1991).

Tier 1 spills are minor but comparatively frequent events. They occur primarily at fixed installations such as ports, harbours, terminals, and oil-handling facilities where the spill size and potential impact are generally small. Responsibility falls to the facility operators to prepare contingency plans identifying the risks and threats posed by spills, the most likely spill scenarios, and the range and level of resources needed to deal with them. Indeed, the OPRC Convention calls for governments to require the operators of oil-handling facilities to prepare and maintain oil pollution emergency plans (IMO, 1991).

Trained members of the regular work force should be familiar with the procedures for initiating a response and activating the facility's emergency plan at any time. Assuming the response is mounted quickly and effectively, any continuing leakage will be stopped, and the spilled oil will be contained and possibly recovered. In the event of a larger incident, the Tier 1 response capability should serve as a first-aid measure and readily form part of an escalated response.

The quality of Tier 1 response capabilities varies, reflecting the disparate organisations operating oil-handling facilities. Some installations are operated without proper emergency plans, others without suitable response equipment or trained spill control personnel. Deficiencies at this basic level have repercussions on the effectiveness with which Tier 1 resources can be integrated into higher tiers.

Tier 2 spills are those which, by virtue of their size and potential impact, call for a response greater than that available at an individual site maintaining preparedness for a Tier 1 spill. A local government agency often will manage and direct the response to a Tier 2 spill, calling on resources of its own and those of neighbouring authorities and local industry. Regardless of the nature of any government/industry partnership in any part of the world, the basic premise is that

available resources are pooled to create the necessary response capability.

Tier 3 spills are of national significance and call for the mobilisation of resources and a response greater than that possible through the pooling of Tier 2 capabilities. To augment the pooled Tier 2 resources available from local government and industry, stockpiles of equipment and cooperatives intended to deal with Tier 3 spills have been created in a number of countries, mostly by the oil industry. Tier 3 stockpiles may be primarily intended for use within one large country, for a region, or globally.

Tier 3 spills inevitably result in governments' becoming directly involved in coordinating the escalation of cleanup resources and managing the spill response. A national contingency plan is essential to establish the government's policy toward oil pollution, the capabilities developed in preparation for such events, and the strategies intended to be used. The national contingency plan also should provide for the pooling of local government and industry equipment resources.

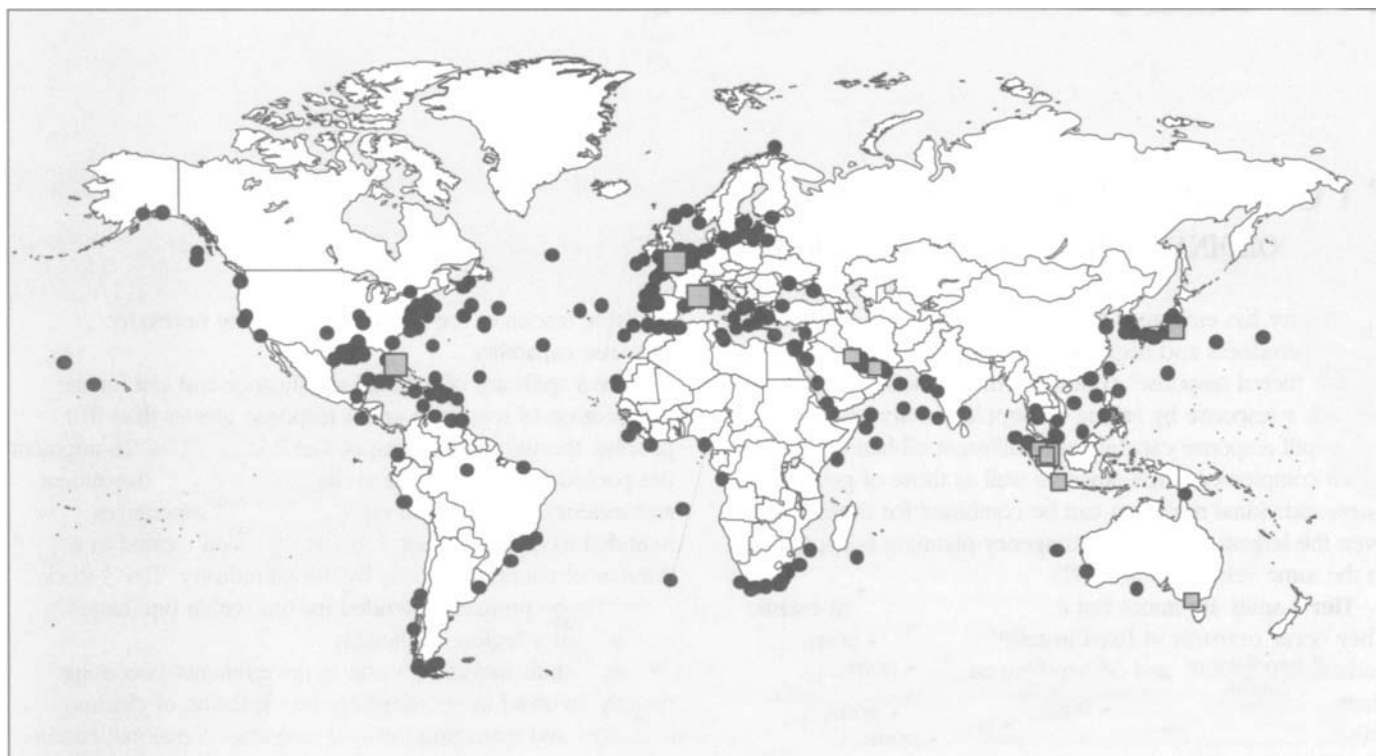
2.2 ESTABLISHMENT OF EQUIPMENT STOCKS

Next to the obligation of underwriting the costs of oil spills, the main role of industry in spill response is to provide expertise and equipment. This role is also noted in Resolution 5 of the OPRC Convention (IMO, 1991). It is logical that the development of oil spill response capabilities will be related to the likelihood of spills occurring, as well as to the damage that might ensue. A risk analysis usually is the first step in the process of selecting resources and deciding where personnel, equipment, and materials should be based. Records of past spills have proved useful in identifying high-risk areas.

The bias toward locating several Tier 3 regional stockpiles in consumer countries exists for good reason. Oil spill statistics reveal that significantly more major oil spills occur close to the voyage destination than occur at the origin or in transit (ITOPF, 1996a, 1996b). From 1970 to 1995, about 380 oil spills of more than 5,000 bbl (700 tonnes) from tankers were recorded worldwide. More than half of these occurred in European and North American waters. Figure 2 shows the locations of the major spills and the main stockpiles of equipment available for international use. Figure 2 also shows that

FIGURE 2.

LOCATIONS OF MAJOR OIL SPILLS FROM TANKERS (OVER 5,000 BBL), 1970-95 (●), AND LOCATIONS OF THE MAIN EQUIPMENT STOCKPILES AVAILABLE FOR INTERNATIONAL USE (■) FROM CCC IN FORT LAUDERDALE, USA; OSRL IN SOUTHAMPTON, UK; FOST IN MARSEILLE, FRANCE; EARL IN SINGAPORE; PAJ IN SAUDI ARABIA, ABU DHABI, MALAYSIA, SINGAPORE, INDONESIA, JAPAN (6 DEPOTS); AMOSC IN GEELONG, AUSTRALIA



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comparatively few developing countries are situated in high-risk areas.

A more detailed analysis has been made of the 13 different Regional Seas Areas designated by the United Nations Environment Programme (UNEP) (ITOPF, 1996b). High-risk areas are found where a high oil transportation volume coincides with dense traffic and/or other navigational hazards such as shallow water, bad weather, and severe sea conditions. Notable high-risk areas include the Bosphorus and Malacca/Singapore Straits, Mediterranean and Caribbean Seas, South Africa, and South Korea/Japan. In the Mediterranean and Caribbean Seas, many of the countries exposed to a high risk have limited spill response capabilities.

Industry arrangements for supplementing local and national response capabilities are referred to as cooperatives or stockpiles. The terms are synonymous to the extent that both cooperatives and stockpiles involve the pooled resources of member companies, stored and maintained ready to be called out to a major spill.

Cooperatives usually cover relatively small geographical areas, such as an estuary, where a number of oil industry facilities forming the cooperative are located. The Gulf Area Oil Companies Mutual Aid Organisation (GAOCMAO) is an oil industry cooperative covering a larger water body and several countries, but the concept of pooling resources to deal with a

spill remains the same. National oil industry cooperatives, such as the Petroleum Industry of Malaysia Mutual Aid Group and Norsk Oljevernforening for Operatørselskaper, generally do not provide equipment operators. Some have sufficient numbers of trained personnel amongst member companies to create an operator pool in case of need, while others rely on contractor networks.

Large stockpiles usually are intended for use within groups of countries or particular regions, such as the Clean Caribbean Cooperative (CCC) and East Asia Response Limited (EARL). There are variations; for example, the Oil Spill Response Limited (OSRL) is available to operate globally, while the Australian Marine Oil Spill Centre (AMOSC) is an industry stockpile primarily intended for national use. The members of major stockpiles have favoured establishing teams of trained personnel to maintain and operate the equipment. In the case of the Petroleum Association of Japan (PAJ), stockpiled equipment is maintained by contractors, but users of the equipment have to provide their own operators. The PAJ arrangement also involves the maintenance of five identical equipment depots located along the Gulf-Japan tanker routes, in addition to six stockpiles located within Japan.

Oil spill cooperatives and major stockpiles are expensive to establish and maintain. To provide a financial return partially offsetting the cost to members, most operators have

equipment and materials available for use at commercial rates. The rates charged to non-members are typically twice the member rates. In this way, the shipping community makes a substantial, indirect contribution to maintenance costs. Outside the USA and Japan, full membership has not been open to shipowners, but some stockpiles and cooperatives have accepted shipping companies as associate members with partial access to the pooled resources.

Countries with industry cooperatives or stockpiles located nearby have tended to rely on those services in preference to their own governments' Tier 2 and 3 capabilities. This may result in reducing some of the duplicative investment through the scaling down of existing government stockpiles and more reliance being placed on industry. Whether such a trend is healthy depends on local circumstances and to what extent available industry equipment is adequate, well-located, and maintained. More importantly, governments taking this route will have less control over the choice of equipment and its availability in the event of a spill.

In some parts of the world there may be few or no specialised resources available nationally beyond what is held at individual facilities; and these, even when combined, may not constitute a credible Tier 2 response capability. For these countries, a Tier 2 spill effectively calls for a Tier 3 response involving resources from other countries and regions. However, it rarely is feasible to airlift Tier 3 resources to a country lacking the logistic infrastructure. In such circumstances, the best remedy lies in mounting a response using available non-specialised local resources.

Industry Tier 3 capabilities rarely are used, which makes it all the more important for the necessary arrangements to be in place for adequate response. There is little point in having these resources if the movement of trained operators and their equipment is hindered or prevented. Obstacles encountered include customs restrictions and a reluctance on the part of recipient countries to allow the return of equipment to base. Commercial incentives encourage stockpile managers to try to overcome such obstacles in advance, but facilitating the cross-border transfer of personnel and equipment is a task that only the government of the recipient country can perform. Article 7 of OPRC Convention establishes that contracting states should facilitate the movement of foreign spill response personnel and equipment to, in, and from their territory (Appendix; IMO, 1991).

2.3 RESEARCH AND DEVELOPMENT PROGRAMMES

Several ambitious research and development (R&D) programmes have been sponsored separately by industry and government in the wake of the *Exxon Valdez* incident, but in almost all cases the financial commitment has dwindled in recent years. In the United States, a five-year \$30 million programme funded by the Marine Spill Response Corporation (MSRC) ended in 1995. The support from the American Petroleum Institute (API) and most individual oil companies

is also at a low level. This trend is reflected by similar cuts in government funding in the last two years.

Attempts to avoid supporting duplicative work under different programmes in the USA and elsewhere have not been entirely successful. To some extent, this is a natural consequence of governments' tendency to channel funds to national research institutions. Specific projects have been better focused and sustained, and ultimately more successful, although in the case of the Newfoundland Offshore Burn Experiment, the attendant cost was enormous. This \$60 million experiment conducted in 1993 was facilitated by Canadian government authorities and jointly funded by government agencies and industry in the United States and Canada.

To bring a wider and more international approach, IMO hosted meetings sponsored by governments and industry at which projects were reviewed and priority assigned to those which would contribute most to an improvement in effective response to spills (IMO, 1995). However, no funds were committed, and it is not yet clear whether sufficient impetus has been given to the promotion of international cooperation in coordinated, focused, and effective R&D, despite the importance attached to this subject in Resolution 7 of OPRC Convention (IMO, 1991).

2.4 TRAINING AND EXERCISE PROGRAMMES

In this decade, the number and scope of oil spill exercises have greatly increased in the United States and elsewhere. This increase is partly a result of mandatory requirements under the Oil Pollution Act 1990 (OPA 90), but the trend for more and better exercises is worldwide. The shipping and oil industries are organising joint exercises with national governments.

Through the industry stockpiles and cooperatives, spill experience may be retained in a central and focused organisation, from which knowledge and information can be disseminated to the wider industry. The teams maintaining most of the largest stockpiles — for example OSRL, EARL, CCC, and AMOSC — run extensive training programmes designed for different operator and management levels. The managers of Tier 3 stockpiles are participating in mobilisation exercises whereby equipment is airlifted to the site in order to test response times, customs clearance procedures, logistics support, and other practical arrangements. Training activities such as these occupy maintenance staff between responses, and the revenue gained helps offset members' costs of purchasing and maintaining specialised equipment.

Governments, working singly or jointly, run training courses within the framework of the UNEP Regional Seas Programme. Several industry organisations, including OSRL and ITOFF, have contributed to the development of training modules in the IMO Model Course Programme on Oil Pollution Preparedness and Response. Collaboration between industry and government in the field of training is continuing to develop through the wider availability of such training courses to government personnel involved in oil spill response.

Training and exercise programmes have even more relevance in the 1990s with the increase in the number of spills.