

INTERNATIONAL

Oil Spill Conference

Prevention,
Behavior,
Control,
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PROCEEDINGS



1991 International Oil Spill Conference



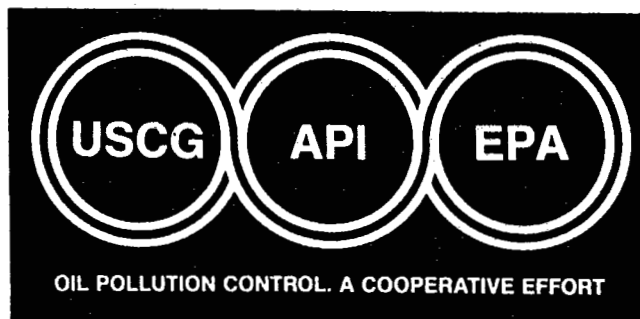
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FOREWORD

This is the 12th biennial International Oil Spill Conference. It is jointly sponsored by the American Petroleum Institute, the U.S. Coast Guard, and the U.S. Environmental Protection Agency. The Conference provides an opportunity for experts from all over the world to share their knowledge with other people in the field, and to discuss their concerns. It is estimated to attract more than a thousand participants from 35 different countries and will have more than 125 exhibits of oil spill equipment and services.

The first Oil Spill Conference was held in 1969. The goals of the conference were to delineate the overall dimensions of the spills problem, to explore the state of the art in the prevention and control of spills, and to review the relevant research. While much has been learned in the past 22 years, there are still many challenges ahead in identifying better ways to prevent spills and to respond to those that occur.

This year there are an unusual number of new developments which will enhance our knowledge on spill response and cleanup. There will be papers on the use of bioremediation, dispersants, management of spills, fate and effects of oil, efforts to improve the capabilities of spill response organizations, and spill modeling. There also will be case histories on the response to a number of significant spills. In addition, there will be extensive discussions on the new oil spill legislation and its implications. As a special attraction, this year's Conference will include an open water demonstration of a number of new and innovative types of cleanup equipment.

The sponsors of this Conference thank the authors of the papers which constitute the Proceedings as well as all members of the panels, session chairmen, and planning committees for their generous contribution of time to make this conference a success.

James C. Hildrew

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Section I

CONTINGENCY PLANNING

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NATIONAL OIL SPILL RESPONSE PLANNING IN THE U.S.S.R.: PRINCIPAL CONCEPTIONS AND OBJECTIVES

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ABSTRACT: International and domestic experience in the response to major oil spills at sea confirms the vital necessity of a national contingency plan to guarantee effective utilization of national resources and those of assisting countries and organizations.

Experience in responding to recent major oil spills underlines deficiencies connected with the shortage of technical means and also with ineffective organization of the response and cooperation of all parties involved. This results in unjustifiable delays in decision making and, finally, in catastrophic damages to the environment.

The main principles of the U.S.S.R. national oil spill response plan, currently under consideration for approval, are as follows:

- involvement of a wide range of national forces and forces of the neighboring countries under preliminary agreed-upon schemes;
- strengthening and development of appropriate legal instruments to stipulate obligations of the parties involved in pollution response operations;
- development of a mechanism to reduce impediments to financial, technical, and related agreements required prior to commencement of operations (sources of finances, preliminary approval of the response technology by competent authorities, facilitation of custom procedures);
- unification of the structure of the U.S.S.R. national contingency plan with a view to making it compatible with corresponding plans of neighboring countries following the prototype developed by the International Maritime Organization (IMO);
- cooperation in the establishment of the international monitoring system, data bank, and computerized exchange of information.

It has been obvious from recent years' experience that the main provision for effectively responding to major oil spills at sea, those posing a threat to a single country or several, is the availability of a sound national plan. This plan must deal with three major components of the problem:

- reducing to a minimum the probability of the incidents and, if they should occur, minimizing the outflow of oil;
- ensuring proper readiness and quick response to oil spill with technical means and personnel (logistical support, personnel training); and
- ensuring effective oil spill response (operation control, enlisting interacting forces, monitoring, research and development support).

Further examination has shown that one of the main causes of blunders and failures in response to recent major oil spills lies in faults

of responsibility. Hence we consider the main task in environmental protection to be improved planning with the following directions:

- The U.S.S.R. national contingency plan (Plan), with appropriate legal status should be the basic document, obligatory for all ministries, agencies, and organizations of the U.S.S.R. All secondary documents, such as regional, basin, zone, and other local plans should run out of the national plan.
- Structure and contents should comply with the recommendations of IMO and with international agreements with regard to major oil spills (compatibility with the neighboring countries' plans, compliance with the terms of bilateral and multilateral assistance agreements).
- The time needed for domestic and/or international coordination (finance, environment, customs) should be minimized. With recent major oil spills, significant delays occurred before countermeasures could be applied.

The first version of the U.S.S.R. Plan, developed in accordance with above mentioned concept, is currently under consideration and approval by appropriate bodies. It contains information on such aspects of the problem as logistic support, relevant agreements with neighboring countries, oil spill response strategy, and some aspects of contingency planning in the U.S.S.R. that might be of interest to professionals in this field.

International agreements and contingency planning

The U.S.S.R. Marine Pollution Control and Salvage Administration (MPCSA) under the aegis of the Ministry of Merchant Marine is the national authority responsible for responding to pollution incidents at sea regardless of the source of pollution. Shore cleanup rests with local councils of People's Deputies. The MPCSA and local authorities perform their responsibilities in cooperation with appropriate U.S.S.R. ministries, committees, and agencies on the basis of resolutions issued by the government of the U.S.S.R. After being signed, international agreements of cooperation in response to pollution incidents are normally introduced to the various agencies by resolutions of the government. This means that obligations contained in those agreements become law for all appropriate agencies of the country. This mechanism provides a basis for responsible national authority in operational activities relating to other agencies—e.g. legal, financial, customs, immigration and other procedures to be followed in case of pollution incident response operation.

The U.S.S.R. has recently concluded two bilateral international agreements. The agreement between the U.S.S.R. and the U.S. Concerning Cooperation in Combating Pollution in the Bering and Chukchi Seas in Emergency Situations was signed on May 11, 1989; and went into force on August 17, 1989. The agreement between the U.S.S.R. and Finland on Cooperation in Combating Pollution of the Baltic Sea in Accidents Involving Oil and Other Harmful Substances was signed on October 26, 1989; and will very soon come into force.

Both agreements cover issues of joint response to pollution incidents in emergency situations and of prompt notification of the existence or the imminent threat of such incidents. The agreements also contain obligations of the parties to exchange relevant information mutually, to carry out cooperative research and development in the field of preparedness and response to pollution incidents, and to conduct joint pollution response exercises. The governments of both countries have agreed to facilitate to the greatest extent possible, the arrival and departure of response resources made available by the assisting party and to reimburse expenses associated with provisions of those resources.

In accordance with the provisions of those agreements the responsible authorities in the involved countries have developed joint contingency plans (JCP) against pollution in the respective areas of the agreements. The JCPs provide a detailed mechanism for joint response based on a collective onshore support of OSCs activities. The plans are to be reinforced by operational appendixes containing information on communications and logistics support for the responsible authorities' regional divisions. The agreement plan and its appendixes constitute an adequate system of differentiation of responsibilities at all levels of pollution response management.

The U.S.S.R. is planning to develop further a system of international agreements and contingency plans on response to pollution incidents with bordering and neighboring countries. It is not expected, however, that future agreements and their JCPs will be standard; most probably they will reflect peculiarities of response mechanisms existing in individual countries and the results of responses to the most recent spillages.

National contingency planning

Currently under the auspices of MPCSA, work is being done to revise and update oil spill response contingency plans under the U.S.S.R. Ministry of Merchant Marine—the lead agency in the country for responding to pollution incidents at sea.

As mentioned in the *Proceedings of the 1989 Oil Spill Conference*, so far there are three levels of domestic contingency planning—local, regional, and basin. The local level is represented by port and harbor oil spill response plans. According to the command structure provided in local plans, harbor masters and captains of the ports are responsible for the organization of first-strike actions on response to pollution incident in the port or harbor area. If the scale of an incident exceeds the means and resources of the port, the regional oil spill response contingency plan is invoked. Port and harbor commanders are also responsible for preventive and preparatory arrangements for responding to pollution incidents in the area of their responsibility; they acquire and stockpile oil recovery and containment equipment in accordance with recommendations based on risk analysis, and hypothetical volume of oil spill in the area.

At present time, 11 sea regions around the coasts of the U.S.S.R. have response measures for oil spills at sea. They are coordinated by MPCSA and shipping companies of the U.S.S.R. Ministry of Merchant Marine situated in the following ports: Murmansk, Leningrad, Tallinn, Riga, Klaipeda, Odessa, Novorossisk, Batumi, Baku, Vladivostok, and Kholmok. The maritime safety administrations of those companies provide for the development and maintenance of contingency plans in regions of their responsibility. Regional plans are approved by the president of the appropriate shipping company and contain description of organizational structure for response to pollution incidents at sea, alerting and communications procedures, duties and responsibilities of cooperating agencies in the area, directions for training and exercises, and appendixes with reference data on geographic coverage, sensitivity mapping, and logistics support.

According to the requirements of the plan in case of a pollution incident at sea, or threat thereof, a shipping company must establish a

response team ashore for strategic coordination of response activities and to provide for an on-scene commander for the operational management of means and resources on site. In accordance with the provisions of the plan, upon request of the response team the cooperating organizations of the agencies in the area must, within their capabilities, provide necessary means and resources. The response staff consists of representatives from cooperating agencies and is headed by the president of shipping company or his deputy on the maritime safety matters. The on-scene commander is normally provided by the emergency division on the sea basin.

The emergency divisions (EDs) belong to the shipping companies, however economically they are self-supporting and specialize in oil spill response, salvage, underwater, and towing operations. There are eight EDs based in the following ports: Arkhangelsk (Northern Shipping Co.), Murmansk (Murmansk Shipping Co.), Leningrad (Baltic Shipping Co.), Odessa (Black Sea Shipping Co.), Baku (Caspian Shipping Co.), Vladivostok (Far Eastern Shipping Co.), Korsakov (Sakhalin Shipping Co.) and Petropavlovsk-Kamchatski (Kamchatka Shipping Co.).

The EDs have at their disposal multipurpose oil spill response vessels, rescue vessels, tugs and ice breakers with main engine outputs ranging from 1,200 to 12,000 h.p., sea-going and port divers and fast boom-laying boats, self-propelled floating cranes with hoisting capacities of 1,600, 800, 100, 25 and 16 metric tons, pontoons, and other ship raising and rescue technologies. Equipment includes: underwater hull cleaning units, portable pumps, booms and skimmers of different types, oil trawls, facilities for bottom replacement, air compressors, underwater metal cutters and welders, portable electric power plants, underwater TV, and photo facilities.

Stockpiles for the EDs, with oil recovery and containment equipment and trained personnel (up to 30 people for each stockpile) organized as strike teams, are currently situated in the following nine ports: Murmansk, Ventspils, Klaipeda, Odessa, Novorossisk, Batumi, Baku, Nakhodka, and Korsakov. According to regional contingency plans the EDs have the leading role in response to an oil pollution incident or threat thereof.

With regard to the performance of their salvage functions, EDs are under administrative command of the MPCSA. This agency performs state supervision of ED activities and provides for their logistic maintenance and development through financial support received from the state budget and from shipping companies.

The basin level of contingency planning is to coordinate oil pollution incident response activities in case of a large-scale oil spill that requires means and resources from all regions on the basin or from other basins. The delivery of necessary equipment from other basins is coordinated by the MPCSA.

The seas around the U.S.S.R. coasts are divided into five basins. A leading shipping company is appointed at each basin to be responsible for fulfillment of oil spill contingency basin plan. The northern basin, including U.S.S.R. areas of responsibility in the Barents Sea, the White Sea, and other seas in the Arctic up to the 125th meridian, is coordinated by the Murmansk Shipping Company. The Baltic Sea, the Black Sea, and the Caspian Sea Basins are accordingly assigned to the Baltic Shipping Company, the Black Sea Shipping Company, and the Caspian Shipping Company; respectively. The Far Eastern Basin, including U.S.S.R. areas of responsibility in far east and Arctic seas up to the 125th meridian, is coordinated by the Far Eastern Shipping Company.

The logistic support appendixes of the basin plans contain full data on means and resources available at the basin. The response mechanism provided by basin plans is similar to mechanism of the regional oil spill contingency plans. Basin plans require approval of the MPCSA.

In accordance with requirements envisaged by the draft law on environmental protection currently being considered by the U.S.S.R. government, work has begun on developing a national oil spill response contingency plan for the U.S.S.R. The provisions of the draft law require that contingency plans of different levels must be approved by the appropriate councils of People's Deputies. This measure should raise the legal status of the documents and will tighten the cooperating agencies' obligations to the contingency plans.

A national oil spill response contingency plan will ensure coordinated response actions on the national level and will establish a regulatory basis for the development of workable response command hierarchy.

Local, regional, and basin oil spill response contingency plans are

being regularly reviewed and updated. Technical data is updated once a year. General revision of the plans is normally conducted each five years. According to expert assessment, all levels of response contingency plans for an oil spill at sea—maintained within the command structure of the U.S.S.R. Ministry of Merchant Marine—provide for a sufficient level of coordination for their purpose and objectives.

The U.S.S.R. rules and regulations require that cleanup operations of the shoreline, resulting from oil spills at sea are organized by executive committees of the local councils which are to develop and maintain contingency plans for cleanup operations on the shoreline. The plans provide for notification and mobilization procedures for personnel and equipment of enterprises and organizations situated on the shoreline territory under the jurisdiction of the specific local authority. In case of shoreline contamination with oil, or threat thereof, the commission on the emergency situation for strategic planning of response actions must be organized under the appropriate executive council. The commission designates an on-scene commander/coordinator of works along the shoreline and provides for mobilization of available means and resources of appropriate organizations and enterprises. Each enterprise situated on the shoreline, or representing a potential threat of oil pollution, has its own contingency plan for emergency situations. These plans are supervised and coordinated by the commissions. The commission has the right to recruit volunteers for work and mobilize personnel and equipment of MPCSA's strike teams for cleanup actions on the shoreline.

Contingency plans for response to oil pollution on the shoreline are coordinated with at-sea responses.

Oil spill response strategy. In the last five years there were no major oil spills at sea in the U.S.S.R., however some medium oil spills—up to 200 tons—took place. The most serious case in this period was the oil spill from the U.S.S.R. tanker *Antonio Gramsci* (27,706 grt), which grounded near Borge on the south coast of Finland while being loaded with 38,445 metric tons of crude oil. An estimated 600 to 700 tons of the cargo escaped as a result of the incident. The initial response operation was carried out by the Finnish authorities with participation of the Soviet oil combating dredger *Professor Gorunov*.

Although incidents occurring in U.S.S.R. waters can hardly be compared to the scale and consequences of pollution from the *t/s Exxon Valdez* and *t/s Kharsk-5* incidents, the experience of all domestic oil spill response cases is studied and analyzed. Analysis data show that most common oil spills in the vicinity of U.S.S.R. coasts occur as the result of ship groundings and collisions. Also, according to statistics on the Caspian Sea region, discharges of oil and blowouts occur more often from oil production rigs than from ships.

The pollution incident response strategy of U.S.S.R. contingency plans for the sea, takes into account the hypothetical discharge of oil amounting up to 20,00 tons at a time. Since the U.S.S.R. exports only one type of crude oil—Soviet Export Mixture, produced in the fields of the western Siberia—its properties constitute the basic factor in oil spill response strategy considerations. The main characteristics of this medium crude oil product are as follows: pour point, $\sim -15^{\circ}\text{C}$; viscosity at $+50^{\circ}\text{C}$, ~ 6.5 cs, density, 0.865 kg/L.

As has already been mentioned, maps indicating sensitive areas are attached to each contingency plan. Mostly they cover regions with conservation and recreational facilities. The priority for protection is determined in each particular case and depends on many different

factors of practical, hydrometeorological, and economic character. The general strategy for protecting and cleaning sensitive areas supports the use of mechanical cleanup methods and expedient oil slick containment and prohibits the use of toxic chemical agents.

In all cases, the use of dispersants requires approval of the U.S.S.R. State Committee for Environmental Protection and of fishery authorities. In-situ burning is employed very rarely and requires approval of local sanitary authorities of the U.S.S.R. Ministry of Health.

Training and exercises. To prepare participants to manage the response to oil pollution incidents at sea successfully, the U.S.S.R. Ministry of Merchant Marine has established special training courses in Odessa. The courses deal with the widest possible range of issues linked with environmental protection and oil pollution response problems, depending on educational and professional levels of participants. They also provide required training for managers and personnel of oil pollution response equipment. Management employees of ports and shipping companies have to take a course every five years. Personnel of strike teams and emergency divisions normally take one each three to four years. The duration of the courses ranges from one to four weeks.

In addition, regular training and drills are conducted by the strike teams. Each emergency division and shipping company organizes an annual operational exercise on response to a pollution incident in its zone of responsibility. Sometimes these exercises are combined with search and rescue exercises. Every year about 20 operational exercises plus 10 to 15 simulation exercises are conducted. The volunteers are not trained.

Funding. All oil recovery and containment equipment of the strike teams is relatively new, acquired between 1983-86. Reimbursement of costs linked with responses to oil pollution incidents is based on a polluter-pay principle. When the polluter is not known, the expenses come from a special fund administered by the MPCSA. The fund amounts to several million roubles, estimated to be quite sufficient for initial response action in U.S.S.R. waters.

Prospects

Experience has shown the necessity to update any plan in accordance with experience gained from prior oil spills response information, new concepts and technology, changes within national structures, and legislation. The Southern Research and Development Institute of the Ministry of Merchant Marine, Odessa, has responsibility for the national contingency plan in the U.S.S.R. Computerization of information relating to all aspects of oil spill response will allow the prompt exchange of information on the basis of common codes and unified terminology. This is a promising and serious step in the development of international cooperation.

It should be noted that two things will soon require some changes of approach to oil spill response planning in the U.S.S.R.: the tendency to unite oil spill response and salvage operations in emergencies and the rapid rise in chemical shipments. The latter may soon lead to including chemical spill response in oil spill contingency plans. These issues will require review of the structure and equipment of oil spill response teams, scientific and technology support programs, and personnel assignments and training.



IMPROVING CHEVRON'S OIL SPILL PREVENTION, PREPAREDNESS, AND RESPONSE CAPABILITIES

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ABSTRACT: *Soon after the Exxon Valdez spill, Chevron assembled an Oil Spill Response Task Force to coordinate activities among its operating companies and to enhance its prevention, preparedness, and response capabilities. This paper explains several of the programs developed and actions taken.*

Soon after the spill in Alaska, Chevron, like most of the other oil companies, decided to undertake a detailed review of its prevention, preparedness and response efforts. To start, we accepted none of our existing programs as being adequate; each one and every aspect was subjected to an in-depth review.

To accomplish this, Chevron assembled a task force with representatives selected by the heads of our major operating companies throughout the world and of key staff organizations. During its early deliberations, the Oil Spill Response Task Force, as the group was named, developed a list of 35 action items (see Appendix) which it believed would help improve our capabilities. Separate project work groups were established and work began on a priority basis. To emphasize top management support for the effort, a senior level management committee was also formed. Their responsibility was to oversee activities of the task force and to lend a strong management support element.

Outputs from the project work groups are summarized below.

Guiding principles

The Guiding Principles document is perhaps the most important of the reports generated. It outlines Chevron policy for dealing with all aspects of oil and chemical spills to water.

The highest priority—prevention—remains unchanged. However, this “first defense” is underscored by asking each operating company to strengthen its spill prevention program. Particularly important in this effort are training and in-depth reviews of operating practices and facility designs.

The Principles also acknowledge Chevron management's strong view that the full responsibility for preparedness and response belongs to the operating company which may experience an incident. However, it encourages full cooperation and assistance by all other operating companies and affiliates, and establishes internal organizations, coordinated by the corporate Health, Environment & Loss Prevention (HE&LP) staff, for this purpose. These include the following.

- The Advisory and Resource Team which is dispatched to the scene immediately upon notification of an incident—It functions to provide advice and help marshal additional resources that may be needed (not to assume control of the incident). The team consists of professionals from HE&LP and Public Affairs, and a headquarters representative from the impacted operating company.
- The Worldwide Spill Response Team consists of 30 volunteers se-

lected from the most highly trained response personnel at our major facilities throughout the world. Each is available on short notice to assist any operating company that requests their help.

- The Functional Teams can provide expert services from key staff specialties such as Human Resources, Communications, Purchasing, Medical, Claims, Insurance, Legal, and others. Each staff group has prepared its own plan and is prepared to send one or as many persons as may reasonably be needed to assist. Where contractors or consultants may be needed, prearranged contacts have been or are being developed.

- The Mutual Aid Manpower Pool consists of about 200 persons with spill response training or related experience. Typically, each person is a member of his or her local facility's spill response crew and would be made available to other locations.

The Guiding Principles also cover several other important issues related to spill prevention, readiness, and response including establishing a permanent steering committee of executive level management to guide ongoing activity.

Prevention programs

Recognizing the importance we need to place on prevention efforts and the unique character of our different operations, the task force established three separate project groups. Their assignments were to develop vigorous, but practical prevention programs for marine vessels, marine terminals, and offshore oil production facilities.

The marine vessel program required the development and implementation of new training courses on bridge management and cargo handling, the preparation and updating of manuals including ship-specific contingency plans, and making several physical changes to vessel loading/unloading controls. The marine terminal programs called for hazard and operability (hazop) studies at all major facilities and checklist reviews (based on data obtained from the hazop studies) at the smaller facilities. Ship-to-shore interfaces were also thoroughly reviewed. Production programs included increased efforts to monitor and control corrosion, processes to reduce human error, reinforced preventive maintenance, and increased management awareness training in environmental matters. These are just a sampling of the many activities completed and underway.

Exposure and risk review of worldwide operations

The exposure and risk review report identified more than 500 locations worldwide where Chevron has exposure to oil or chemical spills to water. These locations include marine terminals, pipelines, tanker and barge routes, offshore platforms, and shoreline tankage. Each location was evaluated for its relative exposure to spills (using factors such as

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environmental sensitivity, probable fate of the spill, and difficulty of cleanup) and its relative degree of risk (using factors such as potential spill size, product handling frequency, nature of operation, and spill history). The report is an important resource document for priority planning by our operating companies.

Executive crisis teams

The Executive Crisis Team report recommended that the Corporation and individual operating companies form crisis management teams. These teams would oversee the handling of all major incidents, not only oil spills, needing top management attention. The report also recommended that extensive training be provided and periodically renewed.

Field guidance manual

The Field Guidance Manual is a compilation of four separate reports. It was assembled to help our field locations carry out their oil spill preparedness and response obligations. The first section, capability assessment, addresses the size of spills to be considered and the amount of manpower and equipment needed. The contingency planning section addresses the important elements of contingency planning and provides guidance on evaluating an existing plan. Training and drills discuss both the legal requirements and good recommended practices and provides a listing of several training courses available worldwide. Lastly, the resources section describes the resources, essentially equipment and manpower, that are available and how they may be readily accessed.

Organizational study

Our Organizational Study recommended that HE&LP continue to coordinate the emergency prevention preparedness and response effort for Chevron. It further recommended that standing contracts be established with experts for emergency response and contingency planning services. Also, HE&LP was asked to identify the emergency response coordinators at our major facilities and to maintain a continuing dialogue with them on new laws, regulations, response techniques, etc. Finally, HE&LP was requested to develop a hypothetical drill program and to conduct them at field locations upon request. This latter program would supplement the drills already conducted as part of our ongoing compliance program.

Media relations evaluation

Over the past several years, Chevron has provided an in-house program, using media consultants, on effective media relations. The evaluation confirmed the importance of and interest in this training and suggested several changes. Improvements undertaken include a more systematic approach to candidate selection, refresher training, fine tuning of our policy on Reporting Newsworthy Events, and revising our Media Interview Guide.

Mobile command post and communications equipment

Based on the recommendations of the Command Post and Communications project work group, Chevron purchased a mobile van and equipped it with communications equipment. The van can be driven or flown to a site and serve as a command post. Additional prepackaged equipment is also available for quick shipment and/or to support a larger effort. The total cost of this equipment was \$1.2 million. Operating companies are actively encouraged to become familiar with and use the equipment in their drills.

Lessons learned from Valdez

The Lessons from Valdez study focused on four areas: public affairs, legal, environmental, and claims handling. A summary of this report was distributed to management throughout the company in February 1990. The 30 plus recommendations were also incorporated into the contingency planning section of the Field Guidance Manual.

Research and development

The Research and Development project team reviewed the many industry and governmental research efforts, both planned and underway. It was recommended that for the near future Chevron take an active role in selected projects. From time to time, individuals from our operating organizations and staff groups who have the particular expertise needed will be requested to participate on industry/government committees.

Model oil spill bill

Our Government Affairs group and affected operating companies were already working on the several federal bills, consequently the project group concentrated on state legislation. Using proposed California legislation as a guide, the team developed a white paper on the major issues. This was found to be generally applicable for analyzing the legislation proposed by the other coastal states. It was used extensively by many of our field locations in their contacts with legislators, other companies, and the public.

Audit/review guidelines

A self-audit review procedure incorporating appropriate recommendations from all the above reports was developed and distributed throughout the company. Each facility is comparing their internal programs against these guidelines. Later this year, the guidelines will be incorporated into Chevron's regular Corporate Environmental, Health, Fire, and Safety Audit Program.

Closing comment

The exercise we have undertaken has been a thorough, all-out effort; initially estimated as a 28-man-year commitment. The tight deadlines we set necessitated a relatively large work force as most projects had to proceed concurrently. Although most organizations already carry heavy workloads, they viewed this effort as not only important but a valuable learning experience. Good employees were made available. More than 100 different Chevron employees from 30 different operating and staff organizations participated directly in the task force and project work team activities. Several times that number participated in interviews and responded to questionnaires. This large and broad participation gave us not only the valuable training experience noted but it was extremely beneficial in securing wide and strong support for the new ideas and programs generated. This we believe to be one of the strong points of our program.

Appendix

Action Items to Enhance Chevron's Oil Spill Prevention, Preparedness, and Response Capabilities

Management

1. **Support.** Obtain executive support and develop methods to communicate this support. Identify and deal with the institutional



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barriers. Assure that both manpower and other resources are available on a continuing basis.

2. **Crisis training.** Assure that executive management of every operating unit has received crisis management training and that Chevron's executive policy involves the highest levels of executive management in the direct, early and continuing response to major incidents.

Prevention

3. **Prevention.** Review design and operating procedures for facilities involved in the movement and storage of oil and refined products. This includes vessels, docks, terminals, platforms and pipelines. Seek improvements that will lessen the likelihood of a release.

Policy/organization

4. **Overall responsibility.** Define which company group has ultimate responsibility for actual incident response. Alternatives include Corporate teams, operating company headquarter teams and facility or regional teams. Mutual assistance and/or potential overlaps also need to be addressed.
5. **Chevron—affiliate cooperation.** Define roles and coordinate Chevron and affiliate efforts in oil spill preparedness and response.
6. **Corporate coordinator role.** Evaluate the role and functions of the Corporate Coordinator for Emergency Response and recommend changes as needed. Review all elements such as placement, manpower, existing duties and possible new duties.
7. **Oil spill response task force.** Determine the need/desirability of having the Oil Spill Response Task Force or a similar group provide an oversight/coordination role on a continuing basis.
8. **Degree of response.** Define the degree of response Chevron will undertake for incidents involving the different vessel and product ownership combinations.

Risk assessment

9. **USA and Canada.** Review, evaluate and prioritize Chevron's exposure to oil, refined products and other chemical spills in both open seas and inland waterways.
10. **Rest of world.** Review, evaluate and prioritize Chevron's exposure to oil, refined products and other chemical spills in both open seas and inland waterways.

Capability assessment

11. **Guidelines—determining existing capabilities.** Develop guidelines for measuring the preparedness and capability of oil spill response organizations (facilities and co-ops).
12. **Guidelines—determining equipment/manpower needs.** Develop guidelines for determining the type and amount of equipment and manpower needed for responding to spills of a specified size within a specified time frame.
13. **Guidelines—contingency plans.** Develop guidelines for the preparation and review of contingency plans. Assure that the following elements are covered: Organization/duties; coordination with public relations, and other company resources; coordination with governmental agencies; response techniques and priorities; specialized contract resources; prompt claims handling; training/drills; environmental impacts and natural resource damage assessments; updating.
14. **Oil spill cooperative survey.** Conduct a survey of oil spill cooperatives to which Chevron belongs and establish the following: Chevron contact person; area of operation; scope of operation; equipment available (owned, mutual aid); total operating expense, Chevron's share, and how determined; call out procedure; man-

power availability (member company/contractor); spill response experience; unique operating data.

15. **Review/audits.** Perform an independent review of operating company and affiliate contingency plans using guidelines developed above.

Training/drills

16. **Survey—existing courses.** Conduct a survey of available training schools and courses and provide recommendations.
17. **Survey—oil company training practices.** Survey major oil companies to determine the type, degree, and frequency of training, methods and instructors used, and changes proposed for the future.
18. **Training needs.** Analyze Chevron's training needs. Considerations should be given to manpower needed, including relief personnel to respond to a large incident; specialized training for the various defined functions, including media training; ongoing training (use our own instructors for continuity?); etc.
19. **Survey—oil company hypothetical drill procedures.** Sample major oil companies to develop information on their hypothetical drill programs. Evaluate and make recommendations.

Public/community affairs

20. **Lessons from Valdez.** Review *Exxon Valdez* incident for lessons learned.
21. **Survey—media courses.** Determine the availability of various media training courses and summarize with evaluations.
22. **Review present program.** Evaluate the adequacy of our present media relations program related to spills and recommend improvements where necessary. Consider ways to use volunteers in a meaningful way, especially during the early stages of an incident, and to work more cooperatively with environmental activists.

Resources

23. **Chevron response experts.** Review the organization and operation of the Worldwide Oil Spill Response Team, and provide recommendations.
24. **Command center.** Evaluate the need/desirability of maintaining one or more permanent command centers and determine the materials and equipment needed.
25. **Communications equipment.** Evaluate the need/desirability of setting-up one or more portable communications trailers which can be quickly shipped to the scene of an incident. If deemed desirable, determine what equipment should be provided.
26. **Major equipment stockpiles.** Determine what equipment is present in major stockpiles throughout the world. Evaluate its usefulness and availability to Chevron and whether this can be improved.
27. **Cleanup advisor/consultant.** Determine the qualifications and availability of consultants who can provide expert advice on actual on-site cleanups.
28. **Environmental advisor.** Evaluate the desirability of maintaining an in-house expert(s) versus independent consultant with an intimate knowledge of the literature on oil spill fate and effects on various organisms. This type of information is invaluable in deciding where to apply cleanup resources on a priority basis.
29. **Chevron technical support.** Review Chevron's "Release Control Specialists List" and recommend improvements and changes warranted.
30. **Resource manuals.** Evaluate the usefulness of the Resource and Logistics Directories to which we subscribe and recommend desirable format changes. These manuals provide information on local suppliers for several equipment categories and services that are useful in responding to oil spills.
31. **Oil tracking.** Determine the availability, usefulness and cost of various oil tracking devices (for modeling and actual on-scene



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tracking from aircraft) and services. Provide recommendations on the desirability of purchasing equipment and establishing in-house expertise or contracting for such equipment and services.

32. **Corporate/charter aircraft.** Determine the availability of and procedure to access Corporate and/or charter aircraft for initial quick response.

Dispersants/research

33. **Dispersant issues.** Evaluate the desirability of designating one or more person(s) to closely monitor all dispersant issues (fate and effects as well as application techniques) and to participate in and conduct basic research.

34. **Research and development.** Determine the desirability of undertaking research and development programs in addition to industry-wide and government programs such as the new joint DOI/API program.

Legislation/regulations

35. **Legislation/regulations.** Provide manpower to help Corporate Government Affairs analyze and respond to federal, state and local laws and regulations related to oil spill prevention, preparedness, and response.



CHEVRON WORLDWIDE EXPOSURES PROJECT

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ABSTRACT: *The Chevron Worldwide Exposures (W/E) Project illustrates the application of risk management to spill prevention and response planning efforts. The W/E project team defined two terms, "relative risk" and "relative exposure", for describing the risk of a large spill with negative consequences. The team developed a worldwide exposures survey form to collect data for making relative risk and relative exposure evaluations. Using the form, the team identified and evaluated over 500 operations worldwide where Chevron has exposure to oil and chemical spills to surface water. The project team's findings are primarily being used within Chevron to prioritize operations for reviews of spill prevention, preparedness, and response capabilities.*

In 1989, Chevron initiated a corporate-wide effort to assess and make recommendations to enhance Chevron's spill prevention, preparedness and response efforts. The W/E project team was one of 16 company project teams formed.

The W/E project team's objectives were to:

- identify all locations, worldwide, where Chevron has exposure to oil and chemical spills which can affect open seas or inland waterways, and
- for the locations identified, provide an order-of-magnitude estimate of the degree of risk.

Worldwide exposures survey form

To collect and organize the data needed for risk evaluations, the team developed a worldwide exposures (W/E) survey form. The form requests information on:

- operation name and location,
- materials handled that could be spilled,
- spill to navigable water history,
- environmental and public sensitivities at the location,
- spill response capability, and
- previous risk assessments.

Forms were completed for operations which handle oil or chemicals which could be spilled into navigable water. The types of operations encompass:

- tanker and barge shipping routes,
- loading docks and wharves,
- offshore wells and platforms,
- onshore wells located near water,
- onshore tanks located near water,
- sub-sea pipelines,
- pipelines that run next to, under, or over waterways,
- marine terminals, and
- foreign product receiving (product discharge) ports.

Appendix 1 is a copy of the form. Appendix 2 is the instructions for completing the form.

Each team member was assigned companies in the Chevron corporate organization book. Team members investigated their assigned companies and determined if each handles oil or chemicals with potential for spills into water. If the answer was no, the company was deleted from the study. If yes, team members sent W/E survey form packages to the appropriate people in the company.

Risk evaluation

Team members used information reported on the completed forms to assign two relative risk ratings, the degrees of relative risk and relative exposure, to each operation identified on a form. Over 500 operations were identified and evaluated. The team defined relative risk and relative exposure as follows:

Relative risk. The risk of, or potential for, a large spill. The following indicators determine the degree of relative risk:

- potential spill size,
- product transfer or handling frequency and volume,
- nature of the operation (e.g., shipping route in congested vs uncongested traffic area),
- spill history of the facility or operation, and
- general spill history for that type of operation.

Relative exposure. The degree of negative impact from a large spill. The following indicators contribute to the degree of relative exposure:

- environmental sensitivities at the location,
- political and public sensitivities at the location,
- probable nature and fate of the spill (e.g., evaporation, natural dispersion in the open ocean, high probability of landfill, sink to the bottom of the water body),
- difficulty of spill cleanup,
- spill response capability, and
- extent of Chevron ownership or operation of the facility or activity.

The team made qualitative judgments to determine the relative risk and relative exposure ratings. The indicators, shown above, are listed in order of their importance in the determinations. The most important factors are listed first. High, medium high, medium, low medium, and low ratings were assigned.

Problems encountered in gathering data

In nearly all cases, people correctly completed the W/E survey form and often provided more information than was expected. For example, some people attached portions of spill prevention, countermeasures and control (SPCC) plans and lengthy (several pages) information regarding potential impacts from a spill.

The team encountered problems regarding operations not run by Chevron. The team attempted to gather data on and evaluate any

operation that was partially or totally owned by Chevron, regardless of whether it was Chevron run. Examples of activities run by others include: non-operated joint venture (NOJV) production areas, pipeline companies in which Chevron holds stock, and affiliate companies.

The team found that Chevron had only limited information on some activities not operated by Chevron. The team handled these in two ways:

- evaluating the operations based on available data, or
- identifying potential spill locations but deferring any relative risk or relative exposure evaluations to the operator of the activity.

Team members worked with Chevron contacts to determine which way each case should be addressed.

There probably would have been more problems gathering data if team members had not concentrated on making personal contacts, by phone or visit, when possible instead of relying totally on written communications. Team members found this was especially important when requesting information from people they had not met or previously worked with.

Meaning of the relative risk and relative exposure ratings

The worldwide exposure (W/E) ratings are *relative* ratings of operations. Thus, an operation with a "high" relative exposure rating means that the operation has high exposure relative to all evaluated operations. The ratings are subjective but were based on substantial quantitative and qualitative input. The ratings were reviewed by W/E team members and Chevron operating company personnel (including top

management, in some cases) with substantial experience both in the petroleum industry in general and their area of expertise in particular.

Use of the worldwide exposure project findings

The W/E team's findings are being used within Chevron as a resource document in prioritizing operations for reviews of spill prevention, preparedness, and response capabilities. The findings are also being used by corporate support staffs in planning for response to potential major spills worldwide. The Chevron Corporate Emergency Response Group may use the W/E project findings to develop scenarios for hypothetical spill drills.

Conclusions

A risk management approach can be successfully used in spill prevention and response planning efforts. The degree of risk of a large spill with negative consequences can be assessed by evaluating two factors:

- relative risk (potential for a large spill), and
- relative exposure (degree of potential negative environmental and public impacts from a large spill).

Relative risk and relative exposure ratings for operations are made by comparing qualitative and quantitative information about the operations. These relative ratings can then be used to prioritize the operations in spill prevention and response planning efforts.

Appendix 1

World-Wide Exposure Survey Form

Page 1 of ____

Location _____
(city, state, country)
Company Name _____
Facility/Operation Name _____
Name and phone number of person completing this form _____

I. MATERIALS HANDLED WHICH COULD BE SPILLED

Material Handled	Quantity Handled (bbl/yr)	Handling Frequency (days/yr)	Maximum Spill (bbl)	How Packaged	How Handled
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World-Wide Exposure Survey Form

Page 2 of ____

Location _____
(city, state, country)
Company Name _____
Facility/Operation Name _____
Name and phone number of person completing this form _____

II. SPILL (TO NAVIGABLE WATER) HISTORY

Spill Date	Material Spilled	Quantity Spilled	Cause of Spill	Actions Taken to Prevent or Reduce Impact of Future Spills
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World-Wide Exposure Survey Form

Page 3 of ____

Location _____
(city, state, country)



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Company Name _____
 Facility/Operation Name _____
 Name and phone number of person completing this form _____

III. ENVIRONMENTAL SENSITIVITIES AT THIS LOCATION

Environmentally Sensitive Areas

Local Political Concerns

Public Health Concerns in the Event of a Spill

IV. SPILL RESPONSE CAPABILITY

Does this location have spill response equipment on-site or nearby? Yes ___ No ___
 Does this location have written emergency procedures for spill response? Yes ___ No ___
 Are employees at this location trained in spill clean-up and response? Yes ___ No ___

V. PREVIOUS RISK ASSESSMENTS

Has the company done assessments of the potential for spills to water at this facility/operation? Yes ___ No ___
 If yes, please briefly describe or attach a copy of the assessment.

Appendix 2

Instructions For Completing the Worldwide Exposure Survey Form

Please fill out one form for each operation where materials handled could spill into navigable water (e.g., oceans, seas, lakes, rivers). Examples of such operations include:

- tanker or barge shipping routes,
- loading docks or wharves,
- offshore wells and platforms,
- onshore wells located near water,
- onshore tanks located near water,
- sub-sea pipelines,
- pipelines that run next to, under, or over waterways,
- marine terminals, and
- foreign product receiving (product discharge) ports.

You do not need to fill out a form for every individual well. Numerous wells or platforms located in the same area may be grouped together.

"Materials" includes only oils and chemicals. Examples are: crude oil, oil refinery intermediate streams, oil products, synthetic fuels, chemical feedstocks, chemical products. "Materials" does *not* include: gases, coals, soil, ores, minerals, solid catalysts.

Only include one location and one operation per form. Fill out additional copies of the form for additional operations and locations. An example of a correctly completed form is attached.

Note: Fill out one form for each location where a pipeline could spill into water, or list all the water crossings for a major pipeline on one form.

Section I: Materials handled that could be spilled

Complete the table for each material handled by the operation that could be spilled into navigable water.

Material handled is the name of the material. Examples include: unleaded gasoline, Minas crude oil, benzene, lube oil, reformat. Different formulations of a product may be reported as one material if the physical properties and hazards are not significantly different. For example, different octane grades of unleaded gasoline should be added together and reported as "unleaded gasoline."

Quantity handled is the total quantity (in barrels, 1 bbl = 42 U.S. gal) of the material which is received, shipped, or otherwise handled by the operation in a year plus normal standing inventory. Standing inventory is the quantity of material which is stored and not received, shipped, or otherwise handled.

Handling frequency is the number of days per year that the material is shipped, received, stored, or otherwise handled at/by the operation.

Maximum spill is the largest quantity (in barrels) of the material that could be spilled into navigable water in a single incident. For bulk loads of material, use the largest load size (e.g., capacity of the tanker). For material in a tank, use the storage capacity of the tank.

How packaged is the container which holds the material. Examples include: drum, tank, tanker, barge, pipeline.

How handled is what is done with the material at the location. Examples include: stored, shipped by tanker, transported by pipeline, received at wharf, lightered from tanker and received at wharf.

Section II. Spill (into navigable water) history

Briefly list and describe oil or chemical spills at this operation which occurred within the past five years. Only include spills of oils and chemicals into navigable water.

Section III. Environmental sensitivities at this location

Environmentally sensitive areas. See the attached summary of how to identify such areas. List the sensitive resources present and their approximate distances from the operation. If none, write "none."



Documents

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Local political concerns. Briefly describe the extent of environmental activism in the area. Indicate if there is a strong environmental protection lobby (e.g., Greenpeace, the Greens party) present. If a spill at this location would not cause a negative public response or outcry, write "none."

Public health concerns in the event of a spill. If spilled, could any of the materials handled harm the public? Check material safety data sheets (MSDS) for toxicity, corrosivity, and other hazards. Are any of the materials toxic to fish and other aquatic species? Is the navigable water (into which the material could be spilled) used as: drinking water? industrial process cooling water? process water in a wildlife park or research center? If there would be no public health concerns from a spill of material(s) handled at this location, write "none."

Section IV. Spill response capability

Check "yes" or "no" for each question as it applies to spills into navigable water.

Section V. Previous risk assessments

This question asks if this operation has ever been reviewed to evaluate the potential for a spill into navigable water. Check "yes" or "no." If yes, briefly describe the conclusions made from the study.

How to Identify Environmentally Sensitive Areas (Section III of the Worldwide Exposure Survey Form)

A full assessment of the sensitivity of ecological resources in an area requires knowledge of their quantity, susceptibility to harm, and quality. This knowledge also has to be placed in a regional setting or context. For example, a small localized population of a certain species might not be as sensitive if the species is relatively more common on a broader geographic scale.

Susceptibility is important because various resources show differential tolerance to the toxic effects of spilled oil or chemicals. For example, marine mammals which depend on fur coats to maintain body temperature are more vulnerable to spilled oil than those marine mammals which are insulated by layers of fat beneath their skin.

The quality of a resource relates to the value people ascribe to it. Factors contributing to this value judgment include: commercial or recreational worth and the value of the resource for scientific, aesthetic, ecological, and cultural purposes.

Description of sensitive resources

The habitat types and areas listed below will be considered sensitive resources in most parts of the world. In Section III—Environmentally Sensitive Areas, list any such resources located near the operation that would likely be affected by a spill into navigable water. If possible, try to give some idea of the resources' relative significance based on their rarity, uniqueness, economic value, or political sensitivity.

- National Wildlife Refuges
- National Parks and Monuments
- National Marine Sanctuaries
- National Seashores and Recreation Areas
- State, provincial, or local areas designated as ecologically significant
- Migratory routes, breeding, feeding, and haulout (coming ashore) areas for marine mammals
- Rookeries, resting and feeding areas for migratory and resident water birds
- Habitat for any rare, threatened, or endangered species
- Commercial and recreational fishing grounds, including freshwater lakes and streams, estuaries, and tidal creeks and sloughs
- Coastal marshes used as nursery grounds for commercial and recreational fisheries
- Recreational beaches and boating waters

Other habitat types which can receive attention depending on their location and abundance in a region include:

- coral reefs, seagrass beds, and mangrove forests,
- freshwater marshes and swamps, and
- soft-bottom mud flats and subtidal areas.

Methods for identifying environmentally sensitive areas

Several approaches can be used to identify environmentally sensitive areas in the vicinity of potential spill sites:

- Examine existing facility and agency contingency plans (emergency response plans) for the area.
- Refer to wildlife habitat maps of inventories, such as those available for coastal areas from: U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, or state departments of fish and game.
- Review coastal inventories prepared by oil spill response cooperatives.
- Consult with local experts such as wildlife agencies, colleges or universities, and conservation groups.

Resources likely to be impacted in the vicinity of a spill site can be predicted by estimating the expected trajectory (spill flow direction) and spreading characteristics of the spilled material. Trajectory and spreading characteristics can vary with the weather and water (tide and current conditions). Therefore, for offshore and coastal locations, assume that a spill could impact an environmentally sensitive area located in any direction from the spill site. For inland locations, assume that a spill could impact any areas located at and downstream of the spill site.

TASK FORCE ON OIL SPILL PREPAREDNESS: A CANADIAN ON-SHORE EVALUATION

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ABSTRACT: *The oil industry's ability to effectively contain and clean up oil spills has been questioned over the years, and recent events have heightened this concern. Growing public interest and efforts by the upstream oil industry in Canada to assess its operations resulted in formation of the Task Force on Oil Spill Preparedness. The study was sponsored by the Canadian Petroleum Association and the Independent Petroleum Association of Canada, which represent most companies in the upstream industry. The overall evaluation concentrates on both onshore and offshore activities, but this paper discusses only the onshore segment.*

In the past 40 years the industry has made substantial efforts to prevent oil spills. As a result, Canada has experienced no catastrophic oil spills in operating about 40,000 producing wells and 37,000 km of oil pipelines. In spite of these efforts, the industry believes there is room for improvement. The study recommends allocating more resources to improving equipment, training on-site personnel, establishing better communications within companies and between companies and regulatory agencies, and continuing research in oil spill countermeasures. These recommendations are being incorporated in the existing framework to improve the response capability of the upstream oil industry.

In Canada, almost all of the crude oil produced today comes from the western provinces, the so-called Western Canadian Sedimentary Basin. Alberta is by far the largest producer of crude oil in Canada. The other oil-producing provinces are British Columbia, Saskatchewan, Manitoba, and Ontario. Except for the Norman Wells oil field and limited production from Bent Horn in the Northwest Territories, reserves of oil in the rest of the country are not in commercial production. As of December 31, 1988, British Columbia had 673 producing wells, Alberta 22,893, Saskatchewan 13,916, Manitoba 1,370, Ontario 1,170, and the Northwest Territories had 159.

In addition to approximately 40,000 producing oil wells, there is more than 37,000 km of gathering and transmission pipelines. The major transmission line is the Interprovincial pipeline system, which stretches from Edmonton through five provinces and six U.S. states to Montreal. The Trans Mountain pipeline system moves crude from Edmonton through Kamloops to Vancouver and northwest Washington State. Canada's most northerly oil pipeline, the Norman Wells pipeline, ties the Norman Wells oil field to the southern pipeline network at Zama, Alberta (Figure 1).

The wide variety of onshore production and transportation methods for crude oil in Canada creates a continuing challenge for industry to provide skilled manpower, specialized equipment, and resource mate-

rial to combat oil spills. In the past the oil industry has expended a great deal of time and effort to prevent oil spills. As a result, Canada has experienced no catastrophic spills in either the onshore or offshore segments of the business.

Yet the industry believes there is room for improvement. The recent spills in Prince William Sound, Alaska, and offshore Washington State have prompted industry to reevaluate the systems presently in place for spill response. In addition, the general public is demanding that oil companies be capable of responding effectively to all situations.

Although the Canadian oil industry has placed a great deal of effort towards spill countermeasures, the wide range of environmental conditions, the limitations of technology, and the risks of human error must be anticipated and accommodated in the regulatory and planning framework. This report is an assessment of how well the oil industry, operating within the existing regulatory and legal framework, would deal with oil spill accidents.

Objective

To undertake this evaluation, the Canadian Petroleum Association (CPA) established the Task Force on Oil Spill Preparedness (TFOSP), composed of representatives of member companies of the CPA and the Independent Petroleum Association of Canada (IPAC). The task force was organized into offshore and onshore working groups, each charged with determining the current state of preparedness of the industry to handle spills in its assigned area, and with making recommendations on ways to improve response performance and cooperation within companies and between companies and government. Given the almost infinite variety of environmental conditions and circumstances that might cause and/or accompany an oil spill, the task force decided to use a scenario approach in its evaluations. Each working group determined a number of representative spill scenarios, and industry response was evaluated with respect to each specific set of conditions.

This paper presents the findings of the Onshore Working Group.

The Onshore Working Group consisted of 12 members with considerable experience in environmental affairs and, in particular, with oil spill response. The results of this report are based on an industry survey and the confidence that the working group has in response capabilities.

The onshore evaluation focused on Canadian crude oil and condensate products associated with the following:

- Onshore exploration and development drilling wells in Western Canada, the Northwest Territories, and Ontario

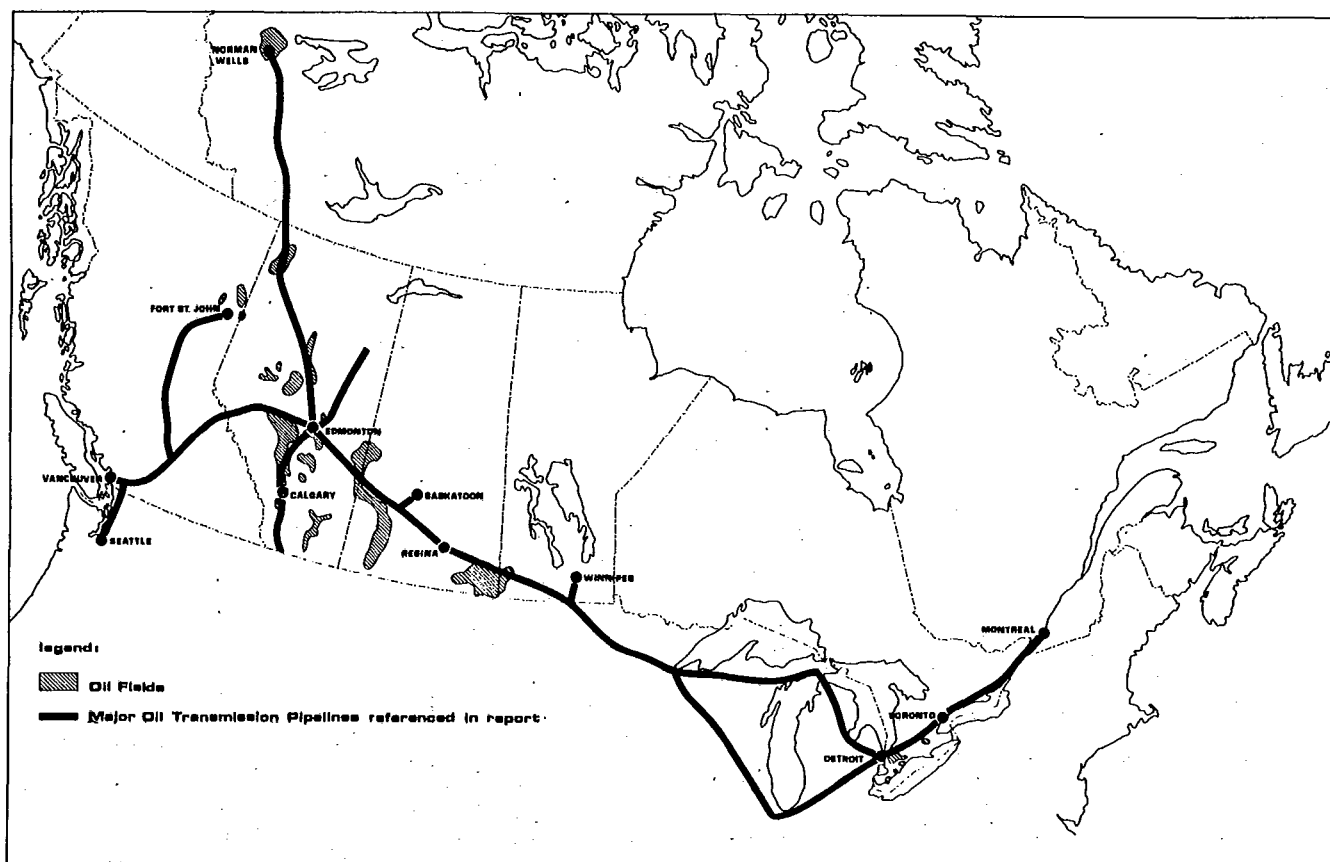


Figure 1. Major oil fields and transmission pipelines in Canada

- Production and processing facilities (wells, flowlines, and batteries) in Western Canada, the Northwest Territories, and Ontario
- Crude oil tanker truck traffic in Western Canada
- Major oil transmission pipelines in the Northwest Territories and from Vancouver to Montreal
- A ship loading terminal (from a pipeline) in Vancouver, British Columbia.

The task force did not evaluate salt water spills from production operations or oil and refined product spills from refining, marketing, or marine tanker (ship) operations. However, the onshore working group did evaluate a ship loading terminal.

To assist the working group, two industry survey questionnaires were prepared. Part A of the survey concentrated on an evaluation of contingency plans. Part B presented the following eight oil spill scenarios for both small and worst-case spills:

- Scenario 1: Oil well blowout
- Scenario 2: Production tank overflow
- Scenario 3: Major pipeline rupture—Urban area
- Scenario 4: Major pipeline break—River crossing
- Scenario 5: Storage tank rupture
- Scenario 6: Ship loading terminal
- Scenario 7: Truck rollover
- Scenario 8: Heavy oil spill into a creek

A series of questions addressing oil spill response measures accompanied each scenario. The questions were designed to investigate a company or an oil spill cooperative's state of preparedness with respect to communication, company policy, response equipment, contingency plans, training, and prevention.

All members of CPA and IPAC were requested to respond to the scenario survey. In addition, the survey was forwarded to members of oil spill cooperatives in western Canada, Ontario, Quebec, and the Atlantic Provinces; drilling and production companies in Ontario; and other interested parties. In all, 260 surveys were distributed.

A total of 68 survey responses were received from 53 companies.

(Some companies, because of the diversity of their operations, returned more than one survey.)

The CPA and IPAC producing members who did respond represent approximately 70 percent of the 1988 Canadian crude oil and liquids production. The working group, based on its members' experience, believes that the responses are representative comments on the state of oil spill preparedness in the industry.

A workshop was held for the working group members to review the responses. Conclusions and recommendations were prepared by the working group in the following categories:

- Company policy
- Prevention
- Communications
- Contingency planning
- Equipment
- Manpower
- Training
- Research and development

Conclusions and recommendations

In general, the industry is prepared to handle incidents that occur on land and in small bodies of water. Manpower, equipment, and contingency plans are available for both short- and long-term response situations. Company and industry associations are in place to coordinate spill response efforts, and these have proven successful in the past.

The industry is concerned with the containment and recovery of oil in fast-flowing river systems, especially during adverse weather. The combination of equipment technology, volume and type of oil, and logistical factors such as time of year, land and water conditions, and accessibility create situations that may be extremely difficult, if not impossible, to handle. Technology for the safe deployment of equip-

ment during times of flooding or ice flows is limited and may never be available. For events such as these, the oil industry has developed strategies for communicating with those affected and would incorporate extensive monitoring and shoreline cleanup activities. Improvements in equipment, deployment techniques, and response training are required if industry is to expand on the current state of preparedness to handle all types of oil.

Companies must identify their worst-case scenarios and continue their efforts to prevent and respond to spills using the best practical technology.

A consolidation of the major conclusions and recommendations is presented in this paper. The reader is referred to the report entitled "Oil Spill Preparedness in the Upstream Petroleum Industry," for a detailed list of conclusions and recommendations. This report is available from the Canadian Petroleum Association; 3800, 150 Sixth Avenue, S.W.; Calgary, Alberta, T2P 3Y7, Canada [telephone (403) 269-6721].

Conclusions

1. The onshore industry has been diligent in developing oil spill contingency plans. However, the plans need more information on policy, specific facilities, urban areas, and product characteristics.
2. Caches of equipment designed for containment and recovery of oil are maintained throughout Canada. This equipment is sufficient in most circumstances for conventional oils. However, in major river systems and/or under adverse weather and logistical conditions, the current available technology is insufficient to provide an effective response.

The safety concerns associated with handling highly flammable light oils or condensates require that some equipment caches contain specific equipment for this purpose. However, equipment for handling heavy oils will also have to be developed.

3. There are a large number of trained individuals capable of deploying oil spill equipment under most circumstances. However, only a limited number of trained personnel are available to manage initial and long-term response in major situations.
4. Industry's response capability to worst-case situations and specific oil types must be improved.

Recommendations

1. All companies must continue to identify their spill response procedures and include these in the appropriate oil spill response plan. This includes the designation of a trained response team and the

pre-authorization of response priorities and authority delegation. Company and cooperative contingency plans should be annually updated and reviewed with management and field personnel in conjunction with simulation and communication exercises.

2. Companies, cooperatives, and industry associations must continue their work to maximize equipment compatibility and effectiveness with the best practical technology. An assessment of equipment to handle worst-case scenarios and specific oil types is required.
3. Companies must recognize that effective oil spill training is not limited to equipment deployment exercises but also includes spill prevention, contingency planning, simulated emergencies, control point selection, community relations, and environmental awareness. Both field staff and management should have spill response training. A clear understanding of duties and responsibilities must be included in employee training programs.
4. More research and development of equipment and response techniques is needed to provide efficient response for shallow and moving ice conditions, fast-flowing rivers, and light and heavy oils.

Implementation

The TFOSP report has been widely accepted by industry and government. It makes a clear statement to the public that the upstream petroleum industry is firmly in control of the question of oil spill preparedness, capable of self-assessment, and ready to deal with any apparent shortcomings.

The Canadian Petroleum Association (CPA) and the Independent Petroleum Association of Canada (IPAC) have established an implementation committee for incorporating the recommendations into member company activities. This group will focus on five major areas:

- Planning
- Prevention
- Equipment
- Training
- Research and development

Each TFOSP recommendation has been reviewed, and implementation procedures and responsible organization and government interfaces have been identified. Over the next five years industry will spend close to \$4 million to achieve the new level of response capabilities in onshore activities.



CONTINGENCY PLANNING: IMPLEMENTATION IS THE KEY

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ABSTRACT: The two basic components of oil spill contingency planning are developing the plan and implementing the plan. An organization with an effective oil spill contingency plan will have considered both components.

Armed with thick oil spill contingency plans, companies expect to be able to respond adequately to major oil spills. For several reasons, this expectation may be unrealistic. For example, the plans may incorporate inadequate appraisals of available response assets, they may have been developed merely to satisfy regulatory requirements, or they may fail to consider various spill scenarios. Plans based on unattainable or unrealistic expectations end up on the shelf collecting dust. Thus, one of the first things to consider in contingency planning is what the plan will be expected to do.

Another factor in the effectiveness of a contingency plan is its format. Oil spill contingency plans that are comprehensive and easy to use are essential. It is useful to divide the plan into three major sections: response procedures, background information, and scenario development. The response procedures section should be relatively short and contain step-by-step procedures to be followed during a spill response. The background information section should contain the background information accumulated during the planning period. The scenario development section should contain the scenarios identified for various spill sizes.

An excellent contingency plan is of limited value if it is not effectively implemented. Effective implementation requires that everyone in the response and planning organization know the company's ideas, policies, and strategies regarding oil spill response, understands his or her roles and responsibilities in preparing for and carrying out a response, and is committed to carrying out the program. Implementation is often difficult because it involves changing the organization's way of doing things. When the way an organization does business does not match a new program being implemented, leadership is required to match them, either by changing the way of doing business or by changing the program. Changing a new program could be as simple as making a decision. Changing the way an organization does business is a process and is usually very difficult, especially in a large, complex organization like an oil company.

Since 1969, many companies have devoted much effort to developing contingency plans, only to discover that the plans were inadequate, out of date, and collecting dust. A massive spill approximately every 10 years seems to remind the oil industry to thoroughly review, update, and upgrade its contingency plans. When a company confronted with the spill crisis of the decade is not totally prepared to respond immediately, the entire industry suffers a black eye. If history repeats itself, the flurry of planning activity so conspicuous today will subside in a few years and, the new and improved plans will begin collecting dust on shelves.

It is unfortunate that oil spills are a risk of doing business in the oil

industry. A liberal interpretation of Murphy's Law would be that it is only a matter of time before the "big one" happens. With increasing global sentiment toward protecting the environment, an oil company unprepared to respond to a major oil spill, and to the subsequent adverse publicity, lacks the foresight of a company expecting to be successful in years to come.⁶

Strategic management in oil companies today must also include environmental concerns because of an increasing number of regulations. Oil companies can no longer afford for the "bottom line" to dominate demands on available resources, because the complexities of doing business in the 1990s demand the spending of resources in areas that once required only part-time attention. More resources should be devoted to the ongoing efforts required for oil spill contingency planning and preparedness. Major spills give no warning. Therefore, the best way to prepare for an oil spill crisis is to maintain a planning and preparedness program. Investments in oil spill prevention and preparedness will be more than justified when response to a major spill is timely and professional.

Contingency planning in the United States can improve. Many plans are poorly organized, difficult (if not impossible) to use during oil spill situations, and lacking in vital information. In many instances, the plans were written to comply with federal or state regulations; they satisfied the government but did not achieve the intent behind the regulations—the ability to respond adequately to an oil spill crisis.

Federal laws and regulations that should be considered during oil spill contingency planning are listed in Table 1. Although these regulations require certain information in oil spill contingency plans, and some plans must be approved by a federal agency, no regulation requires a specific contingency planning format. One well written contingency plan will satisfy all of their requirements. The various government agencies enforcing these regulations should recognize the burdensome contingency planning requirements placed on the oil industry and cooperate with industry to reduce duplicative planning efforts.

Contingency planning

Contingency planning is at least a four-step process:

- Determining if, and why, a contingency plan is needed (to satisfy a regulation and/or to be prepared to respond to a crisis)
- Deciding what to do and who will do it
- Developing and writing a contingency plan
- Implementing the plan

Too often oil spill contingency plans are developed based on unattainable expectations. No matter what crisis is being considered, the first rule should be to base the contingency plan on realistic expectations. Otherwise, the document created will be not a contingency plan, but only wishful thinking.

If a company is prepared to initiate a rapid response, it appears to be

Table 1. Laws and regulations affecting oil spill contingency planning**Laws**

Clean Water Act, as amended
 Comprehensive Environmental Response, Compensation, and Liability Act, as amended
 Resource Conservation and Recovery Act, as amended
 Outer Continental Shelf Lands Act, as amended
 Deepwater Port Act
 Act to Prevent Pollution From Ships, 1980
 Ports and Waterways Safety Act of 1972
 Intervention on the High Seas Act
 Trans-Alaska Pipeline Act
 Oil Pollution Act of 1990
 Occupational Safety and Health Act
 Marine Protection, Research, and Sanctuaries Act

Regulations

40 CFR 300 (National Oil and Hazardous Substances Contingency Plan)
 40 CFR 112 (SPCC, EPA)
 33 CFR 126 and 33 CFR 154-156 (pollution prevention at waterfront facilities, USCG)
 40 CFR 260 et seq. (RCRA, EPA)
 30 CFR 250 (offshore pollution prevention and control, MMS)
 33 CFR 148-150 (deepwater ports, USCG)
 43 CFR 29 (Trans-Alaskan Pipeline, DOI)
 49 CFR 190-195 (pipeline safety, DOT)
 29 CFR 1910.120 (occupational health and safety, OSHA)
 40 CFR 220 et seq. (ocean dumping and establishment of marine sanctuaries, EPA)

ready to quickly recover the spilled oil and prevent, or at least minimize, adverse effects to public health and the environment. Initial public perception is critical to the perceived success of a spill cleanup. Two recent examples prove this point. Exxon was not perceived as being responsive in early stages of the *Exxon Valdez* oil spill and was never able to fully recover, no matter how hard it tried, how much money it spent, or how well it did. No one, especially the U.S. government, could have done a better job of locating equipment (from everywhere in the world) and getting this equipment to the scene in conditions where logistics were difficult at best. On the other hand, BP America was initially perceived as responding quickly and prudently to the 1990 *American Trader* spill off the coast of California. BP was fortunate in many respects, including the timing of the spill and the locations of key personnel when the spill occurred, but the company was perceived as being ready and able to respond. Mistakes made after a company is perceived to be initially inadequate are blown out of proportion as other examples of ineptness. Mistakes made by a company that is initially perceived to be responsive receive much less attention and may have little or no impact on how the company is ultimately perceived.

An effective contingency plan during an oil spill response is not based on a boilerplate plan, which satisfies a regulatory agency's requirements but is ineffective during a spill crisis. Plans developed to be successful during a spill should be scenario-based, meaning that they are developed by conducting risk analyses of the areas in question; identifying several scenarios requiring different levels of response; developing strategies to respond to each scenario; identifying resources necessary to respond to each scenario; and locating the resources identified as necessary for each scenario.

The objective of oil spill contingency planning is to develop a response organization and identify the necessary resources to adequately respond to an oil spill crisis in a timely manner. Scenario development is a practical exercise that assists a planner in achieving this objective. Scenario development is a process that is methodical and creative at the same time. It should address the following:

- How the organization will manage a spill response while the spill response organization is emerging
- The mobilization procedures necessary to control the emerging organization
- Detailed decision analysis at all stages of a response

- The allocation of resources identified as critical in the scenario
- The information processing and decision support tools necessary for implementing the contingency plan

Table 2 lists some steps that should be considered when developing scenarios for an oil spill contingency plan.

The International Tanker Owners Pollution Federation (ITOPF) recommends two major sections for oil spill contingency plans: a strategy and an operational plan.⁴ The strategy section contains background information, which includes the following:

- Risk assessment
- Sensitive areas
- Cleanup techniques
- Equipment locations
- Labor requirements
- Disposal
- Communications
- Logistics support
- Documentation
- Training

Table 2. Steps in scenario development

1. Determine average spill, maximum most probable spill, and worst-case spill for the area.
 - Historical record of spills in the area
 - Hazard assessment (what and where are the hazards)
 - Vulnerability analysis (what is sensitive and susceptible to damage)
 - Risk assessment (probability of spills and damages)
 - Seasonal considerations
2. Describe the event.
 - Situation
 - Location
 - Type and amount of spill
 - Characteristics of the oil
 - Can pollution source be secured?
 - Environmentally sensitive areas
 - Time of year
 - On-scene weather
3. Describe initial actions and time to do them.
 - Notification
 - Activations (what information is necessary?)
 - Initial on-scene investigation, evaluation, and recommendations
 - Initial response actions and strategies
4. Describe emerging spill response organization.
 - Oil spill response team (responsibilities and duties)
 - Command post
 - Logistics requirements
5. Describe containment, countermeasure, and cleanup strategies.
 - What resources must be immediately protected (offshore, near shore, and inland)?
 - What decisions must be made at this time?
 - What information is needed?
 - What problems will there be in obtaining this information?
6. Describe resource requirements for the scenario.
 - Equipment
 - Personnel
 - Funds
 - Minimum response times
7. Describe available resources and response times.
8. Describe shortfalls (resources and logistics).
 - Equipment
 - Personnel
 - Funds
 - Policies
 - Minimum response times
 - Where will resources come from to make up for shortfalls?
9. How long will it take to clean up the spill?
10. Describe disposal options.
11. Describe procedures for terminating cleanup.

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ITOPF's second section is the operational plan, step-by-step procedures for initiating and carrying out an oil spill response. This section is short compared with the strategy section, but it should be all that is needed to initiate a rapid and appropriate response after the discovery of a spill.

Contingency plans in the United States contain mostly background information. This material is often massed in several volumes that occupy a large amount of shelf space. All of this information is useful (if there is time to locate it), but beyond emergency telephone lists, these plans seldom have sections containing step-by-step instructions on how to initiate a spill response when a spill is discovered. Nor do they have sections identifying strategies for different scenarios.

Table 3 is a comprehensive outline of a contingency plan that combines the format ideas of ITOPF, the requirements of the National Oil and Hazardous Substances Contingency Plan (40 CFR 300), and the idea of scenario-based contingency plans. The first major section, Response Procedures, contains step-by-step procedures and is designed to be a stand-alone section. Someone should be able to take this section during the middle of the night and initiate a proper and timely response to a report of an oil spill. Some of the steps, such as notification and activation, may actually occur simultaneously. It is very important to concentrate on this section, because how the response starts could dictate how the rest of the response goes. An important point to remember is that the initial response actions to every spill are basically the same. Planning, practice, and exercises will ensure that the initial actions are timely, setting the tone for the following actions.

The second major section of Table 3 is Background Information. Most U.S. plans are fairly strong in this area. This information supplements the Response Procedures. Although initial actions in response to virtually all oil spill responses are basically the same, on-scene assessments will reveal characteristics that are unique. These unique characteristics will identify issues or problems that information in the Background Information section should help resolve.

The Scenario Development section should contain the response actions and strategies for several scenarios in a specific area. The importance of this section is that it provides insight into the most likely spill situations. In-depth, creative scenario development should reveal many issues that will surface during actual spills. Planning for these issues will enable a response organization to respond quickly and appropriately. More effort in scenario development should produce a better prepared response organization. Every contingency cannot be prepared for, but more preparation before an incident means fewer new issues to resolve during an actual incident.

The size of the facility, vessel, or operating unit will determine the size and complexity of the contingency plan required. Additional sections are listed in Table 3, to show that in some instances additional information is necessary to supplement the three major sections.

Implementation

After working hard to develop a plan for what to do and how to do it, an oil company cannot forget about doing it. It is not enough for corporate leaders to create a strategy that includes an oil spill planning and preparedness program. It is their responsibility to communicate and implement this strategy through leadership.⁵ An oil company armed with a new oil spill contingency plan should ask itself if the new plan is actually a new strategy. Effective implementation of a new strategy would indicate that the company has changed the way it does business. Has the organization really changed the way it does business? If the culture has not changed, then the plan is just wishful thinking. In the short term, developing a new plan based on Table 3 without changing the way of doing business would probably have some benefit. However, in the long term the organization will revert to the way it has always done things. For long-term benefits from a new plan, the organization must change the way it does business. This is why the pain involved in the process of change is worthwhile and necessary.

Many corporate leaders in the oil industry anticipated the passage of the Oil Pollution Act of 1990 and developed strategies with the environment in mind. Most oil companies either have a new oil spill contingency plan or will have one in the near future. The oil companies' spill response teams are now assigned to implement these new plans. What is their readiness to accomplish this task? A key to implementing a strategy lies in understanding the readiness of the

implementers to make the strategy operational. Leadership is required when the culture (the way of doing business) does not match the new strategy. At this point, something must change, either the strategy or the way the organization does business.⁵

Strategies for the future direction of a company can be changed relatively easily. In the case of an oil company, it is easy to decide that a new strategy will be to establish an oil spill planning and preparedness program and set a goal of implementing that program by a certain date. However, this strategy may be difficult to implement because of the way the organization normally does business. An organization that does not have a history of committing resources to an active oil spill contingency planning and preparedness program will find that the toughest part of implementing this program is bringing the future—the environmental strategy—and the past—the organization's culture—together. Changing the way an organization does business is a process and could take a long time, even years.¹ Leadership is required to get the people involved in and committed to a new oil spill planning and preparedness program.

The implementation process should begin before an oil spill contingency plan is developed. When top management decides that a new contingency plan or a major revision is necessary, this change will not be effectively implemented if the strategy comes from the top, as an edict. One way to gain commitment from those that will implement the contingency plan is to involve them in the strategic planning process as early as possible.³ Top management could begin the planning process by meeting with a select group of people representing all levels of the company's response organization. Top management should explain the urgency for the change and what the new strategy will be.¹ The select group of implementers will take this information and conduct fact finding, perform analysis, and conduct discussions as they move toward fully understanding the company's strategy. This interaction brings out issues that top management may not have considered or did not think were important. It more sharply focuses top management's view of the strategy.⁷ It also involves key implementers in the strategic planning process which gains their commitment.

After the people become committed, the next step for corporate leaders is to empower the people to take the necessary action to implement the plan.⁵ Empowerment is a key part of the implementation process. The need for change does not guarantee that change will occur. Empowerment is important because it creates change.¹

Empowering the implementers of a new oil spill contingency plan happens in different ways. A new plan must have the right people implementing it and organization resources that are dedicated and committed to it (especially the dedication and commitment of corporate leaders).¹ The implementers of the plan should be the members of the various company oil spill response teams. The team members will feel empowered to implement the plan if the corporate leaders display their dedication and commitment through their actions. These actions could include consistently talking about the importance of the new plan; actively participating in the development process; or providing the necessary resources to maintain the plan adequately.

Participation in developing the plan by the implementers overcomes resistance to change and adds creativity to the management process. The implementers involved in the strategic work group should be the champions of the strategy during the developmental process. The development of the contingency plan should include more implementers than the strategic session. Again, the participatory process enables the implementers to conduct fact-finding, perform analysis, and conduct discussions as they move toward fully understanding the company's strategy. When the people fully understand, they will be able to see the fit between their jobs and the new program. This focuses the people's attention on the company's strategy.

During the plan development process, the organization's leaders should assess how the implementers are accepting the change and how past ways of doing business may affect implementation. This assessment helps the leaders identify the critical issues that must be changed to create a match between the way the organization does business and the new strategy. This assessment is a reality check for the organization's leaders because it describes the implementers' current capabilities to implement the new plan.⁵

Once leaders have determined the critical issues that should be changed, they can focus on what the implementers need to implement a new oil spill contingency plan.⁵ This could be as simple as a definition of appropriate practices and guidelines. It could also include a much more complex issue, such as how to change from departments within



Documents

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Table 3. Oil spill response contingency plan outline

-
- Record of changes
Table of contents
How to use this plan
Response and planning policies
Purpose and objectives
Authority and applicability
Scope and geographic boundaries
Periodic reviews and updates
- I. Response Procedures (what to do)
- A. Discovery and notification
1. Notify internal and external contacts
 - a. Internal:
 - Predesignated local on-scene commander
 - Facility manager
 - Department manager
 - Headquarters
 - Public affairs
 - Legal/risk management
 - b. External:
 - U.S. National Response Center, Washington, DC
 - Local U.S. Coast Guard Office
 - State environmental agency
 - Local emergency planning commission
 - Local fire and police departments
 - Area facilities (e.g., water intakes)
 2. Activation
 - a. Local response team
 - b. Regional/department response team
 - c. National/headquarters response team
 - d. Outside resources:
 - Cleanup contractors
 - Coops
 - Consultants
 - Government
- B. Evaluation and initiation of action
1. Activate initial response organization
 - a. Designate personnel
 - b. Review responsibilities
 - c. Choose location of command post
 - d. Set up command post
 2. Define the nature of the incident
 - a. Threat to environment/human health
 - b. Maximum potential spill size
 - c. Offshore or nearshore incident
 - d. Shoreline impacts
 - e. Status of vessel/facility
 - f. Spill continuing/secured
 3. Protect the safety of all personnel
 - a. Danger of fire/explosion
 - b. Danger of toxic gases
 - c. Personnel protective clothing
 - d. Site safety plan
 - e. OSHA training
 - f. Medical services
 4. Secure or isolate the source
 - a. Extinguish fires
 - b. Secure/isolate source
 - c. Close fire doors, valves, and vents
 - d. Stabilize the vessel
 - e. Contain spilled material
 5. Evaluate severity of the incident
 - a. Location and size of spill
 - b. Product characteristics:
 - Type
 - Viscosity
 - Pour point
 - API gravity
 - Chemical composition
 - c. Weather/on-scene conditions (Weather forecasts for present and for 6, 12, 24, and 72 hours)
 - d. Movement of spill
 - e. Immediate human health and environmental concerns
 - f. Extent of contamination
6. Initiate prudent response actions
 - a. Based on preliminary assessments
7. Meet with government officials
 - a. Identify sensitive areas
 - b. Confirm protection priorities
 - c. Identify countermeasures to prevent shoreline impacts and protect sensitive environments
 - d. Determine feasibility of dispersant use, in-situ burning, bioremediation, and other chemicals.
 - e. Develop initial strategy
8. On-scene commander evaluation of initial assessment and strategy
 - a. Strategic planning is an ongoing process
 - b. Reevaluate protection strategies of sensitive areas
 - c. Plan to use multiple response techniques
 - d. Activate available and appropriate response assets
 - e. Convene assessment/strategy experts
 - f. Legal and risk assessment issues
- C. Containment, countermeasures, and cleanup
1. Implement logistics support
 2. Contain and remove the oil
 3. Monitor oil movement and protect critical areas
 4. Consider use of dispersants, in-situ burning, and bioremediation
 5. Establish proactive public/media relations
 6. Monitor and refine cleanup strategies
 7. Develop criteria and guidance for terminating cleanup
- D. Waste disposal
1. Identify nature and volume of waste and disposal requirements
 2. Identify temporary and permanent disposal locations
 3. Determine if necessary permits are in place
 4. Determine method of transporting waste to disposal site
 5. Implement disposal plan
- II. Background Information (how to do)
- A. Notification and activation
- B. Response organization
1. National
 2. Regional
 3. Local
- C. Logistics support
- D. Offshore response strategies
- E. Protection strategies
- F. Cleanup techniques
- G. Predicting spill movement
- H. Disposal guidance
- I. Dispersants and other chemicals
- J. In-situ burning
- K. Wildlife protection
- L. Damage assessment and restoration
- M. Cost documentation and accounting procedures
- N. Public/media affairs
- O. Government liaison
- P. Worker health and safety
- Q. Training and exercises
- III. Scenario Development
- A. Hazards analysis
1. Identification
 2. Vulnerability analysis
 3. Risk analysis
- B. Spill scenarios
1. Worst case
 2. Largest most probable spill
 3. Average spill
- C. Strategies for each spill scenario
- D. Resources necessary to respond to each scenario
- E. Location of necessary resources
1. Preexisting contracts
 2. Response times

IV. Figures

- A. Response organization
- B. Geographic boundaries
- C. Notification diagram
- D. Dispersant use decision guide
- E. In-situ burning decision guide
- F. Bioremediation decision guide

V. Forms

- A. Incident report form
- B. Contingency plan checklist
- C. Dispersant use checklist

VI. Appendices

- A. Spill response team duties and responsibilities
- B. Laws, regulations, international treaties, and protocols
- C. Sensitive area descriptions, ESI maps (if available)
- D. Equipment inventory, response assets, response times
 - 1. Contractors/consultants
 - 2. Mutual-aid agreements/coops
 - 3. U.S. government assets (USCG, Navy, NOAA, EPA)
- E. Contracts
- F. Communications
- G. Definitions
- H. Abbreviations

an oil company having autonomy in responding to spills to a new way of doing business, in which an oil company's response to spills crosses departmental boundaries.

Once a new contingency plan is developed, assessing the implementers' readiness to implement the plan will help determine the amount of structure and direction required by them. An action plan is helpful to identify specific actions, responsibilities, and time frames for implementing the plan.³ Participation in the process empowers the people to understand and support the company's strategies.¹ Empowerment makes the people feel they make a difference in the company, enhances their performance through on-the-job training, and provides a feeling of common purpose.² After the people know what to do, give them permission to do it. Use of the new behavior (implementing the new contingency plan) should be reinforced, because reinforcement empowers continued effort toward oil spill planning and preparedness.¹

Summary

The environment in which the oil industry will operate in the 1990s demands that environmental issues become part of corporate strategies. One way to cope with these demands is to implement a contingency planning and preparedness program that is empowered to take the necessary actions to prepare for and respond to oil spills.

Oil spill contingency plans should be formatted so that they will be effective in responding to actual oil spills, as well as satisfying the ever increasing number of regulations affecting oil spill contingency planning. An effective contingency planning format to accomplish both objectives is a plan divided into three basic sections:

- Step-by-step procedures for initiating response actions after a spill is discovered
- Background information that will be necessary in planning for a response, and important as supplemental information during a response
- Scenarios developed to identify the resources necessary to adequately respond to spills of various sizes

An excellent oil spill contingency plan developed using the format in Table 3, or other existing formats, does not guarantee that an oil company will be prepared to respond quickly and professionally to a major spill. The key to effective oil spill contingency planning is implementation. The key to implementation is corporate leadership. It is the responsibility of corporate leaders to communicate their strategies to all levels of the organization and ensure that these strategies are implemented. When there is a mismatch between the way an organization does business and a strategy, leadership is required of the corporate leaders to change the way of doing business, get the people involved and committed, and empower the people to take the appropriate actions to implement the strategy.⁵

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PREPARATION OF MARINE POLLUTION CONTINGENCY PLANS FOR SMALL ISLAND NATIONS

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ABSTRACT: *Many small and remote nations of the South Pacific depend primarily on subsistence fisheries for their livelihoods. The foreshores of many of these nations are fringed by coral reefs, on which very active marine ecological systems depend. Oil spills in these areas would have a serious effect both on these systems and on the islands' economic activities.*

As part of the International Maritime Organization technical assistance program for Pacific Island nations, the Australian government has carried out a number of missions to develop marine pollution contingency plans. This paper discusses the essential issues for these plans, which are often based on an assumption of low risk, but need to recognize the severe effect that a pollution incident would have on the community and the environment. The linking of national plans with effective regional assistance arrangements is also discussed.

Australia, as one of the more industrialized nations in the southwest Pacific basin, and as a member of the Council of the International Maritime Organization (IMO), provides technical and economic assistance to nations of the South Pacific environment protection. In 1988 the Department of Transport and Communications (DoTC) began a program in which visits were made to selected nations to prepare draft marine emergency plans with specific reference to marine pollution from ship sources. Aware of the IMO global program for the protection of marine resources, these nations had requested the assistance of IMO in this task.

Most of the nations within the area attained independence within the past 15 years and retain strong economic and trade ties with their former countries of affiliation. Some of these island nations have inherited ratification of significant international conventions, although regulations for implementing the conventions do not always exist.

Almost all nations in the South Pacific basin rely extensively on aid programs. The source of this aid varies, but the prime donor is generally the nation with past government and public administration ties. Budgetary aid in most cases is being reduced in favor of technical assistance programs. Many of these programs are administered by the economic, environmental, and technical affiliates of the United Nations and by those nations of the northern hemisphere with significant government aid programs. A result of these program arrangements is that implementation of most contingency planning recommendations relating to material resources takes a while to put into effect.

Plan preparation

The visits to remote nations require early and extensive planning to ensure that appropriate government and industry representatives are available to take part in the preparatory discussions. Initial contact with the appropriate Secretary to the government of the nation concerned is generally made through foreign or external affairs offices.

Subsequent arrangements are made directly, a relatively easy matter now that most of these nations are equipped with reliable telephone, facsimile, and telex systems.

Ideally, lead agencies should be identified beforehand, so that personnel within these agencies may give some advance thought to roles and responsibilities. Response implementation varies from nation to nation according to available organization, legislation, and resources. Most countries, being island nations, depend significantly on shipping services for trade. The department in charge of marine affairs is usually the most appropriate authority for marine pollution matters.

Travel to any small or remote nation involves an element of interest beyond that of intercontinental flying. Local flight services may be provided only once weekly, with the aircraft and elements adding variables that need to be accommodated. Aircraft are of varying vintage (Figure 1), and flights may involve some four hours over water. In-flight service may consist of a box of sandwiches or nothing at all. A totally different world greets the traveler on arrival, when the remoteness at last has its impact (Figure 2).

On arrival, a meeting is convened to which all authorities and agencies with an interest in marine pollution matters are invited. Typically represented are departments of the environment, fisheries, oil industry, transport, police, and community affairs groups. The Secretary to government usually presides.

The aims and objectives of the contingency plan and the mission are stated, usually in the following form:

Aims

- To provide guidelines for a coordinated response to a marine pollution incident within the waters of the nation
- To provide pre-incident planning, to minimize the effects of pollution on the economy and physical environment
- To develop mechanisms to request assistance from regional nations under the regional plan.

Objectives

- To identify key authorities for the management of the response
- To identify sensitive areas
- To determine appropriate and feasible response measures
- To determine measures for the disposal of contaminated waste

The preparatory meeting is followed by a tour of the island or, depending upon the extent of the territory, of those areas where risk is deemed to exist. This inspection helps in determining the scope of the plan.

Individual discussions are then held with representatives of each agency to determine the degree of involvement of the agency and the role it may play in a response team. Details are also gathered relating to the resources, both human and material, that may be effectively used.

Legislation

Again, a number of these remote island nations have become independent only in the last 10 to 15 years, and with independence, many



Figure 1. DH 114 passenger aircraft built in 1953 is currently in regular service operating out of Suva, Fiji.



Figure 2. Some final approaches have limited options.

have carried over accession to some international marine pollution and safety conventions, especially those nations operating national shipping services. Nevertheless, in a number of cases no regulations have put into effect the conventions' requirements. Thus, the consultant must identify legislative needs and make recommendations to the Attorney General about the adoption of appropriate conventions. It is also important that responsibility for regulations be given to the appropriate government department.

Governments should be encouraged to ratify the following international conventions, and to establish regulations for their enforcement:

- London Dumping Convention
- MARPOL 1973/78 Convention and Annexes
- Intervention Convention
- International Oil Pollution (Fund) Convention
- Civil Liability Convention

Risk assessment

An early objective is determining the degree of risk. For this, assessments are made of the harbor and oil-handling facilities, and of tonnages and types of oil handled and whether they are transferred via floating pipeline or through a wharf discharge point. Oil storage facilities are also assessed for housekeeping standards (Figure 3). Oil installations are often operated by government and nearly all are located immediately adjacent to the foreshore. A reason for this practice is clearly to maintain minimum runs of above-ground or underground pipeline, but it also depends on the available land. However, such siting



Figure 3. Oil storage terminals are often located on exposed foreshores.

in cyclone-prone areas may readily lead to undermining of bund walls and storage tanks and also to increased corrosion.

In addition to the risks of oil-handling operations, the possible release of oil through vessel grounding should also be considered. In a number of island nations, depth of water and maneuvering space severely limit the berthing of tankers, and product is transferred at anchorage through floating hoses. Fuel and lubricants are brought ashore in lighters that in many cases would raise the eyebrows of any classification society surveyor.

Most of the trading vessels operating in the South Pacific are small by international standards, and as regular traders are familiar with the waters in which they operate (Figure 4). As a result, the risk of spills during oil transfer operations is low, and the potential spill quantity is small. Persistent oils are rarely handled; most of the product is jet fuel, motor gasoline, and light diesel for power generation. All of these grades of fuel evaporate rapidly due to the relatively high ambient temperatures and constant winds. However, a spill of substantial quantity from a broken hose or failed coupling could seriously affect shellfish and coral habitats and affect local fishing for a while. Such a spill would also present a fire hazard until the hydrocarbon vapors dissipated.

A more significant pollution scenario surrounds the possible grounding of a vessel in a lagoon or roadstead (Figure 5), resulting in a release of persistent bunker fuel. Should heavy fuel become beached within a reef on a falling tide, deposition on coral structures would result, smothering some of the many types of marine organisms that inhabit the lagoon area. Oil deposited on foreshores would likely penetrate the coarse coral sand typical of tropical beaches and, because of the low wave energy within the reef area, would likely persist for some time.

The risk of spills from passing traffic is considered to be low, most vessels giving coral reefs a wide berth.

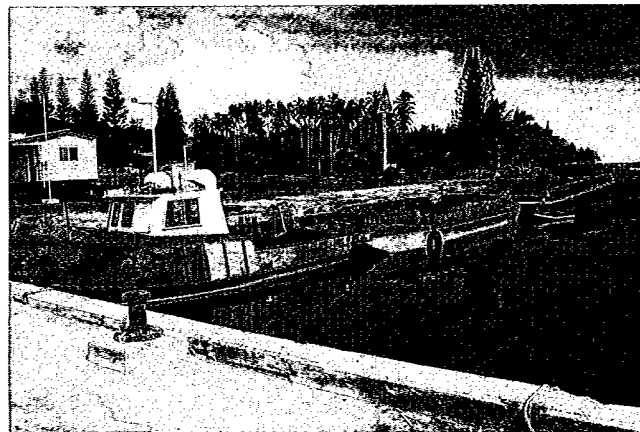


Figure 4. Barges are used for transport of products from ships at anchor to the harbor.



Figure 5. A lagoon and reef-enclosed harbor typical of island nations.

Physical and environmental features

The coastal zones of Pacific island nations vary considerably, from idyllic tropical islands with white beaches, crystal clear water, and overhanging palm trees to islands with extensive tidal flats flanked by mangroves or rugged and exposed limestone cliffs (Figure 6). Most of the islands are fringed by coral reefs, some extending a mere 20 meters from the foreshore, others almost as extensive as the land mass they surround. Within these reefs, beaches generally consist of decomposed coral and coarse sand (Figure 7).

The reefs are a significant resource for subsistence fishing in most of the island nations. Such fishing is generally carried out from small villages located along the coastline. The craft used range from dugout outrigger canoes and outboard-powered aluminum dinghies to steel fishing vessels, often obtained through aid programs. Associated with these programs are attempts to develop organized fishing industries, though few have reached the export stage. However, local fishing has achieved a market basis with the development of fisheries cooperatives (Figure 8).

Because of the nature of coastal activity, it is difficult to establish a vulnerability grading for the littoral area. Local natural resources are all of high value to the local population. All of the fringing reefs are high on the sensitivity list, the only differences among them owing to seasonal variations of weather and to variations of natural self-cleaning in the event of coastal oiling (Figure 9).

Spill response

For a small island nation, a simple but effective contingency plan is the most useful element for spill response. The plan should be agree-



Figure 6. Fringing coral reef and island enclosing a lagoon



Figure 7. Sheltered tidal flats and mangrove habitat within a lagoon



Figure 8. A variety of craft are used in subsistence fishing—note dugout in foreground



Figure 9. High limestone cliffs and narrow reefs with concealed coves that provide access to the water

able to all authorities and agencies and should be updated frequently. Through exercise and review, readiness is maintained and personnel are kept aware of their roles in the response. It is important that authorities are aware of the potential effects of a spill on the local environment, and regular contact with involved agencies should ensure this.

Few governments maintain spill response equipment. It is seen as the responsibility of industry to provide these resources, and in some cases industry does. Limited stocks of small inshore booms and sor-