SECTION 2

THE HISTORY OF JUDGING SPILL RESPONSE PERFORMANCE

This section examines the evolution of spill response and the criteria used to measure performance. During the 1970s and 1980s, criteria evolved from a simple concern of removing free-floating oil from water to a more sophisticated, coordinated government-industry effort minimizing environmental impacts of a spill. In the aftermath of the *Exxon Valdez* spill and Oil Pollution Act of 1990 (OPA 90), the focus on limiting impacts has been hampered by the introduction of concern over assessing damages to the environment.

2.1 SPILL RESPONSE IN THE 1970S AND 1980S

The 1967 *Torrey Canyon* spill in the UK and the 1969 Santa Barbara spill in the US were pivotal events. They focused world attention on oil spills and triggered immediate initiatives in several countries on spill prevention, spill preparedness, research and development on oil spill containment, control, cleanup technology, fate and effects of spilled oil, and spill response planning (see reviews by Gould and Lindstedt-Siva, 1991; Lindstedt-Siva, 1984).

The *Torrey Canyon* and Santa Barbara spill responses were primitive. The application of highly toxic dispersants (actually solvents) to shorelines during *Torrey Canyon* caused greater shoreline damage than did the oil itself (Spooner, 1969). During Santa Barbara, it took 6 days to acquire and assemble a containment boom, which failed when deployed at sea. Beaches were cleaned using straw, rakes, and shovels. Seawalls, jetties, and oiled rocks were steam cleaned or hydroblasted. A cleaning station was set up for oiled birds, but survival rates were low (Gaines, 1969).

During the *Torrey Canyon* and Santa Barbara spills, there were no established criteria by which to judge these responses. For these events and during the early 1970s when spill cleanup cooperatives and industry and government spill response processes were being established, the default criterion was removal of visible oil (Lindstedt-Siva, 1984, 1992). Spill management was relatively simple, conducted either by a spiller with government oversight or by government itself with few, if any, external agencies or organizations involved. Oil was removed from the water surface using containment booms and skimmers (even sinking agents were proposed) and from shorelines by whatever method seemed necessary to produce a "clean beach." The use of toxic dispersants, sand blasting or steam cleaning rocks, bulldozing marshes, excavating large quantities of oiled beach sand, or other similar methods that removed oil without regard for associated ecological impacts.

The *Torrey Canyon* and Santa Barbara spills were global media events. Photos and film of oiled birds and blackened beaches flashed around the world. Newspaper articles and news broadcasts chronicled each spill and progress of cleanup activities. The public was outraged. Scientists were asked to predict spill impacts. Would the environment ever recover? At that time, there were not very many answers.

Public response to these dramatic and serious spill events attracted the attention of elected officials at all levels, setting in motion what would eventually become sweeping environmental legislation. The National Environmental Policy Act was the first of these laws in the US. The International Convention on Civil Liability for Oil Pollution Damage was written in late 1969 and has been adopted internationally. In Santa Barbara, the environmental group Get Oil Out (GOO) was born (Steinhart and Steinhart, 1972). Existing environmental groups took strong positions against offshore oil development, and new environmental groups were formed. Environmental Defense Fund, Friends of the Earth, Natural Resources Defense Council, and Greenpeace were all founded during the period from 1969–1971. These environmental groups often were as critical and distrustful of government as they were of industry. Some observers of environmental issues think that the first Earth Day on April 22, 1970 was triggered by these dramatic spill events. The environmental movement had begun and drew members and financial support from an outraged public.

In response to these two spills, the petroleum industry launched research programs to develop response technologies such as oil containment booms and skimmers, oil sorbents, and less toxic, more effective chemical dispersants. In 1968, the tanker industry formed an organization that was to become the International Tanker Owners Pollution Federation (ITOPF). Based in London, this organization was formed to administer a voluntary compensation agreement. It expanded over the years to provide information and assistance to oil-handling companies and government agencies on laws and conventions covering oil spills, contingency planning, cleanup techniques, and impacts of spilled oil. ITOPF specialists are available 24 hours a day to assist responders during spills. After the Santa Barbara spill, the oil industry began a program to establish spill cleanup equipment stockpiles or cooperatives in many areas of the world. These cooperatives stockpiled and maintained spill response equipment and prepared to respond to spills in their

areas of responsibility. These cooperatives and stockpiles expanded the capabilities of both industry and government.

The first oil spill conference convened in December 1969, jointly sponsored by the American Petroleum Institute and Federal Water Pollution Control Administration, which later became the US Environmental Protection Agency. The first conference contained technical papers on the effects of the *Torrey Canyon* (Spooner, 1969) and Santa Barbara (Straughan, 1969) spills as well as progress reports on research efforts in response technology.

In 1978, the US National Oceanic and Atmospheric Administration (NOAA) was charged with providing scientific support to the US Coast Guard (USCG) during oil spills. At the same time, industry and government spill response teams in Europe and North America were gearing up and began to include environmental scientists. This, and results emerging from industry- and government-sponsored spill research programs, produced a shift in spill response emphasis — minimizing environmental impacts of spills rather than simply removing visible oil (Hum, 1977; Lindstedt-Siva, 1977, 1979; Westree, 1977). This was the beginning of the effort to identify environmentally sensitive areas during the planning process, along with strategies to protect them from oil contamination (Lindstedt-Siva, 1976, 1977; Pavia *et al.*, 1982). Overall environmental impacts of a spill could be reduced significantly if these most vulnerable areas could be protected.

Government and industry began to consider the fate and effects of spilled oil and effects of various cleanup methods. International scientific panels developed consensus recommendations for "low-impact" cleanup methods (API, 1985; Tramier *et al.*, 1981). The scientific community, whether in universities, government, consulting firms, or industry, recognized that the goal of minimizing ecological impacts of spills should be integrated into spill response plans (Lindstedt-Siva, 1977, 1979). Hence, response should be largely based on ecological criteria (Byroade *et al.*, 1981; Cox and Cowell, 1979; Wolfson *et al.*, 1979). This approach was justified because ecological impacts tend to be longer lasting and more difficult to repair than esthetic impacts. Major questions at that time were:

- Did the response minimize the ecological impacts of a spill?
- Were the cleanup methods used ecologically sound?
- Did the response reduce or increase spill impacts versus what would have occurred without human intervention?

Increasingly, governments required advance planning and periodic drills. As a result, site-specific plans were developed that included identification of environmentally sensitive areas with specific strategies to protect them. These plans and required drills brought government and industry spill responders together. Over time, relationships developed, and a level of trust was built. Ideally, there would be teamwork among government and industry responders toward a common goal, thus making response more effective.

During the 6,000-bbl spill in Port Angeles Harbor, Washington (1985), this author observed such teamwork. Government and industry responders agreed on response priorities and methods to achieve their primary goal — minimize the environmental impacts of the spill. Participants worked as a team during response operations and participated jointly in a study to assess the environmental impacts of the spill. Although one environmental group complained that government and industry responders worked too closely together, all involved agreed that working as a team and sharing information seemed the most effective way to conduct a response and ensure that scientific data were available promptly.

2.2 SPILL RESPONSE IN THE 1990s

Because the *Exxon Valdez* spill was so large and in a pristine environment, it generated massive, worldwide media and public attention. Not only did media converge on the small town of Valdez, Alaska, so did cleanup crews and equipment, government agencies and elected officials at all levels, environmental groups, and volunteers who wanted to help. Fishermen mobilized to protect their livelihood. Many groups wanted a part in the response process, most in addition to those that had trained and practiced together and had assigned roles. With the high-stakes legal issues involved in the potential Natural Resource Damage Assessments (NRDAs) and civil or criminal penalties, a highly polarized atmosphere was promoted that interfered with the free flow of information and teamwork (Davidson, 1990).

Internationally, the *Exxon Valdez* spill led to the adoption of the International Convention on Oil Pollution Preparedness, Response, and Cooperation (OPRC Convention) in 1990. The OPRC Convention deals with contingency planning, spill reporting procedures, national and regional systems for response, international cooperation in response, research and development, and technology. By the end of 1996, 30 countries had adopted the OPRC Convention (Moller and Santner, 1997). Additionally, worldwide capabilities of cooperatives and equipment stockpiles established in the 1970s were further expanded.

In the aftermath of the *Exxon Valdez* spill, the focus on limiting spill impacts has been hampered by the assessment of damages to the environment. In the US, the spill resulted in the rapid passage of OPA 90, which included development of new NRDA regulations for oil as well as strengthened response and planning requirements. A good discussion of the content, history, and intended and unintended effects of NRDA regulations is in Mauseth and Kane (1995).

Wells *et al.* (1995) edited the symposium proceedings on the *Exxon Valdez* spill that contains reports of scientists funded by Exxon. Wells *et al.* (1995) state in their introduction to the volume that, at the beginning of the cleanup, lead scientists from government and Exxon attempted to establish a joint research program. This attempt failed when the US Department of Justice imposed confidentiality restrictions on the work of all government scientists. Secrecy became a major factor, along with the possibility that data analysis and interpretation could be delayed pending the outcome of legal action.

Further, Wells *et al.* (1995, p. 20) suggest that, had data entered the public domain, that data might have helped with understanding the spill's impacts and aided initiation of actions to alleviate damage. They quote a 1994 letter from John Robinson, who was in charge of the NOAA team that provided scientific support to the USCG during the spill:

> "To the extent that research conducted during the spill might have offered the potential of changing the course of the cleanup, there were probably several missed opportunities. The adversarial process in which we found ourselves certainly did not work to the benefit of the cleanup. Those of us charged with advising the Coast Guard were effectively blocked from communicating with scientists on either side of the damage assessment issue, much to our unending dismay. People and money to support cleanup related research, as opposed to damage-related research were difficult to come by...We were never able to communicate effectively with scientists employed by the state or federal government's damage assessment efforts."

Legal issues have influenced spill response and the judging of the response effort: the presence of lawyers and the expectation that civil and criminal litigation, as well as NRDAs that may follow, has limited communication between responders representing a spiller and those representing government. There seems to be greater polarization among all concerned with response because of the legal pressures and intense media attention on controversies among participants. Such polarization is seen even in countries that do not have NRDA regulations.

Wells *et al.* (1995) discuss the problems inherent in communicating complex, technical issues to the media and public in a highly charged atmosphere. Some scientists tend to generalize and overstate their conclusions to the media and lawyers in the early phases of an adversarial process. Both the media and legal system encourage individual scientists to make rapid, definite conclusions on controversial issues. In contrast, the slower scientific peer-review system encourages consensus conclusions through criticism by other researchers.

Since the legal system now dominates spill response, scientists are seen as representing one "side" or another. Legal constraints also have affected the quality of science and interpretation of findings. Lawyers want conclusions, not qualifiers. Scientific findings almost always have qualifiers. Scientists working on one "side" do not benefit from peer review of those on the other. Further, there is a conflict of interest when the same government agency plays a major role in directing spill response as well as assessing damages and ultimately receiving damage awards, which response and damage assessment planners should consider. Lindstedt-Siva (1991) recommends separating response and damage assessment functions into different agencies.

Mauseth and Kane (1995) discuss potential conflicts between law and science. Lawyers and scientists have different missions. Lawyers are advocates, trained to present one side and argue its validity. When dealing with scientific issues, their job is not to present the whole literature on a given subject but only those studies that support their case. Scientists' job is to review the whole literature, look at all possible explanations, and let the data drive conclusions. To the extent that scientists are persuaded to become advocates, it represents a corruption of their primary mission.

Wells *et al.* (1995, p. 21) acknowledge that political factors can overwhelm scientific considerations. The authors conclude that objective judging was not possible at the time of the *Exxon Valdez* spill:

> "One major problem for the authorities on both sides was continued public distrust in their deliberations and outputs. Ideally, public representatives should be involved in study design through to data dissemination. But even if all the experts agreed that the best response to the spill was to allow natural processes to take their course, this would have been politically unacceptable because the public was crying, 'do something!' Political and social factors still overshadow the objective analysis of the impacts or lack of them for this particular spill."

Intense media attention may influence the cleanup process and the way it is judged. Davidson (1990) illustrates this point with an example from the *Exxon Valdez*. Davidson notes that the question of how clean is clean became not only a practical matter of recovering oil and cleaning shorelines but also a public relations challenge. Experts could not make decisions on scene because all decisions had to be accepted by the public and public officials. For example, it might be unacceptable from a public relations' standpoint to leave visible oil on a shoreline even though this might be the most ecologically sound option in the opinion of on-scene experts, which reverts to the 1970s default criterion of spill cleanup.

2.3 Summary

As spill response evolved over the past 30 years, the criteria used to assess performance also evolved from simply removing visible oil to the more complex question of how clean is clean. The question of "How clean is clean?" has become not only a practical matter of recovering oil and cleaning shorelines, but also a public relations challenge. Spill managers in the 1990s must now consider competing perspectives of various agencies and organizations involved in a response. Decisions made by spill experts on scene must now be acceptable to the broader public and public officials.

Advances in assessing response effectiveness have not matched the increasing complexity and sophistication of response. This may be due to the response community's focus solely on adding more response capabilities. The tendency of the media and public to judge response based on their own

perceptions rather than factual evidence may have contributed to lack of emphasis on assessing effectiveness. As the limits of increasing capabilities are approached, however, the response community is beginning to recognize the need to assess current practices not from a pass/fail perspective, but from an assessment perspective that identifies strengths and weaknesses. This recognition offers opportunities for performance validation and improvement.