

ORGANIZATIONAL OBSTACLES TO DECISION-MAKING DURING OIL SPILLS

H. E. Mew, Jr.¹

Department of Natural Resources and Community Development
P.O. Box 27687
Raleigh, North Carolina 27611

Ann Hayward Rooney-Char²

Virginia Institute of Marine Science, College of William and Mary
Gloucester Point, Virginia 23062

Capt. James D. Webb³

Captain of the Port, Hampton Roads
Fifth Coast Guard District
200 Granby Mall
Norfolk, Virginia 23510

ABSTRACT: *This paper discusses a procedure for minimizing inter-agency conflict during oil pollution incidents. Under the organizational structure established by the National Contingency Plan, an on-scene coordinator depends on an accurate flow of information from a variety of agencies or groups for effective decision-making and a successful spill response effort. This paper identifies the different groups with responsibilities in spill incidents and discusses how their differing perspectives may lead to conflicts, imposing obstacles to decision-making. Although the differing perspectives reflect substantive issues, behavioral characteristics of organizations may actually precipitate or aggravate conflicts. Disagreements between agencies over substantive issues can be resolved to a large extent through conscientious development of the contingency plan, and frequent communication and joint training exercises among agencies are effective means for averting or minimizing conflict during actual spill incidents.*

Effective decision-making is the key to managing a successful oil spill response effort. However, such an effort usually involves diverse groups, each with its own organizational mission, and each trying to achieve its own set of objectives, including the common goal of minimizing environmental damage. Conflicts inevitably arise, posing obstacles to the decision-making process. This situation of interagency conflict became apparent to the authors at their first meeting during a Fifth District Regional Response Team (RRT) spill response exercise put on by the U.S. Coast Guard's Marine Safety School staff from Yorktown, Virginia.

The table-top exercise, involving a hypothetical grounding of an oil-carrying barge near the North Carolina-Virginia state line on the Atlantic Intracoastal Waterway, was witnessed by members of the National Response Team (NRT) via closed-circuit television. Capt. Webb served as the on-scene coordinator (OSC) for the exercise and as such had the authority to coordinate the response effort. Mew served as the designated North Carolina representative to the RRT, with responsibilities not only for parallel state oil spill statutes, but

1. State Regional Response Team representative
2. National Oceanic and Atmospheric Administration scientific support coordinator
3. Predesignated on-scene coordinator

also for more broadly protecting natural resources of the state. Rooney-Char, who works at the Virginia Institute of Marine Science under a National Oceanic and Atmospheric Administration (NOAA) contract, served as the scientific support coordinator (SSC), with responsibilities delegated in the National Contingency Plan to provide technical assistance and coordinate scientific efforts during a spill incident. During the exercise, the OSC assigned responsibility for coordinating both scientific and state input to the SSC, and the inevitable conflicts dramatically materialized.

The Yorktown exercise is an excellent vehicle for pointing out potential areas of conflict before an actual problem arises. In this instance, however, no concrete actions were taken to resolve identified conflicts. Six months later we were brought together again, this time playing real-world roles in a major oil spill along 11 miles of the North Carolina coast. The inherent conflicts had not gone away, and, as can be expected, conflict resolution was required under spill response conditions not the most conducive for achieving a successful settlement.

Our purpose here is simply to reemphasize the importance of pre-planning and effective interagency communications to a successful spill response effort. We do this using an actual oil spill incident as an illustrative example and drawing on collective experiences in resolving our own conflicts. The majority of such conflicts arise from inherent organizational obstacles encountered when more than one group of people set out to solve a problem. Intuitively, we are aware such obstacles exist. Here, we attempt to identify some of the very real substantive issues which can present obstacles to decision-making when two or more groups interact. We also show that many obstacles can be overcome before actual spill situations. Although the issues giving rise to interagency conflicts generally are substantive, they are precipitated primarily by organizational behavior. These behavioral aspects can be controlled if identified early in the planning stage and dealt with in an appropriate setting.

To begin, we briefly trace the emergence of a national policy aimed at protecting the country's natural resources from the effects of oil spills and describe how the federal government organized to implement that policy. By looking at the assigned roles or missions of the various groups in a response effort, we identify group concerns and perspectives which may differ during spill response. Having identified these as a basis for conflict, we also discuss situations which actually lead to interagency conflicts.

Emergence of a national spill policy

As early as 1924, an Oil Pollution Act (33 USC 431-437) was passed by Congress forbidding the discharge of oil from vessels. In 1954, the International Convention for the Prevention of the Pollution of the Sea by Oil recommended the establishment of nearshore zones where the spilling of oil would be illegal. The Oil Pollution Act of 1961 (33 USC 1001) implemented provisions of that convention.

The 1948 Federal Water Pollution Control Act (33 USC 466-466n) set two key policies. It established as national policy the prevention, control, and abatement of water pollution to enhance the quality and value of the nation's water resources; and it recognized the primary responsibilities and rights of the state in preventing and controlling water pollution. Amendments to this act in 1961 extended federal authority to include all navigable waters in the United States. Additional amendments in 1965 called for cleanup of all interstate and coastal waters, with the states setting water quality standards in accordance with federal guidelines.

Concerns about oil discharges and water pollution merged in 1966 with passage of the Clean Water Restoration Act, which transferred to the Interior Department both the Federal Water Pollution Control Administration and responsibility for the Oil Pollution Act. Then, in 1967, the wreck of the *Torrey Canyon* devastated the coasts of England and France, heightening worldwide awareness of oil spill problems, and leading in 1968 to publication by Interior of an interagency oil spill response agreement—a precursor to the present National Contingency Plan. The 1968 breakup of the *Ocean Eagle* in Puerto Rican waters and the 1969 Santa Barbara offshore oil well blowout further heightened public awareness of oil pollution problems and documented the complexities involved in spill containment and clean-up efforts.

Responding to these concerns, Congress in 1970 added section 11 to the Federal Water Pollution Control Act (Public Law 91-224), declaring as national policy that there should be no discharge of oil into the navigable waters of the United States or adjoining shorelines. Under this law, the president directed the secretary of the interior (Executive Order 11548) to issue implementing regulations, which led to codification of the contingency plan.

With the creation of the Environmental Protection Agency in 1970, amendments to the Federal Water Pollution Control Act in 1972 (PL 92-500), and development of a National Contingency Plan by the Council on Environmental Quality as directed by the president in Executive Order 11735, the current structure of the federal oil spill response effort was established. Further amendments to the Clean Water Act also established a \$35 million revolving fund under Section 311 (k). Managed by the Coast Guard, the fund is to pay for spill response actions taken under section 311.

Significantly, Congress chose the Clean Water Act, with its objective of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters, as the vehicle for addressing oil spill problems. Under section 311 of the act, these problems include not only water quality, but damages to the public health and welfare including, but not limited to, fish, shellfish, and wildlife, and public and private property, shorelines, and beaches.

Implementation of the oil spill provisions of the act was seen not as a single agency delegation of pollution control responsibilities, but rather as a multiagency approach to managing a complex national problem. To coordinate that approach, Congress directed the president to prepare a National Contingency Plan for removal of spilled oil and hazardous substances and to assign duties and responsibilities to federal departments and agencies in coordination with state and local agencies. This plan provides for a pattern of coordinated and integrated response by federal agencies to protect the environment from damaging effects of pollution discharges and promotes the coordination and direction of federal and state response systems.

Organizational structure under the National Contingency Plan

Figure 1, taken from the 1980 edition of the National Contingency Plan, illustrates the conceptual framework underlying the national spill response effort. Overall responsibility for minimizing damages to

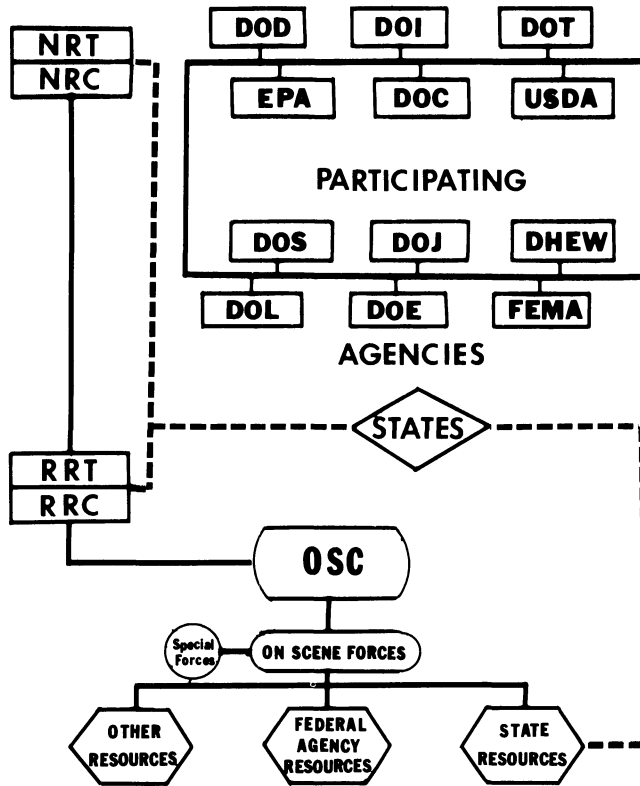


Figure 1. National Contingency Plan concepts

public health, welfare and the environment in the event of a spill lies with a pre-designated federal on-scene coordinator. Responsibility for designating the OSC is delegated to the U.S. Coast Guard for spills in the nation's coastal zone and to the Environmental Protection Agency (EPA) for inland areas of the country. The OSC is responsible for coordinating the response effort and assuring the prompt containment, cleanup, and disposal of spilled material.

On-scene forces assisting in the cleanup effort may include federal, state, local, and private personnel and resources. Special forces, or spill control specialists, also are available to assist the OSC and include the National Strike Force maintained by the Coast Guard, an Environmental Response Team established by EPA, and a scientific support team. Spills in the late 1960s pointed up the need for better scientific information on the impacts of oil on natural resources, and conversely, the need to coordinate diverse scientific opinion. The plan directs NOAA and EPA to designate scientific support coordinators (SSC) for coastal and inland OSCs, respectively.

The Regional Response Teams address policy questions and advise the OSC during spills. Each RRT serves as its region's body for planning and preparedness before a pollution discharge and for coordination and advice during a discharge. The team consists of federal, state, and in some cases, local representatives of agencies having regulatory and legal responsibilities for spill response. The National Response Team has duties at the national level analogous to the RRT. NRT operates a National Response Center (NRC) which serves as a national communications center for activities related to pollution incidents. Figure 1 shows participating agencies on the NRT.

The structure and nature of this national system for spill response exerts considerable influence on the way decisions are reached during actual spill incidents. The decision-making environment of the response organization is characterized by an emergency, problem-solving atmosphere, requiring decisions to be made within an accelerated time and under crisis conditions. Because spills are chance events, each presents a sequence of problems which must be solved at that time, by people who have had to shift quickly into an emergency response mode. Individuals may not have administrative support and may be isolated at a spill site with minimal communications. Rational problem-solving thus is constrained and difficult.

Although groups in a pollution response share a common goal of protecting human health, welfare, and the environment, they actually represent various levels of government, different geographic areas of authority, numerous kinds and levels of technical expertise, and a variety of regulatory and advisory roles. In their normal activities, these groups usually are not involved in collaborative efforts—they function independently, each with its own role expectations, communication patterns, leadership, and norms. During spills, however, these groups must work together, pool their collective expertise and adapt to a crisis, interagency work situation.

The OSC depends on a flow of accurate information on which to base decisions. This information flows through an intricate web of federal, state, local, and private agencies and groups. The contingency plan provides a network for access to the appropriate types and levels of expertise needed to mount a successful spill response. Each level of the response organization (local, state, regional, national) and each component agency, represents another entire network of subgroups. The national spill response organization is, then, essentially a group of groups. The number of levels activated during spills depends on the size and complexity of a particular incident. The essential flow of accurate information to the OSC depends on good communications and coordination among groups involved in the spill incident.

It is when communications and coordination break down that conflicts arise and information flow is disrupted, creating obstacles to decision-making. By analyzing the differing roles and concerns of the groups in the response effort, the several origins of potential conflict become evident.

Key groups in spill response efforts

To better understand the differences in perspective of groups responding to oil spills, it is helpful to categorize the roles of response groups. Three such categories are identified: first responders, mission-oriented groups, and affected parties.

First responders usually are first to arrive at the spill scene, especially if the incident occurs at a fixed facility, is land-transportation related, or poses a threat to public health. Their duties are the most clear-cut and best understood; such people usually are uniformed and readily identifiable. In this category are fire fighters, police, and emergency medical services (EMS). The primary response function of fire fighters is to put out and prevent fires, thereby saving lives and protecting property. The police function is to maintain law and order at the spill scene and to control traffic flow, where necessary. EMS personnel aid the injured.

Mission-oriented groups in a spill response can be characterized as having responsibilities more specific than protection of public safety and welfare. These groups have a specific legislative mission, or they may advocate a particular cause. They tend to view the response from the perspective of their particular mission or cause and are quite intent on carrying that out. In this category are resource management agencies, regulatory agencies, and special interest groups.

Resource management agencies in the spill context include federal and state agencies responsible for fish and wildlife and those charged with protecting parks, forests, and historic sites. Legislatively mandated protection of resources is their responsibility, and the OSC must respect the public laws and regulations these agencies administer.

A second mission-oriented category includes the regulatory agencies. These agencies have a slightly different mission in the spill response context; rather than managing a resource toward some purpose or objective, their legislative mandate is to enforce pollution control laws. Federal, state, and local pollution control laws grant regulatory agencies the power to take enforcement actions related to spill response against an OSC failing to abide by provisions of the law. These actions may be brought if, for example, the OSC allows burning of oiled debris without an air quality permit, illegal transportation or disposal of hazardous waste, or discharge of ponded material which might contravene water quality standards.

The third mission-oriented category includes special interest groups. Such groups can range from conservation groups, such as the Sierra Club and Audubon Society, to research scientists developing a new spill cleanup methodology. Special interest groups can be used

effectively by the OSC for specialized information and perhaps actual manpower to assist in the cleanup effort. Inadequate consideration of such groups may cause group members to vent their frustrations in ways which may be counterproductive to a successful spill response effort.

In the third category of groups responding to oil spills are the parties directly affected. This is a diverse category, tied together by a direct economic or political involvement of group members. Affected citizens and businesses have had their lives disrupted, damages may be heavy, and delays in cleanup can increase damage costs. Such people may want immediate answers on when the material will be cleaned up and what dangers are associated with the spilled material. Failure to respond compassionately to their needs may create problems.

A second group of affected parties are those actually responsible for the spill. These people already have lost the dollar value of the spilled material, probably had their business operations disrupted, and face the prospect of additional cleanup costs and possible civil penalties. Many times they do not have the resources to provide cleanup or do not have the experience to get the job done properly. Delays in cleanup or unnecessary cleanup expenses directly affect these people. Spill contractors are a third group directly affected by cleanup decisions; their business reputations are at stake when they undertake cleanup assignments.

An OSC cannot overlook the fact that local officials also are affected parties. Whether for personal or political reasons, these people take an intent interest in local events and want to see things go right in their community. A mismanaged spill response effort can raise the ire of local officials and, at least in coastal North Carolina, their political clout extends far beyond the geographic boundaries of their communities.

Perhaps stretching the categorization scheme slightly, the news media have been placed under “affected parties.” As often said, the business of the press is to sell newspapers. Spill events are news; they sometimes are sensational; and they many times provide coverage over many days. Most reporters want to get the facts about a spill and take some graphic pictures. When information is not provided to the news media, or when an OSC is not sensitive to the tight deadlines under which reporters work, the reporter still will write a story. Unfortunately, the story unintentionally may distort the facts of the case, lead to unnecessary alarm, and fuel the idea that officials are trying to cover up some problem. The news media need not be adversaries, if an OSC will only provide adequate and timely information so reporters can complete their assigned job.

All of the above groups, at one time or another, will be components of the decision-making structure set up by the National Contingency Plan and will provide the OSC a flow of information so he or she may carry out assigned duties. To this point, the OSC has been treated as a single entity, but in reality, he is supported by a whole series of groups, both from within his own organization and from supporting organizations such as the scientific support coordinator.

Also, the OSC function itself is fragmented. Many states have parallel spill response statutes delegating OSC authorities to individual state agencies. At the local level, especially in the larger metropolitan areas, sufficient numbers of spills occur to support locally funded spill response units. Jurisdictional conflicts between duly authorized OSCs will not be discussed here, but such conflicts most assuredly impose serious obstacles to sound decision-making.

Now that a scheme has been developed to categorize the variety of groups involved in a spill response effort, some very real substantive issues which arise during a response will be analyzed.

Substantive organizational issues

“Substantive organizational issues” simply refers to the type of problems or concerns one is likely to run into if more than one agency is involved in a spill response. Such issues can be split into administrative concerns, which need be resolved only once, and the decisions reached incorporated in the local contingency plan; and operational concerns, which must be resolved for each spill, but whose procedures for resolution can be incorporated in the contingency plan.

Both these categories undoubtedly include very long lists, with several issues being appropriate to unique problems at specific lo-

Table 1. Analysis of potential conflict between groups on key substantive issues

Substantive Issues	First Responders			Mission-Oriented Groups			Affected Parties				
	Fire	Police	EMS	Resource Management	Regulatory Agencies	Special Interests	Impacted Parties	Responsible Parties	Spill Contractors	Local Government	Media
Planning Concerns											
1. "Who's in charge?"	C	C	N	C	C	N	N	C	C	C	N
2. Decision authorities	C	C	C	C	C	N	N	C	N	C	N
3. Confl. legislation	C	C	C	C	C	-	-	N	-	C	N
4. Lines of command	C	C	C	C	C	-	N	C	N	C	N
5. Notification proc.	C	C	C	C	C	N	C	C	-	C	N
6. Standard proc. (SOP)	C	C	C	C	C	-	C	C	C	C	C
7. Commun. equipment	C	C	C	C	C	C	N	C	C	C	C
8. Cleanup philosophies	C	-	-	C	C	C	C	C	C	C	N
9. Media policies	C	C	C	C	C	C	C	C	C	C	C
10. Differing base maps	C	C	C	C	C	C	N	C	C	C	C
Operational Concerns											
1. Timely notification	C	C	C	C	C	C	C	C	C	C	C
2. Spill estimation	C	C	-	C	C	C	C	C	C	C	C
3. Hazard evaluation	C	C	C	C	C	C	C	C	C	C	C
4. Cleanup criteria	C	N	-	C	C	C	C	C	C	C	C
5. Material disposal	C	N	-	C	C	N	N	C	C	C	C
6. Varying sci. opinion	C	-	-	C	C	C	C	C	C	C	N

"C" indicates a potential for conflict
 "N" indicates a "need to know"

cations. Only some of the more common and universal issues are addressed here. These concerns are presented below in the form of questions each group may ask at the spill scene. They are considered issues because each agency may have a different answer.

Administrative concerns include:

- Who is in charge?
- Who has what decision-making authority?
- Does it appear our agencies have conflicting legislation?
- How do the lines of organizational command differ?
- Who should be notified by whom when a spill occurs?
- Do our standard operating procedures (SOP) differ?
- Are our communications equipment frequencies compatible?
- Whose policies determine "how clean is clean"?
- What are our policies for news media and public communications?
- Are we using different base maps?

All of these questions can be resolved through face-to-face communications among involved groups during development of the local contingency plan. Resolution may not be easy, but an appropriate setting and sufficient time can be made available to work out differences.

Operational concerns are those issues which must be resolved each time a spill occurs. These include:

- Was there a timely notification to the appropriate agencies?
- How much material was spilled?
- What are the hazards associated with the spilled material?
- What constitutes an adequate cleanup?
- Where is the material to be disposed of?
- Does varying scientific opinion differ from accepted practice?
- Who will provide spill estimates and assess hazards?

For each spill, questions similar to these undoubtedly will arise. Although such questions generally cannot be answered before an incident or may require an inordinate degree of planning to resolve adequately, procedures can be established to minimize the time required for their resolution on the scene.

The following section links organizational issues with response groups, and analyzes the potential for resulting conflicts, with examples from the Nags Head oil spill.

Organizational obstacles to decision-making

Organizational obstacles to decision-making arise because groups responding to a spill have different perceptions of the correct answers to the above questions. Potential conflicts occur when two groups' perspectives of a problem and its solution differ significantly. Table 1 lists the various groups potentially involved in a spill response and some of the issues they may address. A "C" indicates the potential for interagency conflict, and an "N" indicates groups which "need-to-know" the answer to the questions. If administrative concerns have not been worked out in the contingency plan and if procedures have not been established to resolve operational concerns, a real potential for conflict exists.

During the North Carolina oil spill, several of these issues emerged. This spill occurred on May 6, 1981, when two ocean-going freighters, the *Lash Atlantico* and *Hellenic Carrier*, collided in dense fog about 11 miles off Nags Head, North Carolina, releasing a one-square-mile oil slick. The spill impact on the beach was projected to be minor, but when work was completed on June 6, 1981, more than \$750,000 had been spent cleaning up 200,000 gallons of oil and removing 7,450 cubic yards of oiled sand to an inland site for land farming.

During the spill, there was a real question of who was in charge. As the owner of the *Hellenic Lines* had assumed responsibility for cleanup, the federal OSC served only in an advisory role, and the 311 (k) fund never was opened. The person actually in charge of the cleanup was hired by the owner's underwriter, and he contracted cleanup to several local firms. Several groups had differing opinions of how clean was clean, and heated discussions well into the night finally were required to resolve this issue.

An array of smaller problems also arose, including use of differing base maps by federal agents, state representatives and the contractor, underestimation of the amount of oil spilled, and disagreement over disposition of the oiled sand. Despite such problems, the spill was cleaned up, and the beaches opened for Memorial Day weekend. The state recovered its monitoring and bird-cleaning costs from the owners, and an inspection of the beach a year later showed no traces of the 50,000-plus gallons of oil left on the beach after completion of

cleanup operations. Northeast storms over the winter are suspected to have rearranged the beach significantly and dispersed the oil.

Over the past year, much planning has been done to better cope with a similar incident. A common set of base maps is being developed, spill investigations now are more a joint, rather than independent, effort, and the state, working closely with local authorities, will take charge when no federal spill has been declared and will monitor cleanup operations continuously until the work is complete. As part of this monitoring operation, both the state and the U.S. Coast Guard will assure proper coordination among state and federal agencies responding to the spill.

Organizational factors—the cause of conflict

Obstacles to decision-making arise when groups and individuals responding to a spill have differing perspectives on a problem. The previous section identified many of the substantive issues encountered in spill response activities and the varied perspectives of responding groups. It was also noted that many potential problems can be resolved before a conflict through good planning and frequent interaction among responding groups.

What happens when planning and interaction do not occur? Most spill responders have been in conflict situations and usually have written off these problems as “personality conflicts.” This simplistic answer, however, actually ignores a variety of subtle interactions and messages. If an OSC and others are attuned to these messages, a great many conflicts can be resolved before they can disrupt the spill response effort.

To understand these messages, and their underlying behavioral motivations, the OSCs and groups involved in spill response should think about why a particular group is represented on the response team, what its purpose or functions are and what the individual representing that group expects. The functions of responding groups have been discussed. First responders are concerned with protecting public welfare through fire, law and order, and medical services. Mission-oriented agencies are concerned with protecting natural resources and preventing pollution, and affected parties are trying to minimize personal losses, obtain relief, and carry out assigned tasks. It is between the individuals representing these groups, however, that conflicts actually occur.

It is important to recognize that each response team member also represents a group or agency. Within that external group, the individual functions and behaves in an environment which may be quite different from that of the response team. Certain norms of behavior probably exist within that group, and purpose and group goals may be well-defined. The role of the individual within that group also may be well-defined, and a certain pattern for communications, decision-making, and overall leadership established.

In addition to the norms and expected behavior established by the group, each individual has his own personal needs that directly influence his behavior. Some people have very strong power drives and want to be in charge of the situation. Others are highly motivated to accomplish tasks assigned to them, either by the team leader or external group or agency. Still others are motivated primarily by a strong need to socialize and interact with other team members.

In one way or another, all are driven by a need for status—they have to know where they fit in, and many want to be as high on the ladder as possible. Finally, most individuals involved in a response effort eventually will have to report their success, or lack thereof, to another person, usually their boss. For a variety of reasons most people want to do their job well, and a successfully completed job carries with it all manner of rewards. This need to do a good job strongly motivates most of the response team members.

So how do behavioral factors relate to the real world of cleaning up spills? As an example, consider a newly appointed U.S. Coast Guard OSC serving his first assignment as Captain of the Port. His military background has conditioned him to follow the book strictly, within a well-defined hierarchical organization. Such a posture, however, is not totally compatible with his role as OSC. If this new OSC has not developed working relationships with other spill response agencies before the first spill, conflicts can be expected.

On that first spill, the OSC will find out that at least one or two other agencies will claim to be in charge of the spill response effort

and will have legislative authorities to back them up. If a response agency thinks it was ignored during cleanup operations, the commandant of the Coast Guard is likely to hear of it, or if oily debris is improperly disposed, some state agency actually may attempt to levy a fine against the OSC. Few responding agencies will respect the OSC's authority. Local governments, if they feel the cleanup is not progressing adequately and realize the state is not responsible for the effort, may take their case directly to Washington. Meanwhile, the local press may succeed in selling a great many newspapers, their final article being about the sudden transfer of the newly appointed Captain of the Port.

There are many who will attest that even such a severe scenario can be quite possible. Irrational acts of individuals arise in times of confusion. Confusion leads to uncertainty, and uncertainty leads to fear of failing. Failing means not doing one's job well—but that is an unacceptable alternative. Therefore, fear of failing motivates irrational behavior, which kindles the fires of conflict.

How then does planning and response team interaction minimize behavioral conflict? First, face-to-face interaction during development of a local contingency plan can define clearly a purpose and the goals of the response team. Objectives to be achieved when responding to spills can be agreed on, and the broader organizational responsibilities of participating agencies can be addressed. Second, the roles to be played by each team member and represented agency can be identified. Role conflicts can be resolved and ambiguities addressed.

Third, the mechanisms for decision-making also can be discussed at such a meeting. They include: decision by default (lack of group response); unilateral decision (authority rule); majority vote; consensus; or unanimity. Fourth, alternatives for resolving conflicts can be agreed on, such as: ignore it; smooth over it; allow one person to force a decision; create a compromise; or confront all the realities of the conflict (facts and feelings), and attempt to develop an innovative solution.

Fifth, means and patterns of communication can be resolved. This would include not only establishing radio frequencies and other electronic means of communicating, but also establishing patterns of information flow among group members. Finally, leadership roles and hierarchies can be established. Although an OSC may be in charge of an operation, a variety of other leadership roles under him need to be filled if a response effort is to be successful.

Interaction among team members can take the form of both periodically scheduled meetings and planned drills and exercises. Such interaction, quite subtly, will establish the status of each member, including leadership roles, and it will become apparent who can be relied on to carry out assigned responsibilities. The job of each team member will be better understood by all, and unwritten norms for the response team will evolve.

An example from the Nags Head spill illustrates the value of interaction before an actual spill. Several weeks after the original spill, a second spill was reported at Nags Head. Some thought it was merely reappearance and movement of the original oil. The SSC suggested depositing the contaminated sand in the surf zone as a means of separating and dispersing the oil. The state objected, and although the procedure was attempted, the conflict still was brought before the RRT for resolution.

The net result was that the technique was declared a valid experiment, and the only real problem turned out to be insufficient communication before the event. From this event, the RRT became more aware that solutions to many spill problems actually will have a scientific basis, but that such solutions may not be common knowledge or follow established ways of doing things. Such alternatives should be pursued, but special emphasis needs to be placed on discussing with all involved parties any planned actions. The RRT also presents an excellent and efficient forum for conducting fundamental contingency planning on a region or district-wide basis.

Summary and conclusions

We close by reaffirming that effective decision-making is the key to managing a successful oil spill response effort. We have tried to show that organizational obstacles to effective decision-making exist, and have divided these obstacles into substantive issues and organizational

factors. Whenever two or more groups come together, there is the potential for conflict due to differing group perspectives. The perspectives usually are based on concerns over substantive issues, but the conflict many times is precipitated by organizational factors.

What we are beginning to recognize is that conflict can be anticipated and minimized. If we sort the causes of such conflict into two lists, labeled "substantive issues" and "organizational factors," we have a simple tool for understanding and forestalling potential conflict situations. The substantive issues are real and can be resolved through the conscientious involvement of all affected groups in the development of the contingency plan. Organizational factors also are real and can best be dealt with by just getting to know one another better through frequent communication and joint training exercises, where one learns what to expect from the other person under a variety of situations.

If this interaction among groups fails to occur before an actual oil spill incident, an OSC can expect much of his time will be taken up in resolving conflicts under less than ideal conditions and under the vigilant eyes of federal and state agencies, the news media, and others affected by the spill.

Bibliography

1. Brecher, Joseph J., 1970. *Environmental Law Handbook*. California Continuing Education of the Bar, Berkeley, California, 343pp
2. Collins, B.E. and H. Guetzkow, 1965. *A Social Psychology of Group Processes for Decision-Making*. John Wiley and Sons, Inc., New York, pp88-119
3. Council on Environmental Quality, 1970. *Environmental Quality*. U.S. Government Printing Office, Washington, D.C. 326pp
4. Daniel, Lee, 1981. *Oil Discharge Investigation Form—Nags Head Oil Spill*. Division of Environmental Management, Raleigh, North Carolina, 14pp
5. Landau, Norman J. and Paul D. Rheingold, 1971. *The Environmental Law Handbook*. Ballantine Books, Inc., New York, 496pp
6. The National Oil and Hazardous Substances Contingency Plan (40 CFR 1510), 1980. *Federal Register*, March 19, 1980, v45, n55, pp17832-17860
7. Rubin, I. and R. Beckhard, 1979. Factors influencing the effectiveness of health teams. *in Organizational Psychology*. Third edition. D. A. Kolb, I. Rubin and J. M. MacIntyre, eds. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, pp358-360