Cultural Constraints

Historically, archaeologically or culturally-significant sites or resources are found on all coasts, but are more likely in areas remote from, or undisturbed by, recent human activity (e.g., much of the Pacific Northwest coast). Even if these sites are not directly affected by oil, shoreline activities may result in contact with these resources.

If such sites are present within response areas, special permission will normally be required from cognizant tribal, government, cultural, historic, or archaeological organizations prior to commencing cleanup activities.

Authorization

In addition to shoreline access, which may require permission from outside the response organization, government organizations:

- May restrict use of non-mechanical countermeasures listed on the National Contingency Plan Product Schedule (e.g., dispersants, surface washing agents, bioremediation agents, or burning); and
- Will require specific authorization and permits to transport and dispose (including temporary storage of recovered oily materials) of recovered oily wastes.

Process for Developing Incident-Specific Strategies

Spill response management follows a general sequence of steps for each spill, spill phase, and response location:

1. Gather information and assess the situation.
2. Define response goals and priorities.
3. Define response objective(s).
4. Develop strategies to meet the objectives, based on windows of opportunity.

5. Evaluate the feasibility of the options and strategies in view of the environmental conditions and spill specifics.
6. Select response options and tactical arrangements to implement identified strategies (begin process to obtain necessary approvals, permission, permits).
7. Prepare an Incident Action Plan for carrying out the identified strategies.
8. Implement field response operations plans for each strategy.

While certain objectives, strategies, and tactics can be identified before an incident, and will usually be included in both owner/operator response plans and area contingency plans, responders must develop incident-specific response strategies (step 4, above) at the time of the incident. Steps 4, 5, and 6 are related to the incident response objectives, and are subject to a variety of incident-specific conditions, such as those discussed in detail in the remainder of this section. The remaining steps will be sufficiently incident-specific that discussing them further in this manual is not possible.

Integration of On-water Response Options

If a response objective is to minimize or prevent shoreline impact, using multiple, integrated on-water countermeasures offers the best chance of success. Thus, if "very early" window of opportunity options are to be used, decision-making, strategic plan development and approvals, and implementation must be rapid. Each response tool has advantages, disadvantages, and limitations in its effectiveness. Decision-makers must weigh various tradeoffs when considering and comparing response options. Since there is no single, perfect response option, the best solution is to use all the "tools in the toolbox" in combined (integrated) operations to achieve response objectives. In general, these tools include:

- Monitor and wait. No active response to remove oil;
- Physical containment and mechanical recovery. Removes oil from the water, with few environmental impacts but involves operational limitations associated with weather, visibility, physics, etc.;

- Dispersant application. Protects waterfowl and shoreline habitats but increases oil in the water column and exposure of water column organisms;
- In-situ burning. Protects sensitive shoreline habitats by removing floating, burnable oil but heavy, black smoke is unsightly, alarming, and can be a respiratory hazard for humans and animals. Removal of burn residue may be technologically difficult and may further damage the environment; and
- Shoreline cleanup will not disrupt water column species but allowing oil to reach shore means that intertidal and shore-based species have already been impacted.

Temporal Considerations

Mechanical recovery, dispersant application, and in-situ burning operations can be used singly, or in combination, to improve efficiency and effectiveness.

- Mechanical recovery: oil that escapes containment or recovery will still be available for subsequent mechanical removal, treatment with dispersants, or for burning;
- Dispersants: some of the dispersant-treated slick may actually be missed and be available for additional dispersant operations, burning, or mechanical containment and recovery (except oleophilic skimmers for a few hours). Also, containing and burning a partially treated slick should remain viable, since dispersant application may decrease the slick's tendency to emulsify and prolong or reopen the window of opportunity for burning;
- Burning: most (>90%) of the oil burned will be converted to carbon dioxide, water vapor, and soot. Any oil that escapes the fire boom will be available downstream for re-collection and burning, mechanical recovery, or dispersant treatment; and
- The residues from a successful burn or partially-burned Categories III and IV oils, on the other hand, are not suitable for chemical dispersion. However, residues can be physically removed using viscous-oil recovery systems,

or nets and hand tools. If partially burned oil/residue sinks, then the environmental consequences of leaving the submerged oil must be compared to the consequences of removing the submerged material.

Spatial Considerations

Integrating response options also includes spatial considerations. For safety reasons, combined, simultaneous operations should be conducted only in designated safe operating zones that take into account spill and site specifics:

- Response vessels must always be far enough apart to preclude near-misses, collisions, or other disruptions of operations;
- Aircraft operations must be coordinated through a single air-traffic control system with specific directives for allowable altitudes, airspace, air and surface radio frequencies, emergency procedures, etc.;
- Mechanical cleanup and in-situ burning operations should be positioned in the thickest layers of oil, consistent with safety and environmental constraints;
- Burning should be positioned and conducted to: 1) avoid ignition of source; 2) avoid endangering personnel, facilities, vessels, or equipment downstream/downwind; 3) prevent accidental ignition of nearby contained or uncontained slicks or vapors; and
- Dispersants should be used on slicks that are sufficiently downstream/downwind from other operations that wind or current will not carry dispersant into those operating areas. Safe operating distances will be spill-specific.

Shoreline Strategies

Shoreline response strategies differ from on-water response strategies because:

- Stranded oil generally remains in place or is slow-moving; and
- Land-based operations usually are less weather-dependent than water-based activities, and there are different safety and feasibility factors to consider.

Since shoreline response can be a long-term operation (days-weeks-months), integrating multiple shoreline protection and cleanup options into strategies that are implemented simultaneously is common practice (nearshore containment and recovery often take place alongside various types of shoreline cleanup).

The following discussion includes all options operated from shore.

Shoreline Protection

The basic shoreline protection objective is to:

- Prevent or minimize contact between oil and the shore zone (or a resource at risk in the zone).

This can be done by combining activities, techniques, and equipment to:

- Remove shoreline debris before the oil is washed ashore;
- Contain and recover floating oil prior to shoreline impact;
- Deflect oil away from shore;
- Trap or contain and collect oil at the shoreline;

- Prevent stranded oil from refloating and affecting adjacent areas; and
- Prevent oil being washed over a beach into a lagoon or backshore area.

Shoreline Treatment and Cleanup

For an oiled shoreline, the main treatment objective is often to restore the oiled shore zone to a pre-spill "clean" condition. But defining a specific level of "clean" will be different for each spill (or even different for different phases of a single response) and, although promoting recovery usually includes removing some portion of the oil and allowing the rest of the oil or residue to degrade naturally, the best course of action may be to let all the oil degrade naturally. Final levels of allowable oil concentrations can, and should, be determined by consensus (considering overall environmental consequences) during contingency planning and sensitivity mapping before any spill. This process should balance conflicting environmental and socioeconomic concerns.

Reducing overall environmental consequences in an effective and efficient manner usually requires a combination of techniques, including:

- Natural recovery;
- Physical washing;
- Physical removal;
- Physical in-situ treatment (including burning); and
- Chemical or biological treatment.