In Situ Burn Checklist

The following checklist will assist OSCs at any level to ensure that reasonable decisions are made on the use of ISB on the Upper Mississippi River.

ISB Decision Tree

Step 1: Site Conditions and Desirability

- Access routes to the scene?
- Locational information to include: River mile or latitude/longitude or other precise geographical description?
- Material, amount, size, age, phase, condition of spill?
- Environmental conditions: air temperature, wind speed, lake/river current speed, wave heights, water temperature, ice conditions?
- Will the use of ISB prevent or reduce further damage by the spill?
- Is mechanical containment and recovery adequate? If so, explain why burning is being considered.
- Ecological factors such as environmentally sensitive areas? See page F-29 for Ecological Considerations.

Step 2: Feasibility

- Can worker safety be reasonably assured?
- Can the fire be contained? If not, should not burn.
- Are environmental conditions favorable? Wind speeds less than 20 knots (23 mph, 34 feet/sec), currents less than 3/4 of a knot (0.9 mph, 1.3 feet/sec), and waves less than 3 feet? If not, then probably should not conduct the burn.
- Will the smoke plume lower the visibility enough to adversely impact transportation via air, water, or land?
- Are atmospheric conditions very stable (i.e., winds are light and fog or low stratus clouds are present)? Then, the smoke plume will likely be more difficult to disperse and you might not want to burn unless there will be no human impact.
- Is the oil burnable? Recommended thicknesses are 2 to 3 mm for fresh crude oil, 3 to 5 mm for diesel and weathered crude, and 5 to 10 mm for emulsions and bunker C. Water-in-oil emulsions containing more than 30 to 50% water are difficult to ignite and support combustion. Most oils readily burn if the water content is less than 25%. Most crude oils require an evaporative loss of less than 30% to burn.
- Residues: The removal of burn residues should be considered since the potential exists for undefined levels of environmental impacts even with a successful burn. See pages F-34 and F-35 for additional information.
- Is the product ignitable without adding a burning agent? COSTA procedure approval is required for use of burning agents.

The term "burning agents" means those additives that, through physical or chemical means, improve the combustibility of the materials to which they are applied. It is recommended that, when addition of a burning agent is being evaluated, first consideration be given to the more environmentally friendly products such as kerosene or jet fuel "A" before considering the more environmentally hostile products such as gasoline or diesel.

- Is the product gasoline or other light petroleum product? If so, both mechanical techniques and ISB are still viable options. However, due to the greater risk of flammable hazard, uncontrolled sources

In Situ Burn Checklist

(Continued)

of ignition should be removed from the area, only intrinsically safe equipment should be used on the site, and combustible gas indicators should be used to monitor for flammable vapors.

- Is the area forested or are conditions very dry? If so, then it may not be safe to burn.
- If in a marsh or wetlands area see pages F-14 to F-15.
- Are adequate fire boom, towboats, and igniters available?
- Is adequate helicopter/monitoring equipment available?
- Can notices to mariners, aircraft, and populations be issued in time?
- Can personnel and equipment be mobilized in time?
- Can authorization be secured in time?

See pages F-33 to F-35 for information operational considerations : open water burning, inland environment burning, ice conditions, fire boom, ignition, oil thickness, weathering, emulsification, and burn residues.

Step 3: Acceptability

- Distance between burn and human population?
- Will ambient PM-10, averaged over 1 hour, near humans, be above 150 micrograms per cubic meter? If so, evacuate or shield them, or do not conduct the burn.

Generally, burning should not be conducted if human population centers exist within 6 miles downwind of the burn or 3 miles in other directions. These distances are only a rule of thumb - they may be longer or shorter depending on the circumstances of the case. In general, a safety margin of 45 degrees of arc on either side of the wind vector should be allowed to account for wind shifts. This means that burning is not recommended if there is a human population center within 6 miles from the burn measured along the wind direction and expanded 45 degrees on either side of the wind direction. A 3 mile safety margin is recommended in other directions.

Other considerations include:

- Does the landowner concur with the decision to burn?
- Are there cultural, historical, or archaeological resources that could be affected by the burn? If so, probably should not burn.
- Does the proposed burn area contain state or federal threatened or endangered species populations or their critical habitats? If so, and the proposed burn appears likely to result in greater overall injury to those species or habitats than other response actions, including "no action", the state and federal natural resource trustees will likely object to it.

Step 4: Authorization and Conditions

- Are forecasted weather conditions favorable?
- The Site Safety Plan should be reviewed to ensure that ISB is adequately addressed.
- Unified Command authority to start, proceed, limit, or halt the burn must be recognized.
- Conduct trial burn to evaluate smoke plume drift and dispersion.
- Burn extinguishing measures are available?
- Public notification. See page F-28 for guidelines on Public Notification.
- A written description of the incident and burn plan should be provided to the OSC and other pertinent players.

In Situ Burn Checklist

(Continued)

Step 5: Monitoring

The primary operational purpose in monitoring the burning of spilled oil is to determine if burning requirements and objectives are met. Although the current body of knowledge about burning is limited, each operational use provides an opportunity to gather further information. Operational monitoring should occur during a response involving the use of in situ burning and should be accompanied by a detailed monitoring plan.

Operational monitoring should include such parameters as:

- type and amount of oil spilled;
- weather and water conditions;
- trajectory of the slick and smoke plume;
- estimated volume of oil to be burned;
- estimated volume of oil actually burned and remaining;
- observation of the effectiveness of residual material collection;
- observations of adverse affects to natural resources both pre- and post-burn (e.g., number of dead organisms)
- effects on human health (see pages F-16 to F-27 for Air Monitoring Guidelines)

In an effort to gather more data about in situ burning, spill-of-opportunity research possibilities involving a broad range of physical, biological, and chemical issues, is encouraged. Research monitoring might involve:

- collection of oil sample prior to burning for analysis;
- observations of residual material behavior and fate;
- collection of residual material for analysis;
- upwind and downwind air sampling;
- number and location of sampling stations;
- determination of compounds (PAHs, particulates) to be monitored;
- species and numbers of biota (e.g., waterfowl, aquatic organisms, vegetation) in the area.

Step 6: Reports

- A lessons learned report should be submitted by the Unified Command to the FOSC (and thence to the RRT), SOSC, state and federal natural resource trustees, and local incident commander. The feedback from these reports will help in evaluating policies and procedures and improving them as needed, especially since burning is a relatively new countermeasure on the Upper Mississippi River and these guidelines are untested.
- Post burn monitoring of the site should be considered.

ISB Reference Sources

National Contingency Plan, 40 CFR Parts 300 to 399.
API/NOAA manual "Options for Minimizing Environmental Impacts of Freshwater Spill Response, September 1994", also known as the Freshwater Manual.
Region 5 In Situ Burn Guidelines adopted in June 1996.
Alternative Response Tool Evaluation System (ARTES) adopted by RRT-5 in June 1996.
NOAA HAZMAT In Situ Burning Planning Guidelines, 11 June 1996.
Alaska Regional Response Team In Situ Burn Guidelines for Alaska, May 1994.

In Situ Burn Checklist

(Continued)

S.L. Ross Environmental Research Ltd., Alaska Clean Seas, Alaska Department of Environmental Conservation, In Situ Burning: A Valuable Tool for Oil Spill Response, April 1995

Regional Response Team 2 - In Situ Burning Decision Flow Chart, DRAFT 11/12/96.

Regional Response Team 6, In Situ Burn Decision Tree.