

NRT SCIENCE & TECHNOLOGY COMMITTEE

Fact Sheet: Site Safety Plans for Marine *In-Situ* Burning Operations

Introduction

This fact sheet provides information on site safety planning specific to *in situ* burning. In most instances, *in situ* burning will be one part of an overall spill response operation. Similarly, site safety plans for *in situ* burning should be an attachment to an umbrella site safety plan covering the entire spill response.

Safety hazards for *in situ* burning (ISB) operations are similar to those of mechanical response operations at sea, with additional hazards related to the burning of oil. The site safety planning requirement for *in situ* burning operations extends from the general Occupational Safety and Health Administration (OSHA) requirements (29 CFR 1910.120) for hazardous waste operations and emergency response (HAZWOPER). Under the OSHA regulation, each employer is responsible for the health and safety of employees involved in response operations. The combination of the general site safety plan and the appendix site safety plan for *in situ* burning must include all elements listed in OSHA's 29 CFR 1910.120 (b)(4).

For a complete program, an employer also must provide safety and health hazard training for *in situ* burn operations in addition to those for conventional response operations. Adequate health and safety training for ISB include pre-burn training for configuration and coordination of boom, vessel, ignition, and safety operations, emergency safety procedures (e.g., emergency burn termination), and communication protocols (e.g., Go/No-Go policies). If an employer's health and safety program contains all of the OSHA-required elements, the program and plan comply. Any local or state health and safety regulations need consideration and incorporation into the plan as necessary.

Existing Plans

1) Generic Site Safety Plans: As a pre-incident planning function, response agencies develop generic site safety plans composed of checklists and fill-in-the-blank formats to facilitate rapid incident-specific data entry. Most site safety plans follow a general outline consistent with OSHA's required elements [29 CFR 1910.120 (b)(4)]. Standard format, however, is not an OSHA requirement. During emergency response, site safety plans must be flexible and easily adaptable in order to keep pace with the dynamics of the spill. Generally, response agencies develop site safety plans consisting of a generic core portion that captures required general oil spill site-safety elements along with a repository of incident-specific attachments to access quickly as the incident dictates. For example, hypothermia is not a risk for all spill situations. However, boilerplate language on precautions, symptoms, and response actions for hypothermia can be extracted quickly from a database, and attached to a plan for response situations with a

hypothermia risk.

2) Regional Response Team ISB Plans: Regional Response Team (RRT) ISB plans address safety as a primary consideration for the feasibility of conducting *in situ* burning. Some RRT plans contain statements requiring that the party seeking approval submit an OSHA-compliant site safety plan to the Federal On-Scene Coordinator (FOSC). Other RRT plans incorporate site and worker safety issues into their Applications for Approval or Operational Checklists. As a follow on, RRTs should ensure that Area Committee Plans adequately address ISB site safety.

Sample ISB Site Safety Plan

Guidance for developing a site safety plan tailored to *in situ* burn operations and designed as an appendix to a general site safety plan is attached to this document. The sample plan format originated from a USCG generic site safety plan for oil spills. The U.S. Navy Supervisor of Salvage & Diving (SUPSALV) adapted the original plan to incorporate health and safety issues pertinent to ISB. General site safety and health protocols, such as medical surveillance, should be similar for all response tasks at the given incident, and should be included in the umbrella site safety plan.

Although safety concerns are consistent among all of the regions, a standardized format for safety plans is not established. The attached sample is not a standard, but rather a suggested starting point. In its appendices, the sample plan contains operational aspects that may create redundancy with existing ISB operations plans. If a safety consideration is tied to the specific operation that makes it different because of the added hazard of ISB, then the operation is included in the plan. For regions and responders with comprehensive ISB operations plans, redundancy may be dropped from the sample. Recognizing regional differences and specificity, standardized format may not be desirable. With this a consideration, the NRT S&T Committee recommends that site safety plans for *in situ* burning contain common components unique to *in situ* burn operations listed below.

Components of ISB Operations Site Safety Plans

1) ISB Site Description: This component characterizes the burn areas with respect to the general spill site. The ISB site description (with an attached map) identifies or defines: a) spill hazards peculiar to pre-burn, burn, and post burn operations; b) ISB-sensitive areas, such as population centers, ecologically-sensitive areas, or fuel depots and sources of secondary ignition; and c) weather conditions restrictive or prohibitive of burn operations. This information is desirable for the planning of safe ISB operations. Wind and current data is used to determine the direction and extent of the smoke plume, and hence the safest position for the fire resistant boom. Sensitive populations downwind from the burn may be at risk of exposure to the smoke plume. Their presence therefore may affect burn feasibility and boom positioning. Current ISB approval distances

should place highly-sensitive areas beyond exposure zones, but these areas still should be delineated so all ISB responders are aware of high risk areas.

Since ISB may pose different medical emergencies than conventional response operations, such as burn or smoke inhalation casualties, a hospital capable of handling such emergencies should be contacted prior to burning and identified in the site safety plan.

2) Burn Objectives: This section contains detailed objectives of the burn which should be updated daily and communicated to personnel during pre-departure briefings. Objectives should include specific details of the burn strategy, such as the proposed number of burns, plans for simultaneous burns, and daily recovery goals.

3) ISB Response Organization: This section details the command structure responsible for coordinating burn operations. Responsibilities and functions should be clearly defined. At a minimum, the following are needed:

- C Safety Officer (Incident Safety Officer or designee)
- C ISB Site Safety Supervisor
- C *In Situ* Burn Task Force Leader/Group Supervisor (subdivision of the Operations Section)
- C *In Situ* Burn Technical Specialist (within Planning Section)
- C Fire Monitor Personnel (staff from ISB Task Force/Group)

In some instances, (e.g., smaller spills, limited availability of personnel, or ISB operations occurring simultaneously with other response operations) one person can fulfill more than one role. Where state and local response agencies are involved in a response, they will be included in the Unified Command directing spill response operations and thus will participate in the decision whether to conduct an ISB. Participating agencies will also ensure that all surrounding communities are alerted to the planned burn.

Next, vessel and aircraft requirements should be identified. Aerial support operations should be specified, and pilot input included in the site safety plan. If air-deployable igniters are to be used, igniter safety precautions must be described and an MSDS attached. Vessels and aircraft should be dedicated to function as follows:

- A ISB Command Vessel
- A Safety Vessel
- A Boom-towing Vessels
- A ISB Air Operations

4) Burn Area Control: This section includes the burn plan and procedures for site and traffic control in and around the response area. The burn plan includes

burn feasibility, operational checklists, and an action plan, including the AGo/No-Go@ policy and burn termination criteria. Clear delegation of authority for stopping the burn must be made upfront to enable one person (fire monitor personnel) onboard each vessel to stop the burn should safety become jeopardized.

Site control procedures should be identified to ensure that all personnel within the burn site are trained to perform their responsibilities safely. Traffic control should be coordinated with the local airports, the FAA (Notice to Aviators), and the USCG (Notice to Mariners) to restrict air and water traffic during burn operations. In recognition of the fact that an ISB, especially when viewed from a distance, may be mistaken for a vessel fire or even a building, industrial or wildland fire, it is important to ensure that all surrounding communities are alerted to the planned burn. Participating agencies in the ICS/UC will be responsible for ensuring that all potentially impacted communities are alerted to the planned burn operations. Depending on the burn location, it may be necessary to notify organizations of burn operations, such as Captain of the Port, Marine Safety Office, fire departments, law enforcement agencies, marine search and rescue organizations, and beach patrol or life guards, assuring their appropriate participation.

This section also highlights safe vessel locations, air and/or surface deployable igniter safety measures, premature and secondary ignition hazards, and pre-burn checks and requirements.

5) Hazard Evaluation: ISB emits several potentially harmful constituents, however, health professionals are concerned primarily with airborne particulate (#PM-10) inhalation relative to other emission hazards. Established OSHA permissible exposure limits (PELs) for PM-10 concentrations are as follows:

Y 15 milligrams per cubic meter (mg/m³) for total particulates averaged over 8 hours; and
Y 5 mg/m³ for PM-10 averaged over 8 hours.

To ensure the health and safety of responders, the site safety plan should develop alternatives to help all responders and response vessels from entering the smoke plume or approaching the fire perimeter. Data analyzed from the Newfoundland Offshore Burn Experiment (NOBE) demonstrate that PM-10 levels remain low upwind and outside of the smoke plume. Until further experience is gained, however, it is strongly recommended that PM-10 levels be monitored for worker=s health and safety.

Data on other ISB gaseous emissions suggest that concentrations do not pose a significant risk if responders and vessels remain at safe distances and upwind from the burn, since concentrations of carbon dioxide are high at ground levels close to the burn. If for some reason a responder must move close-in to the burn,

proper personal protection equipment and monitoring must be administered. Additionally, a multiple burn scenario has not been tested. Should multiple burns be proposed, sampling for other hazards such as carbon monoxide, carbon dioxide, polynuclear aromatic hydrocarbons, in addition to PM-10, is advised.

Inclusion of information on other constituents of the burn emissions may be requested by the Incident Commander/Unified Command, with advice from the Safety Officer, to provide responders with more knowledge regarding their health and safety. Sampling strategies should be decided upon in the local planning process. Furthermore, specific guidance on monitoring protocols and equipment is forthcoming from the S&T Committee.

Hazards inherent to burning (e.g., responders getting burned) need to be defined and emergency procedures highlighted. For example, hospitals identified in the general site safety plan may not have the capability to render proper medical services to a burn victim. Prior to commencement of burn operations, a capable hospital should be contacted to verify that services are available (hospital should be included in Section 1: ISB Site Description).

Other hazards that may be intensified by *in situ* burning (e.g., heat stress) may be captured in the ISB site safety plan. In most circumstances, however, it may be useful to refer to the general site safety plan for other hazards that exist for all response personnel.

6) Personal Protective Equipment: Employers are responsible for supplying personal protective equipment (PPE), as required by OSHA [29 CFR 1910.120 (g)]. PPE levels should be determined based upon evaluation of threats identified in site characterization and hazard evaluation. For safe ISB practices, workers must remain out of the smoke plume and maintain safe distances from the fire perimeter at all times. Because of this, a high level PPE requirement may be unnecessary and undesirable. People with fire protective equipment may feel overconfident in their protection and move too close to the fire, potentially putting other personnel or a vessel in danger. In any case, an employer providing PPE, including respirators [29 CFR 1910.134], must comply with OSHA regulations for training, selection, medical examination and monitoring, and maintenance.

If vessels of opportunity systems (VOSS) are used for *in situ* burns, VOSS personnel must be properly fitted and trained prior to commencing operation.

7) Emergency Procedures: This section details procedures for medical emergencies, extinguishment of small fires, and emergency communication. Emergency communication protocols should be clearly identified, and safe zones for personnel defined. Radio links (with specific frequencies for vessel-to-vessel, vessel-to-command, vessel-to-air, and air-to-air communications) should be defined and listed.

8) Training and Safety Meetings: Responders must be trained for the anticipated hazards of ISB response efforts, including daily briefs on incident-specific safety issues. Details of the ISB site safety plan may change throughout the response effort. Changes to the plan need to be complemented with briefings to ensure that personnel understand any changes affecting safety.

For more information

The sample ISB site safety plan is posted on NOAA's FirstClass Communication System in the NRT S&T Conference Folder. RRTs and OSCs are welcome to download the sample plan, or pursue the format that serves the most utility in their region. General site safety plans for oil and chemical spills are posted in the "Safety Shorts" folder on the NOAA FirstClass Communication System.

For more information contact Paul Hankins (SUPSALV):

Phone: 703/607-2758,

E-mail: <hankins_paul_f@hq.navsea.navy.mil>.

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