Oil or Chemical Spill Notification

call the National Response Center at
800-424-8802

Oil Spill Response

in the Region IV Coastal Zone,
contact the U.S. Coast Guard
Marine Safety Office (MSO):

MSO Wilmington, NC 910-792-8408	MSO Charleston, SC 843-724-7616
MSO Savannah, GA 912-652-4353	MSO Jacksonville, FL 904-247-7310
MSO Miami, FL 305-732-0160	MSO Tampa, FL 813-228-2189
MSO Mobile, AL 334-441-5121	

In the Region IV Inland Zone,
contact the U.S. Environmental
Protection Agency:
404-562-8700

Inland Zone U.S. Coast Guard Offices are:

MSO Huntington, WV 800-253-7465	MSO Louisville, KY 800-253-7465
MSO Paducah, KY 502-442-1621	MSO Memphis, TN 901-544-3912

State Pollution Response Contacts are:

North Carolina 919-733-3300	South Carolina Spill: 888-481-0125 Office: 803-896-4000
Georgia 404-656-4300	Florida 850-413-9911
Alabama 334-242-4378	Mississippi 601-352-9100
Tennessee 800-258-3300	Kentucky 800-928-2380

Suggested References:

Burning Issues: Is torching the most benign way to clear oil at sea?
Science News 1993 144:220-223

In-Situ Burning of Oil: An alternative approach to spill response
National Response Team, Research and Development Committee 1992

The Science, Technology, and Effects of Controlled Burning of Oil At Sea
Buist, I.A., et al.

Marine Spill Response Corporation
Technical Report Series 94-013 1994

Document prepared by:
Region IV
Regional Response Team

RRT IV Co-chairs:
U.S. Coast Guard 305-536-5651
U.S. EPA 404-562-8721

IN-SITU BURNING IN OIL SPILL RESPONSE

Newfoundland Offshore Burn Experiment, Canada 1993

General Spill Response Considerations

When prevention efforts fail and an oil spill occurs on the water, spill responders face a difficult battle against a dynamic opponent. They have a number of tools at their disposal, depending on the unique aspects of each situation. Among the options available are mechanical cleanup methods, such as containment booms and skimmers, non-mechanical methods, such as dispersants or *in-situ* burning, natural removal, and shoreline cleanup. The selected mix of countermeasures will depend on potential shoreline and natural resource impacts, the size, location, and type of the spill, weather, and other variables.

This pamphlet on *in-situ* burning is one of a series that provides an overview of oil spill prevention, planning, and response topics.

What Is In-Situ Burning?

In-situ burning means the controlled burning of oil "in place." On open water, burning requires specialized fire resistant boom because uncontained oil rapidly spreads too thin to sustain combustion. *In-situ* burning requires less labor than most other techniques and can be applied in areas where other methods can not be used because of limited access
to the spill location or ice conditions. Fire-resistant booms are subject to some of the same wind and sea limitations as mechanical removal, since a fire boom behaves much like a standard containment boom. However, burning rapidly removes large quantities of oil and,
minimizes the need for recovery and storage.

Where the Oil Goes

The primary products of *in-situ* burning of oil are carbon dioxide and water vapor. About 90% to 95% of the carbon product is released to the atmosphere as carbon dioxide, while particulates commonly account for only about 5% to 10% of the original volume burned. In addition, about half of the particulates are soot, which is responsible for the black appearance of the smoke plume. Minor amounts of gaseous pollutants are emitted, such as carbon monoxide, sulfur dioxide, and nitrogen oxides. In addition, some polynuclear aromatic hydro-carbons (PAHs) are emitted, but the amount released is less than the amount in the original oil.

Field experiments have shown that most air pollutants of concern produced by an *in-situ* burn are concentrated around the area of the fire. Only one pollutant, the fine particles in the smoke, is of concern beyond the immediate area of the fire. These particulates can cause respiratory distress in the elderly or those with impaired lung function if they are inhaled at high levels. Although these small particles from an *in-situ* burn will typically remain suspended and dilute high above the human breathing zone, monitoring plans have been established so responders can monitor particulate levels to ensure the protection of public health.

The decision to use *in-situ* burning must consider the tradeoffs involved.

Effectiveness

In-situ burns have typically removed over 90% of the contained oil during experiments and accidental burns of petroleum on water. Factors that affect the effectiveness of *in-situ* burning include, wind and sea conditions, type of oil, thickness of oil, and degree of weathering that has occurred (fresh oil that has not emulsified burns easier). The small percentage of the original oil volume left unburned is typically a viscous, taffy-like material that floats for a long enough period of time to be manually removed.

Approval of In-Situ Burning

Because of the tradeoff decisions involved, certain approvals must be obtained prior to use of *in-situ* burning. Use of burning agents to increase oil combustibility is regulated by Subpart J of the National Contingency Plan. The State Implementation Plans required by the Clean Air Act are the primary plans that regulate air quality and pollutant sources. Agreements between state and federal regulatory authorities establish areas and necessary conditions where rapid decisions on *in-situ* burning may be made by the Federal On-Scene Coordinator and/or the State On-Scene Coordinator(s).

What Are the Potential Benefits?

- Reduces impact of surface oil on shorelines, sensitive habitats, birds, mammals, and other wildlife.
- Rapidly consumes oil in the burn.
- Reduces oil storage and disposal problems.
- Eliminates the air quality impacts of the volatile hydrocarbons that would otherwise evaporate.
- The products of combustion are diluted in the air above and downwind of the burn, dispersing rapidly at ground level to normal concentrations.

What Are the Potential Tradeoff Considerations?

- Use limited to favorable atmospheric and sea conditions.
- Equipment required for burning may not be readily available.
- Time frame for effective use may be short due to difficulty of igniting weathered oil.
- Air quality impacts.
- Safety of response workers.
- Risk of secondary fires.
- Limited to use where population centers and sensitive biological resources would not be at risk from smoke.