

Regional Response Team/Northwest Area Committee

In-Situ Burning in Oil Spill Response

What Is In-Situ Burning?

In-situ burning is 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 cannot be used because of limited access to the spill location or ice conditions. Burning quickly removes large quantities of oil and minimizes the need for recovery and storage.

Where the Oil Goes

Carbon dioxide and water vapor are the primary products of *in-situ* burning. About 90% to 95% of the carbon product released to the atmosphere is carbon dioxide, while particulates are only about 5% to 10% of the original volume burned. In addition, about half of the particulates are soot, which causes the black smoke plume. Minor amounts of gaseous pollutants are emitted, such as carbon monoxide, sulfur dioxide, and nitrogen oxides. Typically, most air pollutants produced by an *in-situ* burn are concentrated around the area of the fire.

Only one pollutant, fine smoke particles, is of concern beyond the immediate fire area. At high concentration levels, these particulates can cause respiratory distress in the elderly or those with impaired lung function.

Although these small particles typically disperse in the upper atmosphere, monitoring plans have been established to track particulate levels. The decision to use *in-situ* burning must consider the following tradeoffs:

- the impact on air quality,
- the benefit of rapid oil removal
- the safety of the response workers, and
- the risk of secondary fires.

Approval

Because of tradeoffs involved, certain approvals must be obtained prior to using *in-situ* burning. The National Contingency Plan outlines the approval process which is further explained in the Northwest Area Contingency



M/V New Carissa, Coos Bay/North Bend, Ore. March 1999.
Photo: NOAA

Plan. State Implementation Plans required by the Clean Air Act regulate air quality and pollutant sources. Agreements between state and federal regulatory authorities establish areas and conditions where *in-situ* burning may be used.

Effectiveness

In-situ burns have typically removed over 90% of the contained oil on water. The small percentage of oil left unburned is typically a viscous, taffy-like material that floats long enough to be manually removed.

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.

Downside

- Use limited to correct atmospheric and sea conditions or offshore areas to protect public health.
- Equipment required for burning may not be readily available.
- Time frame for effective use may be short due to difficulty of igniting weathered oil.