National Oceanic and Atmospheric Administration
U.S. Department of Commerce

*NOAA's Oil Spill Response*

# Oil Spill Dispersant Application and Monitoring

Once oil has spilled, responders use a variety oil spill countermeasures to reduce the adverse effects of spilled oil on the environment. Dispersants are one kind of countermeasure.

Oil spill dispersants are chemicals applied directly to the spilled oil in order to remove it from the water surface. Surface oil can be especially harmful to birds, mammals and other organisms that come in contact with the water surface.

Oil on the surface is often cohesive and natural degradation processes are slow. When dispersants are applied to surface oil slicks, tiny dispersant-oil droplets then separate from the slick and mix into the water column, reducing the size and volume of the surface slick.

The tiny droplets are too small to refloat to the surface. Bacteria and other microscopic organisms then act to quickly degrade the oil. Dispersants are commonly applied through specialized equipment mounted on an airplane, helicopter or ship.

## Monitoring

Special Monitoring of Applied Response Technologies (SMART) is a cooperatively designed monitoring program for dispersant use. SMART relies on small, highly mobile teams that collect real-time data using portable, rugged and easy-to-use instruments.

The SMART program is designed to address critical questions:

Are dispersants effective in dispersing the oil? How quickly are dispersants working? Having monitoring data can assist the Unified Command with decision-making for operational use of dispersants.

## Dispersants

To monitor the efficacy of dispersant application, SMART recommends three options, or Tiers.

**Tier I**

A trained observer, flying over the oil slick and using photographic job aids or advanced remote sensing instruments, assesses dispersant efficacy and reports back to the Unified Command.

**Tier II**

Tier II provides real-time data from the treated slick. A sampling team on a boat uses a fluorometer to continuously monitor for dispersed oil one meter under the dispersant-treated oil slick.

The team records and conveys fluorometer data to the scientific support team, which forwards it with recommendations to the Unified Command. Water samples are also taken for later analysis at a laboratory.

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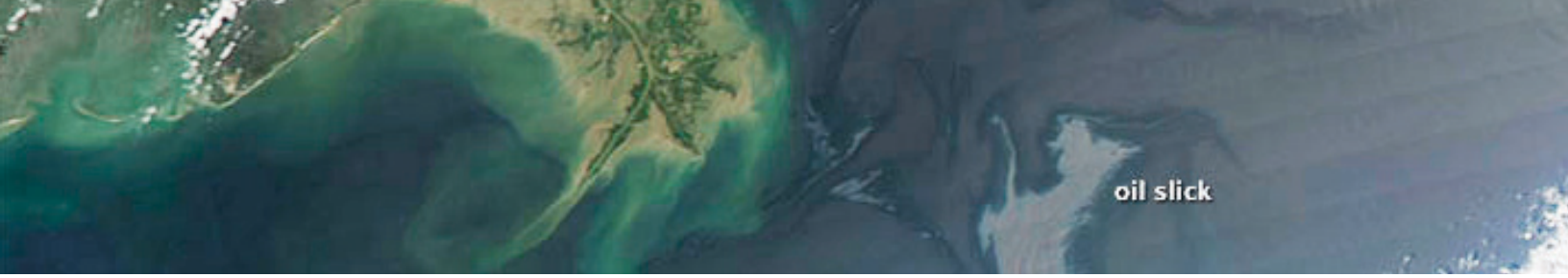



**Tier III**

By expanding the monitoring efforts in several ways, Tier III provides information on where the dispersed oil goes and what happens to it: (1) two fluorometers are used on the same vessel to monitor at two water depths; (2) monitoring is conducted in the center of the treated slick at several water depths, from one to ten meters; and (3) a portable water laboratory provides data on water temperature, pH, conductivity, dissolved oxygen, and turbidity.

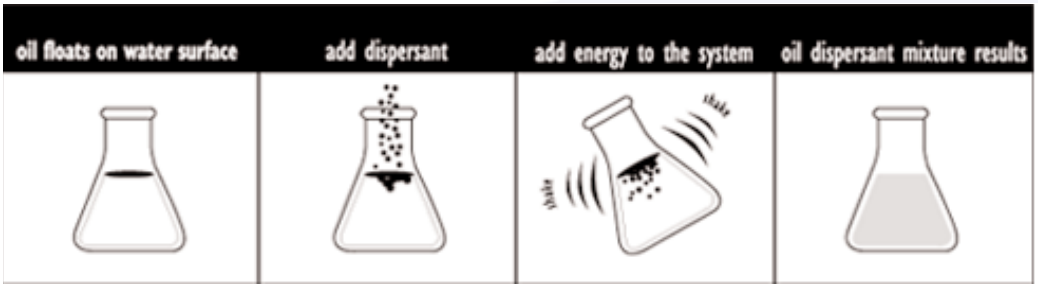
## Field Experience

SMART has already been successfully tested in the field during exercises and spills. SMART has been used to monitor dispersant applications in the Gulf of Mexico. Practical usage help us to enhance SMART protocols and equipment.

For online information on SMART, visit http://response.restoration.noaa.gov/smart

Learn more about NOAA's response to the BP oil spill at http://response.restoration.noaa.gov/deepwaterhorizon.

To learn more about NOAA, visit http://www.noaa.gov.




*First, the dispersant is applied to the water surface. Next, molecules of the dispersant attach to the oil, causing it to break into droplets. Wave action and turbulence then force the oil-dispersant mixture into the water column, so that the oil that had been concentrated at the surface is diluted within the water column.*