

RRT III Fact Sheet

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OIL DISPERSANTS

Dispersants are a group of chemicals designed to be sprayed onto oil slicks, to accelerate the process of natural dispersion. Spraying dispersants may be the best means of removing oil from the sea surface, particularly when mechanical recovery is not possible. Their use is intended to minimize the damage caused by floating oil, for example to birds or sensitive shorelines. However, in common with all spill response options, the use of dispersants has its limitations and should be carefully controlled.

How Dispersants Work

Natural dispersion of an oil slick occurs when waves and other turbulence at the sea surface cause all or part of the slick to break up into droplets and enter into the water column. The addition of dispersants is intended to accelerate this process.

Dispersants have two main components, a surfactant and a solvent. Surfactants are substances that when dissolved in water (or aqueous solution) reduces its surface tension or the interfacial tension between it and another liquid (e.g., oil). A part

of the surfactant molecule used in dispersants has an attraction to oil (i.e. it is oleophilic) while another part has an attraction for water (i.e. it is hydrophilic).

When a dispersant is sprayed onto an oil slick, the interfacial tension between the oil and water is reduced, promoting the formation of finely dispersed oil droplets. These droplets will be of varying sizes and although the larger ones may rise back to the surface some will remain in suspension. If dispersion is successful, a characteristic plume will spread slowly down from the water surface a few minutes after treatment. However, the effective distribution of surfactant throughout the oil is crucial to the success of the process. To achieve the required distribution, most dispersants contain a suitable solvent which allows the dispersant to penetrate into the slick and acts as a carrier for the surfactant.

Limitations

Dispersants have little effect on very viscous, floating oils, as they tend to run off the oil into the water before the solvent can penetrate. They are unsuitable

for dealing with viscous emulsions (mousse) or oils which have a pour point near to or above that of the ambient temperature. Even those oils which can be dispersed initially become resistant after a period of time as the viscosity increases as a result of evaporation and emulsification. For a particular oil, the time available before dispersant stops being effective depends upon such factors as sea state and temperature but is unlikely to be longer than a day or two.

Environmental Concerns

The use of dispersants has in the past tended to provoke controversy since their application can be seen as a deliberate introduction into the sea of an additional pollutant in addition to the short term increase in hydrocarbon concentration in the water. However, there is a wealth of laboratory data indicating that dispersants and oil/dispersant mixtures exhibit relatively low toxicity to marine organisms.

The rapid dilution of the dispersed oil, the proximity to sensitive areas as well as the

direction of currents and the mixing depths of surface waters are all factors which should be considered when deciding upon dispersant use. In the open sea, concentrations after spraying are unlikely to remain high for more than a few hours and significant biological effects are therefore improbable. In shallow waters close to the shore, where water exchange is poor, higher concentrations may persist for long periods and may give rise to adverse effects. However, the controlled application of dispersants may be beneficial in that it may reduce damage to adjacent ecologically sensitive shorelines by surface oil.

The decision whether or not to use dispersants rather than other response options, will need to take into account cost-effectiveness and conflicting priorities for protecting different resources from pollution damage. The benefit gained by using dispersants to protect coastal amenities, sea birds and intertidal marine life may far outweigh the disadvantages such as the potential for temporary tainting of fish stocks. Certain resources are difficult to protect from dispersed oil. It may be decided not to apply dispersants near to these resources, even if the risk of damage is low.

Scope of Dispersant Use

RRT III has an approved memorandum of understanding which provides for the preauthorization for the use of dispersants (chemical countermeasures) by the FOSC. This preauthorization applies only in the Federal Region III portion of designated zones in the COTP Hampton Roads (HR) and COTP Philadelphia (PHI) geographic areas of responsibility. The MOU constitutes preconsultation and concurrence for the approval for use of dispersants within the preapproval areas. The MOU establishes criteria under which dispersants listed on the NCP Product Schedule may be used in RRT III waters. No biological agents will be used as a primary response measure.

Four distinct zones and their associated zone-specific conditions, which determine the nature of dispersants in each zone, have been identified in the MOU. Zone specific conditions apply only to spills of 50 barrels or less, except in Zone 1, where specific conditions apply to spills of any size.

Zone A - Big Stone Beach Anchorage in Delaware Bay. Limited preauthorization for the use of dispersants on spills of 50 barrels or less, or 50 barrels or

less portions of larger spills, provided the former is a spill of opportunity and the latter is for trial use only.

Zone 1 - COTP HR and COTP PHI Subregional Area. Preauthorization is granted with respect to spills of any size in the offshore waters that lie 3nm and seaward of the Territorial Sea Baseline along the coast of Virginia, Maryland, and Delaware.

Zone 2 - Coastal waters within the COTP HR and COTP PHI Subregional Area. Concurrence required for operational use of dispersants in waters that are at least 0.5 nm from any shoreline and where the water depth is greater than 40 feet. Before authorizing operational use the FOSC must obtain concurrence from EPA, NOAA, DOI and affected State/Commonwealth.

Zone 3 - Nearshore waters within the COTP HR and COT? PHI Subregional Area. Concurrence required for operational use in waters less than 0.5 nm from shore or water depth less than 40 feet. Dispersants are not a primary tool in this zone.

Please contact our RRT Coordinator through the web site or at (757) 398-6620 for more information.