

Dispersant Use Policy for Barbados

Introduction

The Barbados National Oil Spill Contingency Plan (NOSCP) was developed to facilitate and promote prompt, effective and soundly managed response to oil spill incidents, both terrestrial and marine.

The goal of oil spill response is to minimize the adverse effects of the spill. A variety of response approaches can be used to achieve this objective, including natural attenuation, mechanical containment and recovery, the use of sorbent materials, and the application of chemical dispersants.

Since their introduction in the 1960s, dispersants have been refined to increase their efficacy and reduce their environmental toxicity. Despite these improvements, there remains controversy about the effectiveness and environmental acceptability of chemical dispersants as a spill response option. Even though modern dispersants are formulated to be less toxic than the oils they are intended to treat, there are circumstances where the use of dispersant may not produce a positive net environmental benefit.

The requirement that guidelines related to the use of dispersants for oil spill response in Barbados should be developed as an annex to the NOSCP is an acknowledgement that if dispersants are to be incorporated into oil spill response strategies, clear policies for their approval and use must be put in place.

This policy guidance is intended to outline:

- The conditions under which dispersants may and may not be used;
- The information necessary to support a request to use dispersants;
- The authorities responsible for issuing a decision of dispersant use;
- The factors to be considered in making a decision on the acceptability of dispersant use;
- The requirements for reporting and monitoring during and subsequent to the use of dispersants.

The elaboration of clear regulatory policy is intended to facilitate timely decision making about whether a request to use dispersants should be approved or declined.

Background

Chemical dispersants are liquid mixtures of surfactants and solvents. They work by promoting the disintegration of an oil slick into numerous tiny oil droplets, which become suspended in the water column. The dispersion of the slick in this manner enhances the rates at which oil is removed from the surface of the water, facilitates rapid dilution of the

oil by wave movements, and provides an increased surface area for the degradation of the oil by micro-organisms.

Advantages and Disadvantages of Dispersant Use

Chemicals dispersants can be extremely useful in minimizing the environmental and economic damage caused by a marine oil spill. However, the use of dispersants has the potential to cause harm to sensitive environmental resources, particularly if the dispersants are used inappropriately. Because modern dispersants are formulated to be less toxic than the oil they are used to treat, adverse environmental effects are likely to be due to the presence and behaviour of the dispersed oil, rather than of the dispersant itself.

In any decision about whether or not to use dispersants, the likely effects, benefits and drawbacks must be carefully considered. Some of the advantages and disadvantages of dispersant use are listed below.

Advantages

1. Dispersants accelerate and enhance natural dispersion and degradation processes, facilitating rapid decreases in oil concentrations.
2. Dispersants are effective for dealing with large volumes of oil in a short time.
3. Removal of oil from the water surface helps reduce exposure of marine birds and mammals, and their habitats, to surface oil.
4. Exposure of shorelines to surface oil is reduced; dispersed oils tend not to wet sediments, beach sand, etc.
5. Because dispersed oil droplets are not driven by the wind, the speed of movement of the slick is reduced, giving more time for measures to be put in place to protect sensitive resources downwind of the slick.
6. Coalescence and re-surfacing of oil is reduced, thus inhibiting the formation of tar balls and stable, hard-to-degrade oil water emulsion (mousse).
7. Dispersant use can be more cost-effective than other response methods.

Disadvantages

1. Dispersant use introduces additional, low-toxicity, substances into the marine environment.
2. If dispersants are used on light oils such as gasoline, kerosene and diesel fuel, there is a greater likelihood of harm to marine organisms than if the oil was left to evaporate naturally.

3. By increasing the volume of oil dispersed in the water column, dispersants may adversely affect the quality of fish and shellfish intended for commercial exploitation.
4. The use of dispersants may have harmful effects in shallow waters and waters with poor circulation, as these factors limit the dilution of the dispersed oil.
5. There is a limited window of opportunity within which dispersants can be effectively put to use.
6. Treating an oil spill with dispersant reduces the effectiveness of oleophilic skimming equipment.

Dispersant Policy for Barbados

General Guidelines

Generally, the National Oil Spill Response Committee and National Response Team will adopt the policy outlined in the *Caribbean Island Oil Pollution Preparedness Response and Co-operation Plan, 1998*, as follows:

1. Dispersant may be applied only in areas more than one nautical mile (1.8 km, 6,100 ft) from any shoreline, or more than three nautical miles (5.6 km, 18,240 ft) upcurrent from important marine fisheries or coral reef ecosystems that are less than 20 feet (6 m) from the water's surface.
2. The water depth in the area in which the dispersant will be applied should exceed 30 feet (9 m).
3. The method of dispersant application must be one recommended by the manufacturer.
4. The rate of application must be as recommended by the manufacturer.
5. The dispersants should exhibit low toxicity.
6. If dispersant use is to be conducted beyond Barbados's territorial seas, the Chair of the National Oil Spill Response Committee will notify potentially affected downstream Island States and/or Territories.
7. In the event that it is determined that the use of dispersants is necessary and/or will occur, and if it is apparent that downstream Island States and/or Territories may be affected, then agreement for such use must be obtained from the potentially affected Island States and/or Territories.
8. During a dispersant operation, the responsible party and/or Incident Commander should determine the effectiveness of the dispersant application by on-scene observation and/or by laboratory testing. Application of dispersant should be discontinued if found to be ineffective.

Additionally, the following guidelines shall apply:

9. Approval for the use of dispersant **must** be obtained from the Environmental Protection Department (EPD), the designated NOSCP lead agency, before dispersant application is commenced.
10. In addition to the areas identified in item 1 above, dispersant may be used to treat spills of oil within the main harbour of the Bridgetown Port.
11. The use of dispersants is not considered as a primary oil spill response tool. It should be regarded as a secondary response option to be used only in the event that mechanical containment and recovery, use of sorbents and/or manual techniques have proven to be, or are likely to be, ineffective or impractical.
12. The application of the dispersant should be monitored/observed by one or more members of the National Oil Spill Response Committee.
13. Dispersants should **not** be used
 - To treat spills of light fuel products (e.g. diesel, gasoline, kerosene);
 - To treat oil with a viscosity greater than the maximum specified for the dispersant;
 - In areas with poor circulation;
 - In fishing areas;
 - In freshwater environments;
 - As shoreline cleaning agents;
 - For cleanup of boats, skimmers, booms or other equipment.
14. The EPD, National Oil Spill Response Committee and National Response Team will use the net environmental benefit analysis (NEBA) approach to make decisions about dispersant use, taking into account
 - The distribution, fate, toxicity and biological effects of the dispersed oil in water, sediments and organisms if dispersant is applied;
 - The distribution, fate, toxicity and biological effects of the oil if it is not treated with dispersant (i.e. if some other treatment/recovery method is implemented);
 - The likely effectiveness of dispersant application vs. other methods of treatment;
 - The potential for damage to, and the relative priorities for protection of, sensitive resources, including mangroves, coral reefs, sea-grass beds, fisheries, seawater intakes, and other environmental and economic resources;
 - The time-scales for recovery of the resources, species and habitats likely to be affected.

15. At any time during the response operation, the Chair of the National Oil Spill Response Committee may instruct that dispersant use be discontinued based on criteria related to effectiveness, environmental risk and/or the availability of other viable response options.

Information Management Guidelines

Pre-Approval of Dispersants

All dispersants intended for use in Barbados are to be pre-approved by the National Oil Spill Response Committee. In order for pre-approval to be obtained, the following information must be submitted to the National Oil Spill Response Committee:

- Name of dispersant;
- Type of dispersant;
- Manufacturer's name and contact information;
- Date of manufacture and expiry date;
- List of ingredients;
- Recommended storage instructions;
- Instructions for use;
- Material Safety Data Sheets (MSDSs) and other chemical hazard and toxicity information;
- Size and location(s) of dispersant stockpiles.

Further information may also be requested by the Committee:

- A list of countries in which the dispersant is approved for use;
- Results of case studies and field experiments relating to the efficacy and environmental impacts of the dispersant;
- Instances and outcomes of application of the dispersant as part of an oil spill response;
- Any other information as deemed necessary.

Approval of Dispersant Use

It is acknowledged that oil "weathers" after it has been spilled, and that this weathering progressively decreases the effectiveness of dispersants. Therefore it is important that dispersants, if they are to be used, are applied as soon as possible after the oil has been spilled. Therefore it is in the best interest of both the National Oil Spill Response Committee and the responsible party to avoid a lengthy decision-making process. Rapid and informed decisions can be facilitated by prompt submission of as much of the following information as possible to support a request for approval of dispersant use:

- Name of the responsibly party
- Name of reporting party
- Date and time of spill
- Location of the spill
- Source of the spill
- Location of the source
- Nature of spill
 - ▶ cause of spill
 - ▶ marine vs. terrestrial
 - ▶ instantaneous vs. continuous
- Characteristics of the oil spilt
 - ▶ product name and whether it is a crude oil/refined product
 - ▶ specific gravity/API gravity
 - ▶ kinematic viscosity
- Estimated spill volume
- Extent of the spill
 - ▶ length
 - ▶ width
- Weather conditions at spill site
 - ▶ sea state
 - ▶ wave height
 - ▶ water depth
 - ▶ wind speed and direction
 - ▶ air and sea temperatures
 - ▶ visibility
- Predicted spill movement
 - ▶ speed
 - ▶ direction
- Description of coastal areas and resources likely to be affected by the spill/slick
 - ▶ beaches
 - ▶ mangroves
 - ▶ seagrass beds
 - ▶ fish nurseries
 - ▶ sea birds and mammals
 - ▶ marinas/ports/harbours
 - ▶ fishing areas/activities
 - ▶ water intakes
 - ▶ recreational areas
 - ▶ others
- Remedial action taken and current/predicted effectiveness
- Type of dispersant to be used, including manufacturer's specifications for use
- Quantity of dispersant to be used
- Dispersant application method
- Location of dispersant use.

Monitoring and Reporting

During an Incident Response

In situ monitoring of the dispersant application and effectiveness, as well as the fate, distribution and movement of treated oil must be carried out as part of the oil spill response. Visual observation is the minimum level of monitoring required, and should be supplemented and supported, where possible, by *in situ* monitoring of dispersed oil in the water column. If monitoring demonstrates that dispersant application is ineffective, reports should include possible explanations for this result.

After an Incident Response

Post incident reports should include details of the dispersant application, its effectiveness and impacts on sensitive environmental and economic resources. The following information should be included in post-incident reports:

- Time dispersant application commenced;
- Time dispersant application ceased;
- Types of dispersant applied;
- Quantities of dispersant applied;
- Locations of dispersant application;
- Dispersant application methods and rates;
- Types of oil treated;
- Other response methodologies employed;
- Effectiveness of dispersant application (if dispersant was ineffective, likely reasons for its ineffectiveness should be included);
- Environmental impacts of dispersant application (including an assessment of any observed net environmental benefit).

In addition, post-incident monitoring should be carried out immediately after the response is completed, 30 days after the response is completed and 90 days after the response is completed. This monitoring should include:

- Water sampling for dispersant residues and petroleum hydrocarbons;
- Sediment sampling for dispersant residues and petroleum hydrocarbons;
- Ecological and biological monitoring of affected habitats, flora and fauna.

Results of this monitoring and an accompanying report should be submitted to the National Oil Spill Response Committee for review.

References

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