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Standard Guide for Determining Net Environmental Benefit of Dispersant Use[1]

This standard is issued under the fixed designation F2532; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide covers considerations in determining net environmental benefit of dispersant use on oil spills. This guide is applicable to both surface and sub-surface application. The purpose of this guide is to minimize environmental and socioeconomic impacts of oil spills.

1.2 Net environmental benefit analysis (NEBA) should be conducted as part of oil spill contingency planning.

1.3 There are many methods to control, cleanup or treat oil spills. Dispersants should be given equal consideration with other spill response options.

1.4 Only general guidance is provided here. For the purposes of this guide, it is assumed that the crude or fuel oil is dispersible to some extent. The dispersant is also assumed to be relatively effective, applied correctly, and in compliance with relevant government regulations. Differences between commercial dispersants or between different oils are not considered in this guide.

1.5 This guide applies to marine and estuarine environments only.

1.6 When making dispersant use decisions, appropriate government authorities should be consulted as required by law.

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.8 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Significance and Use

2.1 Net Environmental Benefit Analysis (NEBA) applied to oil spill response is the process of considering advantages and disadvantages of different spill response options (including no response) to arrive at a spill response decision resulting in the lowest overall environmental and socioeconomic impacts.

2.2 Spill response will likely involve some combination of response options. There are no response methods that are completely effective or risk-free. NEBA should be conducted with appropriate regulatory agencies and other organizations as part of spill contingency planning. NEBA is important for pre-spill planning since some response options have a limited window of opportunity.

3. Net Environmental Benefit Analysis for Oil Spill Response

3.1 The objective of NEBA is to choose the oil spill response option that will result in the lowest overall negative impact on the environment. The NEBA should focus on local and regional areas of concern and should result in decisions based on what is best for a specific location. With NEBA comes the recognition that, regardless of the response option chosen, some impact will occur. Tables 1 and 2 and Appendix X1 and Appendix X4 provide considerations and comparisons for use in the NEBA process. Appendix X2 and Appendix X3 present an ecological risk assessment method for determining the net environmental benefit of dispersant use.

3.2 The NEBA process involves several tasks (**1, 2**).[2]

3.2.1 Gather information on the risk considerations noted in Table 2 including habitats and species of concern, physical and chemical characteristics of the spilled oil, shoreline geomorphology, potential socioeconomic impacts, and spill response options. Resource trustees, area contingency plans, and environmental sensitivity maps are good sources of information.

3.2.2 Consider relative importance of natural resources.

3.2.3 Review oil spill case histories and experimental data relevant to the spill location and response options being assessed.

[1] This guide is under the jurisdiction of ASTM Committee F20 on Hazardous Substances and Oil Spill Response and is the direct responsibility of Subcommittee F20.13 on Treatment.

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[2] The boldface numbers in parentheses refer to the list of references at the end of this standard.

TABLE 1 Dispersant Use Compared to Other Spill Response Options

Response Method	Advantages	Disadvantages
No response (monitor only)	appropriate for spills that do not threaten shorelines used when other response options may cause more damage than natural removal used when environmental conditions do not allow use of other response methods	can be politically unacceptable potential wildlife exposure wind direction could shift resulting in oil stranding onshore
Mechanical on-water recovery	removes oil from environment allows recycling and proper disposal of recovered oil	wind, waves, and currents can limit containment and recovery debris and viscous oil problematic limited recovery of spilled oil due to encounter rates in large spills storage and disposal of recovered oil may be limited equipment and labor intensive
Dispersants	prevents or reduces oiling of wildlife prevents or reduces oil stranding onshore reduced or no storage and disposal of oil reduces or prevents formation of mousse enhances natural degradation processes rapid treatment of large areas reduces adherence of oil to suspended particulates and inhibits sedimentation of oil	Oil and dispersants are left in the environment time frame for effective use may be limited due to slick thickness, weathering, emulsification less effective on high viscosity oils or in highly emulsified oil oil concentrations in water column typically greater when dispersant used than when oil is naturally dispersed resulting in increased impacts on organisms in upper 10 m of water column exclusion zones may be created based on water depth, distance from shore, limited water circulation, presence of marine sanctuary or water intakes, etc. can be politically unacceptable
In-situ Burning	reduced or no storage and disposal of oil may prevent or reduce oil stranding onshore prevents or reduces oiling of wildlife	time frame for effective use may be limited due to slick thickness and emulsification wind, waves, and currents may make ignition difficult weathered oil difficult to ignite 2 mm to 3 mm minimum slick thickness for ignition air pollution issues (smoke) residues that may sink can be politically unacceptable

TABLE 2 Risk Considerations for Dispersant Use

Oil Location	Risk Drivers	Priorities
Water surface	oil type persistence size of oil slick time/distance before oil comes ashore	birds, marine mammals, sea turtles, endangered/protected species
Water column	oil type oil concentrations advection depth dilution potential exposure duration food web contamination proximity to water intakes season life stages of species of concern biological recovery time	commercial or subsistence fisheries coral reefs seagrass beds endangered/protected species tourist/recreational areas
Shoreline	oil type shoreline type persistence season extent of oiled shoreline oil thickness natural cleansing (wave and tidal action) burial potential shoreline accessibility biological recovery time	intertidal communities marshes mangroves bird concentration areas marine mammals endangered/protected species tourist/recreational areas

3.2.4 Compare advantages and disadvantages of response options including no response (see Table 1).

3.2.5 Predict potential environmental impacts for chosen response method.

3.2.6 Weigh advantages and disadvantages of response options in relation to ecological value and human use of impacted area.

3.2.7 Choose the optimum response method.