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Standard Guide for Ecological Considerations for the Use of Oil Spill Dispersants in Freshwater and Other Inland Environments, Lakes and Large Water Bodies[1]

This standard is issued under the fixed designation F1210; 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 the use of oil spill dispersants to assist in the control of oil spills. The guide is written with the goal of minimizing the environmental impacts of oil spills; this goal is the basis on which the recommendations are made. Aesthetic and socioeconomic factors are not considered, although these and other factors are often important in spill response.

1.2 Spill responders have available several means to control or clean up spilled oil. In this guide, the use of dispersants is given equal consideration with other spill countermeasures. It is not considered as a "last resort" after all other methods have failed.

1.3 This is a general guide only. Oil, as used in this guide, includes crude oils and refined petroleum products. Differences between individual dispersants or between different oil products are not considered.

1.4 The guide is organized by habitat type, for example, small ponds and lakes, rivers and streams, and land. It considers the use of dispersants primarily to protect habitats from impact (or to minimize impacts).

1.5 This guide applies only to freshwater and other inland environments. It does not consider the direct application of dispersants to subsurface waters.

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

1.7 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.8 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

F2532 Guide for Determining Net Environmental Benefit of Dispersant Use

3. Significance and Use

3.1 This guide is meant to aid local and regional response teams who may use it during spill response planning and spill events.

3.2 This guide should be adapted to site specific circumstance.

4. Environment Covered—Lakes and Large Water Bodies

4.1 Lakes and large water bodies are major fresh water features that are a significant part of major water systems. They have a dynamic near-shore ecology, and a wide mixture of animal and plants species. In northern regions, these water bodies may be partly or completely ice-covered during part of the year but will not freeze to the bottom. Commercially important fishing and recreational activities are frequently associated with these water bodies.

4.2 While most of these bodies are naturally occurring and exist during the most year, some may be man-made.

4.3 The characteristics of these water bodies are:

4.3.1 Open water area greater than 10 hectares,

4.3.2 Water depths in excess of 1.5 m,

4.3.3 Soft or hard bottom with a low organic content except in shallow water areas,

4.3.4 Acidic water in some areas especially near industrial regions,

4.3.5 A well defined inlet or outlet, or both, and

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

4.3.6 A well defined shoreline of varied characteristics such as sand beaches and rocky headlands similar to marine environments. Some parts of the shore may be similar to those in ponds and sloughs.

5. Background

5.1 The effects of oil and dispersed oil on these aquatic environments have been the subject of numerous studies. The studies have involved both intentional experimental spills and studies undertaken during actual spill situations (**1-4**).[3]

5.2 There have been a number of studies on the impact of oil and oil/dispersant mixtures on microbiological systems (**5-11**) and on macrobiota (**12, 13**).

5.3 The principal biotic components of such water bodies are a variety of fauna and flora. The aquatic flora include algae (planktonic and attached) and floating or submerged vascular plants. Terrestrial flora include grasses, moss, lichens, herbs, forbs, and woody plants. In deep water areas, there is little vegetation except for algae.

5.4 The fauna include invertebrates (molluscs, crustaceans, worms, and other similar species), fish, a variety of waterfowl and seabirds (ducks, loons, gulls, terns, and herons), mammals, such as beaver and muskrat, and in many areas, significant human activity. The distribution and composition of species is a function of climate, local geography and soil type, and human use of the area.

5.5 Human activities range from recreation and tourism, to shipping and commercial fishing. In many cases, lakes and other large water bodies are the source of potable water for human consumption or industrial use.

6. General Considerations for Making Dispersant Use Decisions

6.1 The dispersant use decision is, in this case as most others, one of trade-offs. The use of dispersants can reduce the adverse effects of spilled oil on certain biological species at the expense of other components of the ecosystem (**14**).

6.2 Guide F2532 should be followed before making a decision to use dispersants in a river or creek.

6.3 In most cases, the mortality of individual creatures is of less concern than the destruction of habitat. The repopulation of areas after the spill will occur naturally when an area becomes a suitable habitat for a given species.

7. Recommendations

7.1 Dispersant use in lakes and other large water bodies and their bordering vegetation should be considered if a spill poses a significant threat to indigenous wildlife or its habitat. In evaluating the potential for dispersant use, consideration should be given to the alternatives of leaving the oil untreated or the use of mechanical recovery equipment. In many cases, a spill response operation can cause serious damage to a lake or large water body habitat, or a disruption of nesting and breeding activities.

7.2 Since large waves can be generated in these water bodies, the need to supply additional energy for the dispersant process is not an issue. In many cases, the water is shallow enough that the dispersed oil will reach the bottom and will have the potential to cause impact on the benthic community.

7.3 The use of dispersants near water intakes is not recommended because there is a possibility of inducing increased contamination. Dispersant application should be far enough away from the intake so that dilution can occur before the water is used for potable or industrial applications.

7.4 Should waterfowl, either migrating or resident, be present, the use of dispersants is recommended to reduce the impact on this resource.

7.5 In some areas, the protection of fish, their eggs, larvae, and juveniles, is a concern. Fish larvae and eggs have been found to be particularly susceptible to oil. In this case, the mechanical removal may be preferred if it can be completed before the oil contacts the eggs or larvae.

8. Keywords

8.1 dispersants; environmental sensitivity; freshwater; inland; lakes; oil spill; oil spill dispersants

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

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