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Standard Guide for Ecological Considerations for the Use of Oilspill Dispersants in Freshwater and Other Inland Environments, Rivers and Creeks[1]

This standard is issued under the fixed designation F 1231; 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 oilspill dispersants to assist in the control of oil spills. This 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 "last resort" after all other methods have failed.

1.3 This is a general guide only. It assumes the oil to be dispersible and the dispersant to be effective, available, applied correctly, and in compliance with relevant government regulations. In the assessment of environmental sensitivity, it is assumed that the dispersant is nonpersistent in the natural environment. 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 This 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) and to clean them after a spill takes place.

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.0

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

2. Significance and Use

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

2.2 This guide should be adapted to site-specific circumstances.

3. Environment Covered—Rivers and Creeks

3.1 Rivers and creeks are moving bodies of fresh water that are a significant part of major water systems. They have a dynamic near shore ecology, and a wide variety of animal and plant species. In northern regions, these water bodies may be partly or completely ice covered during part of the year. Shallow rivers and most creeks may freeze to the bottom in the winter. Commercially important fishing and recreational activities are frequently associated with these water bodies.

3.2 Rivers generally refer to large bodies of moving water, whereas creeks are smaller bodies of flowing water.

3.3 The characteristics of these water bodies are:

3.3.1 Flowing water,

3.3.2 Water depths in excess of 1 m is designated as a river, shallower would be a creek,

3.3.3 A low organic content bottom except in shallow near shore still-water areas,

3.3.4 Acidic water in some areas especially near industrial regions,

3.3.5 A well defined source or outlet, or both, and

3.3.6 A well defined shoreline consisting of sand beaches and rocky headlands similar to marine and lake environments.

4. Background

4.1 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 **(1-5)**.[2]

4.2 There have been a number of studies on the impact of oil and oil/dispersant mixtures on microbiological systems **(6-16)**.

4.3 The principal biotic components of such water bodies are a variety of fauna and flora. The aquatic flora include bacteria, algae (planktonic and attached), and floating or

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

submerged vascular plants. Terrestrial flora include grasses, moss, lichens, herbs, forbs, and woody plants. In deep water areas, there is little vegetation except for bacteria and algae **(17-20)**.

4.4 The fauna include invertebrates (zooplankton, molluscs, crustaceans, worms and other similar species), fish, a variety of waterfowl (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 **(21)**.

4.5 Human activities range from recreation and tourism, to shipping and commercial fishing. In many cases, rivers and creeks are the source of potable water for human consumption and industrial use.

5. General Considerations for Making Dispersant Use Decisions

5.1 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.

5.2 In most cases the mortality of individual creatures, while of concern, 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.

6. Recommendations

6.1 Dispersant use in rivers and creeks 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 rivers and creeks habitat, or a disruption of nesting and breeding activities.

6.2 The turbulence of the flowing water may be adequate to provide the energy for dispersion and vertical transport. This is certainly the case in areas where there are rapids. 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.

6.3 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 upstream of the intake so that dilution can occur before the water is used for potable or industrial applications.

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

6.5 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, mechanical removal may be preferred if it can be completed before the oil contacts the eggs or larvae.

7. Keywords

7.1 creeks; dispersants; environmental sensitivity; freshwater; inland; oil spill; oilspill dispersants; rivers

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