



~~Designation: F1209-89 (Reapproved 2007)~~ Designation: F 1209 – 08

Standard Guide for Ecological Considerations for the Use of ~~Oilspill~~ Oil Spill Dispersants in Freshwater and Other Inland Environments, Ponds and Sloughs¹

This standard is issued under the fixed designation F 1209; 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 socio-economic 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~~ 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. 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 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) ~~and to clean them after a spill takes place.~~ 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 *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 circumstance.~~ Referenced Documents

2.1 ASTM Standards:²

F 2532 Guide for Determining Net Environmental Benefit of Dispersant Use

3. Environment Covered—Ponds and Sloughs

~~3.1 Ponds and sloughs are small isolated water bodies that are not part of major water systems. They have a dynamic ecology, and a wide mixture of animal and plant species. In northern regions, these water bodies may freeze to the bottom and do not sustain a wide variety of aquatic species.~~

~~3.2 While most of these bodies are naturally occurring and exist throughout the year, some may be man-made. In arid climates, the existence of these bodies may be seasonal.~~

~~3.3 The characteristics of these water bodies are:~~

~~3.3.1 Open water area of less than 10 hectares;~~

~~3.3.2 Shallow water with a maximum depth of 1 to 1.5 m;~~

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.

Current edition approved ~~Nov. 15, 2007~~ March 1, 2008. Published ~~November 2007~~ March 2008. Originally approved in 1989. Last previous edition approved in 1999 as F 1209 – 89 (1999).

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

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.

- 3.3.3 Soft bottom with a high organic content;
- 3.3.4 May have alkaline or acidic water;
- 3.3.5 No well defined inlet or outlet, and
- 3.3.6 Poorly defined shoreline consisting of floating mats of vegetation. 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—Ponds and Sloughs

4.1 Ponds and sloughs are small isolated water bodies that are not part of major water systems. They have a dynamic ecology, and a wide mixture of animal and plant species. In northern regions, these water bodies may freeze to the bottom and do not sustain a wide variety of aquatic species.

4.2 While most of these bodies are naturally occurring and exist throughout the year, some may be man-made. In arid climates, the existence of these bodies may be seasonal.

4.3 The characteristics of these water bodies are:

- 4.3.1 Open water area of less than 10 hectares,
- 4.3.2 Shallow water with a maximum depth of 1 to 1.5 m,
- 4.3.3 Soft bottom with a high organic content,
- 4.3.4 May have alkaline or acidic water,
- 4.3.5 No well defined inlet or outlet, and
- 4.3.6 Poorly defined shoreline consisting of floating mats of vegetation.

5. Background

4.1The5.1 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 (~~1-51-6~~).³

4.2There5.2 There have been a number of studies on the impact of oil and oil/dispersant mixtures on microbiological systems and plankton (~~6-157-16~~).

4.3The5.3 The principal biotic components of such water bodies are a variety of fauna and flora. The aquatic flora include bacteria, algae, algae (planktonic and attached); and floating or submerged vascular plants. Terrestrial flora include grasses, moss, lichens, herbs, forbs, and woody plants.

4.4The5.4 The fauna include invertebrates, (zooplankton, molluscs, invertebrates (molluscs, crustaceans, worms, and other similar species), worms), 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. There have been some studies on the effects of oil and oil/dispersant mixtures on fauna (17, 18). The distribution and composition of species is a function of climate, local geography and soil type, and human use of the area (~~16-19~~).

4.5Studies of the effects of oil on vegetation include laboratory work on the effects on willows, moss, lichen, black spruce, and sedge. These studies showed that the pouring of oil directly on the vegetation was lethal to willow and moss, and caused some nonpermanent damage to the other species (~~17-2620-29~~).

4.6Floating leaves are wetted and penetrated by oil from slicks while younger floating leaves whose cuticles are intact are more resistant to penetration by oil. Penetration occurs most readily in areas where there is damage to the leaf caused by insects or mechanical abrasion.

4.7Oil5.7 Oil is retained in areas of dense vegetation and is released slowly. Dispersants applied soon after a spill appear to speed the movement of the slick through the vegetation if there is some water movement. Only the oil that contacts the leaves causes some damage. Leaves and stems that are subsurface are not damaged by the presence of oil. Oil slicks that are restricted to contact of the stem areas near the water surface are not very injurious.

4.8Field5.8 Field studies in northern environments have shown little long term effects of spilled oil. There have been few studies on the effects of dispersed oil in these environments.

4.9Although oil may cause extensive damage to vegetation growing in low-lying wetlands and shorelines of bog lakes, plants that grow from rhizomes or healthy portions of aerial tissue (sedge and willow); willow) have a high recovery potential. Long-term damage to root systems could, however, slow recovery of the vegetation in impacted areas. This may be of less importance in areas with an elevated water table (bog lakes).

4.10Laboratory studies of the foliar damage to moss, lichen, willow, black spruce, and sedge; sedge by dispersants indicate some damage, but this is generally not lethal. ~~Many dispersants are fast acting contact poisons, but their activity is limited to the site of application.~~ Plants treated with dispersants recover in most cases. However, foliar damage may increase the plant's susceptibility to pathogens.

4.11Field studies on the effects of the direct spraying of plants with dispersants indicated that the short-term effect of dispersants to individual plants was less than that incurred through natural causes. No long term effects were found and seasonal growth was not affected.

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