USE OF DISPERSANTS

IN THE

CARIBBEAN

Prepared by: Response Technology Committee
Chemical Countermeasure Sub-committee
Caribbean Regional Response Team
# UPDATES AND CHANGES

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RE: CHANGE 1 TO CARIBBEAN REGIONAL RESPONSE TEAM POLICY FOR USE OF DISPERSENSANTS IN OCEAN AND COASTAL WATERS

PURPOSE: This notice provides changes to the Caribbean Regional Response Team (CRRT) Policy for Use of Dispersants in Ocean and Coastal Waters concerning the sections of the policy addressing the intended monitoring program for dispersant operations.

SUMMARY OF CHANGES: This change incorporates a general description of the intended monitoring program for dispersant operations. The policy sections that allude to the “Special Response Operations Monitoring Program”, or SROMP, are deleted since this monitoring protocol has since been replaced by the “Special Monitoring of Advanced Response Technologies”, or SMART. Due to the anticipated frequent changes in the evolving monitoring protocols, this policy will only refer to the monitoring procedures currently accepted by the Caribbean RRT. The details of those monitoring protocols will be identified under separate planning documents.

ACTION: Remove and insert the following pages:

Remove

Introduction Pages 1 & 2
Contents of Appendix III

Insert

Introduction Pages 1 & 2
Appendix III

If you have any questions, please contact me at 305-536-6503, by facsimile at 305-536-5091, or by e-mail at emosher@d7.uscg.mil. This change became effective on July 29, 1999.

Sincerely,

LCDR Eric J. Mosher
U.S. Coast Guard Alternate Co-Chair
Caribbean Regional Response Team

Encl: (1) Change 1 to Caribbean Regional Response Team Policy for Use of Dispersants in Ocean and Coastal Waters
RE: CHANGE 2 TO CARIBBEAN REGION REGIONAL RESPONSE TEAM POLICY FOR USE OF DISPERsans IN OCEAN AND COASTAL WATERS

PURPOSE: This notice provides changes to the Caribbean Regional Response Team (CRRT) Policy for Use of Dispersants in Ocean and Coastal Waters to provide dispersant use operational planning and implementation guidance to On Scene Coordinators (OSCs) serving the Caribbean Region.

SUMMARY OF CHANGES: This change will provide Caribbean Region OSCs with guidance for decision making on proper dispersant use and strategy, development of an Operations Plan, gaining CRRT approval (if necessary), developing functional positions within the Unified Command to support dispersant operations, site safety preparation, and enhancing planning efforts.

ACTION: Remove and insert the following pages:

Remove
Table of Contents

Insert
Table of Contents from enclosure (1)

Contents of Appendix VI from enclosure (1) after Appendix V

If you have any questions, please contact me at 305-536-6503, by facsimile at 305-536-5091, or by e-mail at emosher@d7.uscg.mil. This change became effective on August 1, 1999.

Sincerely,

LCDR Eric J. Mosher
U.S. Coast Guard Alternate Co-Chair
Caribbean Regional Response Team

Encl: (1) New Table of Contents for CRRT Policy for Use of Dispersants in Ocean and Coastal Waters and new Appendix VI – Dispersant Use Operational Planning and Implementation Guidance
DISTRIBUTION LIST

Copies of this policy and subsequent changes will be distributed as follows:
(one copy to each of the listed recipients)

COAST GUARD

Commandant (G-MEP)
LANTAREA OPCEN
National Strike Force Coordination Center
Atlantic Strike Team
Gulf Strike Team
CGD Seven (m)
CGD Seven (cc)
GANTSEC
MSO San Juan

FEDERAL AGENCIES

U.S. EPA Region II – Caribbean Region
U.S. EPA Puerto Rico Office – Caribbean Region
U.S. Department of the Interior Region IV – Caribbean Region
U.S. Department of Commerce Region IV – Caribbean Region
U.S. Fish and Wildlife Service, Puerto Rico – Caribbean Region
National Marine Fisheries Service, St. Petersburg, Florida – Caribbean Region
Virgin Islands National Park
NOAA HAZMAT Reference Library Seattle, Washington
NOAA Biological Assessment Team, Seattle, Washington
NOAA HAZMAT USCG Commandant (G-MOR)
NOAA Scientific Support Coordinator, CGD Seven

STATE AND LOCAL AGENCIES

Commonwealth of Puerto Rico, Puerto Rico Environmental Quality Board
Commonwealth of Puerto Rico, Department of Puerto Rico Natural and Environmental Resources
USVI Department of Planning and Natural Resources
VITEMA

NON-GOVERNMENT AGENCIES

Marine Spill Response Corporation, SE region
Clean Caribbean Corporation
National Response Corporation

If you would like to be added to this distribution list please contact the Caribbean Region Regional Response Team Response and Technology Chairperson or your agency representative to the Caribbean Regional Response Team (CRRT).
INTRODUCTION

SECTION I
Purpose, Authority, & Scope

SECTION II
Dispersant Use Pre-Authorization

Application Zones:
- Green Zone
- Yellow Zone
- Red Zone

SECTION III
Protocols

APPENDICES

Appendix I  Zone Maps
Appendix II  Section 7 Consultation
Appendix III  Dispersant Use Monitoring
Appendix IV  Dispersant Use Decision Elements and Documentation/Application Forms
Appendix V  Letters of Agreement
- Commonwealth of Puerto Rico
- U.S. Virgin Islands
Appendix VI  Dispersant Use Operational Planning and Implementation Guidance
INTRODUCTION

Following an oil spill, response actions are needed to minimize or reduce the threat to human health and environmental impact. While physical control and recovery techniques are the traditional response measures, other countermeasures also need to be considered. Dispersants are chemicals that orient at the water-oil interface and, by reducing the surface tension, cause all or part of the slick to be dispersed into the water column. Scientific studies indicate that using dispersants can, under certain conditions, significantly reduce the negative short-term and long-term environmental impacts of oil spills.

This Dispersant Use Policy is set forth by the Federal Caribbean Regional Response Team (CRRT) for the use of dispersants in response to oil spills on coastal or ocean waters. Its fundamental concept is that dispersing all or part of the slick in offshore waters can prevent the potentially more devastating impacts of oil on sensitive environments inshore. Effective use of dispersants has a limited window of opportunity due to weathering characteristics of oils, which are rapidly affected by the physical environment. The effective application of dispersants, therefore, requires that pre-approval for dispersant use exists as a valid spill countermeasure option.

This Caribbean Dispersant Use Policy includes pre-authorization agreements, consistent with the National Contingency Plan (NCP), in the form of Letters of Agreement (LOAs) for Puerto Rico and the U.S. Virgin Islands. These LOAs permit the use of dispersants in specifically designated areas. Within pre-approved areas, further consultation by the Coast Guard OSC is not required, as long as the appropriate CRRT agencies are notified and the relevant protocols are followed. This plan is not intended to exclude or prevent the use of mechanical, in-situ burning, biological, or other cleanup methods. Instead, it encourages the combination of techniques to minimize a spill’s effect.

Pre-authorization is not limited to only those organizations with pre-established contracts with dispersant application operators. Due to the time-critical elements involved in a dispersant-use decision, however, the Caribbean RRT strongly recommends that contractual arrangements for provision of the necessary equipment and personnel for aerial spraying operations be established prior to an incident to avoid unnecessary delays in implementation of this policy.
The Caribbean RRT believes that this Dispersant Use Plan will help to ensure a more rapid and effective response to oil spills in the Caribbean. It is foreseen that the endorsement of dispersant use in the waters of the Caribbean will lead to an increased availability of dispersants and associated application equipment in the region.

The Caribbean Dispersant Use Plan consists of an Introduction, followed by five sections and appendices.

Section I provides the purpose, authority, and scope of the policy.

Section II describes the established ocean and coastal waters zones for pre-authorized and conditional use of dispersants.

Section III lists pre-approval, provisions, and protocols for use of dispersants as required by this policy.

Section IV is a signature page where the Caribbean members representing the United States Coast Guard (USCG), the United States Environmental Protection Agency (EPA), the United States Department of the Interior (DOI), the United States Department of Commerce (DOC), the Commonwealth of Puerto Rico, and the United States Virgin Islands have by signature agreed to adopt this policy for their respective agency or state.

The appendices include:

- Maps delineating zones of dispersant use pre-authorization.
- Biological assessments and letters pertaining to Section 7 consultations with the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USWF) for protection of threatened and endangered species during dispersant application operations.
- The intent of the CRRT to adopt the current monitoring program for dispersant application operations in the CRRT region which is supported by the U.S. Coast Guard National Strike Force.
- Documentation forms, dispersant use decision elements and application procedures.
- Letters of Agreement from the Commonwealth of Puerto Rico and the U.S. Virgin Islands for which this policy covers, which establish the conditions for conducting any dispersant application.
SECTION I

Purpose

This policy provides pre-authorization, pursuant to Subpart J of the NCP, for the limited use of dispersants by the pre-designated USCG On-Scene Coordinator (OSC) on oil discharges impacting waters within the Caribbean RRT boundaries. The CRRT recognize that the complete physical containment, collection, and removal of oil discharges may not be possible. The use of dispersants may therefore be considered to prevent a substantial threat to the public health or welfare, or to minimize the threat of impacts to the environment. This policy establishes criteria under which dispersants may be applied to the waters within the Caribbean Region.

Authority

Subpart J of the NCP provides for the RRT representatives for EPA, the affected states, and the DOC and DOI natural resource trustees to review and either approve, disapprove, or approve with modification pre-authorization plans for the use of chemical countermeasures for oil spill response. If pre-authorization is approved, the OSC may authorize the use of chemical countermeasures as specified in the plan without obtaining specific concurrences from EPA, the affected states, or DOC and DOI.

Scope

The USCG, EPA, DOI, DOC, and the Commonwealth of Puerto Rico, and the U.S. Virgin Islands have adopted the use of dispersants as an approved tool to respond to spilled or discharged oil on ocean and coastal waters within the jurisdiction of the CRRT. This policy includes protocols under which dispersant use must be conducted by the USCG OSC. The pre-authorization for the use of dispersants provided by the LOAs is in effect for the pre-designated USCG OSC only.
SECTION II

Dispersant Use Pre-authorization and Application Zones

In general, except as noted in the LOAs (see Appendix V), pre-authorization exists 0.5 miles seaward of Puerto Rico and 1.0 miles seaward of the U.S. Virgin Islands providing the water depth is at least 60 feet in depth. Three zones have been established to delineate locations and conditions under which dispersant application operations may take place in waters of the CRRT.

1. GREEN ZONE - PRE-AUTHORIZATION FOR DISPERSANT APPLICATION

The Green Zone is defined as any offshore water in which ALL of the following three conditions apply:

For Puerto Rico:

1) the waters are not classified with a "Yellow" or "Red" zone;
2) the waters are at least 0.5 miles seaward of any shoreline; and,
3) the waters are at least 60 feet in depth.

For U.S. Virgin Islands:

1) the waters are not classified with a "Yellow" or "Red" zone;
2) the waters are at least 1.0 miles seaward of any shoreline; and,
3) the waters are at least 60 feet in depth.

Within the Green Zone the signatories to the LOAs agree that the decision to apply dispersants rests solely with the pre-designated USCG-OSC, and no further approval, concurrence or consultation on the part of the USCG-OSC with EPA, DOC, DOI or the States is required.

The Dispersant Use "Documentation" Forms, found in Appendix II, will be included in the post-incident report, and will be available to EPA, DOC, DOI and the States upon their request when dispersant application operations commence.

All dispersant operations within the Green Zone will be conducted in accordance with the protocols outlined in Section III of this policy.
2. **YELLOW ZONE - WATERS REQUIRING CASE-BY-CASE APPROVAL**

The Yellow Zone is defined as any waters within the CRRT which have not been designated as a "Red" zone, and in which **ANY** of the following conditions apply:

**For Puerto Rico:**

1) Waters designated as marine reserves, National Marine Sanctuaries, National or State Wildlife Refuges, or proposed or designated Critical Habitats;

2) Waters within 0.5 miles of a shoreline;

3) Waters less than 60 feet in depth; or

4) Waters in mangrove or coastal wetland ecosystems, or directly over coral communities which are in less than 60 feet of water. Coastal wetlands include submerged algal beds and submerged seagrass beds.

**For U.S. Virgin Islands:**

1) Waters designated as marine reserves, National Marine Sanctuaries, National or State Wildlife Refuges, or proposed or designated Critical Habitats;

2) Waters within 1.0 miles of a shoreline;

3) Waters less than 60 feet in depth; or

4) Waters in mangrove or coastal wetland ecosystems, or directly over coral communities which are in less than 60 feet of water. Coastal wetlands include submerged algal beds and submerged seagrass beds.

If the USCG-OSC believes dispersants should be applied within the Yellow Zone, a request for authorization must be made to the CRRT representatives of the EPA, affected State(s), DOC, and DOI. The information contained on the documentation/application form in Appendix IV must be provided to the CRRT members. The OSC is only granted authority to conduct dispersant operations in the Yellow Zone when concurrence has been given by EPA and the affected State(s), and after consultation with DOC and DOI. EPA, the State(s), DOC and DOI must respond to the OSC request for authorization within four (4) hours. If a decision cannot be reached within four hours, the OSC is to be notified and informed of the delay.

Once authorized, application of dispersants within the Yellow Zone will be conducted in accordance with the protocols outlined in Section III.
3. **RED ZONE - EXCLUSION ZONE**

The Red Zones are those areas designated by the CRRT where dispersant use is prohibited. No dispersant application operations will be conducted at any time in the Red Zone unless: 1) dispersant application is necessary to prevent or substantially reduce a hazard to human life; and/or 2) an emergency modification of this Agreement is made on an incident-specific basis.

The CRRT has not currently designated any waters of Puerto Rico as Red Zones but retains the right to include areas for exclusion in the future.

For the U.S. Virgin Islands the following areas have been designated as Red Zones:

1) Waters of the Virgin Islands National Park including waters one mile seaward from the park boundary.

2) Waters of the Buck Island Reef National Monument including waters one mile seaward from the park boundary.
SECTION III

Protocols

THE FOLLOWING REQUIREMENTS APPLY TO THE APPLICATION OF ALL DISPERSANTS UNDER THE PROVISIONS SET FORTH IN THIS POLICY.

1. Dispersants will only be used to mitigate the effects of spilled oil and to protect public health and welfare and the environment.

2. The USCG-OSC will immediately notify EPA, DOC, DOI, and the affected State(s) of the decision to use dispersants under the provisions of this agreement. This initial notification will include, but not necessarily limited to, the following information:
   a) Date, time, and location of the incident;
   b) Type and amount of oil discharged;
   c) Area affected;
   d) The projected area of impact if the oil is not dispersed;
   e) Reasons why dispersants or chemical agents have been selected;
   f) Dispersant to be used; and
   g) On-scene weather and forecast.

3. The USCG will make every effort to continuously evaluate the decision to use dispersant by considering the advice of the EPA, DOI, DOC and the affected State(s). The use of dispersants will be discontinued if so requested by the EPA, DOI, DOC or the affected State(s). Such request may be verbal followed by written documentation.

4. The USCG-OSC shall comply will all occupational Health and Safety Administration (OSHA) regulations.

5. The USCG-OSC shall make every reasonable effort to provide EPA, DOI, DOC and the affected State(s) the opportunity to observe dispersant application operations. The inability to have or take advantage of the opportunity will not be cause for cessation of application operations.

6. Monitoring will be conducted to evaluate the decision to continue dispersant application and to document results. Recommended monitoring procedures are included in Appendix III.

7. Prior to commencing application operations, an on-site survey will be conducted, in consultation with natural resource specialists, to determine if any threatened or endangered species are present in the projected application area or otherwise at risk from dispersant operations. Measures will be taken to prevent impacts to wildlife, especially threatened and endangered species. Survey flights in the area of application will be conducted during dispersant operations.

8. When dispersant application is proposed in a Green Zone area that is adjacent to or near an area less than 60 feet in depth, due consideration shall be given to the trajectory of the dispersed oil. If resources in adjacent shallow areas are at risk, consultation with the trustees must be conducted. The zone maps contained in Appendix I showing the 60 foot depth contour should be used for general reference only. Nautical or bathometric charts should be consulted for more detail.

9. A dispersant use post-incident report shall be completed by the OSC within 45 days of dispersant
application operations. This report shall include the Documentation/Application Form contained in Appendix IV. Recommendations for changes or modifications to this agreement may be presented in the report. This report will be provided to the CRRT.

10. Only those products listed on the EPA nation Contingency Plan's Product Schedule as dispersants will be considered for use under the provisions of this agreement.

11. The dispersant use decision elements contained in Appendix IV shall be reviewed by the OSC and used to help guide the decision to use or request the use of dispersants.
APPENDIX I

Zone Maps
Caribbean Regional Response Team

Dispersant Pre-Approval Zones Map Key

preparing by NOAA

USE ONLY AS A GENERAL REFERENCE

Date/Time:

Puerto Rico

1 - Isla de Mona Map
2 - Isla de Secheo Map
3 - PR Disp Map 1
4 - PR Disp Map 2
5 - PR Disp Map 3
6 - PR Disp Map 4
7 - PR Disp Map 5
8 - PR Disp Map 6
9 - Isla de Vieques Map
10 - Isla de Culebra Map
11 - St. Thomas Map
12 - St. John Map
13 - St. Croix Map

CRRT Dispersant Map Key

RAH
Caribbean Regional Response Team

Dispersant Pre-Approval Zones
prepared by NOAA

USE ONLY AS A GENERAL REFERENCE

Puerto Rico
Caribbean Regional Response Team

Dispersant Pre-Approval Zones
prepared by NOAA

USE ONLY AS A GENERAL REFERENCE

Puerto Rico
Dispersant Pre-Approval Zones
prepared by NOAA

USE ONLY AS A GENERAL REFERENCE

Puerto Rico
Note: Planned use of dispersants in the vicinity of the British Virgin Islands (BVI) exclusive economic zone must be coordinated with the cognizant BVI authorities.
Note: Planned use of dispersants in the vicinity of the British Virgin Islands (BVI) exclusive economic zone must be coordinated with the cognizant BVI authorities.
APPENDIX II

Section 7 Consultation
Mr. Charles Oravetz  
Protected Species Management Branch  
National Marine Fisheries Service  
9721 Executive Center Drive North  
St. Petersburg, Florida 33702

Dear Mr. Oravetz:

In accordance with the requirements of the Endangered Species Act and 50 CFR 402.12, I am enclosing for you review and concurrence our “Biological Assessment of Effects on Listed Species of Caribbean Regional Response Team Letters of Agreement on Limited Use of Oil Spill Dispersants.”

These Letters of Agreement (LOA) pre-authorize the limited use of dispersants by the pre-designated U.S. Coast Guard Federal On-Scene Coordinator on oil discharges impacting the waters of the Commonwealth of Puerto Rico and the Territory of the U.S. Virgin Islands. These LOAs implement Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) and are signed by the U.S. Coast Guard, U.S. Environmental Protection Agency, the U.S. Department of the Interior, the U.S. Department of Commerce, and the Commonwealth of Puerto Rico, and Territory of the U.S. Virgin Islands. It is understood that this may constitute a federal action in areas where endangered and threatened species are known to occur and consultation under Section 7 of the Endangered Species Act may be required.

Our biological assessment indicates that the listed species are not likely to be adversely affected by this action. The use of dispersants offers strong potential for net environmental benefit during an oil spill by allowing for increased protection of nearshore, shoreline, and down-current biological resources and habitat and provides for a more rapid removal of oil from the environment thus subjecting fewer resources to potential impact.

Commander Bradford Benggio, National Oceanic and Atmospheric Administration (NOAA) Scientific Support Coordinator to the Seventh Coast Guard District has discussed this matter with LT David Bernlardt of your staff and with Commander Gary Petrae, U.S. Department of Commerce trustee representative to the Caribbean Regional Response Team.

Thank you for your efforts in this review. With your concurrence, a formal consultation should not be necessary. If you have any questions or desire further information, please contact Mr. Eric Wolfe at (305) 536-3060.

Sincerely,

//s//

R. C. WIGGER  
Captain, U.S. Coast Guard  
Chief, Marine Safety Division  
Seventh Coast Guard District  
By direction of the District Commander

Encl: (1) Biological Assessment  
(2) LOA Puerto Rico  
(3) LOA U.S. Virgin Islands
Biological Assessment of Effects on Listed Species of Caribbean Regional Response Team
Letters of Agreement on limited Use of Oil Spill Dispersants

Description of Proposed Action

The proposed actions are two Caribbean Regional Response Team (Caribbean RRT/CRRT) Letters of Agreement pre-authorizing limited use of dispersants by the pre-designated United States Coast Guard (USCG) On-Scene Coordinator (OSC) on oil discharges impacting the waters of the Commonwealth of Puerto Rico and the Territory of the U.S. Virgin Islands. The Letters of Agreement implement Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) and are signed by the USCG, U.S. Environmental Protection Agency (USEPA), U.S. Department of Interior (USDOI), the U.S. Department of Commerce (USDOC), and the Commonwealth of Puerto Rico, and the Territory of the U.S. Virgin Islands.

The Caribbean RRT agrees that the primary method of controlling discharged oil shall be physical removal for the environment. The Caribbean RRT recognizes, however, that in certain instances physical containment, collection, and removal of oil may not be possible and the use of dispersants must be considered in order to prevent substantial threat to public health or serious environmental damage. By breaking a cohesive surface oil slick into small droplets that disperse into the water column, dispersants can prevent an offshore oil spill from contaminating wildlife and critical habitat in nearshore and shoreline areas.

The Caribbean RRT strongly recommends that, to be effective, application of dispersants should be targeted to begin not later than six hours after an oil spill. Accordingly, employment of dispersants usually requires that authorization for use be given prior to a spill incident. Within areas pre-authorized for use of dispersants by the Letters of Agreement, further consultation by the USCG OSC is not required, provided the appropriate CRRT agencies are immediately notified and applicable protocols are followed. Pre-authorization allows the USCG OSC to order the use of dispersants, as defined in the National Contingency Plan (NCP) and listed on the USEPA NCP Product Schedule, when in the judgment of the USCG OSC their use is necessary to prevent substantial threat to public health or welfare or to minimize serious environmental damage. The Letters of Agreement are not intended to exclude or replace the use of mechanical, in-situ burning, or other open-water cleanup methods but to enable and encourage the use of all appropriate techniques in the strategy to remove oil from the water surface and, thereby, minimize environmental impacts of a spill.

If a decision to use dispersants is made, the USCG OSC will immediately notify the USEPA, USDOC, USDOI, the Commonwealth of Puerto Rico, and the Territory of the U.S. Virgin Islands through CRRT representatives. A post-incident briefing will be held within 45 days following an application of dispersants to exchange information on effectiveness of the application and to determine whether changes to the Letters of Agreement are necessary.

Description of Pre-authorization Area

Pre-authorization Area for the Commonwealth of Puerto Rico:

Dispersants are pre-authorized for use only in open waters that are at least 0.5 nautical miles from any shoreline and where the water depth if greater than 60 feet.

Dispersants are not pre-authorized for use in, on, or over waters containing reefs, waters designated as marine reserves, mangrove areas, fresh or brackish waters or waters in coastal wetlands; except with the prior and express concurrence of the Puerto Rico Department of Natural Resources and USEPA, in consultation with USDOC and USDOI. Coastal wetlands include: submerged algal beds (rocky or unconsolidated bottom), submerged seagrass beds, and coral reefs.

Pre-authorization Area for the Territory of the U.S. Virgin Islands:

Use of dispersants is pre-authorized only in open waters that are at least one mile from any shoreline, or at least one
mile from any reef which is less than 20 feet from the water’s surface, and where the water depth in the application area is greater than 60 feet.

Dispersants are not pre-authorized for use in, on, or over waters containing reefs, waters designated as marine reserves, mangrove areas, fresh or brackish waters or waters in coastal wetlands; except with the prior and express concurrence of the U.S. Virgin Islands Department of Planning and Natural Resources and USEPA, in consultation with USDOC and USDOI. Coastal wetlands include: submerged algal beds (rocky or unconsolidated bottom), submerged seagrass beds, and coral reefs.

**Description of Oil Dispersants**

Chemical dispersants are products applied to oil on the water surface to enhance formation of fine oil droplets, which enter the water column and are dispersed by currents. Some physical dispersion occurs naturally following oil spills due to agitation created by wave action and ocean turbulence. Chemical dispersants enhance and accelerate this natural process, accomplishing in minutes to hours what otherwise requires days to weeks. The advantages of rapid dispersion early in a spill include minimizing direct contact of wildlife with a surface slick and reducing the amount of oil impacting sensitive nearshore and shoreline areas. Whereas untreated oil floating on the water surface can be beached by wind, dispersed oil droplets are unlikely to strand ashore because they are not subject to wind action. Movement of dispersed oil droplets is determined by currents that do not penetrate the beach face.

Dispersants, which are typically applied from vessel or aircraft mounted spray systems, offer several operational advantages. Dispersant application enables treatment of large areas of spilled oil much more quickly than can be accomplished with mechanical methods and prior to significant expansion of the slick with time. Dispersants can be applied in rough weather and sea conditions under which use of booms, skimmers, and other mechanical equipment may be impractical. To be effective, however, dispersants generally must be applied within the first few hours following an oil spill. This is a result of the fact that when oil is released to the marine environment it is immediately subject to a wide variety of weathering processes. Weathering quickly increases the viscosity of the oil, making dispersion by the addition of chemical dispersants difficult if not impossible over time. Depending on the type of oil spilled and the environmental conditions, the window of opportunity for successful use of dispersants can be as short as a few hours.

The key components of chemical dispersants are one or more surface-active agents, or surfactants. Surfactants contain molecules with both water-compatible (hydrophilic) and oil-compatible (lipophilic or hydrophobic) groups. The surfactant molecules reduce the oil/water interfacial surface tension, enabling the oil layer to be broken into fine droplets with minimal mixing energy, thereby enhancing natural dispersion. Surfactants also tend to prevent coalescence of oil droplets and reduce adherence to solid particles and surfaces, such as sediments and feathers. In addition to surfactants, most dispersant formulations also contain a solvent carrier to reduce viscosity of the surfactant so that the dispersant can be sprayed uniformly. The solvent may also enhance mixing and penetration of the surfactant into more viscous oils. Though early dispersants contained agents highly toxic to marine life, manufacturers have refined formulations of more recent generations of dispersants to dramatically reduce toxicity. Modern dispersants contain solvents composed of nonaromatic hydrocarbons or water-miscible concentrates (alcohols or glycols) as well as less toxic surfactants. The exact dispersant-to-oil application ratio, usually planned at 1:10, is determined by the nature of the oil and sea conditions.

By dispersing oil into the water column, the spreading or dilution becomes three-dimensional. The subsurface oil concentration initially increases, but diminishes rapidly with distance and time due to physical transport processes. This is in contrast to untreated oil concentrated at the water surface, which can coalesce in surface convergence zones even after it has spread out to very low concentrations. The highest concentration of chemically dispersed oil typically occurs in the top meter of water during the first hour following treatment (Rycroft et. al., 1994). Available data suggest that concentrations of more than ten parts per million (ppm) of dispersed oil are unlikely beyond ten meters (depth) of the slick and that even within one meter depth of the slick, concentrations rarely exceed 100 ppm. The continuous mixing and dilution capabilities of open water lead to uniformity and are sufficient to rapidly reduce these concentrations. Field studies show that water column concentrations decline to undetectable or background levels within several hours following application of a dispersant (SEA, 1995). Under untreated slicks, oil concentrations typically range from a few parts per million to less than 0.1 ppm, diminishing with depth and time.
The dispersed oil droplets, ranging in size from microns to a few millimeters, break down by natural processes, such as biodegradation. Microbial biodegradation of oil appears to be enhanced by dispersal because of the larger surface area available as compared to a surface slick. Dispersants also prevent formation of tarballs and oil-in-water emulsions (mousse), which tend to be resistant to biodegradation due to their low surface area. The chemical dispersants applied, like the oil droplets, are diluted by diffusion and convective mixing. Much of the solvent fraction evaporates immediately after the dispersing is applied. The surfactants are readily biodegraded.

**Description of Listed Species Present**

**Cetaceans**

Endangered cetaceans that occur in the area under considerations include two mysticete species: humpback, and finback whales, and one odontocete, the sperm whale. Humpback whales (*Megaptera novaeangliae*) occur in the area most commonly during their winter breeding season. Krill and small schooling fishes are the mainstay of the humpback's diet. Finback whales (*Balaenoptera physalus*) winter in the area, primarily in offshore waters, and feed on small schooling fishes, pelagic crustaceans, and squid (NMFS, 1989). Both baleen whale species are all opportunistic feeders and may feed at or near the surface (McKenzie and Nicolas, 1988).

The sperm whale (*Physeter macrocephalus*) occurs most frequently at the edge of the continental shelf or in deep oceanic waters. Sperm whales tend to inhabit areas with a water depth of 600 meters or more and are uncommon in waters less than 300 meters deep. Sperm whales are deep diving and feed primarily on squid and deep water fishes.

**Sea Turtles**

Four listed sea turtle species occur in the area under consideration. Leatherback, and hawksbill sea turtles are endangered; green and loggerhead sea turtles are threatened. Leatherback sea turtles (*Dermochelys coriacea*) nesting in the U.S. Caribbean is reported in the Virgin Islands (St. Croix, St. Thomas, St. John) and Puerto Rico, including Islas Culebra, Vieques, and Mona (NMFS and USFWS, 1992). Leatherbacks are considered to be a highly pelagic species but occasionally enter the shallow coastal waters of bays and estuaries. They may concentrate near and follow drifting schools of jellyfish, their primary prey. Hawksbill sea turtles (*Eretmochelys imbricata*) are predominantly tropical. Adult hawksbills characteristically inhabit shallow rocky areas and coral reefs but also occur in mangrove-bordered bays, estuaries, and lagoons and occasionally in deep waters. Juveniles occupy the deeper water pelagic environment, often associated with floating patches of sargassum mats. Hawksbill turtles are omnivorous opportunists and seem to prefer invertebrates, particularly sponges (Ernst *et al.*, 1994). Atlantic green sea turtles (*Chelonia mydas*) inhabit and nest in the U.S. Virgin Islands and Puerto Rico. Their preferred habitat appears to be lagoons and shoals with an abundance of marine grasses. Adult green sea turtles are primarily herbivorous, foraging on algae and seagrasses; juveniles may eat a variety of invertebrates as well (NMFS and USFWS, 1991a). Loggerhead turtles (*Caretta caretta*) wander widely throughout the marine waters of their range, including the area under consideration. They commonly inhabit the continental shelves and estuarine environments, occurring most frequently in waters less than 50 meters deep (Ernst *et al.*, 1994). Hatchlings and juveniles are often found along current fronts, downswells, or eddies associated with drifting mats of sargassum. Loggerheads are omnivores and feed on a wide variety of benthic invertebrates including crustaceans, mollusks, and sponges (NMFS and USFWS, 1991b).

**Effects of Oil Spills on Listed Species**

**Cetaceans**

Cetaceans spend considerable time at the surface swimming, breathing, feeding, or resting and so are at risk of exposure to a surface oil slick, water-in-oil emulsion, or tar balls. Although there is evidence that some cetacean species are able to detect oil, they do not always avoid it. The volatile fraction of crude oil contains many toxic hydrocarbons that evaporate and can create hazardous air concentrations in the vicinity of a spill (Allen and Ferek, 1993). The most serious potential risk to cetaceans appears to be inhalation of these toxic vapors, which can cause inflammation of mucous membranes of the eyes and airways, lung congestion, and possibly pneumonia. At very
high exposure levels, volatile hydrocarbons can potentially result in neurological disorders and liver damage. Effects from direct contact or ingestion of oil are generally temporary and of less concern for cetaceans. Oil is unlikely to adhere to the surface of their skin, which is also relatively impermeable to the oil's toxic components. Baleen plates of skim-feeding baleen whales may become fouled by oil on the water surface, temporarily interfering with feeding. For a few days or weeks, hydrocarbons or their metabolites in exposed marine invertebrates could be transferred to cetaceans preying upon them. This exposure would likely be short-term and is not expected to result in serious effects (Geraci, 1990). Benthic invertebrates accumulating residues from contaminated sediments could provide a potential source of longer-term exposure to bottom-feeding cetaceans. Cetaceans might also be indirectly affected if an oil spill resulted in destruction or significant shifts in the distribution of key prey species populations.

Collision with vessels poses a serious threat to some endangered species. Right whales are particularly susceptible to injury or death from ship collisions because they surface skim-feed and often rest at the surface. Response vessel speeds should be restricted any time endangered species are in the area of an oil spill, especially when visibility is limited.

Sea Turtles

Sea turtles can be exposed to spilled oil when feeding, surfacing to breath, or nesting in areas contaminated by stranded oil. Turtles are also susceptible to floating tarballs formed from weathered oil. There is no firm evidence that sea turtles are able to detect and avoid oil (Odell and MacMurray, 1986). Studies indicate oil exposure can have several adverse effects on turtles, including toxic responses to vapor inhalation or ingestion, skin irritation, interference with osmoregulation and ion balance, and reduced hatching success (Van Fleet and Pauly, 1987; Fritts and McGehee, 1982; Lutz and Lutcavage, 1989). Experiments on adult loggerhead turtles conducted by Lutcavage et al. (1993) showed that major body systems in marine turtles are adversely affected by even short exposures to weathered South Louisiana crude oil. Effects observed included alteration of blood chemistry, alteration of respiration and diving patterns, interference with salt gland function, and skin lesions. Exposure to fresh oil would likely be considerably more harmful. Though oil exposure may not directly kill adult turtles, the effects may make them more vulnerable to predation or disease.

Oiling of sea turtle nesting habitat poses a potential risk to adult nesting turtles, hatchlings, and to eggs. Turtle embryos are particularly sensitive. The effects of oil on the development and survival of marine turtles appears to be variable, depending on such factors as stage of nesting, oil type, degree of oil weathering, and amount and height of oil deposition on the beach. Studies by Fritts and McGehee (1982) indicate that fresh oil washing ashore to the level where nests with incubating eggs are located may result in extensive embryo mortality. The studies found that mortality may not be significant if eggs are deposited in sand after contamination has occurred and the oil has weathered, although hatchlings may be smaller than normal. Some evidence suggests olfactory cues are imprinted on sea turtles as hatchlings and guide them back to their natal beaches for nesting when they reach maturity. Oil on the beach could interfere with these chemical guides (Lutz et al., 1985). Response activities to clean oil stranded on beaches may pose an addition risk of injury to eggs, hatchlings, and nesting adults.

Analysis of Biological Effects of Proposed Action

A primary objective of an oil spill response is to quickly remove as much oil as possible from the surface of the water, thereby minimizing direct contact with wildlife and preventing movement of the oil into nearshore and shoreline areas where removal is more difficult and environmental impacts severe. Dispersants, applied under appropriate conditions, may offer the best response option to help achieve this objective. Dispersion of oil at sea, before a slick washes ashore, reduces the overall and particularly the chronic impacts of oil on sensitive inshore habitats including salt marshes, coral reefs, sea grasses, and mangroves. Dispersed oil is less likely than a surface slick to reach shoreline areas. Any dispersed oil that does move inshore is less likely to stick to shorelines and vegetation because dispersants alter the adhering property of oil droplets. Consequently, habitats recover faster if the oil is dispersed before it reaches them (NRC, 1989). By protecting nearshore and shoreline habitats from contamination, dispersant use benefits listed species and other wildlife that rely on them including sea turtles and cetaceans.

Many of the species listed in the Caribbean Region rarely occur in the area where dispersant use will be pre-authorized by the Letters of Agreement and so are unlikely to be adversely affected. Most sea turtles occur primarily
the shallower, nearshore waters where dispersant application is not pre-authorized. Many of the sea turtles and cetaceans that occur more frequently in the open waters of the pre-authorized area are present there seasonally, reducing the risk they would be affected. Potential effects of dispersant use on listed species that may occur in the area under consideration for pre-authorization by the Letters of Agreement are considered below.

**Direct Contact and Ingestion**

By removing the surface oil slick, dispersants reduce the risk of direct contact with wildlife that dwell at or pass through the water surface to feed or breath such as sea birds, sea turtles, and cetaceans. Juvenile sea turtles, which often are found with drifting sargassum mats in convergence areas further from shore, would particularly benefit from removal reduced surface exposure in the area under consideration. Sea turtles and cetaceans may experience higher exposure in the water column, primarily in the upper few meters, following dispersion. In open waters with continuous mixing and dilution capabilities, however, dispersed oil is rapidly diluted. Considering that concentrations fall to background levels within the first few hours following dispersion, exposure will be short-term and at low concentrations. Most marine mammals do not drink large volumes of sea water and so probably will not ingest significant quantities of oil directly from solution or dispersion in the water column (Neff, 1990). Exposure of sea turtles to tar balls, which they are known to ingest and which also adhere to juveniles, would be reduced because dispersants help prevent tarball formation. Dispersed oil droplets are less sticky and therefore less likely to adhere to baleen plates, skin, feathers, or other body surfaces than undispersed or naturally dispersed oil (Neff, 1990).

According to the Letters of Agreement, dispersants will not be sprayed near listed species or other wildlife. Data indicate that dispersant alone is unlikely to contribute significantly to adverse biological effects in the water column. Within the normal range of operating dosages, biological effects are due to the dispersed oil, not the dispersant (NRC, 1989; SEA, 1995).

**Prey Contamination**

If zooplankton, fish, and other water column or benthic organisms become oiled or accumulate oil in their tissues, they could ultimately expose species that prey upon them. Marine mammals, except the manatee, are carnivores that rely on invertebrates or fish for sustenance. Several sea turtle species that occur in the area under consideration for action also prey on aquatic invertebrates and fish. Prey species that occur in open waters further from shore where dispersant use will be pre-authorized are the primary concern. Those that occur in nearshore areas where dispersant use will not be pre-authorized by the Letters of Agreement are unlikely to be impacted.

Most aquatic organisms have the ability to metabolize and depurate petroleum hydrocarbons. Existing data demonstrate that complete depuration occurs once the source of the contamination is removed. It is unlikely that significant amounts of petroleum hydrocarbons will be accumulated by pelagic organisms during a dispersant application because of the short duration and low concentration expected in the water column. Under such conditions, any accumulated petroleum hydrocarbons should be rapidly depurated. Marine food chain biomagnification does not occur because vertebrate predators readily metabolize and depurate hydrocarbons from their tissues. Most marine organisms also metabolize and excrete the surfactants in dispersants. Metabolism of surfactants is rapid enough that there is little likelihood of food chain transfer from marine invertebrates and fish to predators, including the listed sea turtles and cetaceans (Neff, 1990).

Marine finfish, for example, take up petroleum hydrocarbons from water and food. The compounds induce the hepatic Mixed-Function-Oxidase (MFO) system and within a few days following exposure, aromatic hydrocarbons are oxygenated to polar metabolites and excreted. For this reason, most fish do not accumulate and retain high concentrations of petroleum hydrocarbons and so are unlikely to transfer them to predators, such as the listed sea turtles and cetaceans. The fish may be tainted with metabolites bound to tissue macromolecules, but these metabolites are so reactive that it is unlikely that they would be released in a toxic form during digestion by the consumer and so would not pose a serious risk (Neff, 1990).

Zooplankton, which are a particularly important food source for baleen whales, can become contaminated by assimilating hydrocarbons directly from seawater and by ingesting oil droplets and tainted food. Planktonic crustaceans can transform aromatic hydrocarbons to polar metabolites that may be excreted or bound to tissues. For
a few days or weeks, unmetabolized or metabolized hydrocarbons in zooplankton could be transferred to predators. Geraci (1990) has estimated a forty-ton whale would have to consume approximately 150 gallons on oil to result in harmful effects. Considering the low concentrations and short duration of exposure to dispersed oil, as described earlier, it is unlikely the listed whales would ingest this volume of oil through consuming contaminated zooplankton.

**Prey Abundance: Toxicity to Zooplankton**

Concerns have been expressed that listed marine species, namely baleen whales, could be adversely affected if major populations of key pelagic or benthic prey species were severely impacted. Though some studies do indicate toxic effects to zooplankton from dispersed oil, serious population impacts are unlikely at the short-term exposures that would result following dispersion in the zones pre-authorized under the Letters of Agreement.

When dispersants are applied in pre-authorized deep water to turbulent seas, the resulting oil concentrations in the water column will remain below levels observed to cause adverse biological effects to zooplankton in laboratory tests. Available toxicological data indicate the range of sublethal and lethal threshold concentrations for most aquatic organisms is above 10 ppm over an exposure period of 48 to 96 hours. It is unlikely that dispersed oil would exceed 10 ppm concentration and 2-4 hour duration at depths below the upper 10 meters of the water column (SEA, 1995). Consequently, adverse effects are not expected below the upper 10 meters of the water column following oil dispersion. Within 10 meters of the surface, potential exposure of water column organisms to concentrations of 10 ppm or higher dispersed oil would be brief, lasting no longer than a few hours. Most of these organisms have the ability to rapidly metabolize and completely depurate petroleum hydrocarbons once exposure ceases. Although such exposures could result in temporary sublethal effects on physiological functions in some planktonic organisms, the existing data indicate that chronic effects are unlikely (NRC, 1989; SEA, Inc., 1995). The range of sublethal and lethal thresholds measured for modern dispersants in the absence of oil as determined by laboratory tests with sensitive species is much greater than concentrations that occur in the water column following dispersant application (NRC, 1989; Rycroft, et. al., 1994). Considering the broad distribution and relatively short life cycle of zooplankton, population level effects from such a short-term, pulsed exposure to low concentrations of dispersed oil are not expected and, therefore, unlikely to adversely impact predators such as baleen whales.

**Analysis of Alternatives**

**Emergency Authorization**

The proposed action pre-authorizes the FOSC to use dispersants as a first-stage response technique in specified zones as described above. The alternative is to require the FOSC to seek CRRT authorization to use dispersants in these zones on a case-by-case basis at the time of an oil spill emergency. The limited "window of opportunity" for the most optimal and effective use of dispersants following an oil spill occurs very early -- usually within the first few hours. Without pre-authorization to permit rapid response and mobilization of the necessary equipment, the delay for case-by-case RRT approval would realistically eliminate dispersants as a response option. Moreover, in the absence of pre-authorization, spill response organizations are unlikely to invest in the equipment and training necessary to apply dispersants due to the low probability that authorization would be issued in time to employ the technique effectively. Pre-authorization enabling timely use of dispersants under appropriate conditions in the designated zones provides greater protection for listed species and critical habitat than does case-by-case authorization at the time of a spill emergency.

**Mechanical Removal**

Mechanical containment and removal will remain the preferred response tool for most oil spills, which usually are close to shore in areas where other response options are unlikely to be approved. Experience has shown, though, that mechanical response often cannot adequately deal with very large spills offshore. Performance of mechanical methods can be severely limited by weather and oceanic conditions and by the nature of the oil slick. Booms and skimmers are of limited use even in moderate seas and are usually effective only at slow currents (less than 1 knot) and low wave heights (less than 2 meters). Consequently, mechanical recovery rates are often poor. Even under calm conditions, use of mechanical equipment alone to deal with large spills in which oil rapidly spreads over large
areas may not be feasible. For these reasons, dispersant application is an important complementary spill response technique and should be included along with other techniques as an option in developing the appropriate response strategy. Under the Letters of Agreement, use of dispersants will be considered when and where physical removal is impossible or insufficient for protecting natural resources, including listed species.

**In-Situ Burning**

In-situ burning is an oil spill response technique that can quickly remove large volumes of oil from the water surface by igniting oil that is towed away from the main slick in fire-resistant boom. Though in-situ burning is a highly useful and important response option, there are some differences in the range of oil and weather conditions under which in-situ burning and dispersants are effective. For example, in-situ burning is not effective once oil has spread to less than about two millimeters thick. Also, if winds are blowing shoreward toward populated areas or sensitive environments, in-situ burning is unlikely to be employed due to concerns about potential effects of the smoke plume. Under conditions for which in-situ burning would not be effective or creation of a smoke plume is deemed unacceptable, dispersants may be a viable option.

**No Action**

Another alternative is not attempting to remove released oil from the water surface, potentially allowing the oil to wash ashore. The oiled shoreline could be cleaned or allowed to recover naturally. Due to the importance of nearshore and shoreline habitat to a variety of organisms and the difficulty of cleaning oiled shorelines without inflicting further injury, this alternative is considered the least desirable from several perspectives, including protection of listed species and critical habitat. Unrecovered oil poses a high risk of exposure and injury to wildlife, especially sea birds, marine mammals, and intertidal organisms. Cleaning and rehabilitation of oiled wildlife, particularly marine mammals, have had limited success and release of rehabilitated animals creates a risk of introducing disease into wild populations.

**Conclusions**

The purpose of dispersants, used alone or in conjunction with other open-water spill response techniques, is to quickly remove spilled oil from the water surface, thereby reducing exposure to wildlife and preventing contamination of sensitive nearshore and shoreline habitat. Under appropriate conditions, dispersants can reduce environmental impacts from oil spills, including injury to listed species and critical habitat. Dispersant application is not likely to adversely affect listed species beyond the potential effects of the spilled oil or add to the cumulative environmental stresses currently acting on the species.

The parties to these Caribbean Letters of Agreement pre-authorizing dispersants as an oil spill response technique in the designated zones conclude that this action is not likely to adversely affect the listed species or critical habitat present in the area under consideration and that formal consultation under Section 7 of the Endangered Species Act is not necessary. We request that you concur with these conclusions. Consultation will be re-initiated if additional information not previously considered becomes available indicating adverse effects to listed species or critical habitat from the identified action.

**References**


Van Fleet, E. S. and G.G. Pauly. 1987. Characterization of oil residues scraped from stranded sea turtles from the
Mr. James Oland  
U.S. Fish and Wildlife Service  
P.O. Box 491  
Boqueron, PR 00622

Dear Mr. Oland:

In accordance with the requirements of the Endangered Species Act and 50 CFR 402.12, I am enclosing for you review and concurrence our “Biological Assessment of Effects on Listed Species of Caribbean Regional Response Team Letters of Agreement on Limited Use of Oil Spill Dispersants.”

These Letters of Agreement (LOA) (enclosures 2 and 3) pre-authorize the limited use of dispersants by the pre-designated U.S. Coast Guard Federal On-Scene Coordinator on oil discharges impacting the waters of the Commonwealth of Puerto Rico and the Territory of the U.S. Virgin Islands. These LOAs implement Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) and are signed by the U.S. Coast Guard, U.S. Environmental Protection Agency, the U.S. Department of the Interior, the U.S. Department of Commerce, and the Commonwealth of Puerto Rico, and Territory of the U.S. Virgin Islands. It is understood that this may constitute a federal action in areas where endangered and threatened species are known to occur and consultation under Section 7 of the Endangered Species Act may be required.

Our biological assessment indicates that the listed species are not likely to be adversely affected by this action. The use of dispersants offers strong potential for net environmental benefit during an oil spill by allowing for increased protection of nearshore, shoreline, and down-current biological resources and habitat and provides for a more rapid removal of oil from the environment thus subjecting fewer resources to potential impact. To assist your review, I am also enclosing information on the National Contingency Plan (NCP) Product Schedule and Technical Product Bulletins for Dispersants.

The U.S. Fish and Wildlife Service (USFWS) review of our Biological Assessment for the “Region IV Regional Response Team Policy for the Use of Dispersants in Ocean and Coastal Waters” (enclosure 6) concurred with our determination that the proposed dispersant pre-authorization was not likely to adversely affect the listed species under the responsibility of the Service (enclosure 7). All listed species considered in this Biological Assessment for the Caribbean were also considered in the Biological Assessment for Region IV. Although patterns of species behavior and habitat use may vary among populations distributed in different geographic areas, these differences are not expected to be significant enough to result in a higher likelihood of impact from dispersant pre-authorization in the Caribbean than in Region IV.

Lieutenant Commander Bradford Benggio, National Oceanic and Atmospheric Administration (NOAA) Scientific Support Coordinator to the Seventh Coast Guard District has discussed this matter with Mr. Jorge Saliva of your staff, with Mr. James Lee, U.S. Department of the Interior trustee representative to the Caribbean Regional Response Team, and Mr. Gregory Hogue, Dispersant Sub-Committee Chair to the Caribbean Regional Response Team.
Thank you for your efforts in this review. With your concurrence, a formal consultation should not be necessary. If you do not concur, please consider this letter as a request for formal Section 7 consultation. If you have any questions or desire further information, please contact Mr. Eric Wolfe at (305) 536-3060.

Sincerely,

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R. C. WIGGER
Captain, U.S. Coast Guard
Chief, Marine Safety Division
Seventh Coast Guard District
By direction of the District Commander

Encl: (1) Caribbean RRT Biological Assessment
(2) LOA Puerto Rico
(3) LOA U.S. Virgin Islands
(4) NCP Product Schedule Information
(5) Technical Product Bulletins for Dispersants
(6) RRT IV Biological Assessment
(7) USFWS Letter of Concurrence
Biological Assessment of Effects on Listed Species of Caribbean Regional Response Team
Letters of Agreement on Limited Use of Oil Spill Dispersants

Description of Proposed Action

The proposed actions are two Caribbean Regional Response Team (Caribbean RRT/CRRT) Letters of Agreement pre-authorizing limited use of dispersants by the pre-designated United States Coast Guard (USCG) On-Scene Coordinator (OSC) on oil discharges impacting the waters of the Commonwealth of Puerto Rico and the Territory of the U.S. Virgin Islands. The Letters of Agreement implement Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) and are signed by the USCG, U.S. Environmental Protection Agency (USEPA), U.S. Department of Interior (USDOI), the U.S. Department of Commerce (USDOC), and the Commonwealth of Puerto Rico, and the Territory of the U.S. Virgin Islands.

The Caribbean RRT agrees that the primary method of controlling discharged oil shall be physical removal for the environment. The Caribbean RRT recognizes, however, that in certain instances physical containment, collection, and removal of oil may not be possible and the use of dispersants must be considered in order to prevent substantial threat to public health or serious environmental damage. By breaking a cohesive surface oil slick into small droplets that disperse into the water column, dispersants can prevent an offshore oil spill from contaminating wildlife and critical habitat in nearshore and shoreline areas.

The Caribbean RRT strongly recommends that, to be effective, application of dispersants should be targeted to begin not later than six hours after an oil spill. Accordingly, employment of dispersants usually requires that authorization for use be given prior to a spill incident. Within areas pre-authorized for use of dispersants by the Letters of Agreement, further consultation by the USCG OSC is not required, provided the appropriate CRRT agencies are immediately notified and applicable protocols are followed. Pre-authorization allows the USCG OSC to order the use of dispersants, as defined in the National Contingency Plan (NCP) and listed on the USEPA NCP Product Schedule, when in the judgment of the USCG OSC their use is necessary to prevent substantial threat to public health or welfare or to minimize serious environmental damage. The Letters of Agreement are not intended to exclude or replace the use of mechanical, in-situ burning, or other open-water cleanup methods but to enable and encourage the use of all appropriate techniques in the strategy to remove oil from the water surface and, thereby, minimize environmental impacts of a spill.

If a decision to use dispersants is made, the USCG OSC will immediately notify the USEPA, USDOC, USDOI, the Commonwealth of Puerto Rico, and the Territory of the U.S. Virgin Islands through CRRT representatives. A post-incident briefing will be held within 45 days following an application of dispersants to exchange information on effectiveness of the application and to determine whether changes to the Letters of Agreement are necessary.

Description of Pre-authorization Area

Pre-authorization Area for the Commonwealth of Puerto Rico:

Dispersants are pre-authorized for use only in open waters that are at least 0.5 nautical miles from any shoreline and where the water depth if greater than 60 feet.

Dispersants are not pre-authorized for use in, on, or over waters containing reefs, waters designated as marine reserves, mangrove areas, fresh or brackish waters or waters in coastal wetlands; except with the prior and express concurrence of the Puerto Rico Department of Natural Resources and USEPA, in consultation with USDOC and USDOI. Coastal wetlands include: submerged algal beds (rocky or unconsolidated bottom), submerged seagrass beds, and coral reefs.

Pre-authorization Area for the Territory of the U.S. Virgin Islands:

Use of dispersants is pre-authorized only in open waters that are at least one mile from any shoreline, or at least one
mile from any reef which is less than 20 feet from the water’s surface, and where the water depth in the application area is greater than 60 feet.

Dispersants are not pre-authorized for use in, on, or over waters containing reefs, waters designated as marine reserves, mangrove areas, fresh or brackish waters or waters in coastal wetlands; except with the prior and express concurrence of the U.S. Virgin Islands Department of Planning and Natural Resources and USEPA, in consultation with USDOC and USDOI. Coastal wetlands include: submerged algal beds (rocky or unconsolidated bottom), submerged seagrass beds, and coral reefs.

**Description of Oil Dispersants**

Chemical dispersants are products applied to oil on the water surface to enhance formation of fine oil droplets, which enter the water column and are dispersed by currents. Some physical dispersion occurs naturally following oil spills due to agitation created by wave action and ocean turbulence. Chemical dispersants enhance and accelerate this natural process, accomplishing in minutes to hours what otherwise requires days to weeks. The advantages of rapid dispersion early in a spill include minimizing direct contact of wildlife with a surface slick and reducing the amount of oil impacting sensitive nearshore and shoreline areas. Whereas untreated oil floating on the water surface can be beached by wind, dispersed oil droplets are unlikely to strand ashore because they are not subject to wind action. Movement of dispersed oil droplets is determined by currents that do not penetrate the beach face.

Dispersants, which are typically applied from vessel or aircraft mounted spray systems, offer several operational advantages. Dispersant application enables treatment of large areas of spilled oil much more quickly than can be accomplished with mechanical methods and prior to significant expansion of the slick with time. Dispersants can be applied in rough weather and sea conditions under which use of booms, skimmers, and other mechanical equipment may be impractical. To be effective, however, dispersants generally must be applied within the first few hours following an oil spill. This is a result of the fact that when oil is released to the marine environment it is immediately subject to a wide variety of weathering processes. Weathering quickly increases the viscosity of the oil, making dispersion by the addition of chemical dispersants difficult if not impossible over time. Depending on the type of oil spilled and the environmental conditions, the window of opportunity for successful use of dispersants can be as short as a few hours.

The key components of chemical dispersants are one or more surface-active agents, or surfactants. Surfactants contain molecules with both water-compatible (hydrophilic) and oil-compatible (lipophilic or hydrophobic) groups. The surfactant molecules reduce the oil/water interfacial surface tension, enabling the oil layer to be broken into fine droplets with minimal mixing energy, thereby enhancing natural dispersion. Surfactants also tend to prevent coalescence of oil droplets and reduce adherence to solid particles and surfaces, such as sediments and feathers. In addition to surfactants, most dispersant formulations also contain a solvent carrier to reduce viscosity of the surfactant so that the dispersant can be sprayed uniformly. The solvent may also enhance mixing and penetration of the surfactant into more viscous oils. Though early dispersants contained agents highly toxic to marine life, manufacturers have refined formulations of more recent generations of dispersants to dramatically reduce toxicity. Modern dispersants contain solvents composed of nonaromatic hydrocarbons or water-miscible concentrates (alcohols or glycols) as well as less toxic surfactants. The exact dispersant-to-oil application ratio, usually planned at 1:10, is determined by the nature of the oil and sea conditions.

By dispersing oil into the water column, the spreading or dilution becomes three-dimensional. The subsurface oil concentration initially increases, but diminishes rapidly with distance and time due to physical transport processes. This is in contrast to untreated oil concentrated at the water surface, which can coalesce in surface convergence zones even after it has spread out to very low concentrations. The highest concentration of chemically dispersed oil typically occurs in the top meter of water during the first hour following treatment (Rycroft et. al., 1994). Available data suggest that concentrations of more than ten parts per million (ppm) of dispersed oil are unlikely beyond ten meters (depth) of the slick and that even within one meter depth of the slick, concentrations rarely exceed 100 ppm. The continuous mixing and dilution capabilities of open water lead to uniformity and are sufficient to rapidly reduce these concentrations. Field studies show that water column concentrations decline to undetectable or background levels within several hours following application of a dispersant (SEA, 1995). Under untreated slicks, oil concentrations typically range from a few parts per million to less than 0.1 ppm, diminishing with depth and time.
The dispersed oil droplets, ranging in size from microns to a few millimeters, break down by natural processes, such as biodegradation. Microbial biodegradation of oil appears to be enhanced by dispersal because of the larger surface area available as compared to a surface slick. Dispersants also prevent formation of tarballs and oil-in-water emulsions (mousse), which tend to be resistant to biodegradation due to their low surface area. The chemical dispersants applied, like the oil droplets, are diluted by diffusion and convective mixing. Much of the solvent fraction evaporates immediately after the dispersing is applied. The surfactants are readily biodegraded.

Description of Listed Species Present
for which Assessment was Requested by the U.S. Fish and Wildlife Service

Sea Turtles

Four listed sea turtle species occur in the area under consideration. Leatherback, and hawksbill sea turtles are endangered; green and loggerhead sea turtles are threatened. Leatherback sea turtles (*Dermochelys coriacea*) nesting in the U.S. Caribbean is reported in the Virgin Islands (St. Croix, St. Thomas, St. John) and Puerto Rico, including Islas Culebra, Vieques, and Mona (NMFS and USFWS, 1992). Leatherbacks are considered to be a highly pelagic species but occasionally enter the shallow coastal waters of bays and estuaries. They may concentrate near and follow drifting schools of jellyfish, their primary prey. Hawksbill sea turtles (*Eretmochelys imbricata*) are predominantly tropical. Adult hawksbills characteristically inhabit shallow rocky areas and coral reefs but also occur in mangrove-bordered bays, estuaries, and lagoons and occasionally in deep waters. Juveniles occupy the deeper water pelagic environment, often associated with floating patches of sargassum mats. Hawksbill turtles are omnivorous opportunists and seem to prefer invertebrates, particularly sponges (Ernst *et al*., 1994). Atlantic green sea turtles (*Chelonia mydas*) inhabit and nest in the U.S. Virgin Islands and Puerto Rico. Their preferred habitat appears to be lagoons and shoals with an abundance of marine grasses. Adult green sea turtles are primarily herbivorous, foraging on algae and seagrasses; juveniles may eat a variety of invertebrates as well (NMFS and USFWS, 1991a). Loggerhead turtles (*Caretta caretta*) wander widely throughout the marine waters of their range, including the area under consideration. They commonly inhabit the continental shelves and estuarine environments, occurring most frequently in waters less than 50 meters deep (Ernst *et al*., 1994). Hatchlings and juveniles are often found along current fronts, downswells, or eddies associated with drifting mats of sargassum. Loggerheads are omnivores and feed on a wide variety of benthic invertebrates including crustaceans, mollusks, and sponges (NMFS and USFWS, 1991b).

West Indian Manatee

The endangered West Indian manatee (*Trichechus manatus*), a sirenian, occurs in Puerto Rico and very rarely in the Virgin Islands. Manatees most frequently dwell in protected, low-salinity waters where vegetation is abundant. They are commonly found in the waters of large, slow-moving rivers and river mouths and in shallow, low energy coastal areas such as estuaries or bays. Manatees prefer shallower estuarine and freshwater habitats, rarely venturing into offshore, open oceanic waters except to move from one favorable feeding area to another. Such movements are generally confined to inshore waters less than five meters deep (St. Aubin and Lounsbury, 1990). Seasonal movements result from the manatee's intolerance to cold. Populations tend to shift south in winter and make shorter movements to and from natural and artificial warm-water refuges such as artesian springs and power-plant discharges during cold fronts. During the summer, movements are less predictable and the population is more dispersed along the coast as manatees explore alternative feeding areas.

Like other sirenians, manatees are aquatic herbivores and feed on a wide variety of submerged, emergent, floating, and shoreline vegetation. In saltwater, they feed primarily on several species of seagrass, including turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), and shoal grass (*Halodule wrightii*). Manatees also may eat some species of algae, mangrove leaves, and red mangrove seedlings. They have been known to haul themselves partially out of the water to consume bank vegetation. In freshwater, manatees feed on a variety of plants, including *Hydrilla verticillata*, algae, and water hyacinth (*Eichhornia crassipes*). Movements and aggregations of manatees, which spend several hours each day feeding, can be correlated with the distribution of seagrasses and vascular freshwater aquatic vegetation (Reynolds and Odell, 1991). Manatees routinely cross between the islands of Puerto Rico in the area under consideration. As in other areas in the
Caribbean basin, the distribution of manatees in Puerto Rico is not uniform and is most likely related to the distribution of freshwater resources, seagrass beds, and sheltered areas. In some areas, seasonal shifts in local abundance appear to correlate with the rainy season in that manatees tend to move downstream when water levels drop in the dry season. Surveys indicate most manatees are seen along the eastern and southcentral coasts of Puerto Rico and tend to congregate near the Roosevelt Roads Naval Station on the eastern end of the island (Rathbun and Possardt, 1986).

**Brown Pelican**

The Caribbean brown pelican (*Pelecanus occidentalis occidentalis*) is listed as endangered in Puerto Rico, and the Virgin Islands. Coastal diving birds, brown pelicans feed almost entirely on fish captured by plunge diving in coastal waters. They feed in both inshore and nearshore waters, though preferred feeding areas occur around root systems of fringe and overwash mangroves, waters protected by coral reef barriers, bays, estuaries, and lagoons. Habitat that brown pelicans use for roosting and loafing includes fringe mangroves, rocky shores surrounding offshore cays, sandy beaches, and littoral woodlands. They also rest on the water surface. Brown pelicans nest colonially, predominantly on small coastal islands. Nests are built in bushes or low trees, and occasionally on the ground. Brown pelicans rarely occur away from saltwater and usually do not venture more than 20 miles out to sea except to take advantage of especially good fishing conditions (Collazo and Klaas, 1986, Fritts *et al.*, 1983).

The range of the Caribbean brown pelican includes the Puerto Rico-U.S. Virgin Islands area. In this region, breeding colonies of the Caribbean brown pelican occur at several well-established sites along the coasts of the islands and are highly variable in onset and duration of nesting season. Colonies on the southwestern and western coasts of Puerto Rico (Guanica, Montvala, and Anasco Bays) are usually active on a well-defined seasonal basis. Breeding activities begin between May and August and last through February. Other colonies (Congo Cay, Cayo Conejo, Whistling Key, Dutch Cap Cay, Buck Island, and Green Cay National Wildlife Refuge) are active during most or all of the year. Nesting peaks September through November. Important feeding areas in Puerto Rico include San Juan Bay, Dorado Lagoon and Humacoa Lagoon. In the Virgin Islands, specific feeding areas are selected opportunistically, near fish schools (Collazo and Klaas, 1986).

**Roseate Tern**

The roseate tern (*Sterna dougallii dougallii*) is an endangered coastal diving bird that breeds in two discrete areas in the Western Hemisphere. One population breeds on islands along the northeastern coast of the United States; the other breeds on islands around the Caribbean Sea from the Florida Keys to the Lesser Antilles (USFWS, 1989a). Roseate terns are exclusively marine, breeding usually on small islands, but occasionally on sand dunes at the end of barrier beaches. They typically build their nests under or adjacent to clumps of beach vegetation, rocks, driftwood, or other objects that provide cover and shelter. In the Caribbean, roseate terns nest between May and July. Chicks spend most of their time in tunnels under vegetation or rocks until they fledge (USFWS, 1989a).

The roseate tern is a specialist feeder on small schooling marine fish it catches by plunging vertically into the water and seizing in their bill. They usually feed over open water, often in tidal channels, tide rips, or over sandbanks where currents bring fish into relatively shallow water. Roseate terns return to shore to rest and roost after feeding offshore, rarely resting on the water.

**Effects of Oil Spills on Listed Species**

**General Effects**

General physiologic effects of oil on listed species can include altered blood chemistry, immunological dysfunction, altered osmoregulation, pulmonary and neurological damage, reproductive impairment, liver and kidney damage, and dermal lesions. Functions such as thermoregulation and locomotion, including buoyancy, may also be affected. Additional effects due to increased stress may manifest themselves as anemia (wasting syndrome) and increased susceptibility to predation.
Sea Turtles

Sea turtles can be exposed to spilled oil when feeding, surfacing to breathe, or nesting in areas contaminated by stranded oil. Turtles are also susceptible to floating tarballs formed from weathered oil. There is no firm evidence that sea turtles are able to detect and avoid oil (Odell and MacMurray, 1986). Studies indicate oil exposure can have several adverse effects on turtles, including toxic responses to vapor inhalation or ingestion, skin irritation, interference with osmoregulation and ion balance, and reduced hatching success (Van Fleet and Pauly, 1987; Fritts and McGehee, 1982; Lutz and Lutcavage, 1989). Experiments on adult loggerhead turtles conducted by Lutcavage et al. (1993) showed that major body systems in marine turtles are adversely affected by even short exposures to weathered South Louisiana crude oil. Effects observed included alteration of blood chemistry, alteration of respiration and diving patterns, interference with salt gland function, and skin lesions. Exposure to fresh oil would likely be considerably more harmful. Though oil exposure may not directly kill adult turtles, the effects may make them more vulnerable to predation or disease.

Oiling of sea turtle nesting habitat poses a potential risk to adult nesting turtles, hatchlings, and to eggs. Turtle embryos are particularly sensitive. The effects of oil on the development and survival of marine turtles appears to be variable, depending on such factors as stage of nesting, oil type, degree of weathering, and amount and height of oil deposition on the beach. Studies by Fritts and McGehee (1982) indicate that fresh oil washing ashore to the level where nests with incubating eggs are located may result in extensive embryo mortality. The studies found that mortality may not be significant if eggs are deposited in sand after contamination has occurred and the oil has weathered, although hatchlings may be smaller than normal. Some evidence suggests olfactory cues are imprinted on sea turtles as hatchlings and guide them back to their natal beaches for nesting when they reach maturity. Oil on the beach could interfere with these chemical guides (Lutz et al., 1985). Response activities to clean oil stranded on beaches may pose an additional risk of injury to eggs, hatchlings, and nesting adults.

Manatees

Little information is available regarding the effects of oil on manatees. In that manatees surface to breath and tend to rest at or just below the surface of the water, they are at risk of direct exposure to oil on the water surface. Toxic vapors and contact could cause irritation of the mucous membranes of the eyes and airways, possibly leading to lung congestion or even pneumonia (St. Aubin and Lounsbury, 1990). The volatile fraction of crude oil (approximately one-third by volume) contains many toxic hydrocarbons which evaporate and can create hazardous air concentrations near the spill (Allen and Ferek, 1993). Ingestion of tar balls or plant material contaminated with fresh oil could result in absorption of toxic hydrocarbon fractions during the long retention time in the gut of this herbivore. Because their skin is thick and underlain by a thick layer of blubber, direct exposure to oil would probably not cause significant effects on thermoregulation (St. Aubin and Lounsbury, 1990). The aggregation of manatees into small, restricted habitats, particularly during winter, makes them susceptible to catastrophic losses. This scenario is more likely to be associated with coastal accidents than with offshore transportation of oil.

Birds

Birds exposed to oil can suffer serious adverse physical and chemical effects. Feathers absorb oil, interfering with critical functions such as insulation, water-repellency, buoyancy, and flight. Death can result from combinations of hypothermia, starvation, and drowning. Birds may also suffer toxic effects from inhalation of petroleum vapors or ingestion of oil while preening or from eating contaminated food. Ingested oil can cause anemia, pneumonia, intestinal irritation, kidney damage, altered blood chemistry and osmoregulation, decreased growth, and decreased production and viability of eggs (Fritts et al., 1983). Oil contamination on egg shells, even in very small quantities, is extremely toxic to avian embryos.

Bird species differ in their vulnerability to oil spill impacts depending on their behavior, distribution, and reproduction. Marine species adapted to life on the open ocean are particularly susceptible to direct exposure. Diving coastal seabirds, including the roseate tern, are at high risk of oil exposure because they regularly enter the water for feeding. Shorebirds, wading birds, raptors and passerines are less susceptible to exposure to free-floating oil because they rarely immerse themselves in water and do not raft or rest on the water surface. They are, however, at risk of contamination from oil that washes ashore. Shoreline oiling can severely impact shorebirds, wading birds, and other species that use beach habitat for nesting or foraging, as do piping plovers. Especially vulnerable are
seabird species that assemble regularly or seasonally such as roseate terns, which form large nesting and staging aggregations. Some species, such as raptors, can be impacted indirectly if their primary food sources are affected. Dispersant use can reduce the risk of these impacts by reducing the amount of oil washing ashore and remaining afloat at sea with potential to contaminate seabirds.

**Analysis of Biological Effects of Proposed Action**

A primary objective of an oil spill response is to quickly remove as much oil as possible from the surface of the water, thereby minimizing direct contact with wildlife and preventing movement of the oil into nearshore and shoreline areas where removal is more difficult and environmental impacts severe. Dispersants, applied under appropriate conditions, may offer the best response option to help achieve this objective. Dispersion of oil at sea, before a slick washes ashore, reduces the overall and particularly the chronic impacts of oil on sensitive inshore habitats including salt marshes, coral reefs, sea grasses, and mangroves. Dispersed oil is less likely than a surface slick to reach shoreline areas. Any dispersed oil that does move inshore is less likely to stick to shorelines and vegetation because dispersants alter the adhering property of oil droplets. Consequently, habitats recover faster if the oil is dispersed before it reaches them (NRC, 1989). By protecting nearshore and shoreline habitats from contamination, dispersant use benefits listed species and other wildlife that rely on them for nesting, feeding, or resting. This would include the listed species that nest along Caribbean shorelines such as the roseate tern, brown pelican, leatherback sea turtle, and Atlantic green sea turtles.

Some of the listed species in the Caribbean Region, such as most sea turtle species and brown pelicans, occur or feed predominantly in shallower, nearshore waters rather than in the area where dispersant use will be pre-authorized by the Letters of Agreement and so are not likely to be adversely affected. Dispersant application would benefit these and other listed species by preventing contamination of shoreline and nearshore habitat and, concomitantly, the impacts associated with shoreline cleanup activity. Brown pelicans, for example, are known to be highly sensitive to human disturbance, especially when nesting. The primary human-related cause of mortality to manatees is collision with watercraft. Such potential nearshore impacts from cleanup activities would be minimized by preventing oil from stranding ashore.

Potential effects of dispersant use on listed species that may occur more frequently in the open waters pre-authorized for dispersant use, are considered below. In some cases, the species are present in the pre-authorized area seasonally rather than year-round, reducing the risk they would be affected.

**Direct Contact and Ingestion**

By removing the surface oil slick, dispersants reduce the risk of direct contact with wildlife that dwell at or pass through the water surface to feed or breath such as sea birds, sea turtles, sirenians, and cetaceans. Diving sea birds such as the brown pelican and roseate tern are particularly vulnerable to surface slicks. Chemically dispersed oil droplets are less sticky and therefore less likely to adhere to feathers, skin, or other body surfaces than undispersed or naturally dispersed oil (Neff, 1990). Juvenile sea turtles, which often are found with drifting sargassum mats in convergence areas further from shore, would particularly benefit from reduced surface exposure in the area under consideration. Exposure of sea turtles to tar balls, which they are known to ingest and which also may adhere to juveniles, would be reduced because dispersants help prevent tarball formation. Sea turtles and manatees in offshore areas may temporarily experience exposure to higher concentrations of oil droplets in the water column, primarily in the upper few meters, following dispersion. In open waters with continuous mixing and dilution capabilities, however, dispersed oil is rapidly diluted. Considering that concentrations fall to background levels within the first few hours following dispersion, exposure will be short-term and concentrations low.

**Prey Contamination**

If zooplankton, fish, and other water column or benthic organisms become oiled or accumulate oil in their tissues, they could ultimately expose species that prey upon them. Diving seabirds and several sea turtle species that occur in the area under consideration prey on fish and aquatic invertebrates. Prey species that occur in open waters further from shore where dispersant use will be pre-authorized are the primary concern. Prey species that occur in nearshore areas where dispersant use will not be pre-authorized by the Letters of Agreement are unlikely to be impacted.
Most aquatic organisms have the ability to metabolize and depurate petroleum hydrocarbons. Existing data demonstrate that complete depuration occurs once the source of the contamination is removed. It is unlikely that significant amounts of petroleum hydrocarbons will be accumulated by pelagic organisms during a dispersant application because of the short duration and low concentration expected in the water column. Under such conditions, any accumulated petroleum hydrocarbons should be rapidly eliminated. Marine food chain biomagnification does not occur because vertebrate predators, including sea turtles and sea birds, readily metabolize and depurate hydrocarbons from their tissues. Most marine organisms also metabolize and excrete the surfactants in dispersants. Metabolism of surfactants is rapid enough that there is little likelihood of food chain transfer from marine invertebrates and fish to predators (Neff, 1990).

Marine finfish, for example, take up petroleum hydrocarbons from water and food. The compounds induce the hepatic Mixed-Function-Oxidase (MFO) system and within a few days following exposure, aromatic hydrocarbons are oxygenated to polar metabolites and excreted. For this reason, most fish do not accumulate and retain high concentrations of petroleum hydrocarbons and so are unlikely to transfer them to predators. The fish may be tainted with metabolites bound to tissue macromolecules, but these metabolites are so reactive that it is unlikely that they would be released in a toxic form during digestion by the consumer and so would not pose a serious risk (Neff, 1990).

Pelagic invertebrates become contaminated by assimilating hydrocarbons directly from seawater and by ingesting oil droplets and tainted food. Crustaceans can transform aromatic hydrocarbons to polar metabolites that may be excreted or bound to tissues. For a few days or weeks, unmetabolized or metabolized hydrocarbons in crustaceans and other invertebrates could be transferred to predators. Considering the low concentrations and short duration of exposure to dispersed oil, as described earlier, it is unlikely predators would ingest enough oil through consumption of contaminated aquatic invertebrates to result in adverse affects.

Analysis of Alternatives

Emergency Authorization

The proposed action pre-authorizes the FOSC to use dispersants as a first-stage response technique in specified zones as described above. The alternative is to require the FOSC to seek CRRT authorization to use dispersants in these areas on a case-by-case basis at the time of an oil spill emergency. The limited "window of opportunity" for the most optimal and effective use of dispersants following an oil spill occurs very early -- usually within the first few hours. Without pre-authorization to permit rapid response and mobilization of the necessary equipment, the delay for case-by-case CRRT approval would realistically eliminate dispersants as a response option. Moreover, in the absence of pre-authorization, spill response organizations are unlikely to invest in the equipment and training necessary to apply dispersants due to the low probability that authorization would be issued in time to employ the technique. Pre-authorization enabling timely use of dispersants under appropriate conditions in the designated zones provides greater protection for listed species and critical habitat than does case-by-case authorization at the time of a spill emergency.

Mechanical Removal

Mechanical containment and removal will remain the preferred response tool for most oil spills, which usually are close to shore in areas where other response options are unlikely to be approved. Experience has shown, though, that mechanical response often cannot adequately deal with very large spills offshore. Performance of mechanical methods can be severely limited by weather and oceanic conditions and by the nature of the oil slick. Booms and skimmers are of limited use even in moderate seas and are usually effective only at slow current (less than 1 knot) and low wave heights (less than 2 meters). Consequently, mechanical recovery rates are often poor. Even under calm conditions, use of mechanical equipment alone to deal with large spills in which oil rapidly spreads over large areas may not be feasible. For these reasons, dispersant application is an important complementary spill response technique and should be included along with other techniques as an option in developing the appropriate response strategy. Under this regional policy, use of dispersants will be considered when and where physical removal is impossible or insufficient for protecting natural resources, including listed species.
In-Situ Burning

The Caribbean Regional Response Team approved a policy, effective May 3, 1996, pre-authorizing use of in-situ burning in response to oil discharges within the jurisdiction of the Caribbean RRT. In-situ burning is an oil spill response technique that can quickly remove large volumes of oil from the water surface by igniting oil that is towed away from the main slick in fire-resistant boom. Though in-situ burning is a highly useful and important response option, there are some differences in the range of oil and weather conditions under which in-situ burning and dispersants are effective. For example, in-situ burning is not effective once oil has spread to less than about two millimeters thick. Also, if winds are blowing shoreward toward populated areas or sensitive environments, in-situ burning is unlikely to be employed due to concerns about potential effects of the smoke plume. Under conditions for which in-situ burning would not be effective or creation of a smoke plume is deemed unacceptable, dispersants may be a more viable option.

No Action

Another alternative is not attempting to remove released oil from the water surface, potentially allowing the oil to wash ashore. The oiled shoreline could be cleaned or allowed to recover naturally. Due to the importance of nearshore and shoreline habitat to a variety of organisms and the difficulty of cleaning oiled shorelines without inflicting further injury, this alternative is considered the least desirable from several perspectives, including protection of listed species and critical habitat. Unrecovered oil poses a high risk of exposure and injury to wildlife, especially sea birds, marine mammals, and intertidal organisms. Cleaning and rehabilitation of oiled wildlife, particularly marine mammals, have had limited success and release of rehabilitated animals creates a risk of introducing disease into the wild population.

Conclusions

The purpose of dispersants, used alone or in conjunction with other open-water spill response techniques, is to quickly remove spilled oil from the water surface, thereby reducing exposure to wildlife and preventing contamination of sensitive nearshore and shoreline habitat. Under appropriate conditions, dispersants can reduce environmental impacts from oil spills, including injury to listed species and critical habitat. Dispersant application is not likely to adversely affect listed species beyond the potential effects of the spilled oil or add to the cumulative environmental stresses currently acting on the species. In a previous U.S. Fish and Wildlife review of a Biological Assessment of the effects of the Region IV Regional Response Team (RRT IV) Dispersant Use Policy, USFWS concurred with the U.S. Coast Guard’s determination that the proposed dispersant pre-authorization, was not likely to adversely affect the listed species under the responsibility of the Service. All listed species considered in this Biological Assessment for the Caribbean RRT Letters of Agreement were also considered in the Biological Assessment for the RRT IV Dispersant Use Policy. Though patterns of behavior and habitat use may vary among populations of a species distributed in different geographic areas, these differences for the listed species considered in this Biological Assessment are not expected to be significant enough to result in a higher likelihood of impact from dispersant pre-authorization in the Caribbean RRT area of responsibility than in the RRT IV jurisdiction.

The parties to the Caribbean Letters of Agreement pre-authorizing dispersants as an oil spill response technique in the designated areas conclude that this action is not likely to adversely affect the listed species or critical habitat present in the area under consideration. We request that the U.S. Fish and Wildlife Service concur with this conclusion and agree that formal consultation under Section 7 of the Endangered Species Act is not necessary. Consultation will be re-initiated if additional information not previously considered becomes available indicating adverse effects to listed species or critical habitat from the identified action.

References


Appendix III

Dispersant Use Monitoring
Appendix III

Dispersant Use Monitoring Program within the Caribbean Region

This appendix addresses the recommended process of the CRRT for monitoring dispersant effectiveness during operational application. Given the problems associated with estimating dispersant effectiveness, and the myriad of factors affecting the effectiveness of a dispersant in the field, the CRRT has identified this monitoring program as a recommended method of monitoring dispersant use results. The CRRT endorses the monitoring procedures currently being supported by the U.S. Coast Guard National Strike Force and believes that at this time, they offer the best available methods for estimating dispersant effectiveness in the field. The CRRT therefore recommends that all efforts be made to implement their monitoring procedures. The CRRT does not, however, believe that these protocols can consistently and accurately provide definitive “Go/No-Go”, “Continue/Discontinue” data to the OSC, and therefore does not require that the results of the monitoring protocol necessarily dictate whether or not dispersant operations will continue. An inability to perform monitoring protocols will not necessarily be grounds for cessation of dispersant operations. It should be noted that these monitoring recommendations are not intended to serve as a means of monitoring for natural resource impacts or damages to the environment.
Dispersant Use Monitoring Program within the Caribbean Region

The CRRT has adapted the current U.S. Coast Guard National Strike Force monitoring program for dispersant application operations. The program is designed to allow timely use of this response tool and provide monitoring results to the Federal On-Scene Coordinator (OSC) and Federal and State Trustees involved in the response. This program is designed for the assets and logistical capabilities that are provided in this region by the USCG Gulf Strike Team (GST) and National Oceanic and Atmospheric Administration (NOAA) Scientific Support Coordinator’s (SSC) scientific support team.

The GST has been chosen because of their proven ability to quickly respond to the OSC’s technical needs during an oil spill incident with properly trained and equipped personnel and logistical support. Having a government agency accomplish this task is partially dictated by the operational need for such monitoring data sets to remain in the public domain to ensure availability and objective presentation of the data to the OSC.

The GST will perform the actual on-site monitoring to collect the raw data with the guidance of the SSC’s scientific support team. The SSC scientific support team will assist in monitoring, analysis of the data, and forwarding of the results to the OSC as soon as is practicable.

The monitoring program is designed to enhance to OSC’s decision making process during the use of dispersants in fulfillment of their responsibility to ensure appropriate and timely response to mitigate the effects of oil spills, as established by the Clean Water Act and defined by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This monitoring program is intended to provide the OSC with logical “Continue/Discontinue” input and documentation data during operations involving dispersant application.

Since the monitoring protocols are constantly undergoing revision and change due to improvements and enhancements made to the available technology and monitoring practices, the actual monitoring procedures and process are held under separate cover. The current monitoring protocol is available within other planning documents available to the OSC and the CRRT.
APPENDIX IV

Dispersant Use Decision Elements & Documentation/Application Form
APPENDIX IV

Dispersant Use Decision Elements and Documentation/Application Forms

Forms to document important response information during a dispersant application are contained in this appendix. Also procedures for requesting dispersant application in non pre-authorized areas are provided. Procedures for requesting approval must be followed, as outlined in this Appendix, for the EPA, DOI, DOC, and the affected State(s). Only the OSC can authorize the use of dispersants, therefore, once approval is obtained, it is the OSC's responsibility -- not the potential Responsible Party's -- to make the request and provide the trustees with all required documentation information.

The Documentation/Application Form is provided as a summary of important information to be considered by the OSC along with the Dispersant Use Decision Elements contained in this appendix. This information must be considered when reviewing any request to conduct dispersant operations in response to offshore oil spills within Caribbean RRT (CRRT). The information on the Documentation/Application Form shall be provided prior to approval of dispersant application in all zones that are not pre-authorized. The information must be recorded for documentation purposes for any offshore use of dispersants.

The Dispersant Use Decision Elements in this appendix list the basic components of a dispersant use decision; and are phrased in the form of questions to be considered and answered by the OSC. In some cases, the questions will be easy to answer, and the OSC can use the "Elements" list to rapidly, confirm that each component of a dispersant use decision has been evaluated. In many cases, spill-specific considerations will require a more in-depth approach.

No one document could contain all of the information which may be pertinent to an OSC during the decision-making process. Therefore, CRRT highly recommends that the OSC draw on the expertise of state and local officials, the NOAA Scientific Support Coordinator, the Trustees, and any other relevant source of information when making a dispersant-use decision.
DISPERSANT USE DECISION ELEMENTS

1. Is The Product Dispersible?

This question will be much easier to answer if responders know specifically what product was spilled. Dispersibility will be affected by several factors. Firstly, the API Gravity (or density) of the oil must be considered. Generally, if API Gravity is 17 or above, then the oil may be dispersible. Oil or products with an API Gravity above 45 are dispersible; however, because they evaporate rapidly they are generally not dispersed. One must be aware, however, if 20,000 bbls of an oil with an API of 45 is spilled, 66% may evaporate; but there is still about 7,000 bbls that could affect sensitive environments.

Viscosity of the oil will also impact its dispersability. Generally, an oil must have a viscosity of less than 5,000-10,000 centistokes to be effectively dispersed.

Weathering of the oil will also significantly affect its dispersability. Finally, emulsification (or incorporation of water into the oil) will also affect dispersability. Predictions on the weathering and emulsification of an oil may be made with the NOAA "ADIOS" model. Caution in interpreting the results needs to be exercised. The ability of the ADIOS model to predict viscosity is very unreliable for the great majority of oils in the ADIOS database because of the lack of data on emulsification. In summary, an oil generally will be dispersible if:

- API Gravity is more than 17;
- Pour point is less than 10 F (5.5 C) below ambient temperature; and
- Viscosity is less than 10,000 centistokes.

Tables 1 and 2 may also prove helpful in determining an oil's dispersability.

2. Are The Environmental Benefits Of Dispersing The Oil Likely To Outweigh Those Of Not Dispersing The Oil?

This is perhaps the most difficult question to be answered in the dispersant-use decision-making process.

Further information on weighing the environmental advantages versus disadvantages of using oil spill dispersants is available in Appendix V: "Biological Assessment of Dispersant Toxicity".

3. Is The Chosen Dispersant likely To Be Effective?

The following factors may affect the effectiveness of any given dispersant:

- effectiveness of dispersant application to the oil;
- dispersant-to-oil application ratio;
- oil slick thickness;
- distribution of oil slick on the water;
- droplet size distribution in aerial spray;
- oil viscosity;
- energy input;
- suspended particles in water (sedimentation);
- weathering of oil;
- emulsification (formation of mousse);
- oil composition;
- dispersant composition;
- water salinity; and
- temperature.

**Laboratory Testing:**

One way to measure a dispersant's effectiveness, relative to other dispersants, is through laboratory testing. The National Contingency Plan (NCP) calls for manufacturers to perform a Swirling Flask effectiveness test (SWT) prior to listing their dispersant on the Product Schedule. In this test, seawater and oil are swirled in a flask for twenty minutes. Then, after a 10 minute settling period, a sample of water is collected from the bottom of the flask and analyzed for oil content by spectrophotometry. The final "effectiveness" figure quoted in the NCP is derived by averaging the percent of oil dispersed with a given dispersant and tests with Prudhoe Bay crude and South Louisiana crude oils.

In the NCP, EPA adopted a minimum effectiveness result of 45 percent with the SWT for listing a product as a dispersant on the Product Schedule. This ruling significantly aids the ability of RRTs to evaluate dispersants. For example, on previous Product Schedule lists of "dispersants", more than half did not even attain a 10 percent effectiveness rating. By only listing products that have a 45% or better effectiveness rating, OSCs can muster a greater degree of confidence in a product's expected effectiveness.

It should be emphasized that the results of the Swirling Flask test, or any other laboratory test, do not necessarily indicate the effectiveness of a dispersant in the field. In fact, the National Research Council concluded that, "Unfortunately, there is no strong correlation between laboratory and field tests." There are simply too many variables that affect effectiveness of a dispersant in the field -- i.e. application rate, type of oil, weather conditions, etc.

**Visual Monitoring:**

Another way to assess a dispersant's effectiveness is through visual monitoring of a slick following dispersant application. Several Regions have adopted procedures for accomplishing this, most notably the federal Region VI Response Team. Using their method, observers, during an overflight of the application operations, visually observe and record the operations and their impacts on the slick. Their conclusions of the dispersant's effectiveness are then relayed to the OSC to support further dispersant-use decision-making.

Some caution must also be applied when interpreting visual monitoring results. A recent Workshop, convened by major private and public agencies involved in oil spill operations, concluded that visual monitoring may not always be a precise indication of a dispersant's effectiveness. For example, some studies on dispersants show that dispersants may not become effective until several hours after application. One expert in oil spill dispersants writes, "One should certainly not expect a slick to disappear as soon as it is sprayed with dispersant . . ." Other reports from the field indicate that, while a dispersant may not appear to be working, it may in fact be inhibiting emulsification, thereby making the oil more dispersible.

Another problem with using visual monitoring as a means of estimating dispersant effectiveness is that subjective interpretations of what constitutes dispersal can drastically influence results. Although training observers in standardized methods may help alleviate this problem, some level of subjectivity will always be present with this method. In fact, the National Research Council wrote, [concerning visual monitoring at spills of opportunity] "In [some] tests, different observers at the same site reached different conclusions about how much of the slick had been dispersed."
Water Sampling:

A final way of estimating a dispersant's effectiveness is through water sampling in the field of a slick that has been sprayed with a dispersant product. Real-time measurements can be taken with a fluorometer which is towed by a sampling boat located in the dispersed plume area. Additionally, water samples may be taken of the subsurface dispersed slick and brought to a laboratory for testing of concentration of dispersed oil. There are, unfortunately, also problems with these methods, given that the subsurface plume of dispersed oil will be exceedingly difficult to model and/or effectively sample. Additionally, since the volume of dilution is so high, the low concentrations of dispersed oil expected will be easily confounded by background concentration of oil in the water and oil resulting from the sampling boat's wastewater itself.

A final word on dispersant effectiveness: Even in the case of a highly effective dispersant, some oil will remain on the water surface, and probably foul shoreline resources. Dispersants should not be seen as "cure-all" answer to the problems that oil spills present; but rather as one of several mechanisms available to an OSC for reducing the environmental impacts of spilled oil.

4. Can The Dispersant Application Be 1) Safely And 2) Effectively Implemented Given Environmental Conditions?

Several important environment parameters will affect the ability to safely and effectively implement a dispersant application operation. They are:

- **Wind speed:** Winds should be less than or equal to 25 knots.
- **Visibility:** Visibility should be greater than or equal to 3 miles.
- **Ceiling:** There should be a ceiling greater than or equal to 1000 feet.

**NOTE:** Dispersant operations should take place during daylight hours only.

5. Are Sufficient Equipment And Personnel Available To Conduct Aerial Dispersant Application Operations Within The Window Of Opportunity?

Oil fate and weathering information such as the Automated Data Inquiry for Oil Spills (ADIOS) model available from NOAA should have been consulted to help determine the window of opportunity for effective use of dispersant on the oil. Equipment and personnel must be available on scene quickly enough to effect a successful application of dispersant onto the oil within the window of opportunity.

6. Has A Site Safety Plan For Dispersant Operations Been Completed?

In accordance with the National Contingency Plan, responsibility for assuring site safety rests both with the OSC and the company or agency actually performing the operations.

7. Is The Product To Be Dispersed Within A Pre-authorization Zone?

Appendix I contains maps indicating the areas of pre-authorization for dispersant use. These areas include waters that are with the Green Zone in which ALL of the following conditions apply:
For Puerto Rico:

1) the waters are not classified with a "Yellow" or "Red" zone;

2) the waters are at least 0.5 miles seaward of any shoreline; and,

3) the waters are at least 60 feet in depth.

For U.S. Virgin Islands:

1) the waters are not classified with a "Yellow" or "Red" zone;

2) the waters are at least 1.0 miles seaward of any shoreline; and,

3) the waters are at least 60 feet in depth.

Dispersant use is not pre-authorization if the waters are within the Yellow Zone and in which ANY of the following conditions apply:

For Puerto Rico:

1) Waters designated as marine reserves, National Marine Sanctuaries, National or State Wildlife Refuges, or proposed or designated Critical Habitats;

2) Waters within 0.5 miles of a shoreline;

3) Waters less than 60 feet in depth; or

4) Waters in mangrove or coastal wetland ecosystems, or directly over coral communities which are in less than 60 feet of water. Coastal wetlands include submerged algal beds and submerged seagrass beds.

For U.S. Virgin Islands:

1) Waters designated as marine reserves, National Marine Sanctuaries, National or State Wildlife Refuges, or proposed or designated Critical Habitats;

2) Waters within 1.0 miles of a shoreline;

3) Waters less than 60 feet in depth; or

4) Waters in mangrove or coastal wetland ecosystems, or directly over coral communities which are in less than 60 feet of water. Coastal wetlands include submerged algal beds and submerged seagrass beds.

Additionally, dispersant use is prohibited in those areas designated as being the Red Zone. No dispersant application operations will be conducted at any time in the Red Zone unless: 1) dispersant application is necessary to prevent or substantially reduce a hazard to human life; and/or 2) an emergency modification of this Agreement is made on an incident-specific basis.
The CRRT has not currently designated any waters of Puerto Rico as Red Zones. For the U.S. Virgin Islands the following areas have been designated as Red Zones:

1) Waters of the Virgin Islands National Park including waters one mile seaward from the park boundary.

2) Waters of the Buck Island Reef National Monument including waters one mile seaward from the park boundary.

If the USCG-OSC believes dispersants should be applied outside pre-authorized areas a request for authorization must be made to the CRRT representatives of the EPA, affected State(s), DOC, and DOI. The OSC is only granted authority to conduct dispersant operations when concurrence has been given by EPA and the affected State(s), and after consultation with DOC and DOI.

8. Are The Necessary Equipment And Trained Personnel Available To Conduct The Recommended Monitoring Operations?

In accordance with the SMART, which is recommended for use by the CRRT, the U.S. Coast Guard's Gulf Strike Team and/or the Atlantic Strike Team are available to provide monitoring assistance. Given the problems associated with estimating dispersant effectiveness, and the myriad of factors affecting the effectiveness of a dispersant in the field, CRRT addresses the monitoring program in the form of recommendations. CRRT endorses the SMART monitoring protocols and believes they offer the best available methods for estimating dispersant efficiency - and therefore recommends that all efforts be made to implement these monitoring procedures. CRRT does not, however, believe that these protocols can consistently and accurately provide definitive "Go/No-Go", "Continue/Discontinue" data to the OSC, and therefore does not require that the results of SROMP monitoring necessarily dictate whether dispersant operations will continue. An inability to perform SROMP monitoring protocols will not necessarily be grounds for cessation of dispersant operations.

9. Has The Overflight To Assure That Endangered Species Are Not In The Application Area Been Conducted?

In accordance with Protocols in the CRRT Dispersant Use Policy and with the provisions of the Section 7 Consultation conducted for LOAs, an overflight of the application area must be conducted prior to commencing dispersant application operations. A visual observer of the area should attempt to assure that no endangered species appear to be threatened by the proposed operations. In the event of continued operations, periodic overflights to ensure that endangered species are not present are advisable. Consultations with a resource specialist knowledgeable with the area should be conducted to evaluate what risks dispersant application may pose to endangered or threatened species or other resources of concern that may be currently present or nearby.
DOCUMENTATION/APPLICATION FORM FOR DISPERSAN USE

Name of spill incident: ______________________________________

Responsible Party (if known): _____________________________

Date and Time of spill Incident: _____________________________

I. Oil Type:

1. Spilled product name (if known): ________________________

2. Viscosity: ________________________________

3. API Gravity: ________________________________

4. Pour point: ________________________________

5. % Evaporation in: (24 hours) _________________________
   (48 hours) ____________________________

6. Did oil emulsify within the operational period? _________________

** Any information from visual overflights of the slick, including estimations of slick thickness, should be included here. All additional available information pertaining to physical characterization of spilled oil should be included here.

II. Environmental Conditions:

1. Wind speed ________________________________

2. Wind direction ________________________________

3. Visibility ________________________________

4. Ceiling ________________________________
III. Description Of Spill Incident And Spill Site:

Note all relevant details concerning the spill incident and spill site here. Be sure to note whether the spill was a one-time or continuous release, the amount of cargo remaining aboard the vessel, the stability of the vessel, and sensitive environmental conditions in the vicinity of the vessel. An estimated amount of oil on the water should be made, if possible, by using available information on the area of the slick and the estimated slick thickness (as indicated by the color of the slick). Also included should be a description of the location of the spill site, including the nearest major port.

IV. Description Of Area Over Which Dispersants Were Applied:

1. Distance from shoreline ____________________________
2. Depth of water ____________________________
3. Jurisdiction (i.e. federal or state) ____________________________
4. Special management zone area (as defined in LOAS) ____________________________
5. Safety zone established in operational area ____________________________

V. Availability Of Personnel And Equipment:

1. Availability of application and spotter aircraft ____________________________
   Source: ____________________________
   Point of contact: ____________________________
   Type: ____________________________
   Travel time to spill: ____________________________
2. Type of aircraft used ____________________________
3. Aircraft's dispersant load capability ____________________________
4. Availability of qualified personnel ____________________________

Source: ____________________________

Point of contact: ____________________________

Travel time to spill ____________________________

5. Time required for delivery to the aircraft staging area ____________________________

VI. Information On Dispersant Product:

1. Name of dispersant ____________________________
2. Manufacturer ____________________________
3. Amount available ____________________________
4. Source ____________________________

** A Material Safety Data Sheet of the product should be attached here.

VII. Implementation Of Recommended Monitoring Protocols:

1. Was the Gulf Strike Team's Special Response Operations Monitoring Program Team deployed ____________________________

** A full report documenting the activities and results of any monitoring activities should be attached here.
APPENDIX V

Letters of Agreement
Letter of Agreement

Commonwealth of Puerto Rico
LETTER OF AGREEMENT
ON LIMITED USE OF DISPERSANTS AND CHEMICAL AGENTS
DURING OIL DISCHARGES OCCURRING IN COASTAL WATERS
AMONG U. S. COAST GUARD (USCG) - SEVENTH DISTRICT,
U. S. ENVIRONMENTAL PROTECTION AGENCY (USEPA) REGION II,
U.S. DEPARTMENT OF THE INTERIOR.(USDOI),
U.S. DEPARTMENT OF COMMERCE (USDOC),
THE COMMONWEALTH OF PUERTO RICO

100. PURPOSE

101. This Letter of Agreement implements Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) and provides pre-authorization for the limited use of dispersants and other chemical agents by the-pre-designated USCG On Scene Coordinator (OSC) on oil discharges impacting the waters of the Commonwealth of Puerto Rico.

200. AUTHORITY

201. Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) provides that the On Scene Coordinator (OSC), with the concurrence of the USEPA representative to the Regional Response Team and the States with jurisdiction over the navigable waters threatened by the oil discharge, and with the USDOC and USDOI natural resource trustees, may authorize the use of dispersants and other chemical agents on oil discharges; provided however, that such dispersants or chemical agents are listed on the USEPA NCP Product Schedule. Commander, Seventh Coast Guard District has pre-designated the USCG Captain of the Port (COTP) under his jurisdiction as the On Scene Coordinator (OSC) for oil discharges in the coastal zone, and has delegated him the authority and responsibility for compliance with the Oil Pollution Act of 1990 (OPA 90). The Governor of the Commonwealth of Puerto Rico, in turn, has designated the Secretary of Natural Resources to act on behalf of the public as trustee for natural resources under the Oil Pollution Act of 1990 (OPA 90). The Secretary of the Department of Natural Resources (PRDNR) is responsible for the protection and management of fish and wildlife resources, endangered species, forests, coastal reserves and bathing beaches under Commonwealth laws.

202. The USEPA has been delegated authority under Subpart J of the National Contingency Plan to authorize the use of dispersants or chemical agents for the control of oil discharges, and to list which dispersants or chemical agents are authorized to be used for this purpose. The U. S. Department of the Interior (USDOI) and the U.S. Department of Commerce (USDOC) are designated federal trustees of certain natural resources under Subpart G of the NCP and are to be consulted regarding natural resources. In such cases, this Agreement constitutes pre-consultation and pre-concurrence for the use of dispersants or chemical agents.
300. **SCOPE**

301. The USCG, USEPA, USDOI, USDOC and PRDNR agree that the primary method of controlling discharged oil shall be the physical removal of the oil from the environment. These agencies recognize that in certain instances the physical containment, collection, and removal of the oil may not be possible, and the effective use of dispersants or other chemical agents must be considered to prevent substantial threat to public health or welfare, or minimize serious environmental damage. This Agreement establishes criteria under which USEPA listed dispersants or chemical agents can be used on or in the waters of the Commonwealth of Puerto Rico.

400. **PROTOCOLS**

401. As attested by the signatures set forth below, the USCG, USEPA, USDOI, USDOC, and the PRDNR agree that the pre-designated USCG On Scene Coordinator has pre-approval to order the use of dispersants or chemical agents on oil discharges, as defined in the National Contingency Plan, when in the judgement of the USCG On Scene Coordinator, the use of dispersants or chemical agents is necessary to prevent substantial threat to public health or welfare, or minimize serious environmental damage, subject to the conditions presented in this document.

402. The OSC shall arrive at his decision to use dispersants through the decision making process and information gathering scheme as detailed in Subpart J of the Caribbean Regional Contingency Plan (Annex K of the Local Spill Response Plan for Puerto Rico and the U.S. Virgin Islands).

403. The USCG agrees with USEPA, USDOI, USDOC and PRDNR that if a decision has been made to use dispersants under the provisions of this agreement, the OSC will immediately notify USEPA, USDOI, USDOC and PRDNR of that decision. This initial notification will include, but is not limited to, the following information to the extent available:

   a. Date, time, and location of the incident;
   b. Type and amount of oil discharged;
   c. Area affected;
   d. The projected area of impact of the oil if not dispersed;
   e. Reasons why dispersants or chemical agents have been selected;
   f. Type of dispersant to be used;
   g. Application method, rate, and amount;
   h. On scene weather observations.

404. The Secretary of the PRDNR or his representative will immediately notify the Puerto Rico Scientific Advisory Committee. The Scientific Advisory Committee will evaluate the environmental impact of the use of the dispersant or chemical agent with respect to the minimization of impact on environmentally sensitive area, economically important areas, beaches, or other areas of interest.

405. The USCG, USEPA, USDOI, USDOC and the PRDNR further agree the OSC has pre-approval
to order the use of dispersants or chemical agents, subject to the following conditions:

405.1 The use of dispersants or chemical agents is authorized only after all methods of physical or mechanical removal are judged by the OSC to be infeasible.

405.2 The pre-designated authority to use dispersants or chemical agents on oil discharges in accordance with this Agreement is vested solely in the individual who is the pre-designated USCG OSC. This authority will not be delegated.

405.3 The decision to use dispersants or chemical agents shall be made only after consulting the Puerto Rico Coastal Atlas for Sensitivity of Coastal Environments and Wildlife to Spilled Oil and the decision guidelines for dispersant use detailed in Subpart J of the Region II Regional Contingency Plan (Part 2600 of the USCG Local Contingency Plan).

405.4 Dispersants or chemical agents will be used only when they are expected to prevent or minimize substantial threat to public health or welfare, or serious environmental damage.

405.5 Dispersants or chemical-agents may be used only in open waters that are at least 0.5 nautical miles from any shoreline and where the water depth is greater than 60 feet deep.

405.6 Dispersants or chemical agents shall not be used in, on, or over waters containing reefs; waters designated as marine reserves; mangrove areas; or waters in coastal wetlands; except with the prior and express concurrence of the PRDNR and USEPA, in consultation with USDOC and USDNI. Coastal wetlands include:

1) Submerged algal beds (rocky or unconsolidated bottom);
2) Submerged seagrass beds; and
3) Coral reefs

405.7 Dispersants or chemical agents shall not be used in fresh or brackish waters.

405.8 As a general rule, if a discharge is too small to be removed by alternative mechanical methods, it is too small to consider the application of dispersants or chemical agents.

405.9 Sinking agents are not dispersants and shall not be considered as authorized chemical agents. Use of sinking agents is expressly prohibited by this Agreement and the National Contingency Plan.

405.10 If an oil discharge poses an imminent threat to a sensitive area restricted by protocol 405.5, the USCG OSC must contact USEPA and PRDNR for concurrence, and consult with USDOC and USDNI. If USEPA and PRDNR disagree, the opinion of PRDNR shall prevail. If PRDNR provides no answer within 4 hours, USEPA's decision will prevail. In the event that neither PRDNR nor USEPA can provide an answer within 4 hours, the USCG OSC may proceed with the dispersant or chemical agent application if the threat represents a substantial threat to public health or welfare, or serious environmental damage is imminent if dispersants or chemical agents are not used.

405.11 Any use of dispersants or chemical agents requires that a post incident debriefing take place within 45 days after the first application of dispersants or chemical agents. The
debriefing will gather information concerning the effectiveness of the dispersant or chemical agent used, the effectiveness of the application program at preventing environmental damage, and whether any changes or modifications to this Agreement are necessary. The debriefing will be chaired by the PRDNR and shall include the incident specific Regional Response Team (RRT). The results of the debrief will be included in the OSC Report.

406. The USCG OSC shall make every effort to continuously evaluate the decision to use dispersants or chemical agents by considering the advice of the USEPA, USDOI, USDOC, PRDNR, the other members of the Caribbean Regional Response Team, and any other agencies, groups, or information sources which may be available.

500. **AMENDMENTS**

501. This Letter of Agreement may be amended in whole or in part as mutually agreeable to all parties thereto.
600. CANCELLATION

601. This Letter of Agreement may be canceled in whole or in part by any of the participating agencies. Cancellation will take place 30 days following delivery of written notification to each of the agencies participating in this Letter of Agreement.

/s/ Captain Zawadzki 11/13/91
Chief, Marine Safety Division
Seventh Coast Guard District

/s/ Mr. Richard Salkie 11/13/91
Associate Director, Removal and Emergency Preparedness Programs
U.S. Environmental Protection Agency
Region II

/s/ Mr. Gregory Hogue 11/13/91
U.S. Department of the Interior
Caribbean RRT Representative

/s/ Mr. Waynon Johnson 11/13/91
U.S. Department of Commerce
Caribbean RRT Representative

/s/ Santos Rohena-Betancourt 11/13/91
Secretary, Department of Natural Resources
Commonwealth of Puerto Rico
LETTER OF AGREEMENT
ON LIMITED USE OF DISPERSANTS AND CHEMICAL AGENTS
DURING OIL DISCHARGES OCCURRING IN COASTAL WATERS
AMONG U. S. COAST GUARD (USCG) - SEVENTH DISTRICT,
U. S. ENVIRONMENTAL PROTECTION AGENCY (USEPA) REGION II,
U.S. DEPARTMENT OF THE INTERIOR,(USDOI),
U.S. DEPARTMENT OF COMMERCE (USDOC),
THE COMMONWEALTH OF PUERTO RICO

600. CANCELLATION

601. This Letter of Agreement may be canceled in whole or in part by any of the participating agencies. Cancellation will take place 30 days following delivery of written notification to each of the agencies participating in this Letter of Agreement.

This signature page shall be considered part of the original Letter of Agreement.

/s/ Genaro Torres
June 5, 1995
Environmental Quality Board
Commonwealth of Puerto Rico

DATE
Letter of Agreement

Territory of the U.S. Virgin Islands
LETTER OF AGREEMENT
ON LIMITED USE OF DISPERSANTS AND CHEMICAL AGENTS
DURING OIL DISCHARGES OCCURRING IN THE COASTAL WATERS
AMONG U.S. COAST GUARD (USCG) - SEVENTH DISTRICT,
U.S. ENVIRONMENTAL PROTECTION AGENCY (USEPA) - REGION 11,
U. S. DEPARTMENT OF THE INTERIOR (USDOI),
U. S. DEPARTMENT OF COMMERCE (USDOC),
AND THE TERRITORY OF THE UNITED STATES VIRGIN ISLANDS

100. PURPOSE

101. This Letter of Agreement implements Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) and provides pre-authorization for the limited use of dispersants and other chemical agents by the pre-designated USCG On Scene Coordinator (OSC) on oil discharges impacting the waters of the Territory of the U.S. Virgin Islands.

200. AUTHORITY

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202. The USEPA has been delegated authority under Subpart J of the National Contingency Plan to authorize the use of dispersants or chemical agents for the control of oil discharges, and to list which dispersants or chemical agents are authorized to be used for this purpose. The U.S. Department of the Interior (USDOI) and the U.S. Department of Commerce (USDOC) are designated Federal trustees of certain natural resources under Subpart G of the NCP and are to be consulted regarding natural resources. In such cases, this Agreement constitutes pre-consultation and preconcurrence for the use of dispersants or chemical agents.

300. SCOPE

301. The USCG, USEPA, USDOI, USDOC and DPNR agree that the primary method of controlling discharged oil shall be the physical removal of the oil from the environment. These agencies recognize that in certain instances the physical containment, collection, and removal of the oil may not be possible, and the effective use of dispersants or other chemical agents must be considered to prevent substantial threat to public health or welfare, or minimize serious environmental damage. This Agreement establishes criteria under which USEPA listed dispersants or chemical agents can be used on or in the waters of the Territory of the U.S. Virgin Islands.
PROTOCOLS

401. As attested by the signatures set forth below, the USCG, USEPA, USDOI, USDOC, and DPNR agree that the pre-designated USCG On Scene Coordinator has pre-approval to order the use of dispersants or chemical agents on oil discharges, as defined in the National Contingency Plan, when in the judgement of the USCG On Scene Coordinator, the use of dispersants or chemical agents is necessary to prevent substantial threat to public health or welfare, or minimize serious environmental damage, subject to the conditions presented in this document.

402. The OSC shall arrive at his decision to use dispersants through the decision making process and information gathering scheme as detailed in Subpart J of the Caribbean Regional Contingency Plan (Annex K of the Local Spill Response Plan for Puerto Rico and the U.S. Virgin Islands).

403. The USCG agrees with USEPA, USDOI, USDOC and DPNR that if a decision has been made to use dispersants under the provisions of this agreement, the OSC will immediately notify USEPA, USDOI, USDOC and DPNR of that decision. This initial notification will include, but is not limited to, the following information to the extent available:

- Date, time, and location of the incident;
- Type and amount of oil discharged;
- Area affected;
- The projected area of impact of the oil if not dispersed;
- Reasons why dispersants or chemical agents have been selected;
- Type of dispersant to be used;
- Application method, rate, and amount; and,
- On scene weather observations.

404. The USCG, USEPA, USDOI, USDOC and DPNR further agree the OSC has pre-approval to order the use of dispersants or chemical agents, subject to the following conditions:

404.1 The use of dispersants or chemical agents is authorized only after all methods of physical or mechanical removal are judged by the OSC to be infeasible.

404.2 The pre-designated authority to use dispersants or chemical agents on oil discharges in accordance with this Agreement is vested solely in the individual who is the pre-designated USCG OSC. This authority will not be delegated.

404.3 The decision to use dispersants or chemical agents shall be made only after consulting the Virgin Islands Oil Spill Sensitivity Atlas and the decision guidelines for dispersant use detailed in Subpart J of the Region II Regional Contingency Plan (Part 2600 of the USCG Local Contingency Plan).

404.4 Dispersants or chemical agents will be used only when they are expected to prevent or
minimize substantial threat to public health or welfare, or serious environmental damage.

404.5 Dispersants or chemical agents may be used in open waters that are at least one mile from any shoreline or at least one mile from any reef which is less than 20 feet from the water's surface. In all cases where dispersants or chemical agents are used, the water depth in the application area must be greater than 60 feet deep.

404.6 Dispersants or chemical agents shall not be used in, on, or over waters containing reefs; waters designated as marine reserves; ma grove areas; or waters in coastal wetlands; except with the prior and express concurrence of DPNR and USEPA, in consultation with USDOC and USDOI. Coastal wetlands include:

1) Submerged algal beds (rocky or unconsolidated bottom);
2) Submerged seagrass beds; and,
3) Coral reefs.

404.7 Dispersants or chemical agents shall not be used in fresh or brackish waters.

404.8 As a general rule, if a discharge is too small to be removed by alternative mechanical methods, it is too small to consider the application of dispersants or chemical agents.

404.9 Sinking agents are not dispersants and shall not be considered as authorized chemical agents. Use of sinking agents is expressly prohibited by this Agreement and the National Contingency Plan.

404.10 If an oil discharge poses an imminent threat to a sensitive area restricted by protocol 404.5, the USCG OSC must contact USEPA and DPNR for concurrence, and will consult with USDOI and USDOC. If USEPA and DPNR disagree, the opinion of DPNR shall prevail. If DPNR provides no answer within 4 hours, USEPA's decision will prevail. In the event that neither DPNR nor USEPA can provide an answer within 4 hours, the USCG OSC may proceed with the dispersant or chemical agent application if the threat represents a substantial threat to public health or welfare, or serious environmental damage is imminent if dispersants or chemical agents are not used.

404.11 Any use of dispersants or chemical agents requires that a post incident debriefing take place within 45 days after the first application of dispersants or chemical agents. The debriefing will gather information concerning the effectiveness of the dispersant or chemical agent used, the effectiveness of the application program at preventing environmental damage, and whether any changes or modifications to this Agreement are necessary. The debriefing will be chaired by DPNR and shall include the incident specific Regional Response Team (RRT). The results of the debrief will be included in the OSC Report.

405. The USCG OSC shall make every effort to continuously evaluate the decision to use dispersants or chemical agents by considering the advice of the USEPA, USDOI, USDOC, DPNR, the other members of the Caribbean Regional Response Team, and any other agencies, groups, or information sources which may be available.

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This Letter of Agreement may be amended in whole or in part as mutually agreeable to all parties thereto.

600. CANCELLATION

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/s/ 11/13/91
Captain Zawadzki DATE
Chief, Marine Safety Division
Seventh Coast Guard District

/s/ 11/13/91
Mr. Richard Salkie DATE
Associate Director, Removal and
Emergency Preparedness Programs
U.S. Environmental Protection Agency
Region II

/s/ 11/13/91
Mr. Gregory Hogue DATE
U.S. Department of the Interior
Caribbean RRT Representative

/s/ 19 June 1992
Mr. Waynon Johnson DATE
U.S. Department of Commerce
Caribbean RRT Representative

/s/ 19 June 1992
Mr. Roy Adams DATE
Commissioner
Department of Planning and Natural Resources
U.S. Virgin Islands
Appendix VI

Dispersant Use Operational Planning & Implementation Guidance
Appendix VI

Dispersant Use Operational Planning
&
Implementation Guidance
APPENDIX VI

Dispersant Use Operational Planning
and Implementation Guidance

**Purpose.** This guidance was developed to assist the On Scene Coordinator (OSC) and
the Unified Command in their effort to assess the potential use of dispersants, and if
warranted, their use on applicable oil spills occurring within the Caribbean Region. This
plan supports the decision making, logistical, and mobilization concerns associated with
the proper use, deployment, and monitoring of dispersant technology. Essentially this
document provides a guide to develop and execute a dispersant use operations plan.

**Background.** The priority in using dispersants is gaining the approval to do so and
mobilizing the equipment and people to accomplish the task. It is critical that OSCs,
Area Committees, and Unified Commands plan for the use of dispersants and other
complex countermeasures. Time is critical for the use of this type of technology and
deployment windows are narrow. The characteristics and weathering of most oils and
other operational priorities lead to dispersant operations being more effective within the
first 24 hours of the response. Also specialized equipment and trained personnel are
not abundantly available, especially in some remote areas. These resources must be
pre-identified and all necessary agreements needed to access them should be in place
as much as practicable. This guidance, developed in checklist form, should assist
OSCs and Unified Commanders in implementing proper dispersant use as an effective
countermeasure for an oil spill. This guidance is arranged to assist in:

- Decision making on proper dispersant use and strategy;
- Development of an Operations Plan;
- Gaining CRRT approval (if necessary);
- Developing functional positions within the Unified Command to support
dispersant operations;
- Site safety preparation; and
- Enhancing planning efforts.

**Appendix Format.**

The format of this guidance is a bit different in that it is not intended to stand by itself. It
is a collection of flowcharts, matrices, checklists, templates, and job aids that your
planners can incorporate into their existing planning efforts and eventually use in
training and qualification programs. We wanted to avoid another publication to add to
the myriad of pubs you already have. Having said this, we also feel that if your Unified
Command staff follows the guidance within this effort, you should be able to address
and support all the issues that comprise a successful dispersant deployment.

To allow a one-stop-shop, there is some overlap with the approval portions of this
agreement found in Appendix IV. However, the primary goal of this effort is to address
the operational aspects, planning, and logistics of dispersant deployment and not the
approval of the same. There is a link but the two issues are very different. The
appropriate place for you to use this information is in planning and preparedness
discussions with your Area Committees and its eventual incorporation of applicable
sections into the ACP.

**Implementation.**

**Safety.** Safety of personnel is paramount to the success of the operation. To assist the
Unified Command in developing a Dispersant Use Safety Plan, a safety plan checklist is
included in this appendix. Planners are encouraged to develop safety plan templates
before the need to deploy dispersants occurs.

**Flexibility.** Like other functions within a particular response management system, the
Incident Commander is free to decrease or expand his/her functional structure based on
the response need. Dispersant operations are no different. For instance, in a less
complex response, the monitor role can be combined with the spotter role, thus
alleviating the need for additional aircraft. For more complex operations, you may
decide to add additional spray platforms under one spotter or multiple spotters
depending on the acceptable span-of-control. Observers may be assigned to any
platform if acceptable to save resource expenses. Any combination is possible.

**Organization.** An ICS organization chart is included to show the potential relationships
within the Unified Command between the Dispersant Operation Group, the Technical
Specialists, and Logistics.

**Procedure.** On Scene Coordinators (OSCs) are encouraged to use this guidance to
standardize the planning and implementation of dispersant use.
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<td></td>
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<tr>
<td>• Spotter Aircraft / Spotter</td>
<td></td>
</tr>
<tr>
<td>• Spray Aircraft / Spray Vessel / Sprayer</td>
<td></td>
</tr>
<tr>
<td>• Sprayer Log Sheet</td>
<td></td>
</tr>
<tr>
<td>• Monitoring Aircraft / Vessel and Monitor</td>
<td></td>
</tr>
<tr>
<td>• Observation Aircraft / Vessels/ Observers</td>
<td></td>
</tr>
<tr>
<td>• Dispersant Observation Job Aid</td>
<td></td>
</tr>
<tr>
<td>• Dispersant Observation Equipment &amp; Pre-Flight Safety Brief Checklist</td>
<td></td>
</tr>
<tr>
<td>• Dispersant Observation Final Reporting Form</td>
<td></td>
</tr>
<tr>
<td>• Common ICS Responsibilities for Each Position</td>
<td></td>
</tr>
<tr>
<td>Site Safety Plan Template for Dispersant Operations</td>
<td></td>
</tr>
</tbody>
</table>
ICS ORGANIZATION CHART FOR DISPERSANT USE

FOSC or Incident Commanders (Unified Command)

Operations Section

Dispersant Operation Group Supervisor

Planning Section

SSC/Technical Specialists

Spotter Aircraft

Monitoring Aircraft/Vessel

Spray Aircraft/Vessel

Observation Aircraft/Vessel
NOTES: 1. The dotted lines above depict the cross-functional relationships between Operations, Planning, and Logistics to successfully implement dispersant activities.

2. Flexibility is paramount during dispersant operations. The IC/UC may choose to place the Monitoring and Observation Aircraft/Vessel(s) under the guide of the Planning Section. Normally monitors and observers pass their information directly to the Technical Specialists located under Planning (e.g. similar to SCAT Teams, field observers, etc.). Either scheme will work as long as a strong working/reporting relationship exists between Operations and Planning. Their placement within functional schematic diagram is totally at the IC/UC discretion.
## DISPERSANT USE DECISION / IMPLEMENTATION

#### ELEMENT CHECKLIST

Note: Need all "YES" answers before dispersant use is acceptable.

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>DECISION ELEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1. Is the spill/oil dispersible?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oil is generally dispersible if:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>API Gravity is more than 17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pour Point is less than 10 F (5.5 C) below ambient temperature</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Viscosity is less than 10,000 centistokes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note: Some modern dispersants may be formulated to be effective on a wider range of oil properties. The choices of dispersants listed on the NCP's National Product Schedule are limited. To answer this question you should look at which dispersant would the most effective given the type of oil.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>DECISION ELEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2. Have environmental tradeoffs of dispersant use indicated that use should be considered?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note: This is one of the more difficult questions. Dispersant toxicity assessment information found in Appendix IV of the CRRT pre-approval agreement may assist in this decision.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>DECISION ELEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3. Is the chosen dispersant likely to be effective?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consider:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* effectiveness of dispersant application to the oil;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* dispersant-to-oil application ratio;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* oil slick thickness;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* distribution of oil slick on the water;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* droplet size distribution in aerial spray;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* oil viscosity;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* energy input;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* suspended particles in water (sedimentation);</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* weathering of oil;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* emulsification of oil;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* oil composition;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* dispersant composition;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* water salinity; and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* temperature.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* dispersant type compatible with application means</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note: A preliminary effectiveness test such as the standard flask swirling method is highly recommended.</td>
</tr>
</tbody>
</table>
DISPERSANT USE DECISION / IMPLEMENTATION

ELEMENT CHECKLIST (cont.)

Note: Need all "YES" answers before dispersant use is acceptable.

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Can dispersant application be conducted safely and effectively given the physical environment?

   Environmental parameters:
   
   * winds less than or equal to 25 knots
   * visibility greater than or equal to 3 miles
   * ceiling greater than or equal to 1000 feet
   * operations during daylight hours only

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Are sufficient equipment and personnel available to conduct aerial dispersant application operations within the window of opportunity?

   Note: Refer to elements and position descriptions under the Dispersant Operations Group Supervisor in the Operations Section…Other tools are available to assess this such as the NOAA Dispersant Mission Planner

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Has a Site Safety Plan for dispersant operations been completed?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Is the spill/oil to be dispersed within a Pre-Approved Zone?

   Refer to Section II within the CRRT Dispersant Pre-Approval Agreement

   If the spill/oil is NOT in a Pre-Approved Zone, has approval been granted?

   Submit "CRRT Documentation/Application Form for Dispersant Use" to the Incident Specific CRRT members with request for approval.

   Dispersant use in non-approved areas must be requested by the OSC and approved by EPA and the affected state(s) after consultation with DOC and DOI.
Note: Need all "YES" answers before dispersant use is acceptable.

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DECISION ELEMENT</td>
</tr>
<tr>
<td>8.</td>
<td>Are the necessary equipment and trained personnel available to conduct the recommended monitoring operations?</td>
</tr>
<tr>
<td></td>
<td>The recommended monitoring protocol in the CRRT region is the Special Monitoring for Advanced Response Technologies or SMART. The Gulf Strike Team or Atlantic Strike Team is available to support and provide monitoring assistance.</td>
</tr>
<tr>
<td></td>
<td>It may not be appropriate to base Go/No Go or continue/discontinue decisions solely on results from the SMART monitoring team since dispersant effectiveness is often delayed or not totally and easily conclusive.</td>
</tr>
<tr>
<td></td>
<td>Monitoring is recommended but not strictly required…should not be a showstopper for operation.</td>
</tr>
<tr>
<td>9.</td>
<td>Has the overflight to assure that endangered species are not in the application area been conducted?</td>
</tr>
<tr>
<td></td>
<td>The provisions of the Section 7 consultation in regard to the CRRT Pre-Approval Agreement requires an overflight of the application area to ensure endangered species are not threatened or endangered by the operation.</td>
</tr>
<tr>
<td>10.</td>
<td>Has a Dispersant Operations Plan been completed?</td>
</tr>
<tr>
<td></td>
<td>Attached within this plan is a Dispersant Operations Plan template. The completion of this template should provide the OSC and Unified Command with a suitable and complete plan to support and implement the dispersant effort.</td>
</tr>
</tbody>
</table>
### DISPERSANT APPLICATION PLATFORM CAPABILITY DECISION MATRIX

<table>
<thead>
<tr>
<th>Platform</th>
<th>Payload (Gallons)</th>
<th>Approximate Min/Max Dosage (Gallons per Acre)</th>
<th>Coverage/Sortie * 5 gal/acre Dosage (Acres)</th>
<th>Coverage/Sortie * 10 gal/acre Dosage (Acres)</th>
<th>Coverage/Sortie * Max gal/acre Dosage (Acres)</th>
<th>Maximum Operational Time (Hours)</th>
<th>Transit Speed (Knots)</th>
<th>Operational Speed (Knots)</th>
<th>Operational Niche/Limitation Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bell 212 with Bucket</td>
<td>300</td>
<td>0.8/21.5</td>
<td>60</td>
<td>30</td>
<td>14</td>
<td>1.7</td>
<td>40-90</td>
<td>40-90</td>
<td>***(1)</td>
</tr>
<tr>
<td>C130 with ADDS</td>
<td>5000</td>
<td>1.4/16.4</td>
<td>1000</td>
<td>500</td>
<td>305</td>
<td>12</td>
<td>200-300</td>
<td>140-150</td>
<td>***(2)</td>
</tr>
<tr>
<td>C130 with MASS</td>
<td>2000</td>
<td>2.6/19.4</td>
<td>400</td>
<td>200</td>
<td>103</td>
<td>12</td>
<td>300</td>
<td>140-200</td>
<td>***(3)</td>
</tr>
<tr>
<td>DC-4</td>
<td>2170</td>
<td>0.8/10.3</td>
<td>434</td>
<td>217</td>
<td>211</td>
<td>4.5</td>
<td>175</td>
<td>156-175</td>
<td>***(4)</td>
</tr>
<tr>
<td>DC-6B</td>
<td>3000</td>
<td>4.3/19.8</td>
<td>600</td>
<td>300</td>
<td>152</td>
<td>5.5</td>
<td>130-225</td>
<td>130-225</td>
<td>***(5)</td>
</tr>
<tr>
<td>Thrush</td>
<td>510</td>
<td>-/-</td>
<td>102</td>
<td>51</td>
<td>-</td>
<td>4.5</td>
<td>125</td>
<td>90</td>
<td>***(6)</td>
</tr>
<tr>
<td>Air Tractor 801</td>
<td>800</td>
<td>-/-</td>
<td>160</td>
<td>80</td>
<td>-</td>
<td>2.5</td>
<td>200</td>
<td>150</td>
<td>***(7)</td>
</tr>
<tr>
<td>Large Vessel (&gt;100ft)</td>
<td>3000</td>
<td>2.2/35.8</td>
<td>600</td>
<td>300</td>
<td>84</td>
<td>100</td>
<td>15</td>
<td>3-10</td>
<td>***(8)</td>
</tr>
<tr>
<td>Small Vessel (20-40 feet)</td>
<td>600</td>
<td>1.1/71.7</td>
<td>120</td>
<td>60</td>
<td>8</td>
<td>20</td>
<td>25</td>
<td>3-10</td>
<td>***(9)</td>
</tr>
<tr>
<td>Fire Monitor</td>
<td>Vessel Dependent</td>
<td>5/20</td>
<td>Vessel Dependent</td>
<td>Vessel Dependent</td>
<td>Vessel Dependent</td>
<td>Vessel Dependent</td>
<td>Vessel Dependent</td>
<td>Vessel Dependent</td>
<td>2-15</td>
</tr>
</tbody>
</table>

**Notes:**

* Assumes Full Payload
** Small platforms may be the best choice for larger spills to treat the leading edge and thicker portions of the slick until a larger and more effective platform can arrive on scene.
*** For notes (1) through (10) see next page.
**** To assist in determining a proper platform for dispersant deployment, the following “Dispersant Application Operations Feasibility Form” may be useful.
**DISPERSANT APPLICATION PLATFORM CAPABILITY DECISION**

**MATRIX NOTES**

**NOTES:**

(1) For relatively small spills and where transit distance is short. Platform has relatively short operational duration and spray capacity.

(2) Most capable platform for large spills. Has high endurance and spray capacity. If a Coast Guard C-130 Hercules is used to support ADDS-Pack deployment, in accordance with existing MOAs, a modification (removal of rails in cargo bay) to the aircraft setup will be necessary which would take 6 to 8 hours to complete. This delay should be accounted for when considering aircraft availability.

(3) Good platform for endurance. Spray capacity is less than half of Adds-Pack. For medium to large spills.

(4) Use for medium to large spills. Moderate endurance. Spray capacity is similar.

(5) Use for medium to large spills. Moderate endurance. Spray capacity is similar.

(6) Crop-duster type aircraft good for small to medium spills. Can be turned around quickly for repeated treatments of larger slicks. Spray nozzles should be calibrated specifically for dispersant operations to obtain correct droplet size and spray pattern.

(7) Crop-duster type aircraft good for small to medium spills. Can be turned around quickly for repeated treatments of larger slicks. Spray nozzles should be calibrated specifically for dispersant operations to obtain correct droplet size and spray pattern.

(8) High endurance and spray capacity, but has slow operational speed.

(9) Small to medium slicks or surgical treatment of the slick’s leading edge. Slow speed and low spray capacity.

(10) May be good for surgical treatment of the slick’s leading edge and thickest portions of the slick. Calibration and delivery rate may be difficult to control.
1. Key Operational Factors
   
a. **Weather**
   
<table>
<thead>
<tr>
<th>Wind</th>
<th>OK</th>
<th>Not OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visibility</td>
<td>OK</td>
<td>Not OK</td>
</tr>
<tr>
<td>Clearance</td>
<td>OK</td>
<td>Not OK</td>
</tr>
</tbody>
</table>

b. **Window of Opportunity**

<table>
<thead>
<tr>
<th>Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>hrs</td>
</tr>
</tbody>
</table>

c. **Daylight Hours Remaining**

<table>
<thead>
<tr>
<th>Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>hrs</td>
</tr>
</tbody>
</table>

d. **Enter Smallest Window**

<table>
<thead>
<tr>
<th>Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>hrs</td>
</tr>
</tbody>
</table>

e. **Platform Data**

<table>
<thead>
<tr>
<th>Transit Speed</th>
<th>Knots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Speed</td>
<td>Knots</td>
</tr>
<tr>
<td>Swath</td>
<td>Feet</td>
</tr>
<tr>
<td>Coverage Rate</td>
<td>Acres/s</td>
</tr>
<tr>
<td>Coverage Rate</td>
<td>SqFt/s</td>
</tr>
<tr>
<td>System Pump Rate</td>
<td>gpm</td>
</tr>
<tr>
<td>Dispersant Payload</td>
<td>gals</td>
</tr>
<tr>
<td>Dispersant Actual Load</td>
<td>gals</td>
</tr>
<tr>
<td>Ideal Oil/Dispersant Ratio</td>
<td></td>
</tr>
<tr>
<td>Oil Treatable/Ideal Ratio</td>
<td>bbls</td>
</tr>
<tr>
<td>% Oil Treatable w/Ideal Ratio</td>
<td>%</td>
</tr>
<tr>
<td># Dispersant Loads/Oil Volume</td>
<td></td>
</tr>
<tr>
<td>Max Acres/Dispersant Load</td>
<td>Acres</td>
</tr>
<tr>
<td>Bbls Treated Based on Speed</td>
<td>bbls</td>
</tr>
<tr>
<td>Actual Oil/Dispersant Ratio</td>
<td></td>
</tr>
<tr>
<td>Dispersant gallons/Acre</td>
<td></td>
</tr>
<tr>
<td>Time to Deplete Stockpile</td>
<td>hrs</td>
</tr>
</tbody>
</table>

2. **Spill Stats**

   | Spilled Oil | bbls |
   | % Spilled Oil Evaporated/Dispersed | % |
   | Total Treatable oil | bbls |
   | Slick Area | Acres |
   | Average Slick Thickness | mm |
   | Distance: Staging to Treatment Area | NM |

3. **Resource Locations and Distances**

<table>
<thead>
<tr>
<th>Location</th>
<th>Distance to Staging Area</th>
<th>Transportation Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staging Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dispersant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On Product Schedule?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Amount</td>
<td>Gals</td>
<td></td>
</tr>
<tr>
<td>Platform Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dispersant Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application System Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spotter Location</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. **Time To Get Systems Ready (hrs)**

   | Person Recall | |
   | Loading/Transport to Staging Area | |
   | Totals | |
   | Loading of Stockpile | |
   | Loading of Application System | |
   | Enter Total Time for Ready System | |
   | Enter Slowest Transport Speed (kn) | |
   | Time to Arrive at Treatment Area | |
   | Time for Positioning | |
   | Total Time to Application | |
   | Amount of Window Time Left | |
   | Time Remaining After Stockpile Use | |
   | Return, Reload, Back O/S Time | |
   | Amount of Window Time Left | |
DISPERSANT OPERATION PLAN CHECKLIST
(Completed by Dispersant Operations Group Supervisor)

GENERAL

Incident Name: ______________________________________________________________
Vessel or Facility Name: ______________________________________________________
Date/Time Spill Occurred: _____________________________________________________
Location of the Spill: __________________________LAT___________LONG___________
Amount/Type of Oil Spilled: _______________________/___________________________
Dispersant Type: ____________________________________________________________

WEATHER ON SCENE

Wind Speed and Direction: ____________________________________________________
Visibility & Precipitation: _____________________________________________________
Sea State: __________________________________________________________________
Ceiling: ____________________________________________________________________

DISPERSANT USE PRE-BRIEF - PLATFORM ASSIGNMENTS:

<table>
<thead>
<tr>
<th>TITLE</th>
<th>PLATFORM/PERSO NEL NAMES</th>
<th>TACTICAL CALL SIGN</th>
<th>ETD TO SITE</th>
<th>ETA TO SITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spotter(s)</td>
<td>_________________________</td>
<td>________________</td>
<td>_________</td>
<td>_________</td>
</tr>
<tr>
<td>Sprayer(s)</td>
<td>_________________________</td>
<td>________________</td>
<td>_________</td>
<td>_________</td>
</tr>
<tr>
<td>Observer(s)</td>
<td>_________________________</td>
<td>________________</td>
<td>_________</td>
<td>_________</td>
</tr>
<tr>
<td>Monitor(s)</td>
<td>_________________________</td>
<td>________________</td>
<td>_________</td>
<td>_________</td>
</tr>
</tbody>
</table>

PLATFORM ASSIGNMENTS / IDENTIFICATION OF OPERATIONAL AREA BOUNDARIES:

<table>
<thead>
<tr>
<th>TITLE</th>
<th>AIRCRAFT DESIGNATOR</th>
<th>LAT</th>
<th>LONG</th>
<th>ALTITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTRY:</td>
<td>____________________</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>EXIT:</td>
<td>____________________</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>SPILL SITE:</td>
<td>____________________</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>LOCATION OF OPERATIONAL AREA:</td>
<td>____________________</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Attach Map, GPS Coordinates, etc.)
# DISPERSANT OPERATION PLAN CHECKLIST

(Completed by Dispersant Operations Group Supervisor)

## AIRCRAFT SEPARATION ALTITUDES:

<table>
<thead>
<tr>
<th>AIRCRAFT/CALL SIGN</th>
<th>SPRAY ALTITUDE</th>
<th>OPERATIONS ALTITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spotter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sprayer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## DISPERSANT INFORMATION:

- **Dispersant Name:** ___________________________________________________________
- **Source of Dispersant:** ______________________________________________________
- **Application Rate per Sortie:** _____ gal/acre  **Number of Sorties Planned:** ________
- **Total Amount of Dispersant to be Used per Sortie:** ____________________________
- **Sprayer Platform:** _______________ _________________ __________________
- **Swath Width:** ___________(ft) _____________(ft) ______________(ft)

## COMMUNICATIONS (complete only as needed; primary/secondary):

<table>
<thead>
<tr>
<th></th>
<th>VHF</th>
<th>UHF</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air to Air</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air to Vessel</td>
<td>VHF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air to Ground</td>
<td>VHF</td>
<td>UHF</td>
<td></td>
</tr>
<tr>
<td>Ground to Vessel</td>
<td>VHF</td>
<td>UHF</td>
<td>Other</td>
</tr>
<tr>
<td>Vessel to Vessel</td>
<td>VHF</td>
<td>UHF</td>
<td>Other</td>
</tr>
</tbody>
</table>

## POST DISPERSANT USE INFORMATION (Fill Out For Each Sortie)

<table>
<thead>
<tr>
<th>SORTIE</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Dispersant Application Began:</td>
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<td></td>
</tr>
<tr>
<td>Time Dispersant Application Ended:</td>
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<tr>
<td>Number of Passes Per Sortie:</td>
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</tr>
<tr>
<td>Total Amount of Dispersant Used:</td>
<td></td>
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</tr>
</tbody>
</table>
(Completed or used by all personnel within Dispersant Group if applicable)

OBSERVATIONS:

What happened when the dispersant contacted the spill? (Describe any apparent change in visible concentration, color, etc.)

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

Did the oil reappear after the application? (Refer to Observer’s Log)

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

DEBRIEF (To be facilitated by the Dispersant Operations Group Supervisor with input from dispersant group elements):

Did the dispersant operation follow the approved Dispersant Operations Plan?

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

What problems were encountered?

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

What recommendations would you make?

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

OTHER:

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

DISPERSANT GROUP PERSONNEL SHOULD PROVIDE FEEDBACK TO THE DISPERSANT OPERATION GROUP SUPERVISOR

DISPERSANT EFFECTIVENESS MONITORING AERIAL CHECKLIST

(Completed by Dispersant Op Monitoring Team)
GENERAL:

Incident Name: ______________________________________________________________

Vessel or Facility Name: ______________________________________________________

Date/Time Spill Occurred: _____________________________________________________

Location of the Spill: __________________________LAT___________LONG___________

Amount/Type of Oil Spilled: _______________________/___________________________

Dispersant Type: ____________________________________________________________

OBSERVATIONS:

What immediately happened when the dispersant contacted the spill? _______________
____________________________________________________________________________

After 2 Hours: _______________________________________________________________

After 6 Hours: _______________________________________________________________

After 24 Hours (if applicable): _________________________________________________

Submerged cloud observed? Yes/No

Number of Passes/Sortie: (1)________ (2)_________ (3)_________ Total___________

Did any oil resurface? Yes/No

Effects On Floating Oil, Biota, Sea Color, Wave Pattern, or Other Physical Features:
____________________________________________________________________________
____________________________________________________________________________

Extent of Application/Acres of Oil Sprayed: ______________________________________

Approximate Percent of Overspray: _____________%

PHOTOGRAPHY:

Color photos taken? Yes/No Written notes made for photos? Yes/No

If videotape of the operation is taken, obtain a copy.

If AIREYE and/or HIRR/IR is used, obtain a copy of the film, tape, or digital imagery.

Monitoring Team Leader reports data to the Scientific Support Coordinator after each sortie.

THE ABOVE INFORMATION SHOULD BE FILLED OUT FOR EACH SORTIE
MONITORING TEAM LEADER ALSO COMPLETES DEBRIEF SECTION OF THE PREVIOUS FORM
DISPERSANT GROUP PERSONNEL SHOULD PROVIDE FEEDBACK TO DISPERSANT OPERATION
GROUP SUPERVISOR

DISPERSANT EFFECTIVENESS MONITORING WATERBORNE
CHECKLIST

(Completed by Dispersant Op Monitoring Team)
GENERAL:

Incident Name: ______________________________________________________________

Vessel or Facility Name: ______________________________________________________

Date/Time Spill Occurred: _____________________________________________________

Location of the Spill: __________________________LAT___________LONG___________

Amount/Type of Oil Spilled: _______________________/___________________________

Dispersant Type: ____________________________________________________________

FLOUROMETRY / SAMPLING:

Monitoring Platform Identified?   Name:  __________________ Location:  _____________

ETD:  _____________  ETA:  ______________  (To Spill Site)

Consider: draft, water depth, weather, freeboard, range, speed, transit time, and completion of each sortie.

Take Background Flourescence Readings

Record Transect Readings After the Dispersants are Applied

Was an oil/dispersant /water sample collected?   Yes  _____  No  _______

If Yes, Label and Record the Following:

- Geographic Location
- Depth
- Location Relative to Spilled Oil
- Time
- Notes:  (Why sample was taken?  Was it typical or unusual?)

Report Information to Monitoring Team Leader

DEBRIEF:

Did the dispersant operation follow the approved plan?  _____________________________________
_____________________________________________________________________________________

What problems were encountered?  _______________________________________________________
_____________________________________________________________________________________

What recommendations would you make?  ________________________________________________
_____________________________________________________________________________________

DISPERSANT GROUP PERSONNEL SHOULD PROVIDE FEEDBACK TO DISPERSANT OPERATION GROUP SUPERVISOR

DISPERSANT APPLICATION LOGISTICS AND SUPPORT CHECKLIST
(Completed by Dispersant Operations Group Supervisor)

Personnel:  (Note: A person can hold more than one functional position especially within the Unified Command Post and depending on the platform resources deployed)
Incident Commander
Operations Section Chief
Dispersant Operations Group Supervisor
Spotter
Sprayer
Effectiveness Monitor
Operations Observer
Planning Section Chief
Technical Specialists (SSC)
Logistics Section Chief
Support Branch Chief
Supply Unit Leader
Ground Support Unit Leader
Vessel/Air Support Unit Leader
Finance Section Chief
Procurement Unit Leader
Cost/Time Unit Leader

**Equipment:** (Note: Number of aircraft and vessels needed are dependent on size/complexity of the operation...vessels or aircraft can serve more than one function)

- Spotter Aircraft
- Spray Aircraft or Vessel (various)

**Spray Aircraft Types:**
- Helicopter (various)
- C-130 Hercules
- DC-4
- DC-6B
- DC-3, Fokker F-27, or Canadair CL-215
- Agriculture Spray Planes: Piper Pawnee, Cessna Agtruck, Ayres Thrush, Turbo Thrush
- Air Tractor 801

- Camera (film and digital)
Video Camera

- Infrared Camera
- Binoculars
- GPS Equipment

**Materials:**

- Proper Quantity of Desired Dispersant (for initial and subsequent applications)
- Functional Position Job Aids and Checklists
  - Dispersant Operation Group Supervisor
  - Spotter
  - Sprayer
  - Monitor
  - Observer
  - Common ICS Responsibilities
- Checklists, Log, and Reporting Forms (Sprayer, Observer, etc.)
- Dispersant Operation Plan
  - Dispersant Operation Plan Checklist
  - Dispersant Effectiveness Monitoring Aerial Checklist
  - Dispersant Effectiveness Monitoring Waterborne Checklist
  - RRT Documentation/Application Form for Dispersant Use (if considering non-approved area)
- Basemaps / Charts of the Area
- Site Safety Plan Items:
  - Monitoring Equipment (e.g. O2/Combustible Gas Meter, WBGT/Heat Stress, H2S Monitor, etc.)
  - Personal Flotation Device
  - Emergency Locator Beacon
  - Survival Equipment
  - NOMEX Coveralls (if available)
  - Cold Water Flotation Suit (if applicable)
  - Level D and Level C PPE Equipment (where applicable)
  - Communications Equipment
- Administrative Supplies (e.g. pencils/pens, note pads, etc.)
DISPERSANT / APPLICATION FORM FROM CARIBBEAN REGION RRT

DISPERSANT PRE-APPROVAL POLICY (Submit to CRRT)
(Use to document information in pre-approved zones and request use in non-pre-approved zones)

Name of the Spill Incident: ______________________________________________________________

Responsible Party (if known): ___________________________________________________________

FOSC / POC (name & Phone #): _________________________________________________________

Date and Time of the Spill Incident: ______________________________________________________

I. OIL TYPE:

1. Spilled oil/substance name (if known): ________________________________________________

2. Viscosity: _______________________________________________________________________

3. API Gravity: ______________________________________________________________________

4. Pour Point: ______________________________________________________________________

5. Percent Evaporation in: 24 Hours - __________________________________________________

   48 Hours - __________________________________________________

6. Did oil emulsify within the operational period? _________________________________________

   ** Any information from visual overflights of the slick, including estimations of slick thickness, should be included here. All additional available information pertaining to physical characterization of spilled oil should be included here.

II. ENVIRONMENTAL CONDITIONS:

1. Wind Speed: ______________________________________________________________________

2. Wind Direction: ____________________________________________________________________

3. Visibility: _________________________________________________________________________

4. Ceiling: __________________________________________________________________________

III. DESCRIPTION OF SPILL INCIDENT AND SPILL SITE:

Note all relevant details concerning the spill incident and spill site here. Be sure to note whether the spill was a one-time or continuous release, the amount of cargo remaining aboard the vessel, the stability of the vessel, and sensitive environmental conditions in the vicinity of the vessel. An estimated amount of oil on the water should be made, if possible, by using available information on the area of the slick and the estimated slick thickness (as indicated by the color of the slick). Also included should be a description of the location of the spill site, including the nearest major port.

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________
IV. DESCRIPTION OF AREA OVER WHICH DISPERSANTS WERE APPLIED:

1. Distance from Shoreline: ____________________________________________________________
2. Depth of Water: ____________________________________________________________________
3. Jurisdiction (i.e. federal or state): _____________________________________________________
4. Special Management Zone Area (as defined in LOAs): _________________________________
5. Safety Zone Established in Operational Area: __________________________________________

V. AVAILABILITY OF PERSONNEL AND EQUIPMENT:

1. Availability of Application and Spotter Aircraft/Vessel: ___________________________________
   Source: __________________________________________________________________________
   Point of Contact: ____________________________
   Type: ____________________________________________________________________________
   Travel Time to Spill: ____________________________
2. Type of Aircraft/Vessel Used: ________________________________________________________
3. Aircraft/Vessel's Dispersant Load Capability: ___________________________________________
4. Availability of Qualified Personnel: ___________________________________________________
   Source: __________________________________________________________________________
   Point of Contact: ____________________________
   Travel Time to Spill: ____________________________
5. Time Required for Delivery to the Aircraft/Vessel Staging Area: ___________________________

VI. INFORMATION ON DISPERSANT PRODUCT:

1. Name of Dispersant: ________________________________________________________________
2. Manufacturer: _____________________________________________________________________
3. Amount Available: _________________________________________________________________
4. Source: __________________________________________________________________________

** A Material Safety Data Sheet of the Product Should Be Attached Here.
VII. IMPLEMENTATION OF RECOMMENDED MONITORING PROTOCOLS:

1. Was the Gulf Strike Team's SMART monitoring protocol deployed? ______________________

** A full report documenting the activities and results of any monitoring activities should be attached here.
INCIDENT COMMAND FUNCTIONAL CHECKLISTS

FOR DISPERSANT USE
A. The Dispersant Operation Group Supervisor is in charge of a functional group under the Operations Section of the ICS organization. This position manages the planning and execution for the dispersant operation. This position relieves the burden on the Operations Section Chief and the Air Operations Branch, and in smaller cases may alleviate the need for the Air Operations Branch. In the event of a large spill, air operations could easily be overwhelmed with vessel skimming and overflight support, which might delay the actual dispersant application.

B. The **Dispersant Operation Group Supervisor** is ground-based and reports to the Operations Section Chief in the ICS organization:

- Submits the dispersant application to CRRT
- Insures the overall safety of the dispersant operation
- Develops dispersant operations portion of the Incident Action Plan or IAP (Dispersant Operation Plan)
- Requests restricted airspace if needed for the dispersant operation
- Determines what aircraft and vessels will be operating on scene to carry out the dispersant operation
- Requests resources needed to implement the Dispersant Operation Plan
- Arranges logistical support including such things as obtaining or storing adequate supplies of dispersants, aircraft maintenance and fuel, airport arrangements, and additional aircrews, if needed
- Supervises the execution of the Dispersant Operation Plan, monitors progress, and makes additional application requests as needed
- Coordinates any aircraft support through the Air Operations Branch Director
- Conducts a safety briefing and debriefing of dispersant operations group personnel
- Obtains video/still photography of the dispersant operation
- Coordinates the disposal of residual dispersant from drums and/or tanks
- Coordinate closely with Scientific Support Coordinator (SSC) and other technical specialists to ensure input/recommendations are shared with the Unified Command
- Obtain samples and oil information (e.g. MSDS, API, Viscosity, etc.) as soon as possible for both spills and potential spills. Can use NOAA's Oil Information Data Sheet from ADIOS to collect information. Determine dispersability potential of the oil. May require lab analysis and testing. SSC can provide this service.
- Obtain dispersant capability as soon as potential need is identified. DRAT can assist.
- Obtain short and long term weather forecasts.
• Comply with the dispersant use planning protocols for the CRRT region including completing of any checklist, consultations, and dissemination of required information to the CRRT or others.

• Continue other countermeasures and operations as appropriate while waiting for dispersants or in conjunction with dispersant use.

• Treat thickest part of the slick as the priority.

• Consider using a tiered response plan (e.g. most available response means first while waiting for more desirable response equipment). For example, start dispersant treatment with vessels and fire monitors or helicopters with a spray bucket until larger platforms, such as a C-130, arrive.

• Determine the relationship between the RP and the government's implementation of the Dispersant Operations Group Supervisor responsibility.

• Develop Safety Plan for Dispersant Operation.

• Establish applicable Safety Zones and Restricted Airspace to ensure safety of vessels, aircraft, and personnel during the operation.

• Use the NOAA dispersant mission planning software to develop a range of scenarios and a comparison table for planning purposes.

• Initiate recording and download capability for GPS or written documentation.

• GPS capability and maps should show application and no-application zones for open ocean.
SPOTTER AIRCRAFT OR "SPOTTER"

A. The Spotter Aircraft Position or "Spotter" is physically located in an aircraft. The Spotter is a person who "spots" or controls, guides, or lines up the sprayer aircraft or vessels over the spill target. Because a dispersant application can be made by both vessels and aircraft, the Spotter would maintain tactical control over both types of delivery systems. The Spotter is in charge of the dispersant operation on scene. Because dispersant operations can be executed in multiple geographic areas due to the spreading and breakup of the slick, multiple spotter aircraft may be needed (one for each spray a/c).

B. The forward air controller (FAC) is a person within the operation who "controls" access into the "controlled" airspace of a dispersant operation. Controlled airspace would be airspace designated in a Notice to Airmen (NOTAM). The controller is normally the spotter aircraft when one spray aircraft or vessel is used but can be the observer or monitor aircraft if more than one spray platform is involved. In addition, an aircraft's communications capabilities may play a role in the decision as to who should serve as the FAC if all aircraft are not equipped with compatible communications gear. This FAC duty is mainly used to "check" aircraft into the ongoing dispersant operation. The spotter aircraft, if not the FAC, will assign the responsibility and notify the command post.

C. Spotter Aircraft Recorder is needed to record spray start/stop times, keep all pertinent log entries, photos, and video.

D. The specific duties of the Spotter Aircraft or "Spotter" are as follows:

- Controls the operational area (ground to air) to ensure safety of entry, access, departure, and to prevent hazards resultant from spray exposure and collisions
- Establishes and maintains communications with dispersant sprayer, observation, monitor aircraft or vessels, and support bases
- Conducts early reconnaissance to determine dispersant target
- Supervises on scene airborne or waterborne dispersant activities
- Directs the line-up of the spray aircraft or vessel and when to turn the dispersant pumps on and off.
- Guides sprayer aircraft or vessels by giving course corrections, ensuring spray aircraft or vessels apply dispersants on the targeted areas
- Coordinates dispersant effectiveness monitoring. This includes aerial surveillance and possibly water monitoring. If a monitoring aircraft is available, the Spotter will use that resource for monitoring. If the monitoring aircraft is not available, the Spotter will assume the monitoring responsibility
- Coordinates the use of restricted airspace by serving as the Forward Aircraft Controller (FAC) (assumes only one spray aircraft). Aircraft assigned as the FAC should be the most capable communications platform. Manages outside air traffic entering or departing the operations area
- May coordinate the use of restricted airspace. Manages outside air traffic entering or departing operations area (assumes only one spray aircraft)
- Set communications protocol and limit communications traffic to avoid confusion between the Dispersant Operations Group resources and others
• Coordinates and is lead for any necessary emergency or rescue evolution

• Determine how the control of the "spray on" and "spray off" will be managed and coordinated for the operation.

• Spotter and Observation Aircrews should be knowledgeable with oil observation, dispersant observations, operations, directing spray aircraft, and monitoring protocols. Need to pre-identify training and knowledgeable personnel.

• Spotter Aircraft needs time in the air to observe prior to dispersant deployment.

• Speed of Spotter Aircraft must be compatible with Spray Aircraft.
SPRAY AIRCRAFT, SPRAY VESSEL, OR "SPRAYER"

A. The Spray Aircraft or Vessel or "Sprayer" is the delivery system of the dispersants to the oil slick. The dispersant application can be both waterborne and airborne depending on the size of the spill and/or dispersant operation complexity. In both cases the "sprayer" reports to and receives tasking from the spotter aircraft. Because dispersant operations can be executed in multiple geographic areas due to the spreading and breakup of the slick, multiple "sprayer" aircraft or vessels may be needed.

B. The specific duties of the "Sprayer" are as follows:

- Verifies calibration of spray application
- Loads dispersant
- Establishes and maintains communications with the Spotter Aircraft
- Applies dispersants as directed by the Spotter Aircraft
- Documents the details of the dispersant application, including the exact location using a Global Positioning System (GPS) recorder and spray log if possible
- Properly disposes of residual dispersant
SPRAYER LOG SHEET

(Completed by Sprayer)

GENERAL

Incident Name:
_______________________________________________________________________

Application Platform Name:
_______________________________________________________________________

Date/Time OF Sortie:
_______________________________________________________________________

Location of the Spill: __________________________________LAT_________LONG___________

Amount/Type of Oil Spilled: __________________________________________________________

Dispersant Type: ________________________________________________________________

DISPERSANT USE INFORMATION

SORTIE NUMBER: ____________________

Application Rate: ___________________________gal/acre

Total Amount of Dispersant to be Used: ____________________________

Sprayer Platform: ____________________________

Swath Width: _____________________________(ft)

Total Amount of Dispersant Used: ____________________________

Time Dispersant Application Began: ____________________________

Time Dispersant Application Ended: ____________________________

Number of Passes: ____________________________
MONITORING AIRCRAFT / MONITORING VESSEL / "MONITOR"

A. The monitor aircraft or vessel or the "monitor" is primarily responsible for monitoring the effectiveness of the dispersant operation through aerial observation in aircraft and through the use of fluorometers on board vessels to sample the dispersed oil.

B. Effectiveness monitoring is concerned primarily with determining whether the dispersant was properly applied and how the dispersant is affecting the oil. This information is of interest to the OSC and any potential RPs to ensure the process is being effective before pursuing the venture further. The goal is to find a dispersant combination (type and application rate) that disperses the maximum amount of oil and minimizes environmental impact. An objective is to insure that the dispersant is responsibly applied to the target (correct rate, minimal overspray). Once applied, if the dispersant appears to be working, the question shifts to the merits of a second or subsequent application. While being fiscally responsible, the focus should be on the environmental benefits versus consequences of additional dispersant being added to the water. With lower toxicity of the dispersants available, it is almost always prudent to reapply dispersants if they are judged to be properly dispersing the oil.

C. Effectiveness monitoring results are passed (as prearranged) either through the Dispersant Operation Group Supervisor or directly to the Scientific Support Coordinator and the Federal On-Scene Coordinator.

D. The specific duties of the Monitoring Aircraft/Vessel and Monitor are as follows:

- Monitors dispersant effectiveness through fluorometry
- Ensures fluorometry data is made available to the Federal On Scene Coordinator (FOSC) through the Scientific Support Coordinator (SSC)
- Personnel are normally deployed as a fluorometry monitoring team on a monitor vessel(s) or observation vessel(s) to measure dispersed oil in the water column
- Documents monitoring activities as required in the Dispersant Operation Plan
- Obtain photos, digital imagery, video, and infrared imagery as appropriate to document operation
- Identify remote sensing and tracking requirements and the applicable support needed.
- Early launch is desirable for SMART monitoring teams, aircraft, and other operational components. Use DRAT to help coordinate logistics.
- Use tracking buoys. Plan ahead for availability. Buoys will assist tracking the slick at night and will also help with trajectory work.
- Identify choices for remote sensing.
- Unified Command should use SMART for monitoring operations.
- Monitoring must be integrated into overall operation.
- Monitors must have compatible communications with other operational elements.
OBSERVATION AIRCRAFT / VESSEL / "OBSERVERS"

A. The observation aircraft or vessels (the "observers") are platforms and persons specifically assigned to observe the dispersant operation. Their observer status should be authorized by the Unified command on the basis of their position as a stakeholder in the outcome of the operation. Observers might include corporate officials, agency representatives, political officials, scientists, trustees, interest group representatives, and so forth.

B. The specific duties of the Observation Aircraft / Vessel / "Observers" are as follows:

- Establishes and maintains communications with the Spotter Aircraft
- Coordinates observation of the dispersant application with the Spotter Aircraft
- May serve as the Forward Aircraft Controller (FAC) if directed by the Spotter. Aircraft assigned must be the most capable communications platform.
- If assigned as FAC, coordinates the use of restricted airspace. Manages outside air traffic entering or departing the operations area
- Use attached Observer Aid
- Use attached checklists and logs
- Before operation begins, Observation Aircraft should mark slick boundary using GPS.
- Spotter and Observation Aircrews should be knowledgeable with oil observation, dispersant observations, operations, directing spray aircraft, and monitoring protocols. Need to pre-identify training and knowledgeable personnel.
DISPERSANT OBSERVER JOB AID

Reporting Observations:

- The Observer does not make operational decisions, i.e. how much dispersant to apply, when or where to apply it, etc. These decisions are made at the Command level. The Observer will make observations based on those decisions.

- Different Observers at the same site may reach different conclusions about how much of the slick had been dispersed. This is why standard reporting criteria and adherence to a common set of guidelines is important.

Oil On The Water:

- Oil surface slicks and plumes can appear different for many reasons including: oil or product characteristics, time of day (different sun angles), weather, sea state, rate at which oil disperses, etc.

- Low contrast conditions (i.e. overcast, twilight, haze, etc.) make observations difficult.

- For best viewing, the sun should be behind you and with the aircraft at an altitude of about 200-300 feet flying at a 30 degree angle to the slick.

Dispersant Applications:

- During dispersants application, it may not be possible to determine the actual area of thickest oil concentrations, resulting in variable oil to dispersant application rates. This could lead to variations in the effectiveness of application. These conditions should be reported by the observer.

- Initial application may have a herding effect on the oil. This would make the slick appear to be shrinking, however, it is the dispersant “pushing” the oil together. Due to this effect, in some cases, the oil slick may even “visibly disappear” from the sea surface for a short time.

- After dispersant application, there may be color changes on the emulsified slick due to reduction in water content and viscosity, and shape of slick, due to the demulsification action of the dispersant, which enhances dispersion.

- Many trials have indicated that dispersants appear to modify the spreading rates of oils and within a few hours treated slicks cover much larger areas than control slicks.

Effective/Ineffective Applications:

- Dispersed oil plume formation may not be instantaneous after dispersant application. In some cases, such as when the oil is emulsified, it can take several hours. A dispersed oil plume may not form at all.

- The appearance of the dispersed plume can range from brown to white (cloudy) to no visible plume.

- Sometimes other things such as suspended solids may appear like dispersed oil.
• The visibility of the dispersed plume will vary according to water clarity. In some case, remaining surface oil and sheen may mask oil dispersing under the slick and thus interfere with observations of the dispersed oil plume.

• Dispersed oil plumes often are highly irregular in shape and non-uniform in concentration. This may lead to errors estimating dispersant efficiency.

• If a visible cloud in the water column is observed, the dispersant is working.

• If a visible cloud in the water column is not observed, it will be difficult to determine if the dispersant is working or not.

• If there are differences in the appearance of the treated slick versus an untreated slick, the dispersant may be working.

• Boat wakes through oil may appear as a successful dispersion of oil, however, this may be just the vessel wake breaking a path through the oil (physically parting the oil) not dispersing it.
DISPERSANT OBSERVATION EQUIPMENT AND PREFLIGHT SAFETY BRIEF CHECKLIST

**Observation Aids:** (Responsibility of Observer Team)
- Basemaps / Charts of the Area
- Clipboard and Notebook
- Pens / Pencils
- Checklists and Reporting Forms
- Observation Job Aids (Oil on Water & Dispersant Observation)
- Camera and Extra Film
- Voice Recorder to Assist in Taking Notes
- Video Camera
- Binoculars

**Safety Equipment:** (Responsibility of pilot or aircrew)
- Personal Flotation Device
- Emergency Locator Beacon
- Survival Equipment
- NOMEX Coveralls (if available)
- Cold Water Flotation Suit * (if water temperature requires)
- Intercom

**Safety Brief - Preflight Safety Brief with Pilot:** (Responsibility of pilot or aircrew)
- Safety Features of Aircraft (i.e. fire extinguishers, communications devices, emergency locator beacon, flotation release, raft, first aid kit, etc.)
- Walk Around Aircraft
- Emergency Exit Procedures
- Purpose of Mission
- Area Orientation / Copy of Previous Overflight
- Route / Flight Plan
Duration of Flight
Preferred Altitude
Landing Site
Number of People on Mission
Estimated Weight of People and Gear
Gear Deployment (if needed, i.e. dye marker, current drogue, etc.)
Frequency to Communicate Back to the Command Post

Spill Information: (Provided by Dispersant Operations Group Supervisor)

- Incident Name: ____________________________________________________________
- Source Name: _____________________________________________________________
- Date / Time Spill Occurred: ______________________________________________
- Location of Spill: _________________________________________________________
- Latitude: ______________________   Longitude: ______________________________
- Type of Oil Spilled: _____________________________________________________
- Amount of Oil Spilled: __________________________________________________

Weather On Scene: (Provided by Scientific Support Coordinator)

- Wind Speed and Direction: ________________________________________________
- Visibility: ______________________________________________________________
- Ceiling: ________________________________________________________________
- Precipitation: ____________________________________________________________
- Sea State: ______________________________________________________________

OPERATION PRE-BRIEF: AIRCRAFT ASSIGNMENTS
(Provided by Dispersant Operations Group Supervisor)

<table>
<thead>
<tr>
<th>Title</th>
<th>Aircraft/Personnel</th>
<th>Tactical Call Sign</th>
<th>ETD</th>
<th>ETA</th>
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<tbody>
<tr>
<td>Spotter (s)</td>
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<tr>
<td>Sprayer (s)</td>
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<tr>
<td>Observer (s)</td>
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<tr>
<td>Title</td>
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<td>Tactical Call Sign</td>
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<td>Monitor (s)</td>
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<tr>
<td>Supervisor (s)</td>
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**SAFETY CHECK:** (Responsibility of pilot or aircrew)

☐ Check all safety equipment and pre-flight safety brief with Pilot

**ENTRY / EXIT POINTS:** (Responsibility of Dispersant Operations Group Supervisor)

<table>
<thead>
<tr>
<th>Airport</th>
<th>Tactical Call Sign</th>
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<tbody>
<tr>
<td>Entry:</td>
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<td>Exit:</td>
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**COMMUNICATIONS:** (complete only as needed; primary/secondary)

(Responsibility of Dispersant Operations Group Supervisor)

☐ Observer to Spotter: (air to air)  
VHF __________ UHF __________ Other __________

☐ Observer to Monitor: (air to vessel)  
VHF __________ UHF __________ Other __________

☐ Observer to Supervisor: (air to ground)  
VHF __________ UHF __________ Other __________

☐ Supervisor to Monitor: (ground to vessel)  
VHF __________ UHF __________ Other __________

☐ Monitor to Monitor: (vessel to vessel)  
VHF __________ UHF __________ Other __________
DISPERSANT OBSERVATION FINAL REPORTING FORM
(Completed by Dispersant Operations Group Supervisor)

☐ Names of Observers (Agency): ________________________________

☐ Platform: __________________________________________________

☐ Date of Application: _____________________________________________________________________

☐ Location (Long./Lat.) / Distance from Shore: ____________________________________________

☐ Time of Commencement of Application: ________________________________________________

☐ Time of Completion of Application: ____________________________________________________

☐ Weather Conditions (air temperature, wind speed, direction): ___________________________________________________________________

☐ Water Temperature, Depth, and Sea State: _____________________________________________

☐ Visibility: _________________________________________________________________________

☐ Altitude (observation and application platforms): _________________________________________

☐ Type of Application Method (aerial / vessel): __________________________________________

☐ Type of Oil: _______________________________________________________________________

☐ Oil Properties (specific gravity, viscosity, pour point, etc.): ______________________________

☐ Name of Dispersant: _______________________________________________________________

☐ Surface Area of Slick: ______________________________________________________________

☐ Operational Constraints Imposed by Agencies: __________________________________________

☐ Percent Slick Treated: ______________________________________________________________

☐ Estimated Efficiency: ______________________________________________________________

☐ Visual Appearance of Application: _____________________________________________________

☐ Submerged Cloud Observed? _______________________________________________________

☐ Recoalescence (reappearance of oil): _________________________________________________

☐ Effectiveness of Application in Achieving Goal (reduce shoreline impact, etc.): __________

☐ Presence of Wildlife (any impacts, i.e. fishkill, etc.): _________________________________

☐ Photographic Documentation: _______________________________________________________

☐ Lessons Learned: __________________________________________________________________
COMMON ICS RESPONSIBILITIES FOR EACH POSITION

A. Common Incident Command System responsibilities should be performed to ensure proper communications and information flow within the Unified Command. This checklist should be added to each functional checklist mentioned earlier.

B. The **Common ICS Responsibilities** are as follows:

- Obtain briefings from supervisors
- Participate in planning meetings as required
- Review assignments with subordinates.
- Maintain communications with subordinates
- Ensure safe operations
- Make or approve expedient changes to the Incident Action Plan (IAP) during the operational period if necessary
- Determine the need and request additional resources
- Maintain Activity Log and submit to the Documentation Unit Leader, Situation Unit Leader, or the Planning Section
SITE SAFETY PLAN TEMPLATE FOR DISPERSANT OPERATIONS

A. SITE DESCRIPTION

Location

General area________________________________________________________
Lat.______________ Long. ____________

Hazards

Oil: ______________________________________________________________
Dispersants: _______________________________________________________
General safety hazards: _______________________________________________

Weather related hazards (mark appropriate)

___sea state, ___heat stress, ___hypothermia, ___frostbite, ___severe storms, ___fog, other:___________________

B. RESPONSE ORGANIZATION

<table>
<thead>
<tr>
<th>Function and Name</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSC:</td>
<td></td>
</tr>
<tr>
<td>Site Safety and Health Officer:</td>
<td></td>
</tr>
<tr>
<td>Scientific Support Coordinator:</td>
<td></td>
</tr>
<tr>
<td>Contractor Supervisor:</td>
<td></td>
</tr>
<tr>
<td>Responsible Party:</td>
<td></td>
</tr>
<tr>
<td>State Representative</td>
<td></td>
</tr>
<tr>
<td>Other Fed/State/Local reps:</td>
<td></td>
</tr>
</tbody>
</table>

C. RESPONSE OBJECTIVES.

__ Dispersant application __ Dispersant observation ___ Dispersant monitoring __
Other: ______________________________________________________________________

Detailed objectives shall be developed daily. Dispersant workplan shall be attached to this site safety plan.

D. SITE CONTROL.

1. Reporting: Personnel involved with dispersant application, observation, and monitoring shall report to the safety officer and the Unified Command.

2. Site Safety Plan: Personnel involved with dispersant application, observation, and monitoring shall subscribe to this or other site safety plans approved by the safety and health officer.

3. Training: No person shall take part in the dispersant operation without adequate training in safety and health, based on work assignment and relevant hazardous conditions.

4. Site boundary: Site boundaries and exclusion zones for dispersant operation shall be marked on a map, (attached) and be modified as necessary.

5. Exclusion zone: Exclusion zone will be established by the Unified Command as needed to keep away vessels not
involved with dispersant operations.

E. HAZARD EVALUATION

Crude oils

**Composition:** Crude oils are composed of indefinite number of hydrocarbon compounds. Most crude oils contain benzene, up to 1 percent by volume. Crude oils also contain toluene, xylene, naphthalenes, & PolyAromatic Hydrocarbons (PAHs) in concentrations that vary widely depending on the source of the oil, weathering, and aging.

**Hazard Description:** Crude oil may cause dermatitis by skin contact; nausea by inhalation; and eye irritation. Benzene is a hematological toxin (it affects the blood and blood forming organs), and is a carcinogen. The most significant hazard from benzene, toluene, and xylene is in poorly ventilated areas (such as pits or under docks), or around freshly spilled oil. Benzo(a)pyrene is a skin contact hazard and potentially may cause skin cancer with chronic skin contact. As oil weathers and ages, benzo(a)pyrene becomes more concentrated because it evaporates much slower than other chemicals in the mixture.

**Basic Precaution:** Stay away from, or upwind of, fresh oil spills; wear chemical resistant clothing as necessary to protect against skin or eye contact; periodically change protective clothing that has oil on it; immediately change clothing that is showing evidence of oil penetrating to your skin; and wash skin with soap and water if contact with oil occurs. Flush eyes with water if oil gets in them. If ingested do not induce vomiting, contact a physician. Use respiratory protection when volatile organic compounds and specifically benzene concentrations exceed OSHA PEL.

**Exposure limits of interest:**

- benzene 1 ppm (OSHA)
- toluene 100 ppm (OSHA)
- xylene 100 ppm (OSHA)
- naphthalene 10 ppm (ACGIH)
- hexane 50 ppm (OSHA)
- coal tar/coal tar pitch volatiles 0.2 mg/m³ (OSHA/ACGIH)

**Dispersants Application**

Dispersants act like detergents. They reduce the surface tension of the oil and break it into tiny droplets. The oil droplets are then mixed in the water column and disperse. To be effective, dispersants keep the droplets apart, and prevent coagulation. Early dispersants (late 60's) contained fairly strong and toxic solvents that were used for clean up of oil tanks or mechanical equipment. They were quite toxic, both to marine organisms and to human. The dispersants currently in use are much less toxic. They contain a surfactant mixed with a solvent, and possibly other chemicals that serve as stabilizers. The solvents currently in use are water, alcohol, glycol, or ethylene glycol.

When applied, dispersants are sprayed on the oil slick, most likely by aircraft. Flying altitude during application is expected to be 50 to 100 feet above the water. The droplets should be large enough to settle rapidly on the slick. Smaller droplets may remain suspended for a longer period of time, and be carried downwind over some distance.

**Health Hazards**

Inhalation of droplets is the most likely route of exposure to dispersant. The toxicity of the solvents now in use is relatively low, and the concentration, if safe operating procedures are used, is not expected to be above the level of concern. Overexposure to the solvent in dispersants, which are the compound of most concern, may cause nausea, dizziness, headache and skin and eye irritation. These are the symptoms to watch out for. See attachment 3 for MSDS for Corexit 9527

All persons coming in contact with the dispersants should read and understand the material safety data sheet (MSDS) of the dispersant to be used. The hazards of contact, symptoms, and preventive measures should be understood and followed.

**Protection**
Adequate protection may be achieved by minimizing exposure. Vessels monitoring dispersant operations should be upwind and shall keep a safe distance away (300 yards) during aerial application. In general, using respirators should not be a routine practice for personnel involved in dispersant application and monitoring. However, under some conditions, when monitoring indicates that overexposure to oil or dispersant may occur, respirators may be used per recommendation of the site safety officer.

Personnel loading the dispersants on planes and vessels and otherwise handling large quantities of the product should exercise greater caution and protection. They should wear non-permeable clothing, boots, and gloves, use eye protection, and exercise safe loading transfer of the material. Since loading of dispersant-applying aircraft may be done many miles away, prudent safety management requires that this operation will be monitored by a safety supervisor at the loading site.

**Monitoring**

Monitoring may be conducted to evaluate the concentration of hazardous chemicals, and to justify the level of PPE. Refer to attachment 1

---

**F. GENERAL SITE SAFETY AND HEALTH PROCEDURES.**

The following controls shall be observed (check appropriate)

- **PFD:** All personnel working in boats or near water (10 feet or less) shall wear Coast Guard approved personal flotation devices (PFDs).

- **Buddy System:** Personnel must work within sight of a partner at all times.

- **Fires:** All vessels shall carry fully charged and operational fire extinguishers.

- **Heat Stress:** The site safety officer shall make heat stress determinations throughout the day. If it is determined that a heat stress hazard exists, an alert shall be passed to all teams. Cold water or lightly sweetened drinks shall be available on all vessels, and their drinking encouraged.

- **Cold Stress:** Workers shall be provided with adequate warm clothing. The Site Safety Officer shall make cold stress determinations throughout the day when temperatures fall below 50 degrees F. For prolonged water temperatures below 59 degrees F, or a combined water and air temperature less than 100 degrees F, exposure suits shall be worn by personnel working/traveling in small boats or aircraft over water.

- **UV Light Exposure:** Sunscreens of protection factor 15 (or greater), and UV tinted safety glasses shall be made available for response personnel as needed.

- **Helicopter Operations:** See attachment 2

---

**G. PERSONAL PROTECTIVE EQUIPMENT (PPE)** See attachment 4 for level D and C ensembles.

---

**H. DECONTAMINATION PROCEDURES**

All contaminated items shall either be decontaminated or disposed off appropriately.
I. EMERGENCY PROCEDURES

1. Emergency Medical Procedures:

• Contact medical personnel for any event beyond your capacity to help.

• Do not attempt to move seriously injured personnel due to risk of further injury. Call for medical evacuation.

• The closest hospital for regular emergencies is: ____________________ Phone: ________________

• Closest hospital for chemical exposure emergencies: ____________________ Phone: ________________

• Contact ATSDR (404) 639-0615 (24 hr)

2. Emergency Fire Procedures:

• If you discover a fire onboard a vessel, immediately notify whoever is in charge. Begin fighting the fire with the nearest extinguisher. Be careful not to let yourself get in a position where you have no means of escape. Turn over the fire-fighting to someone better trained (if you’re not) and help them by supplying extinguishers or other fire fighting equipment they may need. When there is a fire onboard a vessel, it is most important to let someone else know IMMEDIATELY.

• YOU MUST sound the appropriate fire signal if fire can not be put out quickly.

• Radio in for help, use distress signals.

J. COMMUNICATION

1. Hand Signals:

THUMBS UP: I’m OK / I agree.
THUMBS DOWN: don’t agree.
HANDS ACROSS THROAT: out of air / trouble breathing
GRAB HAND/ARM: come with me
HANDS ON HEAD: I need assistance
Repeated short blasts from a hand held fog horn shall be used to indicate a fire emergency.

2. Radio Communication:

Working:
freq: ________, chnl: ________ ( _VHF _UHF _CB _____OTHER)

Emergency:
freq: ________, chnl: ________ ( _VHF _UHF _CB _____OTHER)
freq: ________, chnl: ________ ( _VHF _UHF _CB _____OTHER)

3. Phone Communication:

On-Scene Coordinator:
(____)_________________(_voice _fax _cellular _pager _home)
(____)_________________(_voice _fax _cellular _pager _home)

Site Safety and Health Officer:
(____)_________________(_voice _fax _cellular _pager _home)
(____)_________________(_voice _fax _cellular _pager _home)

Agency for Toxic Substance and Disease Registry (ATSDR)
ATSDR can provide emergency medical and toxicological information, assist in determining procedures for potential chemical overexposures, and can provide on scene assistance for certain chemical emergencies.

Police: 
(_____)______________(voice_fax_cellular_pager_home)

Fire: 
(_____)______________(voice_fax_cellular_pager_home)

Ambulance/EMT/Hospital: 
(_____)______________(voice_fax_cellular_pager_home) 
(_____)______________(voice_fax_cellular_pager_home)

OTHER NUMBERS: 
(_____)______________(voice_fax_cellular_pager_home) 
(_____)______________(voice_fax_cellular_pager_home) 
(_____)______________(voice_fax_cellular_pager_home) 
(_____)______________(voice_fax_cellular_pager_home)
## Sign Up Sheet

<table>
<thead>
<tr>
<th>Team Member (Print Name)</th>
<th>Contact Number (Phone, Pager)</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

### References:

(a) 29 CFR 1910.120 OSHA regulations for Hazardous Waste Sites

(b) 40 CFR 311 Worker Protection

(c) NIOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (NIOSH 85-115)

(d) Site Safety Program for Oil Spill Response
ENVIRONMENTAL MONITORING FOR CHEMICAL HAZARDS:

The following monitoring shall be conducted. Monitoring equipment shall be calibrated and maintained in accordance with the manufacturer's instructions (electronic equipment shall be calibrated before each day's use).

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combustible gas</td>
<td>continuous, ___ hourly, ___ daily, Other:</td>
</tr>
<tr>
<td>Oxygen</td>
<td>continuous, ___ hourly, ___ daily, Other:</td>
</tr>
<tr>
<td>HNU</td>
<td>continuous, ___ hourly, ___ daily, Other:</td>
</tr>
<tr>
<td>OVA</td>
<td>continuous, ___ hourly, ___ daily, Other:</td>
</tr>
<tr>
<td>WBGT/heat stress</td>
<td>continuous, ___ hourly, ___ daily, Other:</td>
</tr>
<tr>
<td>Noise</td>
<td>continuous, ___ hourly, ___ daily, Other:</td>
</tr>
<tr>
<td>H2S Monitor</td>
<td>___ continuous, ___ hourly, ___ daily, Other:</td>
</tr>
<tr>
<td>__ other chemical specific monitors (colorimetric/electronic):</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>___ continuous, ___ hourly, ___ daily, Other:</td>
</tr>
<tr>
<td>2.</td>
<td>___ continuous, ___ hourly, ___ daily, Other:</td>
</tr>
</tbody>
</table>
GENERIC SITE SAFETY PLAN FOR DISPERSANT OPERATIONS

ATTACHMENT #2

AIRCRAFT SAFETY

The acute hazard of aircraft related accident seems to be the major health and safety concern in dispersant observation. Care must be taken that the observation aircraft will not fly close to the aircraft applying the dispersant. All flight must be well coordinated, and safety distance must be kept at all times.

CHOICE OF PLATFORMS

Helicopters are often the aircraft of choice during spill response. Fixed wing aircraft may be used, however, as observation or application platforms. An important consideration for flying aboard any aircraft type is whether or not you are adequately prepared for emergency landings in the event of equipment problems. Multi-engined aircraft are always preferred and offer a much higher degree of safety, especially when operating over water. Floats on a helicopter may be comforting and provide some degree of safety but are often inadequate in rough or rolling seas. If single engine aircraft are used, operations should be adjusted to account for the possibility of a forced landing. One option is to operate only within a reasonable distance to shore and at an altitude that would allow for an emergency no power landing. Another option is to operate only in conjunction with vessels equipped with monitoring communications and able to affect a quick rescue response. In all cases appropriate safety and flotation equipment should be worn. Keep in mind that in time of emergency you will not have time to put on your flotation vest or grab the emergency locator. You better have it on you at all times while in flight.

HELICOPTER SAFETY

BEFORE YOU BOARD...

Notification: Notify the person in charge (OSC, XO, flight ops, SSC etc.) of the flight purpose, destination, and estimated time of return.

Safety brief: Make sure that you and the other passengers get a thorough safety briefing before you fly. It should include general information about the flight, safety features and how to use them, and emergency procedures. Don't forget to take a good look at the aircraft. Rusty rotor blades or improvised repairs may be an indication of poor maintenance. If you are not satisfied with what you see or hear, get another aircraft or pilot.

Safety gear: Prepare your personal safety gear (NOMEX suit, flotation vest, emergency locator, etc.) and make sure it works. Make sure you wear your safety gear (flotation vest, survival equipment) at all times while in flight. You will have no time to put it on in time of emergency.

Brief the pilot: The team leader should brief the pilot on mission details: Where you want to fly, preferred altitude, landing site, number of people, the purpose of the mission, route, estimated weight of people and gear, gear deployment if needed, and other pertinent details. If possible tell the pilot you would like to do your observations through an open window, plan your flight path so you minimize the time you will be looking up sun.

Equipment: Take appropriate map/charts with you to sketch the extent of the spill you observe; the ability to communicate with the pilot during the overflight is important to optimize the overflight observations. Take camera and/or video for documenting what you see. It is helpful if a second person can do the photography.

BOARDING

It is best to board the helicopter when the rotor is stationary. Often it is not possible. If there is a crew member to assist you, follow his/her instructions. If not, board as follows:
• From a safe distance (at least 100 feet) wait for the helicopter to land safely. Be patient. Sometimes the pilot will reposition the helicopter after the first landing.

• Secure any loose items that may be blown away by the rotor wind (downwash). This includes clothing, notebooks, maps, etc.

• Look the other way when the helicopter lands. The downwash from the rotor is equivalent to a 70-80 mph wind, and flying debris may injure your eyes. Wear eye protection when approaching the helicopter.

• You may receive a helmet or headphones from the helicopter crew. If not, wear hearing protection when approaching the helicopter, and during the flight. Most helicopters are very noisy.

• After the helicopter lands, signal to the pilot (which sits on the right hand side) your intention to board. Point to yourself, then to the helicopter, and give a thumbs-up signal. If the pilot approves, he will return the thumbs-up signal. If not, he will give you the thumbs-down, or simply wave you away.

• Approach the helicopter from the front, preferably at an angle from the right hand side (see diagram). This way you will be visible to the pilot. If this is not possible, come from the front and left. NEVER EVER APPROACH THE HELICOPTER FROM THE BACK. The tail rotor is low, spins very fast, and can't always be seen very well. People lost their lives not following this simple safety procedure. If you need to change sides, walk around the front.

• Pay attention to the terrain, and approach the helicopter from the downhill side. This will allow for more clearance between your head and the main rotor.

• If the pilot turned the power off, wait until the rotors stop moving. Just before they stop, the rotors lose momentum and the blades dip closer to the ground.

WHILE IN FLIGHT (Some safety tips):

• As you would do in a car, sit down and fasten your seat belt. If you sit on the floor and/or plan to "hang out" near the open door, wear the gunners belt and make sure it is securely fastened.

• Listen attentively to the briefing by the pilot or crew member on how to get out during an emergency landing. Make sure you know how to operate the emergency exits.

• Absolutely no smoking!

• Wear all the survival gear you plan to take with you. What's on you is what you will have should you need to get out in a hurry.

• If you deploy equipment during the flight, throw it down and under the belly of the helicopter. Relax and enjoy the flight!

COMMUNICATION (When communicating with the pilot or crew member):

• Keep non-essential communications to a minimum. You may be blocking an important call. When you speak be concise and to the point.

• Stop talking if your aircraft was called.

• Notify the crew if you hear or see something that they may not be aware of: Incoming call or another aircraft approaching.

EMERGENCY PROCEDURES
Contrary to popular beliefs, helicopters are safe aircraft, and accidents are rare. Helicopters can land safely using one engine, and in the rare occasion of complete power loss, an experienced pilot will land the helicopter with minimum damage using auto rotation. Nevertheless, you need to be prepared for an emergency:

In case of emergency landing:

• Remove your glasses (they may shatter and injure your eyes) and objects from your mouth
• Disconnect the microphone cord.
• Assume the ditching position
• After landing, release the seat belt, open exit, wait for the rotor to stop spinning, and only then exit the aircraft.

Water ditching:

Helicopters are top-heavy and may invert when landing on water. This may complicate egress and cause disorientation. It is imperative that you locate a reference point to guide you out.

In case of water ditching you should:

• Find a reference point and hold on to it.
• Hold your breath upon contact with water.
• Wait 5-8 seconds after the helicopter has submerged (or until rotor movement stops), then release your seat belt.
• Using the reference point, move to the exit, open it if needed, and exit.
• Inflate the flotation vest only after you are outside the helicopter. Inflating it inside will inhibit your movement.
• Stay near the aircraft.
• Do not use distress flares if oil or fuel are present.

Using common sense and following some basic safety procedures should help you fly safely in helicopters. If you notice safety violations, don't hesitate to report them, even if on your flight everything turned out OK in the end. Similar violations may cause an accident in the future.
SAFE APPROACH TO A HELICOPTER

APPROACH FROM HERE IF SIGNALED BY A CREW MEMBER

SAFEST TO APPROACH FROM THIS DIRECTION. PILOT IN COMMAND CAN SEE YOU

DANGER
PILOT OR CREW MEMBERS CAN NOT SEE YOU

TAIL ROTOR

DANGER
PILOT CAN NOT SEE YOU

APPROACH THE HELICOPTER FROM THE DOWNHILL SIDE

DANGER
I. NAME, BRAND, OR TRADEMARK

COREXIT 9527

1. Type of Product: Dispersant (Concentrate)

II. NAME, ADDRESS AND TELEPHONE NUMBER OF MANUFACTURER

Nalco/Exxon Energy Chemicals. LP
P.O. Box 87
Sugar Land, TX 77487-0087
Mr. David Acker, (713)263-7473
Ms. Marge Walsh, (713)263-7265

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Nalco/Exxon Energy Chemicals. LP
P.O. Box 87
Sugar Land, TX 77487-0087
Mr. David Acker, (713)263-7473
Ms. Marge Walsh, (713)263-7265

TO ALERT THE EMERGENCY RESPONSE TEAM CALL 1-800-231-6633 24 HRS/DAY ASK FOR COREXIT.

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

COREXIT 9527 is not classified as flammable by either DOT or IMO regulations.

2. Ventilation:

Avoid prolonged breathing of vapors. Use with ventilation equal to unobstructed outdoors in moderate breeze.

3. Skin and eye contact; protective clothing; treatment in case of contact:

Avoid contact with skin or eyes. The use of gloves, goggles and protective clothing is recommended. In case of contact, flush exposed area with water. Wash thoroughly after using.

4. Storage temperature:

a. Maximum storage temperature: 170 F
b. Minimum storage temperature: -30 F
c. Optimum storage temperature range: 40°F to 100°F
d. Temperatures of phase separations and chemical changes:

COREXIT 9527 is not adversely affected by changes in storage temperature unless evaporation is allowed to occur.

V. SHELF LIFE

The shelf life of unopened drums of COREXIT 9527 is unlimited. Containers should always be capped when not in use to prevent contamination and evaporation of solvents.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

The usual application methods are by use of aircraft (COREXIT 9527 is applied undiluted during aerial spray), hand-held equipment (e.g., spray cans or "back-pack" sprayers) or workboats (fitted with spray booms mounted ahead of the bow wake as forward as possible.)

COREXIT 9527 should be applied to the floating oil, not to the water around it.

When applied from workboats, an eduction system using a portable fire pump, or a fixed fire-fighting system is best. This should operate at about 40-80 psi depending on the requirements of the eductor used, and deliver sea water at a rate adequate to maintain the spray pattern from the nozzles at the operating velocity of the vessel without blowing away before reaching the oil. Alternatively, the chemical can be fed to the sea water stream with a small metering pump. A treatment rate of about 5 gallons per acre is recommended. The concentration of chemical required must be calculated from the pump capacity, the boom swath width, the boat speed, and (possibly) the thickness of the slick or the amount of oil to be treated over a given area. Unless land areas are immediately threatened, neither agitation nor chemical concentration should necessarily be increased simply to cause rapid disappearance of the oil. Nozzles for spraybooms should produce droplets, not a fog or mist, in a uniform flat spray pattern. Atomizing nozzles are not recommended.

2. Concentration/Application Rate:

During boat application, using an eductor or metering pump for chemical addition, COREXIT 9527 will usually be added to the sea water stream to give a concentration of 3% to 10%, depending on the factors given in part 1 of this section.

For slicks formed by more viscous crude or petroleum products, a hydrocarbon based (kerosene or other aliphatic solvent) dispersant is required. In such a case, one part of COREXIT 9527 may be diluted with 5 or more parts of solvent.

The required dosage of COREXIT 9527 is usually 3 to 7 gallons per acre, regardless of the method of application. Undiluted dispersant is always used in aerial spraying.

3. Conditions for Use:

COREXIT 9527 is not recommended for use on spills on fresh water. It can be used most effectively on spills on salt water of about 1% salt (10,000 ppm salinity) or greater.

Water temperature does not affect the dispersant's action, but the effect of very low temperatures (in increasing the viscosity of the oil) could make dispersion more difficult.

Weathering of oil can have a negative affect on dispersibility, but the amount of time to reach that point can vary widely from a few days to more than a month depending on climatic conditions.

VII. TOXICITY AND EFFECTIVENESS
1. TOXICITY:

<table>
<thead>
<tr>
<th>MATERIAL TESTE</th>
<th>SPECIES</th>
<th>LC50 (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COREXIT 9527</td>
<td>Fundulus heteroclitus</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Artemia salina</td>
<td>50</td>
</tr>
<tr>
<td>No. 2 Fuel Oil</td>
<td>Fundulus heteroclitus</td>
<td>4,280</td>
</tr>
<tr>
<td></td>
<td>Artemia salina</td>
<td>44,000</td>
</tr>
<tr>
<td>COREXIT 9527 &amp;</td>
<td>Fundulus heteroclitus</td>
<td>36</td>
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<tr>
<td>No. 2 Fuel Oil</td>
<td>Artemia salina</td>
<td>44</td>
</tr>
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</table>

2. EFFECTIVENESS

STANDARD EFFECTIVENESS TEST WITH NO. 6 FUEL OIL

<table>
<thead>
<tr>
<th>VOLUME</th>
<th>INITIAL (10 min)</th>
<th>FINAL (2 hrs)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>MEAN % DISPERSION</td>
<td>MEAN % DISPERSION</td>
</tr>
<tr>
<td>10</td>
<td>71</td>
<td>63</td>
</tr>
<tr>
<td>25</td>
<td>69</td>
<td>60</td>
</tr>
</tbody>
</table>

Dosage causing 50% dispersion (from initial dispersion graph) is less than 10 ml.

VIII. MICROBIOLOGICAL ANALYSIS (Not Applicable)

IX. PHYSICAL PROPERTIES

1. Flash Point: 162 F
2. Pour Point: Less than -45 F
3. Viscosity: 60 cst at 60 F, 22 cst at 100 F, 9 cst at 150 F
4. Specific Gravity: 0.995 at 60 F, 0.975 at 100 F
5. pH: 8.2 (10% in deionized water)
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: Water, Ethylene glycol monobutyl ether
8. Additives: Borate ester
9. Solubility: Not Applicable
X. ANALYSIS FOR HEAVY METALS AND CHLORINATED HYDROCARBONS

<table>
<thead>
<tr>
<th>COMPOUND</th>
<th>CONCENTRATION (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>&lt;0.005</td>
</tr>
<tr>
<td>Cadmium</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Chromium</td>
<td>1.0</td>
</tr>
<tr>
<td>Copper</td>
<td>&lt;0.2</td>
</tr>
<tr>
<td>Lead</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Mercury</td>
<td>&lt;0.003</td>
</tr>
<tr>
<td>Nickel</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Zinc</td>
<td>0.1</td>
</tr>
<tr>
<td>Cyanide</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Chlorinated Hydrocarbons</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>
"COREXIT 9500"

I. NAME, BRAND, OR TRADEMARK
COREXIT 9500

1. Type of Product: Dispersant (Concentrate)

II. NAME, ADDRESS AND TELEPHONE NUMBER OF MANUFACTURER
Nalco/Exxon Energy Chemicals. LP
P.O. Box 87
Sugar Land, TX 77487-0087
Phone: (713)263-7256/7265 or (24hrs) 800-231-6633
Fax: (713)263-7955

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Nalco/Exxon Energy Chemicals. LP  
Nalco/Exxon Energy Chemicals L.P.
P.O. Box 87  
P.O. Box 220
Sugar Land, TX 77487-0087  
Long Beach, CA 90801
Phone: (800) 333-3714  
Phone: (310) 639-1533

Nalco/Exxon Energy Chemicals. LP  
Nalco/Exxon Energy Chemicals L.P.
15555 Poydras Street  
701 E. Tudor Street, # 290
New Orleans, LA 70112  
Anchorage, AK 99503
Phone: (504) 561-4656  
Phone: (907) 563-9866

TO ALERT THE EMERGENCY RESPONSE TEAM CALL 1-800-231-6633 24 HRS/DAY ASK FOR COREXIT.

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:
COREXIT 9500 is not classified as flammable by either DOT or IMO regulations.

2. Ventilation:
Avoid prolonged breathing of vapors. Use with ventilation equal to unobstructed outdoors in moderate breeze.

3. Skin and eye contact; protective clothing; treatment in case of contact:
Avoid contact with skin or eyes. The use of gloves, goggles and protective clothing is recommended. In case of contact, flush exposed area with water. Wash thoroughly after using. For open systems where contact is likely,
wear long sleeve shirt, chemical resistant gloves, and chemical protective goggles.

4. **Storage temperature**:

   a. Maximum storage temperature: 170 F
   b. Minimum storage temperature: -30 F
   c. Optimum storage temperature range: 40 F to 100 F
   d. Temperatures of phase separations and chemical changes: N/A

V. **SHELF LIFE**

The shelf life of unopened drums of COREXIT 9500 is unlimited. Containers should always be capped when not in use to prevent contamination and evaporation of solvents.

VI. **RECOMMENDED APPLICATION PROCEDURE**

1. **Application Method**:

   COREXIT 9500 is a high performance, biodegradable oil spill dispersant concentrate that is effective on a wide range of oils including the heavier, more weathered oils and emulsified oils. COREXIT 9500 contains the same surfactants present in COREXIT 9527 and a new improved oleophilic solvent delivery system. The product can be used in all regions of the world regardless of climate.

   **Aerial Spraying.** For aerial spraying, apply COREXIT 9500 undiluted. Various fixed-wing aircraft or helicopters can be used for spraying over a large area, from an altitude of 30 to 50 feet or even higher, depending on application equipment and aircraft.

   The spray nozzles used are most critical since droplet size must be controlled. Avoid nozzles that produce too fine a spray (mist or fog). No nozzle may be necessary if the airplane travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the chemical stream into droplets.

   **Boat Spraying.** COREXIT 9500 may be applied by workboats equipped with spray booms mounted ahead of the bow wake as far forward as possible. The preferred and most effective method of application from a workboat is to use a low-volume, low-pressure pump so the chemical can be applied undiluted. Spray equipment designed to provide a diluted dispersant solution to the spray booms can also be used. As with most effective concentrates, dispersant concentrations in the 5 to 10% range are recommended to avoid significant fall-off in effectiveness. COREXIT 9500 should be applied as droplets, not fogged or atomized. Natural wave or boat wake action usually provides adequate mixing energy to disperse the oil. Water from a fire hose can also be used for agitation of the treated slick.

   Recent tests have indicated that a slightly modified fire monitor may also be useful for applying dispersant concentrations such as COREXIT 9500. A screen cap is used on the nozzle of the monitor to obtain a more uniform spray pattern with the proper sized droplet. Due to the volume output and the greater reach of the fire monitor, significantly more area can be covered in a shorter period of time than using conventional spray booms.

   **System Calibration.** Spray systems should be calibrated at temperatures anticipated to insure successful application and dosage control. Application at sub-freezing temperatures may require larger nozzle, supply lines, and orifices due to higher product viscosity. Refer to Exxon Chemical Company’s Applications Guide for charts and aids in designing and calibrating application systems.

2. **Concentration/Application Rate**:

   A treatment rate of about 2 to 10 U.S. gallons per acre, or a dispersant to oil ratio of 1:50 to 1:10 is recommended. This rate varies depending on the type of oil, degree of weathering, temperature, and thickness of the slick.

3. **Conditions for Use**: 
As with any dispersant, COREXIT 9500 should be applied as soon as possible to the floating oil to ensure the highest degree of success. Early treatment with COREXIT 9500, even at reduced treat rates, can also counter the “mousse” forming tendencies of the spilled oil.

COREXIT 9500 is useful on oil spills on fresh or salt waters, and at any water temperatures. The product is effective on most oils, weathered spills, and chocolate mousse. Although viscous oil may require higher dosage rates, any oil that will film or spread on the water surface usually can be dispersed.

**VII. TOXICITY AND EFFECTIVENESS**

1. **TOXICITY:**

<table>
<thead>
<tr>
<th>MATERIAL TESTED</th>
<th>SPECIES</th>
<th>LC50 (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COREXIT 9500</td>
<td>Menidia beryllina</td>
<td>25.20  96-hr</td>
</tr>
<tr>
<td></td>
<td>Mysidopsis bahia</td>
<td>32.23  48-hr</td>
</tr>
<tr>
<td>No. 2 Fuel Oil</td>
<td>Menidia beryllina</td>
<td>10.72  96-hr</td>
</tr>
<tr>
<td></td>
<td>Mysidopsis bahia</td>
<td>16.12  48-hr</td>
</tr>
<tr>
<td>COREXIT 9500 &amp; No. 2 Fuel Oil (1:10)</td>
<td>Menidia beryllina</td>
<td>2.61   96-hr</td>
</tr>
<tr>
<td></td>
<td>Mysidopsis bahia</td>
<td>3.4    48-hr</td>
</tr>
<tr>
<td>Reference Toxicant (SDS)</td>
<td>Menidia beryllina</td>
<td>7.07   96-hr</td>
</tr>
<tr>
<td></td>
<td>Mysidopsis bahia</td>
<td>9.82   48-hr</td>
</tr>
</tbody>
</table>

2. **EFFECTIVENESS**

Swirling flask dispersant effectiveness test with South Louisiana and Prudhoe Bay Crude Oils

<table>
<thead>
<tr>
<th>Oil</th>
<th>Effectiveness %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prudhoe Bay Crude</td>
<td>45.3%</td>
</tr>
<tr>
<td>South Louisiana Crude</td>
<td>54.7%</td>
</tr>
<tr>
<td>Average of Prudhoe Bay &amp; South Louisiana Crudes</td>
<td>50.0%</td>
</tr>
</tbody>
</table>

**VIII. PHYSICAL PROPERTIES**

1. Flash Point: 176 F (SETA closed sup; ASTM D3278)

2. Pour Point: -70 F (ASTM D97)

3. Viscosity: 55 cst at 68 F

4. Specific Gravity: 0.949 at 60 F (ASTM D1963)

5. pH: 6.4

6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL

7. Surface Active Agents: CONFIDENTIAL
8. Solvents: CONFIDENTIAL

9. Additives: None

10. Solubility: Soluble in fresh water, but dispersible in sea water.

IX. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

<table>
<thead>
<tr>
<th>COMPOUND</th>
<th>CONCENTRATION (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>0.16</td>
</tr>
<tr>
<td>Cadmium</td>
<td>N/D</td>
</tr>
<tr>
<td>Chromium</td>
<td>0.03</td>
</tr>
<tr>
<td>Copper</td>
<td>0.10</td>
</tr>
<tr>
<td>Lead</td>
<td>N/D</td>
</tr>
<tr>
<td>Mercury</td>
<td>N/D</td>
</tr>
<tr>
<td>Nickel</td>
<td>N/D</td>
</tr>
<tr>
<td>Zinc</td>
<td>N/D</td>
</tr>
<tr>
<td>Cyanide</td>
<td>N/D</td>
</tr>
<tr>
<td>Chlorinated Hydrocarbons</td>
<td>N/D</td>
</tr>
</tbody>
</table>

N/D = Not Detected
GENERIC SITE SAFETY PLAN FOR DISPERSANT OPERATIONS

ATTACHMENT #4

PERSONAL PROTECTIVE EQUIPMENT

LEVEL C

OPERATION FOR WHICH THIS LEVEL C ENSEMBLE APPLIES:

Dispersant application, observation and monitoring

SPLASH SUIT

___ Tyvek
___ Saranex

INNER GLOVES

___ Nitrile

OUTER GLOVES

___ Silvershield
___ Solvex
___ Ansol
___ Fireball

OUTER SAFETY BOOTS

___ Neoprene
___ Outer booties

OTHER

___ Full Face Air Purifying Respirator Cartridges: ____________________________

___ Hard Hat
___ EEBA

LEVEL D

OPERATION FOR WHICH THIS LEVEL D ENSEMBLE APPLIES: _____________

___ Cloth coveralls

OPTION: long sleeved coveralls (poison plant areas)
OPTION: short sleeved coveralls (heat stress alert)
OPTION: street clothing may be worn by personnel not exposed to splashing liquids or oily equipment.
rubber steel toe/shank safety boots with textured bottoms

OPTION: hip high rubber boots (e.g., designated snake areas)
OPTION: deck shoes with textured soles (e.g., boat ops)

rubber gloves (as needed)

OPTION: leather gloves (if no contact with oil)

PFD (all personnel on or near water)

quart bottle to carry fluids (during heat stress alerts)

hearing protection (in noisy areas)

insect repellent (in designated mosquito/tick areas)

hard hat (all personnel in designated areas)

safety glasses (as required by Site Safety Officer)

OPTION: with tinted lenses (as required for sunlight)

sunscreen (as needed for sunlight)

whistle (in designated areas)

NOTES:

1) "AS NEEDED" means to use for prevention of significant skin contact with oil.

2) "RUBBER" means chemical resistant material which prevents oil penetration to the skin or cloth garments underneath.